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A critical evaluation of the interpretive framework of the Mississippi period in southeast Missouri

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A CRITICAL EVALUATION OF THE INTERPRETIVE FRAMEWORK OF THE MISSISSIPPI PERIOD IN SOUTHEAST MISSOURI

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by
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The undersigned, appointed by the Dean of the Graduate Faculty, have examined a dissertation entitled

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presented by GREGORY L. FOX

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and hereby certify that in their opinion it is worthy of acceptance.

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GREGORY L. FOX

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ABSTRACT

A critical review of the interpretive framework of the Mississippi period (A.D. 850 to 1450) in southeast Missouri reveals that many currently held interpretations do not stand up to detailed scrutiny. Archaeological research pertaining to the Mississippi period generally is based on empirical observations not evaluated by statistical methods. Phase designations originally proposed in the 1950s remain almost unchanged today. Statistical evaluations using Brainerd-Robinson's coefficient of similarity and other statistical measures demonstrate that sites assigned to the individual phases are not cohesive units of archaeological remains. Cluster analysis of the Brainerd-Robinson coefficients and averaged Euclidean distances failed to derive clusters related to the individual phases because of statistically significant differences in sample sizes. The study indicates that, using existing ceramic horizon markers, any assignment of archaeological components to current phases is tenuous given severe problems with assemblage sample sizes and intragroup variation in ceramic assemblages. Archaeological components now assigned to existing phases need to be reevaluated. Only one area, Pemiscot County, possesses a number of ceramic assemblages that consistently exhibit high BR scores.

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CHAPTER ONE: INTRODUCTION

Archaeological research in southeast Missouri has its roots in antiquarian pursuits of the mid-to-late nineteenth century. Modern archaeology in the region--beginning in the 1930s--primarily has focused on classificatory-historical problems (Willey and Sabloff 1974). Recent studies by Dunnell (1982, 1986, 1988), Dunnell and Feathers (1986, 1991), Feathers (1990), Holland (1991), Teltser (1988), and others have attempted to go beyond those classification-oriented studies to investigate the nature of the diversity present in the region's archaeological record. However, the aforementioned scholars are working in an area where the majority of archaeologists continue to base their research on intuitive interpretations of archaeological phenomena and on statistically unsubstantiated explanations of the prehistoric Native American occupations in the region (see Dye and Cox [1991] for multiple examples).

Two basic, key archaeological taxonomic units come under scrutiny here--types (of ceramic artifacts) and phases (spatial-temporal constructs). Types and phases are the building blocks of archaeological classification and subsequently structure the interpretation of the archaeological record in southeast Missouri. In particular, my research focuses on a critical examination of the phase designations that serve as the analytical basis for regional interpretation and explanation of the Mississippi-period archaeological record (ca. A.D. 850-1550) in a three-county area of the Missouri Bootheel--Mississippi, New Madrid, and Pemiscot counties (Figure 1), (although data from sites in Dunklin, New Madrid, Scott, and Stoddard counties are sometimes included as necessary). Current phase-level classifications for the Mississippi period as manifested in southeast

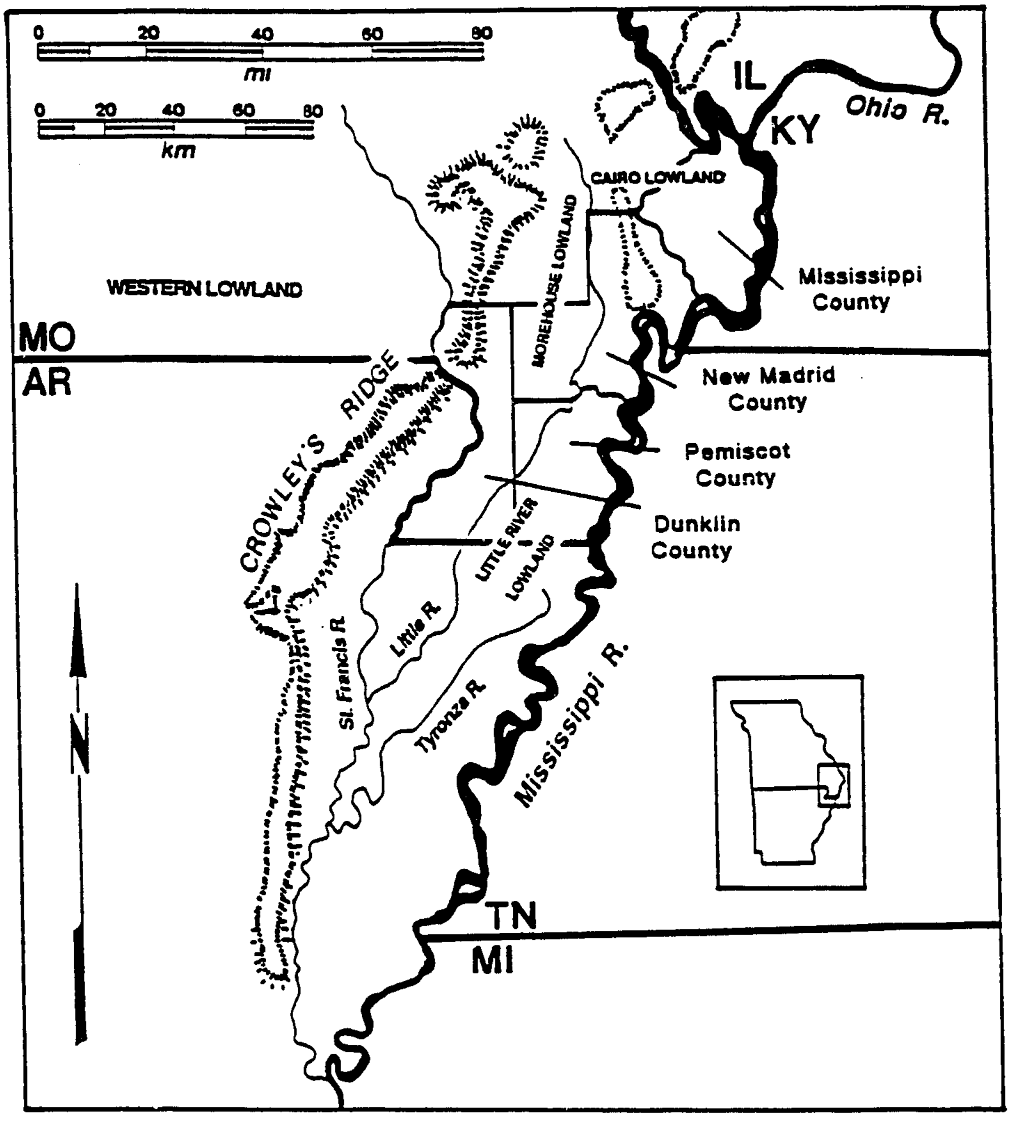

Figure 1. Southeast Missouri.

Missouri primarily are derived from materials found in this small area, making it the appropriate starting point for further critical reviews.

My critical examination of Mississippi-period phases in the Bootheel is stimulated by two realities: (1) despite recent archaeological investigations in the region, the initial classification of cultural phenomena remains essentially unchanged, and (2) researchers working in the area have difficulty assigning many archaeological assemblages to existing phase designations.

The apparent crux of the problem is that most archaeological interpretation in the region is based on typological models for phases proposed in the 1940s, 50s, and 60s that have never been evaluated through either detailed comparative analysis or through the use of statistical methods. Regardless of the fact that many assemblages do not readily fit within the time, space, and content dimensions of the phases as they currently are defined, the phase constructs continue in use. The unfortunate consequence is that much of the variation in the Mississippi-period archaeological record is obscured.

My research takes the first step toward resolution of this problem by showing that the current phases are poorly defined (see discussion of phase construction below), and that it is dangerous to use them as the essential analytical units in regional synthesis. I do NOT propose new phases; that is another step requiring additional field investigations. Here I reexamine the original ceramic-frequency information derived from surface collections and excavations that was used to define Mississippi-period phases in the Bootheel using statistical procedures rather than intuitive groupings. The statistical procedures are the Brainerd-Robinson coefficient of similarity, cluster analysis of those Brainerd-Robinson coefficients, and Euclidean distance cluster analysis of ceramic-type frequencies. These statistics enable an investigator to evaluate phases based on ceramic assemblages in a more-rigorous and replicable manner.

Ceramics are things (sherds and vessels) and phases are conceptual constructs. Each have separate and distinct attributes (see Dunnell 1971a). Ceramic types can be described and represent groupings of real objects. Components, the critical intermediary between types and phases, are defined on the basis of real object contents to which temporal and areal distributions, and cultural meanings, are assigned. Components are subsequently synthesized by regions to define a higher-order conceptual unit--the phase. In the Bootheel, previous assignments of components to phases often is based on an intuitive, arbitrary process that cannot necessarily be replicated. Although artifacts are employed to define the cultural and temporal parameters of a component, and the components then are used to define a phase, a lack of rigor at the lowest level (definition of artifact types) can result in the development of erroneous conceptual constructs at higher levels of classification (see expanded discussion of components and phases in Chapter 2).

Integral to the critical evaluation of existing phase designations are the two questions stated below:

1. Are the ceramic assemblages used to identify components that define the archaeological phases in southeast Missouri statistically similar?

2. Will cluster analysis of ceramic assemblages produce statistically defined homogeneous groups that are similar in content to the previously defined phases?

These two questions stem from the problems investigators (Klippel 1969; J. R. Williams 1968, 1969, 1972) have faced in assigning site assemblages to the phases defined for the Bootheel region. That is, even when assemblages are not perfectly similar to other components assigned to an individual phase, investigators have still attempted to incorporate those assemblages of varying degrees of similarity into the existing classification. As a result, the temporal, spatial, and contextual boundaries of the phases become blurred, and their value as analytical units is diminished.

The prehistory of the Bootheel region is difficult to interpret because phases were originally defined using existing ceramic typologies developed outside of the region, and because of the way these groupings were used in subsequent cultural interpretation. Although a host of phases and ceramic types have been proposed by previous investigators (e.g., Adams and Walker 1942; Chapman 1980a; Lewis 1990a; Marshall 1965a; Phillips 1970; Phillips *et al.* 1951; S. Williams 1954, 1980), their relation to existing archaeological typologies and classifications have varied. The question must be posed, "To what purpose(s) are those typologies and classification systems being developed and applied?" In some cases, classifications and typologies have been applied simply to temporally order data (e. g., Lewis 1990a; Phillips *et al.* 1951). In other cases, archaeological typologies have been used as explanatory devices to delineate and interpret cultural activities (see Chapman 1980). Although neither purpose is exclusive, when the two goals are analytically commingled they often obfuscate reliable achievement of either goal: cultural history or the explanation of human behavior.

Explanation and interpretation of archaeological phenomena in the region often are derived from classifications and typologies via meanings embedded within individual types and classes. As an example, S. Williams' (1980) statement that the Campbell site is the type site of the Armorel phase connotes settlement patterns, subsistence practices, regional and temporal associations, tool assemblages, mortuary practices, and associated ceramic types. These connotations are not based on detailed analysis of multiple components but on preliminary and intuitive interpretations that have yet to be rigorously demonstrated. The cultural and behavioral meanings assigned to a particular phase often far exceed the purpose of a phase as a basic unit of archaeological classification (time, space, and content).

Justification for the Research Approach

In a recent publication, Wesler (1991a) debunks the widely held belief that headpots and astragali dice are restricted to the late Mississippi period by documenting their occurrence in earlier contexts, thereby destroying the long-term utility of these two artifact types as time-sensitive horizon markers. This new information calls into serious question interpretations that use the two types of artifacts as chronological horizon markers and interpretive devices (see Eisenberg 1989; Lewis 1989, 1990b; S. Williams 1980, 1990).

Wesler's specific example, coupled with a two-year perusal of archaeological literature pertaining to the Bootheel region, has led me to question the interpretive basis for Mississippi-period prehistory in general. On the surface, there are no glaring inconsistencies in the archaeological literature. However, detailed examination of literature pertaining to the Bootheel also indicates that there are no detailed comparisons, founded on statistical analyses, to support the interpretive conclusions reached. In fact, most cultural-historical interpretations are a series of just-so stories, vignettes of Mississippi-period lifestyles, and speculations on causal factors (e.g., the transition of Late Woodland to Mississippi-period maize agriculturists, the vacant-quarter hypothesis, and the demise of the Mississippian occupation).

Our understanding of this period of regional prehistory is based on what is generally referred to as knowledge based on authority (Salmon 1984). That is, in order to preserve existing interpretations, or present what are in essence speculative new classifications or interpretations, a renowned authority is invoked for support. As an example, S. Williams (1980:108) invokes James B. Griffin to substantiate his proposed Armorel phase:

> Some may say that the context of the Armorel phase is lacking in definitiveness: in some cases there are surely earlier components on the site. Parkin and Rose are good examples; however, other sites such as Campbell, the most completely documented of the phase and its type site, do seem to have a relatively pure complex, not muddied by other materials. Griffin (personal communication) has given his support to such a construct. [Note that Campbell, 23PM5, was excavated by a noted pothunter, no absolute dates are available, and Holland's recent (1991) dissertation disproves many of the interpretations in Chapman and Anderson's (1955) monograph.]

Interestingly, Griffin had earlier expressed his doubts on the subject of prehistoric "phases." Writing on interpreting settlement patterns, Griffin (1978:xvii) states:

> It is known that radiocarbon dating, that major contribution, does not provide it [precise chronological control], nor I fear do any of the other physio-chemical chronology assessments. Ceramic seriation or type varieties are also aids, but do not provide the fine-tuned chronology necessary for absolute contemporaneity, because of the absence of an acceptable scale for recognition of the longevity of attributes recognized in the manufacture of pottery. The same lack of control is present in the utilization of other prehistoric materials or behavioral patterns. <u>Many now-utilized prehistoric 'phases' are given a time span of a hundred years or more, and it is almost futile or even frivolous to present them as though they were a functioning, interactive society</u> [emphasis added].

No external, critical review of the interpretive basis of southeastern Missouri Mississippi-period archaeology has ever been conducted, although several recent summaries of archaeological phenomena pertaining to the region have been published (Morse and Morse 1983; Smith 1990).

Recent but limited statistical tests of a single interpretive framework (Jones *et al.* 1983:71) from the Lower Mississippi Valley illustrate the validity of statistical evaluations of existing interpretations. Although many of the interpretations and explanations of culture history that form the basis of our understanding appear to be cohesive and do appear to explain certain phenomena, when viewed as a whole the individual interpretations are confusing and do not necessarily complement one another (see Williams' [1980] discussion of the Armorel phase and his use of horizon markers to define that phase). Part of the problem is based on the lack of rigor in constructing past and current ceramic typologies and the use of those typologies as interpretive devices of cultural and historical relations.

My research is intended to be a critical evaluation of the methods of archaeological classification, at the level of the phase, in southeast Missouri. Since many of the current interpretations, explanations, and conclusions in the literature are based on ceramic analysis, only those phases that are based primarily on ceramic contents are addressed. In fairness to previous investigators, examination of their interpretations will employ the same data used in their studies. In fact, statistical evaluation of those initial interpretations may serve to strengthen our existing knowledge of the Mississippi period in southeast Missouri.

Organization of the Research

The body of my investigation comprises several critical reviews. First, a short review of the history of archaeological research in the Bootheel region sets the stage for subsequent evaluations and concentrates primarily on the details of the history of archaeological classification in the region as it pertains to ceramic typology and phase designation.

Second, because the definition and description of phases in the region relies almost entirely on ceramic types, a critical review of the prevalent ceramic typological systems (i.e., Phillips 1970; Phillips *et al.* 1951) is necessary. Although the ceramic typological system originally proposed by Phillips *et al.* (1951) was primarily intended to order ceramics temporally, it ultimately served to drive cultural-historical interpretations of the region. This is a result of embedded temporal, spatial, and contextual meanings that have become associated with the ceramic types. Ceramic typological systems actually are much more than simple temporal orderings, rather, they are used as the underlying structure to interpret both culture history and human behavior.

Third, a short discussion of the 53 corrected radiocarbon dates currently available for the three-county area is presented and, that discussion focuses on the fact that sample selection and interpretation of radiocarbon ages lack analytical rigor. Problems with interpretations and radiocarbon-date averaging found in Chapman (1980a) also are discussed. I show that published interpretations of radiometric dates have served to confuse archaeological interpretation in the Bootheel.

Fourth, it is necessary to evaluate Stephen Williams' (1954) seminal investigation of the region. It is on the basis of his research that the original phases were defined and subsequent interpretations are derived. My evaluation of his research primarily focuses on reexamining his data and statistically examining how that data fits within his typological system.

Fifth, statistical evaluation of excavated ceramic assemblages from southeast Missouri indicate that sample size problems are inherent in Williams' (1954) surface-collected data. Therefore, I found it necessary to evaluate the similarity of ceramic assemblages on the basis of larger excavated assemblages to ensure that sample size can be partially controlled. The excavated assemblages form much of the interpretive basis of Mississippi-period prehistory and therefore lend themselves readily to evaluation.

Finally, an evaluation of ceramic assemblages related to late prehistoric/Late Mississippi-period/protohistoric occupations in southeastern Missouri and northeastern Arkansas is presented. Ceramic assemblages from these sites have been assigned to at least three phases (Campbell, Nodena, and Armorel). These sites are considered to be either Late Mississippi period or protohistoric in age (Price and Price 1990). Similarities between ceramic assemblages from Holland/Maclin (23PM2), Campbell/Cooter (23PM5), Cagle Lake/Kersey II (23PM13), Kersey /Canaday (23PM42), McCoy/Chute (23PM21), Murphy Mound/Caruthersville Mound (23PM43), Denton Mound (23PM549), and Parkin (3CS29) are compared using the Brainerd-Robinson coefficient of similarity (Cowgill 1990).

Because of the orientation of my research, no discussions of the environmental setting, geomorphology, or the results of previous investigations are presented. The reader is referred to Fisk (1944), Holland (1991), Lewis (1974), Morse and Morse (1983), Price *et al.* (1990), Saucier (1964, 1974, 1978), Teltser (1988), and others for this oft-repeated information. The focus of my analysis is the <u>process</u> of archaeological inquiry regarding the

Mississippi period in the Bootheel of Missouri rather than an analysis of specific Mississippi-period occupations.

CHAPTER 2: BACKGROUND AND METHODS

Two recent statistical evaluations of interpretation of the Mississippi period in or near the study area illustrate the value of formal statistical evaluations of archaeological data. In the first, Green (1974) performed a cluster analysis of 549 complete Mississippi-period funerary vessels recovered from multiple archaeological contexts by Works Progress Administration (WPA) projects in Arkansas. Green's analysis, employing 54 nominal-mode attributes, tested four hypotheses concerning the original ceramic typology developed by Phillips *et al.* (1951). Green's conclusions call into serious question aspects of the original typology and, in turn, later typologies founded on the original (e.g., Phillips 1970).

A second statistical evaluation was conducted by Jones *et al.* (1983) to illustrate relations between functional-class richness and sample size , i.e., the relation between numbers of classes noted and numbers of objects counted. Jones *et al.* (1983:71) state:

> Ceramic assemblages, for instance, show the effect well. Figure 10 illustrates the relationship between number of sherds counted and number of classes represented in a series of 38 assemblages reported by Phillips [1970] from the Lower Yazoo Basin, Mississippi. Numbers of sherds and numbers of classes per assemblage are highly correlated ($r=0.85$, $p<.001$), clouding Phillip's use of both numbers and kinds of classes represented to infer the length of occupation registered by each assemblage. Here, stylistic classes show the effect [that artifact class richness may be heavily dependent on the number of objects counted in any given assemblage].

These examples serve to illustrate the value of statistical evaluations of empirically derived, statistically untested, classificatory frameworks and archaeological interpretations of Mississippi period. My research is intended to expand the range of statistical evaluations of interpretations proposed for the region. Statistical methods used during my research are identified and discussed elsewhere in the order they are used.

Sources of Data

In order to compile the requisite data to statistically evaluate previous archaeological classifications relating to the Mississippi period in the Missouri Bootheel, several sources of information were consulted. First, the manuscript library of the Historic Preservation Program-Missouri Department of Natural Resources, Jefferson City, Missouri, was searched for pertinent literature. Second, manuscripts on file at the Archaeological Survey of Missouri were reviewed. Third, information was compiled from selected ceramic collections curated by the Museum of Anthropology, University of Missouri-Columbia. Finally, a general literature review of published archaeological sources was conducted.

Only manuscripts, reports, and articles that provide ceramic frequencies as simple counts are included here. Other significant studies such as Phillips (1970) that present ceramic frequencies only as cumulative frequency graphs are not included. Recent cultural-resource-management (CRM) work was excluded, because no large-scale inventory or testing projects have been conducted in the three-county study area since 1975. Furthermore, ceramic assemblages collected by CRM projects characteristically consist of very small samples and are not considered suitable for statistical evaluation.

Ceramics in this project are cataloged by named typological designations following Phillips' (1970) type-variety system. However, during the project some individual type-varieties were lumped due to sorting difficulties related to small-size (< 1 inch) sherds. The most notable effect of this process is the combination of Matthews Incised var. Matthews with var. Beckwith. These two types are similar in all attributes except in the application of the decorative motif. Specifically, Beckwith's Incised motif is rectilinear in orientation while var. Matthews' has rectilinear and curvilinear guilloche motifs (Phillips 1970:128). At present, known temporal differences in the distribution of those two types are not apparent (see distribution of var. Beckwith Incised at the Wickliffe and Towosahgy sites [Price *et al.* 1990:43; Wesler 1991b:141]). According to Phillips (1970:128) there are, however, some areal differences in the distribution of those two varieties in southeastern Missouri, but this interpretation remains unsubstantiated.

Another example of the lumping procedure employed is the handling of red-filmed ceramic wares. As discussed in Chapter 4, major problems are associated with the typological system devised and implemented by Phillips (1970) and S. Williams (1954) to define and sort red-filmed wares. Consequently all shell-tempered, red-filmed sherds are lumped into a single category.

Taxonomic-Unit Construction

> Following an agreement as to method, the actual classification should be a necessarily slow, deliberate procedure, constantly experimental, subject to such major and minor corrections as newly accumulated data may dictate, subject to a maximum constructive criticism and resulting improvement. Such is the history of any scientific classification. (McKern 1939:305-306)

My research focuses on critical examinations of two basic archaeological taxonomic units--ceramic types (artifacts) and phases (spatial-temporal units)--

that form the basic building blocks of archaeological research and that subsequently structure interpretation of the archaeological record in southeast Missouri. A detailed discussion of existing ceramic typological systems is provide in Chapter 4. Discussion of the higher-order analytical constructs--components and phases--is provided below.

McKern (1934, 1939) provided North American archaeology with one of the first comprehensive taxonomic systems to organize archaeological phenomena. His purpose was to develop a system that would overcome the inadequacy of direct-historical methods of classifying archaeological phenomena. As a result, McKern (1939:302-303) developed a taxonomic method designed to organize complex archaeological data in a manner that reduced the complexity of the data through the establishment of systematic order. McKern states (1939:302):

> The only taxonomic basis for dealing with all cultural manifestations, regardless of occasional direct historical tie-ups, is that of culture type as illustrated by trait-indicative materials and features encountered at former habitation sites.

Overall, standardization of terminology and units of classification defined by McKern was intended to bring order to the chaotic state of cultural classification prevalent in American archaeology in the 1930s. However, McKern did not anticipate that the ordering of archaeological data would be a simple task. Rather, he viewed the process as a long-term one that would require qualitative and quantitative date to differentiate archaeological phenomena.

McKern (1939:305) developed a hierarchical method of classification wherein determinants (specific traits) are employed as markers for particular cultural units. McKern's taxonomic system employs five hierarchically arranged levels beginning with specific manifestations at the lowest level to increasingly general levels. Each of these levels are defined, in contrast with other cultural manifestations, through the use of the comparative method.

McKern (1939:308-310) described his arbitrary divisions as follows. The focus is the taxonomic unit at the level of site where traits that recur can be identified. This unit is the most specific level of the taxonomy and provides the finest level of analysis. This expression of a culture at a site is defined as the component to distinguish the potential multiple cultural manifestations at individual sites from one another. A focus, therefore, is comprised of several similar components. Aspects are the next, increasingly general, units in McKern's taxonomic method. Aspects are defined as a set of similar foci and exhibit marked dissimilarity to other foci. The number of traits aspects share are fewer and more general than those shared by foci but additional traits not found at the level of the foci may be added to this taxonomic unit.

Phases in McKern's method are comprised of several similar aspects and are identified by an increasingly general set of trails. Specifics of cultural traits become less important as the classifier approaches the more generalized classes. A near majority of traits shared in common by aspects determine the phase, and those traits comprise the phase complex. The complex of determinants for an individual phase must be different from all other defined phases. Several phases may exhibit a small complex of general traits, in contrast to other phases where similar traits do not occur and these next-higher taxonomic units were termed patterns by McKern. The traits used as determinants for patterns focus on a culture's adaptation to specific environmental traits as modified by cultural traditions (e. g., the Woodland

and Mississippi patterns). Finally, McKern described the highest level of his taxonomic method as the base. Bases are characterized by the traits that relate in the most general way to the food quest, community order, or possession of classes of products of outstanding cultural import.

McKern's taxonomic method was the first comprehensive attempt to order archaeological phenomena in a hierarchical arrangement using specific traits. Kehoe's (1990:31-32) recent comments on McKern's system provide a succinct view of both his goals and the structure of the taxonomic method:

> The basis for McKern's Method, as for the Linnaean system, was the recognition of discrete elements appearing grouped into populations. Diversity lay both within populations and between populations. Within populations analysts must select the attributes that justify identifying individuals as essentially identical under one taxon; between populations, analysts create taxa not usually visible in the natural world, and show cause for these clusterings. Contemporary organisms might be observed interacting, mating and reproducing, a population with discernable geographic and temporal boundaries and also one that demonstrated genetic connection to earlier or later populations. Beyond the local community of actually interacting contemporary organisms, any more inclusive group, or taxon, is a hypothesized construct . . . If the efforts of various workers are to be compared and generalizations drawn, an explicit method is needed to guide the creation of these hypothesized populations.
>
> The Midwestern Taxonomic Method . . .was a guide but not a cookbook. It presented nested categories to clarify the degrees of similarity being discussed: components are individual organisms, foci are like populations within a species, aspects correspond roughly to species, phases to genera, patterns to families in the Linnaean system, and bases to orders. Like the Linnaean system, the Midwestern Taxonomic Method was heuristically useful both in parsimoniously describing data and in framing arguments . . . Like the Linnaean system, an ordering by the Midwestern Method was basically subjective, but carried a veneer of objectivity because real objects were adduced in argumentation to support a classification.

The outcome of McKern's taxonomic method is a hierarchical system wherein the identification of significant traits (determinants) is based on a subjective process of identifying similarities and differences among archaeological phenomena. Procedures for selecting determinants are not provided nor are explicit criteria for determining similarity among and between components stated in his method. Because of the lack of specificity in the method, as the investigator proceeds through the classification from a focus to a base, criteria for inclusion become increasingly generalized.
The lack of an explicit method for specifying significant traits in McKern's method often resulted in the arbitrary construction of trait lists detailing minute elements in individual components. Plog (1974: 31), discussing the use of traits (McKern's determinants) to temporally order cultural stages in the North American Southwest, states:

> The result of such trait analyses has been a series of impressionistically constructed lists implying spatial and temporal integrity, but rarely achieving either. If it is possible to clarify the extensive information concerning the spatial-temporal distributions of minute traits, it will be done using appropriate statistical techniques to test the efficacy of the hypothesized covariation, not by impressionistically surveying available knowledge.

McKern's Midwestern Taxonomic Method was soon supplanted by Willey and Phillips' (1958) revisions of the taxonomic method. Willey and Phillips (1958:12), writing on cultural-historical integration as the primary task of archaeology on the descriptive level of organization, state: "Culture-historical integration is both the spatial and temporal scales and the content and relationships which they measure." Their focus was the investigation of contextual and spatial-temporal relations in a simultaneous manner. Thus, while McKern's (1939) method focuses on traits related to content, Willey and Phillips' (1958) taxonomic system expanded on McKern's method to include not only context/content but greater precision in the spatial and temporal attributes of cultural classification.

Willey and Phillips (1958:21) reordered previously defined archaeological units, retaining some of McKern's names but providing different definitions. Like McKern's method, the Willey and Phillips system is hierarchical in that it proceeds from the specific to more general levels of classification. This specific to general ordering is the same for both the spatial and temporal units as well as their basic archaeological units (content attributes).

Willey and Phillips, unlike McKern, treat the concept of component as a basic taxonomic unit, but provide no expanded definition of this unit. The concept of focus and aspect are dropped from the Willey and Phillips system and are replaced by a new definition of the phase. Considered to be the most "manageable" unit of archaeological study , the phase is defined as :

> an archaeological unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived, whether of the same or other cultures or civilizations, spatially limited to the order of magnitude of a locality or region and chronologically limited to a brief period of time [Willey and Phillips 1958:22].

Willey and Phillips (1958:22) acknowledge that it is virtually impossible to standardize the amount of time and space a phase occupies because of the vast variation in the conditions entering into the formulation of a phase. They emphasize (1958:23-24) that phases "have no appropriate scale independent of the cultural situation in which it is applied. . . phases may have very considerable and highly variable spatial and temporal dimensions." Acknowledging this potential variation, Willey and Phillips (1958:24) provide an additional level of classification--the subphase. Subphases are defined as "smaller units possessing a few differences in items of content or where such differences are expressible only in variations of frequency." They note that there are no definitive criteria that can be applied in the analytical construction of a subphase.

Willey and Phillips (1958: 22) indicate phases are the "practical and intelligible unit of archaeological study." Phases are constructed from similar components, or what are thought to be temporally limited, culturally significant assemblages identified within sites. Components are defined on the basis of their artifactual contents and represent "culturally homogeneous stratigraphic units within a single site" (Thomas 1969:231). Artifacts are analyzed on the individual and assemblage level, components at the level of sites, and phases are the basic unit of regional analysis and synthesis. Each level represents an increasingly higher order of classificatory inclusion with the typological constructs and associated analytical approaches requiring different and potentially less-exacting methods at each level in the hierarchy.

Both McKern's and Willey and Phillips' taxonomic methods have a shared basic problem at the level of aspect and phase; they lack specific criteria or procedures for identifying significant traits and there are no explicit criteria for assessing similarity among and between components. Consequently, their taxonomies basically are inductive pattern recognition procedures. I examine the problem of similarity of ceramic types, in terms of type-variety classification systems, as they relate to the identification of component traits, below.

Starting at the lowest level, artifacts, the primary ceramic-classification device in southeast Missouri is based on the type-variety concept. Dunnell (1971b) provides a succinct criticism of the type-variety classification system. Responding to Sabloff and Smith's (1969) discussion of analytic and taxonomic classification in the type-variety system, Dunnell (1971b:115) states:

> (1) the authors, following their predecessors, do not distinguish between groups of real objects and conceptual classes to which objects are assigned; (2) they further treat modes apart from types in different but complementary systems, while failing to differentiate attributes (qualities of individual artifacts) from modes (intuitive classes of artificial attributes), a distinction which is quite explicit in the original definition of modes . . .; (3) they do not present any specific problems for which the classification proposed is intended to serve, and thus lack an objective means of evaluating the utility of the scheme. . . ; (4) they further assume, or at least imply, lacking any specific problems, that the scheme is the one for all problems in the area concerned, forcing them into the untenable position of stating that they consider all attributes of their collections.

Type-variety systems designed to classify ceramics may exhibit inherent classificatory flaws that can obfuscate variation in assemblages by glossing over specific attributes of individual sherds under the aegis of the conceptual classes to which the objects are assigned. Consequently, it stands to reason, component identification and the resultant definition of archaeological phases based on the type-variety classification of ceramics may also be flawed if flaws are present in the type-variety system.

To date, all phases defined for the Mississippi period in southeast Missouri are based on components defined primarily on the presence in assemblages of specific ceramic types described using typological schemes. Components in the region defined on the presence of those specific ceramic types are therefore considered to be subjectively defined as there are no explicit qualitative or quantitative means of assessing the similarity of the components. None of the components identified in southeast Missouri have been defined quantitatively, except by the use of seriation of ceramics that are classified by the potentially too general categories resulting from the use of the type and type-variety systems. Plog (1974:45) correctly notes that seriation generally is a synchronic pursuit intended to date sites. He indicates that seriation curves can mask variation in pottery styles since the shape of seriation curves themselves exhibit considerable variation. It follows then, that the higher order phases defined on the basis of those ceramically identified components also may be flawed or be so general as to be difficult to use, and may mask variation reflecting cultural, temporal, and spatial differences among components.

Ceramic types used as the "determinants" of phases should be exclusive to the phase and should not overlap among defined phases. Plog (1974:44) states that categorical typologies are most useful when observations (traits) can be placed within categories so that variability within the categories is slight and variation between the categories is substantial. Plog (1974:45) also notes, however, that arranging data by this process may mask an investigator's ability to understand diachronic problems. Traits (ceramic types) used to define phases should therefore be specific and restricted to that phase. This process, however does not reflect the reality of archaeological deposits.

With the exception of assemblages from short-term, single component sites, archaeological data rarely reflect the specific traits necessary for inclusion in categorical typologies (phases in this case). Change, in terms of artifact types, is a gradual process often resulting in considerable variability within a category (component or phase) when time cannot be carefully controlled. The effect of this variation within categories is the blurring of the boundaries of the category (phases), often to the point wherein individual categories may overlap. Differences between categories are consequently diminished making it difficult for an investigator to reliably include data within any one category.

The development of Mississippi-period phases in southeast Missouri has not followed the slow, deliberate procedure, subject to corrections, and maximum constructive criticism that McKern envisioned. Rather, phases were proposed and adopted on the basis of limited excavations and surface collections. Consequently, phases in southeast Missouri are based on inductive pattern recognition lacking any external tests of their efficacy.The use of statistical methods to evaluate the internal homogeneity of defined Mississippi-period phases in southeast Missouri should discover the too general definitive criteria of the phases resulting from those initial impressions derived from limited data. It is clear from my research that previous efforts to order components into phases are basically subjective efforts as too general definitions of phases are proposed and no strict rules of component assignment are stated. In practice, there are no rules to determine how similar components must be in order for them to be considered as belonging to an individual phase, the appropriate ceramic types simply must be present in the assemblage. The end result has been the proposal of numerous subphases and the sometimes reluctant inclusion of assemblages into existing phases when the basic traits of a phase do not match the phase definition exactly. Consequently, it is virtually impossible to replicate any one set of criteria used to assign a component to a phase or subphase due to the lack of explicitness in the general nature of phase definition. Application of the Brainerd-Robinson coefficient of similarity in my research is meant to provide a replicable, less intuitive technique. However, I note that there are no stated rules associated with that statistic specifying what constitutes similarity or how similar assemblages must be in order to be assigned to the same phase. But I repeat, the results of BR analysis are replicable, and further, this statistic can be used to not only assess previous assignments of components to phases but to propose new assignments as well.

Statistical Packages Employed in the Research

Statistical procedures used here were selected to evaluate phase designations of Mississippi-period archaeological phenomena on a case-by-case basis. Consequently, different statistical methods were employed to evaluate different types of problems. Brainerd-Robinson (BR) coefficients of similarity are used to evaluate the similarities of ceramic assemblages. Cluster analysis of those BR scores is used to determine if sets of ceramic assemblages similar to those originally used to define the phases can be discovered. Average linkage Euclidean distance cluster analysis also is used to group site assemblages on the basis of ceramic-type frequencies to determine if the existing phases can be statistically defined. Statistical analysis was performed using SYSTAT (Wilkinson 1989) on a Macintosh IIsi. In addition, the *Tools for Quantitative Archaeology* (Kintigh 1991) statistical package was used to perform some calculations (notably Brainerd-Robinson coefficient of similarity) not available on SYSTAT.

The data set includes virtually all published ceramic frequencies of Mississippi-period surface collections, excavation-unit contents, feature contents, and house contents resulting from archaeological investigations that took place between 1950 and the present. Data were entered into the two statistical programs as raw frequencies (counts).

Compiling the information in the literature is the sole method available to produce the necessary data set. To be specific, my research focuses on a preliminary review of interpretations and explanations of prehistoric human behavior, culture history, and the archaeological record that are embedded in interpretations of ceramic types and variation in ceramic assemblage composition as detailed by previous investigators. Simply stated, interpretations of assemblage associations presented in the literature are evaluated to determine if those associations are statistically valid. That is, the interpretation that a particular site assemblage or component is associated with a particular phase is evaluated in terms of the similarity of that particular assemblage with all other assemblages assigned that phase using the Brainerd-Robinson statistic. In addition, by employing multivariate statistical methods (i.e., cluster analysis), the internal cohesiveness of the individual phases defined for the Bootheel region (based on ceramic assemblage differences) is tested.

CHAPTER 3: PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS IN SOUTHEAST MISSOURI

This chapter focuses on major archaeological investigations conducted in southeast Missouri in Mississippi, New Madrid, and Pemiscot counties from 1930 to 1990. A short discussion of earlier work is provided as background. Exhaustive treatments of much of this earlier work can be found in numerous doctoral dissertations (e.g., Teltser [1988]) and regional summaries (e.g., Chapman 1980, Morse and Morse 1983).

Antiquarian-Based Investigations

Although Squier and Davis (1848) mention archaeological remains from the Bootheel region of Missouri, the first published concept of a "Mississippi" period is found in Holmes' (1886) Middle Mississippi Valley group. Holmes was referring to the preponderance of shell-tempered pottery found in sites from Vicksburg, Mississippi, to St. Louis, Missouri (see Teltser [1988], Meltzer and Dunnell [1992] for an extensive discussion of Holmes' contribution).

Thomas' (1891, 1894) contributions to American archaeology are the first comprehensive treatments of archaeological sites and material culture in the region. Thomas was not alone in his efforts to classify and categorize the major earthworks and cultural materials in the region. Beckwith (1887, 1911), Croswell (1878), Conant (1878), Potters (1880), Evers (1880), Putnam (1875), Swallow (1858, 1875), and Moore (1910, 1911) all excavated, or analyzed collections from several major ceremonial mound sites in southeastern Missouri. Although their interests were diverse, they all presented interpretations of the antiquity, lifestyle, and material culture of the area's prehistoric inhabitants.

Houck (1908), in his major mound survey, identified 28,000 mound sites in Missouri, a large number of which were in the Bootheel. Two-thirds of Houck's prehistoric mounds, however, often are no more than natural features in the landscape (Chapman 1980b).

Fowke (1910) provided a few brief comments on Mississippi-period sites in southeastern Missouri, but it was not until the publication of WPA- funded archaeological work in the 1940s that modern archaeological principles were applied to research in the Bootheel (Adams and Walker 1942; Walker and Adams 1946). It is at this juncture that we see the beginning of the formal classification of archaeological phenomena in the Bootheel region.

WPA-Sponsored Investigations

Walker and Adams' (1946) treatment of archaeological remains from the Matthews site (23NM156) illustrate the changing face of American archaeology. Closely following the publication of Deuel's (1935, 1937) characterization of Mississippi Valley cultures, Walker and Adams' analysis was the first in southeast Missouri to employ a systematic approach to classification of the material culture and archaeological features from a regional perspective. Although they do not clearly state it in their text, Walker and Adams (1946:93) introduce the concept of the New Madrid focus (see Adams and Walker [1942] for the report of an earlier surface inventory) and compare that focus with other foci in the region. Walker and Adams' classification of the site is the first apparent application of the Midwestern Taxonomic System (McKern 1939) to archaeological remains in southeast Missouri.

The Lower Mississippi Valley Survey

The next significant archaeological investigation to have an impact on the interpretation of Mississippi-period occupations of southeast Missouri was the publication of Phillips *et al.*'s (1951) Archaeological Survey of the Lower Mississippi Alluvial Valley 1940-1947 (LMVS). This treatise had a major impact on archaeological research in the Bootheel even though the authors did no work in Missouri. The data set detailed in the volume consists of a nonsystematic collection of ceramics from several hundred sites in the Lower Mississippi Valley. The outcome was the first comprehensive ceramic typological system for the Lower Valley, and that system was extended to encompass ceramics from the Bootheel region. The primary purpose of the ceramic typology was to assist in temporally ordering archaeological materials in the region. Dunnell (1985) has discussed in detail the significance of the LMVS on the region's interpretive framework and its importance as a regional survey. It was after the LMVS survey that modern interpretations of Mississippi-period occupations of the Missouri Bootheel region began.

Work in the 1950s: Initial Excavations and Classification

Perhaps the most significant event in southeastern Missouri archaeology in the 1950s was the appearance of Stephen Williams' (1954) dissertation. Williams completed large-scale excavations at the Crosno site (23MI1) and a surface survey of diverse geographical regions of southeastern Missouri. At Crosno, Williams identified two Mississippi-period components--Crosno I and Crosno II. The first is associated with a transition between the late Early Mississippi period and the early Middle Mississippi period and the second with the Middle Mississippi period in the Cairo Lowland area. His most notable achievement was the development of a new cultural-historical classificatory system detailing the cultural sequence for the Bootheel Region. This classification is discussed in detail in Chapter Four.

A number of salvage excavations were conducted by the University of Missouri-Columbia (UMC) during the 1950s. Excavations were conducted at 23PM43 (Murphy Mound), 23MI31 (Spanish Grant), and numerous other sites. Analysis of the materials from many of these sites was not completed and was reported in minor detail. (See Chapman 1956:45 for details of the 23PM43 excavations. Cultural materials recovered from the excavations at this site currently are undergoing analysis at the American Archaeology Division, UMC.)

One other aspect of archaeology in the Bootheel must be mentioned--the activities of well-known artifact collector and avocational archaeologist Leo Anderson. Analyses of Anderson's surface collections and excavated materials from large sites in southeast Missouri have been used in a number of archaeological reports (Chapman and Anderson 1955; Holland 1991; Williams 1954). A major contribution to the prehistory of the region was his work at the Campbell site (23PM5) that began in 1954 and continued for almost 15 years.. Working in part with Carl Chapman, Anderson excavated 226 Mississippi-period graves along with 200 ceramic vessels and associated cultural materials (Price and Price 1980). Partial analysis of a small portion of the human remains were published in 1955 (Spier 1955). Holland (1991) completed the analysis of 132 skeletons that are curated at UMC. Anderson's entire ceramic collection from this site was sold at auction in 1978.

Work in the 1960s: Highway Salvage, Land Leveling, and UMC Involvement

Of the forty years since the end of World War II the 1960s was the decade of the most intensive archaeological work in southeast Missouri. Although primarily related to salvage excavations, work conducted by personnel and students at UMC formed a significant part of archaeological research conducted in this region in the twentieth century. Unfortunately, much of this work is published in what are, in essence, preliminary reports with few, detailed inter- and intrasite comparisons or analyses.

Marshall (1965a) conducted an extensive inventory and testing project in New Madrid and Pemiscot counties in conjunction with the construction of Interstate 55. During the inventory phase of the project, Marshall located 24 sites in New Madrid County and six sites in Pemiscot County (some of the sites had been previously recorded). In the testing/excavation phase six sites in New Madrid County were either tested or extensively excavated and one site was excavated in Pemiscot County.

Marshall (1965a:19) states that the most common types of Mississippian ceramics recovered in his survey corridor were Neeley's Ferry Plain, Parkin Punctated, Manley Punctated, Barton Incised, Old Town Red, Wickliffe Series, Varney Red, Varney Red Salt Pan, and Bell Plain. Of the six excavated sites, Marshall considered the King site (23NM202) a Barnes Ridge phase, Late Woodland period site and the Kersey site (23PM42), a multicomponent Late Woodland and Mississippi village as the two significant sites located in the project area. Preliminary analysis of the materials from Kersey resulted in the identification of two new phases--the Late Woodland Kersey phase and the Early Mississippi-period Hayti phase. In addition, the discovery of a crematorium and vertical and horizontal bundle burials adds to our knowledge of Mississippian mortuary practices.

Extensive archaeological work was conducted at Towosahgy State Historic Site (Beckwith's Fort, 23MI2) from 1966 through 1974 when graduate students from UMC conducted research there as part of a cooperative agreement with the Missouri Department of Natural Resources. Price *et al.* (1990) provide a detailed summary of work conducted at the site. Archaeological investigations focused on major surface collecting and limited test excavations (Cottier and Southard 1977:237-239). In 1967 the top of Mound 2 was excavated (approximately 40 percent of the surface) by Gerald Smith, and the remains of 2 burned structures were exposed. In addition Smith excavated portions of Mound 5, and two trenches were opened in the southern part of the site to locate the fortification system. Much of this work remains unreported. J. R. Williams, as a part of the land-leveling work discussed below, excavated a burned structure and other features at 23MI2 in an area under private ownership.

In the mid-1960s a large-scale salvage program, known as the Southeast Missouri Land Leveling Project, was implemented as part of an agreement between the National Park Service and UMC. Due to massive site destruction in the Bootheel region, the large-scale project was undertaken to identify and excavate threatened archaeological sites. Three volumes (R. Williams 1967, 1968, 1972) were produced, documenting work at 21 sites. Because the materials recovered from those excavations and surface collections comprise the bulk of the excavated materials from southeast Missouri curated at UMC, these excavations are used extensively in the analyses presented in Chapter 5.

Hopgood (1969) conducted an extensive surface reconnaissance of the Portage Open Bay area in the Little River Lowland of New Madrid and

Pemiscot counties. This survey documented 27 archaeological sites, and led to the suggestion that the Little River Lowland was not occupied early or late in the general cultural sequence of the region. In addition, Hopgood (1969:68-69) addressed the Barnes-Baytown problem, suggesting the Barnes materials relate more to natural sand inclusions in local clay sources than intentional tempering agents.

Klippel (1969) excavated portions of the mound and occupation area at the Hearnes site (23MI7) in the Cairo Lowland in 1965. Excavations focused on trenching two mounds at the site. Klippel approached the analysis of ceramic vessels and vessel fragments recovered from the excavations in a nontraditional, nontypological manner. That is, used the explicitly stated attributes of shape, structure, and contour to describe and define different classes of ceramic vessels. Included in the report is a cursory comparison of ceramic-vessel classes (based on the above attributes) with vessels from the Bryant and Campbell sites. Klippel (1969:88) posited the hypothesis that "composite contours on independent restricted vessels is an attribute which was popular during the Late Mississippian period (1400-1650) but not during the early Mississippian period (1000 to 1400)."

Work in the 1970s: A Blend of the Old and the New

The 1970s began with publication of Phillips' (1970) Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955, wherein an expansion of the earlier ceramic typology of Phillips *et al.* (1951) is detailed. This contribution is discussed in detail in Chapter 4.

Healan (1972) conducted an intensive surface collection program at 23MI2 as part of the ongoing cooperative effort at that site. He identified functional and temporal differences in the surface assemblage from the site and delineated the Baytown period (Late Woodland) occupation along the southern one-third of the site. In addition, he was able to determine that a late fourteenth-century occupation was clearly discernable along the southeastern corner of the site. Healan's publication is difficult to use in my research because he did not employ the traditional ceramic typologies.

Healan explained the results of his investigation through multivariate statistical evaluation of his data. In keeping with the archaeological zeitgeist of the late 1960s, Healan states his underlying assumptions and definitions as well as the problems his study was addressing. In order to perform a factor analysis, Healan chose not to use the existing descriptive,typological approach to ceramics but instead defined four classes of ceramic attributes--tempering agent, surface treatment, rim/lip treatment, and rim form.

Reagan (1976) also used multivariate statistical analysis in his research focusing on undecorated ceramic vessels from the Lilbourn site (23NM38). Seven factors were employed in the study--wall thickness, strap appendages, vessel height, base diameter, rim declination, tab and effigy appendages, and base thickness to compare the generated statistical clusters of ceramic vessel shapes with ethnographic lexemic categories from historical Native American groups.

Cottier worked at Towosahgy in 1969-1970 and conducted excavations outside of the village fortification to the north, exposing multiple lowered-floor wall trenches of a Mississippi-period house (Cottier and Southard 1977:239-242). In addition, Cottier worked on the southern fortification system of the site through 1972. Exposed in the excavation was evidence of a bastion and multiple palisade-building events as well as evidence of several Mississippian houses within the fortification system (Cottier 1977:345-362).

Finally, Cottier conducted limited excavations in the plaza area of 23MI2 that were followed by additional excavations in this area by Southard in 1974. Evidence of multiple features in the plaza and deep deposits of structures, middens, and other features were noted but never reported.

Chapman (1977) directed multiyear salvage investigations at the Lilbourn site from 1972 to 1977 funded primarily by grants from the National Endowment for the Humanities. Preliminary results of those investigations were published but are by no means complete. Since no systematic analysis of the recovered materials has been conducted, and because the sample from the site is so large, Chapman's excavated materials from Lilbourn have been omitted from consideration here.

Work in the 1980s: Excavations at Beckwith's Fort (23MI2)

Duncan Wilkie of Southeast Missouri State University performed two years of fieldwork at 23MI2 after a long hiatus of archaeological research at that site. Excavations were conducted to assist in planned development of a visitor center and residence. Wilkie excavated 84 1m^2 test pits and several test trenches. He noted a large concentration of Mississippi-period structures overlying a Baytown stratum and a large deposit of Mississippian refuse at the base of the old cut-off lake (a "pottery pavement"). Wilkie also excavated a lowered-floor Mississippi house during his second field season. In addition, a preliminary ground-penetrating-radar survey was undertaken along the southeastern margin of the site. In his final report, Wilkie (1988) described the Mississippi-period house and detailed the profile of the "pottery pavement" excavations.

Price *et al.* (1990) performed additional work at Beckwith's Fort for the

Missouri Department of Natural Resources in 1989. Although the scope of work called for testing the posited ramp at the primary ceremonial mound, locating the northern fortification system, and testing the "borrow area" at the site, results of this investigation provided considerable information applicable to other problems. Most notable was the production of a profile of Mound 2, the ceremonial mound, which reveals multiple construction sequences and illustrates the presence of a temple dump on the face of the mound. In addition, test excavations immediately in front of the mound revealed the presence of a deep (ca. 2 m) Early Mississippi-period midden as well as evidence of a pre-1811-1812 earthquake.

Recent CRM Work in the Bootheel

A February 1991 review of CRM-oriented manuscripts in the library of the Historic Preservation Program-Missouri Department of Natural Resources was conducted to identify the nature and scope of CRM projects in southeastern Missouri. Most reports from projects conducted after 1970 detail small-scale survey projects, and survey-and-testing projects. Some of the investigations noted below are crosslisted in more than one county. Consequently, the total number of projects conducted in the region is somewhat less than suggested by the county totals.

For Pemiscot County the library contains the results of 13 survey projects, and 5 testing projects, along 1 literature review, 1 environmental review, and 1 research design. The Mississippi County section contains 20 survey projects, 1 survey-and-testing project, and 1 literature review. For New Madrid County, the library contains 19 survey reports and 4 survey and testing reports.

All of the above-mentioned CRM-oriented projects can be considered as small-scale projects with the exception of a few surveys. Although the Bootheel is considered to have one of the highest site densities per square mile in Missouri, fewer CRM-related projects have been conducted here than in other areas in the state. The Master Plan for Archaeological Resource Protection in Missouri (Weston and Weichman 1987) indicates that less than 0.003 percent of the land in southeastern Missouri has been surveyed, yet the region has the highest number of National Register-eligible properties in the state.

Chapter Summary

Numerous investigations both large and small are omitted from the above synopsis (e.g., Lewis 1974; Moselage 1962; Perino 1966; Williams 1964). With the exception of ongoing research on the Malden Plain by R. C. Dunnell of the University of Washington and work conducted in Butler and Ripley counties in conjunction with the Powers Phase Project, no systematic archaeological investigations have been conducted in the Mississippi River alluvial flood-plain region of southeast Missouri since the early 1970s. Although a number of salvage projects were initiated (Chapman 1977; Marshall 1965; J. R. Williams 1967, 1968, 1972) publication of the results of those excavation projects can be characterized as preliminary.

CHAPTER 4: TOPICAL PROBLEMS IN INTERPRETING THE MISSISSIPPI PERIOD OCCUPATION

This chapter presents discussions concerning issues pertinent to understanding the interpretive basis of Mississippi-period archaeology in the Bootheel. First, a critical examination of the ceramic typology devised by Phillips (1970) is presented. Second, a short discussion of radiocarbon dates and their application to the interpretive basis in the region is provided. Finally, and possibly most importantly, a detailed discussion of named archaeological phase designations relating to the Mississippi-period occupations concludes the chapter.

Current Ceramic Typologies

> Classification is of necessity the foundation of data analysis in archaeology. It is largely on the basis of classification of the raw data--the artifacts excavated--that inferences are made. The accuracy of classification, in a very real sense, determines the extent to which meaningful and significant inferences will be possible. Inferences in archaeology are, to a large part, based on patterning in data through space and time. But patterning is an elusive phenomenum in that there is no simple independent check of its existence, nor can it easily be determined whether the patterning that exists has not been obscured by the analytical techniques themselves. Classificatory schemes can either enhance that patterning or render it unobservable, depending on their sensitivity to patterning (Read 1974: 216).

The problems of archaeological taxonomy, and the values and problems of typology and paradigmatic classification have been covered extensively in the literature (Dunnell 1971a; 1971b; Ford 1955, 1961; Kelley and Hanen 1988; O'Brien 1986, 1987; Read 1974; Whallon and Brown 1982), and I do not review them here. The ceramic taxonomic schemes employed in southeastern Missouri are typological. Recent investigations by Teltser (1988) and others have employed paradigmatic classifications to examine variation in Bootheel ceramic assemblages. This recent research is not comprehensive and does not attempt to modify existing typologies in their entirety. These works do, however, call into question facets of the existing ceramic typological schemes.

Phillips *et al.* (1951) created the first comprehensive ceramic typological system for the lower Mississippi Valley. The goal of their typology was to incorporate previous work by the LMVS into a broad, regional framework by ordering collections of ceramic sherds into types. The authors envisioned ceramic types as continua, in which individual ceramic vessels might vary within a single potter's work but with variation tending to cluster about a norm (Phillips *et al.* 1951:62). Further, the authors were of the opinion that popular ceramic styles were tied to active population centers and that styles would vary between the centers, subject to ethnographic and geographic factors in proportion to the distances between the centers. Phillips *et al.* (1951:63) note that "the most carefully defined types always overlap" and that as such they are "*created units of the ceramic continuum*" (emphasis in original). The frequently implied goal of their typological framework was to identify variation that made sense archaeologically—variation that allowed distinct time-space contexts to be distinguished).

Phillips *et al.* (1951:69) described 20 ceramic types for the Mississippi period in the lower Mississippi Valley. Despite much debate in the 1950s and 1960s over the relative merits of type-variety classification schemes vs. simple type classification (Ford 1955, 1961; Phillips 1958; Smith *et al.* 1960; Wheat *et al.* 1958), the Phillips *et al.* (1951) types were standards until the publication of Phillips' (1970) Archaeological Survey in the Lower Yazoo Basin, Mississippi, 1949-1955 when the type-variety system came into vogue.* In that study Phillips expanded the original 20 types into a type-variety system of over 40 types in an attempt to refine the existing ceramic classification system. Phillips' opinion concerning type-variety systems is that types are related to widespread geographic expressions of cultural and historical relationships. Further, he viewed varieties and modes of ceramic types as reflecting specific areal and temporal variations in the norm of the type (Phillips 1970:25). Like most typologists, Phillips (1970:25) did not view his system as complete but suggested that any typology requires on-going, continuing refinement until such time as it has reached the end of its usefulness. Unfortunately, Phillips' system has not been the dynamic entity he envisioned but rather has become stagnant, with little if any effort expended to refine those "narrow intervals on the sliding scale of time and area" (Phillips 1970:25).

Both the Phillips *et al.* (1951) typology and the Phillips (1970) type-variety system exhibit overlap among and between types. Phillips (1970:26) states:

> Intergrading [of types] is inevitable; it is in fact their [types] very nature. As data accumulate and the sorting criteria become more explicit, two varieties juxtaposed in time or space naturally become more sortable, but just about that time we begin to discern an intermediate category and the problem of sortability is with us once again.

Types, according to Phillips, should be established primarily on the basis of

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FOOTNOTE:

* The original 20 Mississippi period types defined by Phillips, Ford, and Griffin (1951:69) are: Neeley's Ferry Plain, Parkin Punctated, Barton Incised, Ranch Incised, Vernon Paul Applique, Fortune Noded, Bell Plain, Kent Incised, Rhodes Incised, Walls Engraved, Hull Engraved, Old Town Red, Carson Red on Buff, Nodena Red and White, Avenue Polychrome, Hollywood White Filmed, Wallace Incised, Owens Punctated, Leland Incised, Arcola Incised.

paste, surface treatment, and design (dimensions). The outstanding characteristic of varieties is that they intergrade, and sorting will, by its very nature, be arbitrary. There also is a set of secondary criteria, or secondary dimensions, used in establishing and identifying the varieties—modes of form and modes of decoration. These two additional dimensions apparently do not conflict with Phillips' statement that form and design should be used as little as possible in establishing types (which are, after all, the basis of the varieties). There also are tertiary dimensions associated with design—motif and pattern. The three dimensions primarily associated with design (if form is considered as a component of design) are not necessarily applied in an hierarchical manner.

Phillips (1970) took the original 20-type Mississippi-period ceramic system and expanded it into a total of 40 types with 88 associated varieties (Table 1). Interestingly, almost every type defined by Phillips was based primarily on design (decoration), which negates his statement that types are defined on the basis of paste, surface treatment, and decoration. (From a practical standpoint, paste and surface treatment may be noted in the type definitions but generally are of lesser importance than decoration in sorting the ceramic types). In Phillips' typology, late-period (Mississippian) ceramic paste is divided into two basic categories: (1) Mississippi Plain paste (coarsely crushed shell temper), and (2) Bell paste (finely crushed shell temper). The two temper types are subjective at best because neither "coarse" nor "fine" is defined, nor is there room for the categorization of mixed-temper materials, though these are common occurrences in southeast Missouri assemblages (see Teltser 1988; J. R. Williams 1967, 1968, 1972). In southeastern Missouri, Mississippi Plain was subdivided by Phillips (1970) into two varieties—Neeley's Ferry and

Table 1. Mississippi Period Ceramic Types and Varieties Listed in Phillips (1970)

TYPE	VARIETY
Avenue Polychrome	Avenue
Avoyelles Punctated	Dupree
Barton Incised	Barton, Arcola, Campbell, Estill, Kent, Togo
Bell Plain	Bell, New Madrid, St. Catherine
Campbell Applique	none
Campbell Punctated	none
Carson Red on Buff	Carson, Olmond
Chichchae Combed (historic)	Nick,
Fortune Noded	Fortune
Harrison Bayou Incised	Harrison Bayou
Hollywood White	Hollywood
Kimmswick Fabric Impressed	Kimmswick
Kinlock Simple Stamped	Kinlock
L'eau Noire Incised	L'eau Noire, Anna, Australia, Bayou Bourbe, Evangeline, Shell Bluff
Leland Incised	Blanchard, Dabney, DeepBayou, Fatherland, Ferris, Natchez
Lulu Linear Punctated	(Temporal affiliation is in question according to Phillips (1970:107).
Maddox Engraved	Baptiste, Emerald, Silver City
Matthews Incised	Matthews, Beckwith, Manly
Mazique Incised	Manchac
Medora Incised	Medora
Mississippi Plain	Mississippi, Coker, Mound Field, Nady, Neeley's Ferry, Pocahantas, Yazoo

Table 1: Continued

Mound Place Incised	Mound Place, Chickasawba
Nashville Negative Painted	Kincaid, Sikeston
Nodena Red and White	Nodena, Douglas, Dumond, Ellison
O'Byam Incised	O'Byam
Old Town Red	Old Town, Beaverdam, Grand Village, Panther Creek, St.Francis, Sharbrough.
Owens Punctated	Owens, Menard
Parkin Punctated	Parkin, Castile, Harris, Hollandale, Transylvania
Plaquemine Brushed	Plaquemine, Grace
Pocohantas Punctated	Pocahantas
Pouncey Ridge Pinched	Pouncey
Rhodes Incised	Rhodes, Horn Lake
Ste. Genevieve Plain	Ste. Genevieve
Sanson Incised	Sanson
Varney Red	Varney
Vernon Paul Applique	Vernon Paul
Wallace Incised	Wallace
Walls Engraved	Walls, Hull
Wickliffe Thick	Wickliffe
Winterville Incised	Winterville, Angola, Belzoni, Blum

Mississippi—based solely on geographic distribution. Individual vessels or sherds identified as Mississippi Plain, in addition to having shell temper, exhibit no decoration. If a particular vessel, for example, exhibits a red slip (surface treatment) on a coarse-paste, shell-tempered body, it is classified as something other than the aforementioned varieties. Paste type also cross cuts all vessel forms. The result is that Mississippi Plain (usually referred to in the archaeological literature for southeast Missouri as Neeley's Ferry Plain) becomes a default category for all plain sherds in which large shell platelets are visible.

Current ceramic typological systems devised to encompass and express cultural and historical relations across space and time in fact may mask variation that may be useful to identify, interpret, and explain those cultural and historical phenomena. The overlap among types, clearly expressed as necessary and common by the typologists, results in sorting criteria that often are subjectively and arbitrarily applied to individual ceramic sherds (in part due to their general nature). Furthermore, inconsistent application of sorting criteria has created confusing and often nonreplicative systems. It is not, however, the sole fault of the original typologists. Those "narrow intervals on the sliding scale of time and area" (Phillips 1970:25) have not been adequately defined by additional chronometric controls. *Post facto* additions of sorting criteria and temporally unstated decorative modes (e.g., S. Williams' [1980] Parkin Punctated late mode) have only deepened the typological morass.

The type-variety system of Phillips warrants a close reexamination. If paste is considered to be one of the primary criteria used to identify types in Phillips' system, one could expect that the two basic shell-tempered types would be an integral element in both the type name and type description. This is not always the case however, since Phillips generally has based his types on surface treatment and decoration. Types such as O'Byam Incised, Nashville Negative Painted, and Nodena Red and White are identified in the Phillips (1970) ceramic nomenclature, but they are not defined on the basis of surface treatment---brushing, cord marking, plain, checkstamped, etc.---and paste but rather on decorative technique--incising, negative painting, and polychrome painting respectively. (Note that much of the O'Byam Incised from the Cairo Lowlands of southeastern Missouri may be on clay-tempered, Bell shell-tempered, or near-Mississippi-paste plate forms.) These three types appear to have been defined and sorted by subsequent analysts primarily on the basis of surface decoration and in the case of O'Byam, form and surface decoration.

Negative-painted types, e.g., Sikeston Negative Painted and Angel Negative painted ceramics, illustrate another break with the classificatory system. Although types are to be defined and subsequently sorted on the basis of paste, surface treatment, and design, the two aforementioned types are defined solely on the basis of the presence of certain styles of negative painting (surface decoration, not surface treatment). However, most negative-painted vessels from the Bootheel generally can be regarded as falling into the as-yet-undefined category of effigy vessels. Effigy vessels, in most regional archaeological reports and discussions, are treated separately from the general ceramic assemblages and do not have a separate, formal, type-variety system. Thus Sikeston Negative Painted and Angel Negative Painted effigy vessels are treated differently than other effigy vessels and are assigned into type categories solely on the basis of surface decoration, not surface treatment (e.g., cord marking, brushing, combing, etc.).

Neeley's Ferry Plain

Let us first examine problems the analyst encounters with the most frequently recovered type in the southeastern Bootheel region of Missouri--the supertype Mississippi Plain (varieties Mississippi and Neeley's Ferry Plain [NFP])--first defined by J. B. Griffin for Walker and Adams (1946) at the Matthews site (23NM156) (Griffin [1941] had earlier called this Imperial Plain.)

Phillips changed the original supertype (Neeley's Ferry Plain) to Mississippi Plain and defined at least two varieties that have their geographic expression in southeastern Missouri--Mississippi Plain vars. Mississippi and NFP. Current usage in the Bootheel area favors the variety NFP to refer to this coarsely crushed, shell-tempered plainware.

An even greater problem exists with the variety NFP in that most of the varieties of supertype Mississippi Plain do not possess the requisite attributes for inclusion into variety status. Simply stated, NFP is a coarsely crushed, shell-tempered plainware, lacking distinctive surface treatments and decoration. The "type" thus crosscuts all vessel shapes and forms (e.g., bowls, jars, bottles, plates, and saltpan). All of the attributes--modes of form and modes of decoration--necessary to define a variety are, by definition, absent from the plainware type making it impossible to define the varieties except by imposing geographic boundaries on virtually identical phenomena. Green's (1974) research, employing a factor analysis of Mississippi Plain variety attributes, concluded that the varieties did not stand up to statistical analysis. The only attribute that Green discovered that could separate multiple Mississippi Plain ceramics is vessel shape. That is, his factor analysis factored out bowls and jars, not the stated varieties of plainwares.

In the case of Neeley's Ferry or Mississippi varieties of Mississippi Plain it should be obvious that those attributes considered as essential in other ceramic typologies are totally lacking. Vessel shape, rim form, rim height, shoulder height, inflection of the rim--measurable, objective attributes used successfully in other ceramic typologies--are meaningless in the dominant ceramic typology currently employed in the Lower and Central Mississippi Valley. More importantly, even the smallest sherds of plain, coarsely crushed, shell-tempered ceramics can be identified as Mississippi Plain. The consequence of maintaining this nonvariety as an analytical unit is that nearly all bodysherds of the different type varieties of coarsely crushed, shell-tempered ceramics (e.g., Barton Incised, Matthews Incised, Manly Punctate, Beckwith Incised, Campbell Punctate, and others) are lumped into the Mississippi Plain type (NFP variety). The result is that NFP becomes a default category, and the corresponding frequencies of this type in site assemblages tend to dominate the assemblages. The same holds true for plain Bell paste ceramics. NFP is the dominant ceramic type in 111 of 120 cases (sites, excavation unit levels, features). This dominance of a single supertype in an assemblage has the potential to mask other meaningful variation within the assemblage.

Red-Filmed Wares

Red-filmed ceramic types in the Bootheel region--Old Town Red, Varney Red, and Varney Red Saltpan--provide a second obvious case of confusing ceramic typology and terminology. Phillips *et al.* (1951:131) noted that it was impractical to distinguish coarse and fine shell-tempered red-filmed types that correspond to Mississippi and Bell in the plainware categories, an obvious violation of their classification system where paste is supposed to be an element in the type description. Phillips (1970) lamented that it was still difficult to distinguish the Bell and Mississippi pastes of Old Town Red due to integrading and noted the criticism of others for this lack of consistency in the earlier classification. Phillips (1970:145) then defined the original Old Town Red var. Old Town as:

> Red film or slip on coarse, shell-tempered ware that would otherwise fall within the typological range of Mississippi Plain. Specific shape criteria are lacking. Shapes include about everything in the plainware category except the "standard" jar form which is never, as far as I know, slipped in red.

In southeastern Missouri, the Old Town type is designated variety St. Francis by Phillips (1970:147) and its description contradicts the original definition of Old Town in that it is:

> . . . coarse, shell tempered redware found on the Malden Plain in Southeast Missouri. The original description specified large jars and saltpans but we have since decided to put saltpans in a separate category (cf. Varney Red). As presently defined, var. St. Francis features large jars, which alone makes it stand rather apart from all other varieties of Old Town Red, in which jars are conspicuously absent.

Let's reexamine these statements more carefully. Varney Red Saltpan should be a member of either the saltpan supertype Kimmswick Plain/Fabric Impressed/Ste Genevieve Plain/Fabric Impressed. Phillips (1970:167) defined Varney Red var. Varney as being sorted from Old Town:

> . . . on the theory that saltpans warrant special treatment because of their special function. We are now excluding the other forms. These are covered in the St. Francis variety of Old Town Red. The name Varney Red is thereby meant to apply to all shell-tempered red-filmed saltpan ware in the Lower Mississippi and perhaps beyond.

There is a marked contradiction in the descriptions of these red-filmed ceramic types. Old Town Red's original definition excluded jars because jars are never red slipped, but Old Town Red var. St. Francis ceramics are primarily jars. Varney Red var. Varney used to be Old Town Red var. St.

Francis, which is only found on the Malden Plain of southeastern Missouri and is sorted out because of its special function. It thus appears that a new attribute (function) can be applied at will when the typologist assumes (theorizes) that function is somehow "special." Did Phillips substitute function for form under the old argument "form follows function"? The term Old Town Red has not and cannot be restricted to the Malden Plain, as we find numerous references to Old Town ceramics and sherds classified as Old Town Red in the Cairo Lowland to the east of the Malden Plain, along Pemiscot Bayou, and in several other geographic regions of southeast Missouri as well.

Perhaps the allusions to a wider geographic distribution of Old Town Red in southeast Missouri relate to the efforts by Williams (1954:225) to more narrowly define Old Town Red so as to include only red-filmed sherds with a Bell paste and to establish his type of Varney Red (Williams 1954:209-210) as including only those red-filmed sherds with a NFP paste (a feat Phillips did not seem able to do in his later work). The underlying classification problem with red-filmed ceramics is the application of types derived from nonlocal collections to ceramics which may have a different local setting. Regardless, Old Town Red, in the minds of many analysts, has become a Bell paste (finely crushed, shell-tempered) ceramic and is defined, *post facto*, by its *polished*, red-filmed surface. This has become a problem for anyone attempting to classify red-filmed sherds that have been exposed to surface weathering, as that polished surface can erode and appear similar to Varney Red ceramics. As a final note, Morse and Morse (1983:218) indicate that Varney Red has been established as a variant of Old Town Red but do not note in what publication this variant was established.

The Wickliffe Series

Another classic example of the problem with ceramic typology in the Lower Mississippi Valley is the problem of Wickliffe Thick var. Wickliffe. This thick, special-function funnel (Price 1973:148) or juice press (King 1939:37) was defined as a ceramic type by Williams (1954:214-218) and is one of his horizon markers for the Cairo Lowland phase. Williams (1954) defined four types of Wickliffe: plain, incised, punctate, and cordmarked. Often referred to as the Wickliffe Thick Series, surface treatment of these special-function vessels includes plain surface, occasionally cordmarked, and sometimes incised, rectilinear surface decorations. It is admirable that Phillips (1970) combined all three surface treatments and two decorative modes into the single type and variety. However, once again, types are defined by a suite of attributes including paste, not simply decoration or surface treatment.

J. R. Williams was the first to emphasize the attribute of temper in descriptions of Wickliffe-type ceramics and he described clay-tempered Wickliffe and shell-tempered Wickliffe ceramics (see Reagan 1977). Recent examination of Wickliffe Thick sherds from the Lilbourn site (23NM38), excavated in the mid-1970s by the University of Missouri, confirm that the tempering agent in contemporaneous Wickliffe Thick sherds from the same archaeological contexts can and do have pastes containing clay, shell, or clay and shell temper (Robert Hoard, personal communication 1991). Following Phillips' stated typological criteria, there probably should, then, be three "types" of Wickliffe Thick. We will ignore for the moment the fact that many Wickliffe Thick sherds are not all that thick, as Reagan (1977:297) indicates the range in wall thickness is from 0.8 to 3 cm.

Mixed Types

There are additional classificatory inconsistencies in the ceramic typology used in southeast Missouri and elsewhere in the Central and Lower Mississippi Valley. During the Late Prehistoric period corresponding with Smith's *(1990:164-65) undefined Campbell phase or Williams' (1980) Armorel* phase (whichever the reader prefers), which coincides spatially and perhaps temporally with the Parkin and Nodena phases of northeastern Arkansas, there is a fluorescence in ceramic technology and decoration resulting in the most artistic and technologically complex ceramic assemblages within eastern North America. In ceramic assemblages from this late period analysts encounter situations never foreseen by earlier typologists. For example, how are vessels with a Barton Incised Shoulder and a Campbell Applique rim, a Campbell Applique rim with Manly Punctate shoulder, a Campbell Applique rim and Parkin Punctated body, and an interior, red slipped Parkin Punctated vessel supposed to be typed? Neither the original typology (Phillips *et al.* 1951) or the revised type-variety system (Phillips 1970) provides solutions to these classification problems.

Validity of Types

Ceramic types defined by Phillips *et al.* (1951) and Phillips (1970) are more than a simple ordering of ceramics. Archaeologists have assigned both temporal and cultural interpretations not only to the types but to the presence of types at archaeological sites. Those interpretations (e.g., trade, influence from an external geographic region, subsistence, use, etc.) have become embedded in the minds of archaeologists and influence current and future interpretations and explanations of the Mississippi period in southeast Missouri.

Phillips' (1970) type-variety classification system has become stagnant and embedded in most archaeologists' analytical framework. This system has become so entrenched that research challenging the precepts forming the basis of the original Phillips *et al.* (1951) typology from which Phillips' (1970) type-variety system is derived has largely been ignored. For example, cluster analyses of 549 complete Mississippi-period ceramic vessels performed by Green (1974) demonstrated that Phillips *et al.*'s over-all typology does not hold up under statistical evaluation (that is, they did not cluster) except for some of the decorated types. Green's analysis also indicates that Neeley's Ferry Plain does not cluster into subgroups (varieties) except as bowl and jar shapes (vessel form only). Green's analysis further indicates that there is no statistical support for the separation of Neeley's Ferry Plain and Bell Plain type ceramics (distinct clusters of NFP and Bell Plain did not result in the analyses). Green did suggest, however, that Phillips *et al.'s* (1951) original typology for decorated types may have some validity as these types do cluster in his analyses. Green's research has been generally ignored and Phillips' type-variety system continues to be employed as the primary sorting/classificatory mechanism. It is important to note, however, that Green's research is not published and may not be readily available to archaeologists working in the region.

Statistical comparisons presented later in this research require addressing these typological problems prior to analysis. At those previously mentioned Late Mississippi-period sites, existing ceramic typology is inadequate. As discussed, in these assemblages (23PM5, 23PM13, 23PM21, and others), we find Parkin Punctated var. Harris vessels with Campbell Applique rims, and Old-Town-Red-quality, interior, red slip. In addition, Campbell Applique rims with Ranch Incised shoulders and Campbell Applique rims where the applique mimics the design found on Wallace Incised bowls also are found. At best, these hybrid types are difficult to sort, and including sherds from these vessels in any one category can become an exercise in subjective decision making.

Paste also is a difficult dimension to use in sorting late period assemblages as clay-tempered, Bell-quality paste sherds are frequently noted. These may or may not be analogous to Williams' (1954) fine paste ceramics but it is impossible to tell given the imprecise definition he provides. Surface treatment also is a difficult dimension to use as most ceramics at these late sites, regardless of paste, fall into two basic categories--smoothed and/or polished. That leaves one dimension, design, with which we can adequately sort these ceramics. Ceramic typologies currently in use do not possess the requisite dimensions and attributes (and combinations thereof) to satisfactorily sort these materials in a manner where all variation can be documented.

Regardless, in the context of this study, when these hybrid types are identified they are sorted into existing types for the purpose of comparison with published ceramic frequency counts. Criteria used to sort ceramics with polymerous design attributes are as follows. Rim design takes precedent in sorting criteria followed by the presence or absence of applique, arcaded handles, incising and zoned punctates. Shoulder treatment is the secondary level of the design dimension, and surface treatment (i.e., red filming, cordmarking) is the tertiary attribute of the dimension. Paste is only considered when sorting plainware sherds. This hierarchical system is, of course, inadequate. Considerable shifts in ceramic typology to a strict focus on the design dimension will be necessary to sort and analyze these late materials with any degree of rigor.

A third problem encountered during the analysis was the temporal assumptions regarding clay and shell temper. It is apparent from work by Teltser (1988) that temper in southeast Missouri ceramics rarely is confined to a single material in a single vessel. This observation was reinforced by observations made by the author while working with UMC Museum collections and during the course of the National Science Foundation Southeast Missouri Curation Project currently being conducted by the American Archaeology Division, UMC (R. Hoard and J. Cogswell personal communication). Phillips (1970) and S. Williams (1954) both allude to the persistence of clay tempering from the Woodland period into the Mississippi period in the Cairo Lowland Region. This makes it extremely difficult to determine where a Mississippi-period assemblage begins and where a Woodland period Baytown occupation ends in a ceramic assemblage. Additionally, there appears to be an increase in clay-tempered, fine-paste ceramics at late sites such as 23PM5. To counteract this problem, when compiling information from the literature, only shell-tempered vessels were counted in the plainware categories (Neeley's Ferry and Bell) and counts of Mississippi-period, shell-tempered, decorated ceramic types were augmented with their clay-tempered analogs at Cairo Lowland region sites (i.e., shell-tempered Wickliffe and clay-tempered Wickliffe ceramics were combined as a single count from a single site or provenience).

RADIOCARBON DATES FROM SOUTHEAST MISSOURI

As of this writing there are 52 radiocarbon dates from the three- county study area. Only 39 dates overlap with, or fall within, the Mississippi period as uncorrected calendrical dates. However, of the 13 dates that lie outside of that period 4 are within 60 years of the beginning of that period (A. D. 900) and 1 postdates the end of the Mississippi period (A. D. 1550). Radiocarbon dates from the as-yet-unanalyzed Lilbourn site (23NM38) comprise 54 % of the Mississippi-period dates.

Lewis (1990a:45) recently corrected ten of these dates using Stuiver (1982). All 52 radiocarbon determinations were corrected during this investigation using CALIB, Method A (Stuiver and Reimer 1986:2). Table 2 presents corrected dates for all known radiocarbon dates . The use of the later CALIB program and the method selected therein has resulted in different corrected dates than those published by Lewis (1990a).

The point could be made that this suite of radiocarbon dates is sufficient to bracket the Mississippi-period in the Missouri Bootheel. This is not, however, the case. Lewis (1985) points out that there are two important considerations in applying radiocarbon dates to archaeological contexts: sample selection and interpretation of the dates. At best, we can characterize the above assays as being samples that were nonsystematically selected with subsequent interpretations lacking contextual rigor. As an example, Chapman (1980a:272) averages three dates from separate palisade-related events at the stockade at 23MI2 to derive a mean age for the Beckwith's Fort palisade system even though each palisade feature clearly is a separate event. Subsequent work at the site (Price *et al.* 1990) indicates there are additional fortification episodes at the site that remain undated. Further, Chapman's average does not appear to be an arithmetic mean, nor has he indicated any formula for calculating that "mean" (e.g., Long and Rippeteau 1974). Chapman (1980a:272) also averages two dates from the plaza area at the Lilbourn site (23NM38). He interprets that average, also derived by unknown means, as dating the period when the plaza was in use even though there is a 500-radiocarbon-year difference in the central tendencies for the two dates.

Regardless of how Chapman averaged the dates, averaging dates from separate contexts may be inappropriate and basically meaningless at multiple-component sites. Long and Rippeteau's (1974) method, for example, if applied by Chapman (1980a), allows one to average dates from replicate runs on the same sample material or from the same context (e.g., pit features or house floors). This particular method does not allow one to average dates from separate sources and independent contexts. Chapman attempted to average dates from similar, yet separate, contexts--two palisade lines at 23MI2 and independent features within the plaza at 23NM38. Consequently, these averages could significantly distort any resultant interpretation (i.e., that the site may have been palisaded in both the Late Woodland and Middle Mississippi periods or the plaza was in use during Late Woodland times).

A second example of the misapplication of radiocarbon-age interpretation also can be found in Chapman (1977). Cottier (1977:311) provides a figure depicting the sequential ordering of perceived significant events at the Lilbourn site. Cottier treats these radiocarbon dates as calendrical time rather than as radiocarbon time. The table, therefore, depicts the duration of House I occupation, the duration of plaza use at the site, the year the fortification ditch was filled (in A. D. 1450), and other events. Taking the termination of the fortification ditch as an example, the sample was actually collected from a fill zone <u>near the base of the ditch</u> and consisted of charred twigs and hickory-nut shells. Beyond the obvious two problems associated with this date--fill deposits at the base of the ditch do not represent terminal use of the ditch, and the twigs and nut shells are most likely not a single, homogeneous sample--

Table 2. Corrected Radiocarbon Dates from Mississippi, New Madrid, and Pemiscot Counties, Missouri

LAB No.	Site No.	Calendar years	Corrected Date (A.D.) Max	CT/intercepts	Min	
MISSISSIPPI COUNTY						
BETA-36670	23MI2	A. D. 900 + 120	784	990	1151	(a)
BETA-36671	23MI2	A. D. 410 + 60	427	537	596	(a)
BETA-36669	23MI2	A. D. 1430 + 60	1329	1415	1435	(a)
UGa-244	23MI2	A. D. 1275 + 70	1265	1283	1389	(b)
N-1250	23MI2	A. D. 1115 + 85	1043	1214	1276	(c)
N-1251	23MI2	A. D. 1020 + 75	1002	1040,1095,1119, 1140,1151	1207	(d)
N-1252	23MI2	A. D. 1020 + 75	1002	1040,1095,1119 1140,1151	1207	(d)
N-1253	23MI2	A. D. 750 + 140	660	780,790,802,843, 853	990	(d)
Gak-1681	23MI2	A. D. 280 + 110	230	364,366,388	533	(e)
Gak-1307	23MI8	A. D. 420 + 80	426	539	637	(f)
Gak-1308	23MI8	A. D. 1185 + 90	1192	1262	1283	(f)
M-2212	23MI8	A. D. 640 + 130	607	677	870	(g)
M-2213	23MI8	A. D. 640 + 130	607	677	870	(g)
M-438	23MI20	A. D. 190 + 250	31	264,269,342,374, 376	636	(h)
M-585	23MI20	A. D. 70 + 200	31	257,285,302,319	530	(i)
Gak-1682	23MI32	A. D. 1430 + 100	1312	1415	1444	(e)
Gak-1683	23MI53	A. D. 910 + 80	898	995	1146	(e)
Gak-1309	23MI55	A. D. 1600 + 90	1439	1494,1502,1506, 1605	1648	(f)
UGa-147	23MI55	A. D. 1595 + 75	1441	1492	1643	(j)
Gak-1310	23MI59	A. D. 1340 + 80	1281	1321,1367,1388	1413	(f)
Gak-1684	23MI69	A. D. 310 + 70	262	411	531	(e)
UGa-145	23MI71	A. D. 1470 + 65	1408	1429	1445	(b)
UGa-148	23MI71	A. D. 1380 + 90	1284	1332,1343,1394	1429	(b)
PEMISCOT COUNTY						
M-2217	23PM549	A. D. 1290 +100	1262	1284	1405	(g)

Table 2. Continued.

NEW MADRID COUNTY

DIC-171	23NM38	A. D. 1260 + 120	1220	1281	1395	(c)
DIC-178	23NM38	A. D. 1370 + 100	1280	1330,1347,1393	1430	(c)
DIC-182	23NM38	A. D. 1450 + 165	1280	1422	1621	(c)
DIC-189	23NM38	A. D. 1160 + 60	1193	1257	1278	(c)
DIC-191	23NM38	A. D. 1240 + 85	1232	1280	1386	(c)
DIC-518	23NM38	A. D. 800 + 50	779	889	978	(k)
DIC-519	23NM38	A. D. 1440 + 60	1331	1418	1438	(k)
N-1492	23NM38	A. D. 1155 + 75	1162	1234,1236,1237	1279	(c)
N-1232	23NM38	A. D. 1095 + 90	1034	1193,1202,1206	1262	(c)
N-1233	23NM38	A. D. 1090 + 90	1032	1191	1261	(c)
N-1490	23NM38	A. D. 1370 + 75	1285	1330,1347,1393	1421	(c)
N-1491	23NM38	A. D. 1300 + 75	1278	1296,1375	1394	(c)
N-1493	23NM38	A. D. 1355 + 75	1283	1327,1351,1390	1415	(c)
N-1494	23NM38	A. D. 1170 + 75	1192	1259	1280	(c)
N-1495	23NM38	A. D. 1360 + 75	1284	1328,1350,1391	1417	(c)
DIC-204	23NM38	A. D. 740 + 140	660	778,792,800	900	(c)
DIC-520	23NM38	A. D. 1080 + 140	1001	1163,1174,1188	1280	(k)
DIC-521	23NM38	A. D. 870 + 70	888	981	1017	(k)
DIC-522	23NM38	A. D. 1040**				(k)
DIC-638	23NM38	A. D. 1070 + 100	1020	1161,1185	1260	(k)
DIC-639	23NM38	A. D. 950 + 65	983	1004,1008,1019	1150	(k)
N-1496	23NM49	A. D. 1390 + 75	1301	1334,1338,1403	1428	(c)
N-1497	23NM49	A. D. 1190 + 75	1212	1263	1282	(c)
GaK-1685	23NM154	A. D. 550 + 80	576	643	674	(e)
GaK-1686	23NM154	A. D. 460 + 70	434	564	641	(e)
M-2216	23NM217	A. D. 1040 + 120	1000	1070,1085,1127, 1137,1154	1260	(e)
M-2215	23NM217	A. D. 1750 + 100	1532	1665,1784,1788, 1949,1952	1955	(e)
M-2214	23NM269	A. D. 1220 + 100	1215	1278	1385	(g)

* All dates corrected using CALIB Method A, selection 1, (10 yr atmospheric record to 2490 cal. B.C. (ca. 3950 ^{14}C B. P.).(Stuiver and Becker (1986).

** Chapman (1980a) does not provide the standard deviation for this date.

(a) Price *et al.* (1990).
(b) Brandeau and Noakes (1972).
(c) Cottier (1977).
(d) Yamasaki *et al.* (1974)
(e) J. R. Williams (1972).
(f) J. R. Williams (1968)
(g) Crane and Griffin (1972).
(h) Crane and Griffin (1958)
(i) Crane and Griffin (1959)
(j) Lewis (1982)
(k) Chapman (1980a)

the single-year depiction of this date in Cottier's Figure 125 misrepresents the radiocarbon date. That is, the date has a standard deviation at one sigma of 160-170 radiocarbon years. If correctly illustrated, his interpretation of the sample as relating to the beginning of the ditch filling episode falls sometime between A. D. 1285 and 1615 (uncorrected). In order to achieve a 95 percent confidence interval a two-sigma standard deviation needs to be applied to the central tendency. There is a major difference in the interpretation of that particular radiocarbon date at one sigma, at two sigma, and at the illustrated one-year date presented by Cottier (1977).

Only two of the radiocarbon dates detailed in Table 2 postdate the Middle Mississippi period (ca. A.D. 1450) (M-2215--23NM217 and Gak 1309--23MI55). Interestingly, although much discussed and interpreted, Late Mississippi-period archaeological phenomena in Missouri (such as the Campbell, Nodena, or Armorel phases) are not substantiated by any associated chronometric dates. The Michigan date (M-22125) may very well represent a contaminated specimen. The Georgia date, however, appears to be reliable. Lewis (1990a:45) indicates that this particular date (GaK-1309), initially obtained by J. R. Williams (1968), was run on carbonized wood from a structure at the Hess site (23MI55) with full certainty of its association. This late date generally has been ignored or rejected through omission by the archaeological community.

Although never challenged in print, the GaK-1309 date is ignored by S. Williams (1990) (as is much of the salvage archaeological work conducted in the 1960s and 1970s) in his discussion of his empty-quarter hypothesis. Lewis (1982, 1986) has attempted to present the date, along with a concordant discussion of its implications, to the interpretation of the cultural history of the Cairo Lowland in southeastern Missouri, but to no avail.

To date, no systematic absolute-dating program has been initiated in the Bootheel region although Dunnell is pursuing a TL-dating program for sites on the Malden Plain. There are no dating programs designed to refine the temporal boundaries of either individual sites or named phases. The vast majority of sites have had no absolute-dating procedures applied to the multicomponent assemblages common in the region. Assemblages such as those from 23PM42 (Kersey) and 23PM43 (Murphy Mound), sites which have the potential to shed some light on both Early and Late Mississippi-period occupations of southeastern Missouri, are derived from salvage excavations where little, if any, charcoal was collected for radiocarbon dating, and those specimens that were collected have been stored unprotected for some 35 years. In fact, less than one percent of the recorded sites in the three-county region under review have been subjected to any form of systematic archaeological analysis, particularly the application of radiometric dating techniques.

THE MISSISSIPPI PERIOD CULTURAL SEQUENCE: PHASE DEFINITION

In order to better understand Mississippi-period cultural classification (phase designation) schemes it is necessary to expand the geographic region under consideration to include all of the counties of the Missouri Bootheel. The enlarged area now under consideration includes the portion of lands Chapman (1980a) termed the Southeast Riverine region consisting of the following counties: Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Pemiscot, Ripley, Scott, and Stoddard. The phases, the basis on which they are founded, and their archaeological horizon markers are myriad and, at best, confusing. In the course of the literature review for this research dozens of individual single-case, unsubstantiated archaeological interpretations were noted. It is too great a task to examine those interpretations in their entirety. Rather, the focus of this section will be on larger interpretive frameworks at the level of archaeological phases. The following section outlines each of the phases, although it is doubtful whether some of the existing confusion in terminology and typology can be clarified. It is not my intent to resolve the conflicting phase attributes, refine the horizon markers, or provide any solution to the problems inherent in the extant cultural classification. Rather, I focus on problems associated with the definition of those phases. My discussion is arranged chronologically rather than by phase. This sequence of presentation is necessary to illustrate both the genesis and *post facto* additive process inherent in the development of these cultural-historical classificatory schemes.

The New Madrid Focus

Early WPA-sponsored archaeological work during the 1930s in southeast Missouri resulted in the definition of the first, formal archaeological taxonomic unit--the New Madrid focus (Walker and Adams 1946). This cultural unit was loosely defined on the basis of a comparative "trait analysis" of cultural materials recovered from the Matthews site (23NM138) excavations along with other excavated assemblages in the region (e.g., Kincaid). Trait analysis in this context, however, is simply the nonstatistical comparison of what Walker and Adams (1946:96-97) identified as "determinants" (after McKern 1939:305). Walker and Adams compared the "determinants" of village, house, burial, ceramic, and artifact (with various attributes listed under each heading) of the Matthews materials with Kincaid, Gordon, and related foci defined in northeast Arkansas.

The New Madrid focus was, in part, originally defined on the basis of an earlier WPA-sponsored survey of New Madrid County (Adams and Walker 1942). For a brief period, because the Walker and Adams determinants were so general, other archaeologists began to group and classify sites as belonging to the New Madrid focus even though they lay outside the geographical area covered by Walker and Adams. As an example, Chapman (1947) included the Sandywoods Settlement (23ST26) in Stoddard County as a member of the focus. As a general Middle Mississippi-period classification device, the New Madrid focus still could be applied. However, because of its general nature, it was inadequate to handle what were perceived as geographic differences among the Mississippi-period assemblages in the Bootheel region. S. Williams (1954) was the first to define and classify those regional differences in the archaeological record in southeastern Missouri.

S. Williams' Classification of the Mississippi Period In Southeast Missouri

Stephen Williams, then a student at Yale University, did his doctoral research in southeast Missouri. The main focus of the work was, in part, a follow-up, continuation, and expansion of previous work undertaken by Phillips *et al.* (1951) in the Lower Mississippi Valley Survey. The outcome of Williams' research was (1) the identification of two components at the Crosno site and (2) the definition of four distinct phases of the Mississippi-period occupation of southeast Missouri.

In the course of his doctoral research, Williams (1954) performed a surface archaeological survey, reviewed museum collections, and excavated a major segment of the Crosno site (23MI1). In his dissertation abstract, Williams (1954:iii) states:

> This cultural data is then integrated into four major cultural phases within the Mississippian Tradition. These are the Cairo Lowland, Pemiscot Bayou, Malden Plain, and Nodena phases. This four-fold classification represents a new ordering of the archaeological materials from this area during the time period considered.

Williams is correct that his classificatory scheme was a new ordering of the Mississippi-period archaeological materials, an ordering that in many ways persists today in its original form. However, that ordering is at best a classification largely based on intuition; it is a taxonomy based primarily on seriation of ceramics from a single site (23MI1), and nonsystematic, small-sample ceramic surface collections from a few generally large, Mississippi-period archaeological sites. Some ceramic collections used in the definitions of the various phases can best be categorized as extremely small samples.

To proceed with this discussion of archaeological units, it is necessary to review the taxonomic concepts Williams employed in his dissertation. He defines the Mississippian Complex as " a series of traits, often types of pottery, identifiable as products of Mississippian peoples (Williams 1954:iv-vi)." He further defines the Mississippian period as "the segment of time during which this culture had its rise, flowering, and decline," and he defines the Mississippian tradition as, "the continuity in space, time, and form of the complex just defined." Although these definitions are useful, they do not necessarily reflect any advancement in regional archaeological taxonomy, but Williams (1954:24-41) does provide us with definitions used to develop his classificatory units along with a brief discussion of existing taxonomic units. One should note, however, that his discussion of existing taxonomic units employs the results of his dissertation research; that is, Williams could be considered to have ordered his data prior to completing the requisite analysis. It can be assumed that this is not necessarily intentional; rather and quite hopefully, he simply incorporated the results of his research into the discussion of the regional archaeological taxonomy.

Williams was the first archaeologist to employ the Phillips and Willey (1953) criteria for cultural taxonomy in southeastern Missouri. Consequently, Williams defined and grouped (1) spatial units in terms of locality, region, and area, (2) formal units in terms of component and phase, (3) temporal units in terms of local sequence, regional sequence, and period and area chronology, and (4) integrative units in terms of horizon style and tradition. Definitions provided by Williams (1954:25-26) are consistent with those set forth by Phillips and Willey (1953:618-628). Of particular importance here is the concept of phase. Williams (1954:25), closely following Phillips and Willey, defines a phase as:

> A space-time-culture unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived whether of the same or other cultural traditions geographically limited to a locality or region and chronologically limited to a relatively brief span of time. Often initially defined on the strength of one component with the expectation that others will be found. In most cases, phase probably equals 'society.' In this study the Cairo Lowlands phase is based on a number of components in a region.

Three aspects of this phase definition are of key importance: traits sufficiently characteristic to distinguish a phase from all other components (content), geographic limitations (space), and relatively brief span of time (time) (see Spaulding 1960). Unfortunately, none of these concepts are adequately defined by Williams.

Of major importance to interpreting and explaining the Mississippi-period occupation of the Missouri Bootheel region (note that Williams considers southeast Missouri to be the larger spatial unit) is the definition of temporal units under study. Although Williams clearly defines the concepts under which time is ordered--local and regional sequences, and period and area chronology--the definition of "brief span of time" remains unclear. For general purposes, Early, Middle, and Late are generally applied to the Mississippian period although developmental, emergent, terminal, and other terms also have been applied (cf. Emerson and Lewis 1991; Smith 1990). Phases defined by Williams often encompass all temporal stages of the Mississippi period (e.g., the Cairo Lowland phase).

Williams' (1954) dissertation research included large-scale excavations at the Crosno site, and a nonsystematic surface survey of prominent geographic regions of southeastern Missouri (e.g., Cairo Lowland, Sikeston Ridge, Morehouse Lowland, Malden Plain, and Little River Lowland). Although his collection methods are not well documented, they likely followed those of the LMVS survey. That is, assemblages are grab surface collections of rims or decorated sherds. Williams (1954:124) acknowledges that his research is biased toward large sites .

Williams defined four phases--Cairo Lowland, Malden Plain, Pemiscot Bayou, Nodena--for southeast Missouri based on field observations at 42 sites (Table 3) with test excavations performed at one site--Old Varney River (23DU5) (in excess of 100 sites were recorded by the survey but were not used in formulation of the phases). Much of Williams' information was based on work completed with Scully and Witteborg (Griffin and Spaulding 1952). In addition, Williams included museum collections, amateur collections, and excavated collections (e.g., Matthews site 23NM138) in his analysis.

Interestingly, of the 42 sites in Williams' sample (1954:124-198) only 27 could be assigned to one of his four named phases and he presented ceramic frequencies for only 26 collections (Table 3). The remaining 15 sites are either unclassified or are assigned to larger temporal units such as the Middle Mississippi period. Two of the sites Williams discusses are in Kentucky and are not considered here.

There are several contradictions in Williams' assignment of individual sites to the various phases. Williams did not list a sherd count for several sites (23SO166, 23PM2, 23PM46, 23DU1, 23BR1, 23NM59, 23NM78, and 23ST1). Of greater interest is the fact that in some cases, Williams' surface collections did not contain sherds considered to be the horizon markers of the phase to which the site is assigned. As an example, the ceramic horizon markers for the Cairo Lowland phase are Kimmswick Fabric Impressed and Wickliffe ceramics (Williams also includes O'Byam Incised but considers Kimmswick and Wickliffe to be better markers). Two of Williams' surface-collected, site-ceramic assemblages, assigned to the Cairo Lowland Phase--23MI10 and 23NM69--contain no Wickliffe, Kimmswick or O'Byam ceramics in his reported collections. Similarly, Williams identifies Parkin Punctated as the ceramic horizon marker for his Pemiscot Bayou phase. Of the six sites assigned to that phase in his dissertation, three contain no Parkin Punctated ceramics (23PM28, 23PM40, 23PM42).

It is important to note that Williams' (1954:Table 3) southeast Missouri area chronology incorporates temporal differences between the phases. Interestingly, Phillips (1970:928) does not interpret the formal attributes of the

Table 3. Archaeological Survey of Missouri Site Numbers Assigned to S. Williams (1954) Surveyed Sites

Williams Site Number	Site Name	ASM Number	Phase Name
4-Q-1	PETER BESS	23BR1	not classified
4-Q-3	LAKEVILLE SETTLEMENT	23SO111	Malden Plain
5-Q-3	DURNELL	23SO16	not classified
5-R-1	SIKESTON FORTIFIED SITE	23NM68	Cairo Lowland
5-R-2	EASTLAKE	23NM69	Cairo Lowland
5-R-3	MATTHEWS	23NM156	Cairo Lowland
5-R-8	MOREHOUSE	23NM59	Miss. period
5-R-9	VANDUSER MOUND	23ST1	not classified
5-S-1	CHARLESTON	23MI7	early Miss. period
5-S-4	SANDY WOOD	23ST26	Cairo Lowland
5-S-5	LUSK CHAPEL	23ST28/29	not classified
5-S-6	MEYERS MOUND	23MI10	Cairo Lowland
5-T-1	CROSNO	23MI1	Cairo Lowland
5-T-6	WICKLIFFE	15BA4	(Kentucky site)
6-Q-1	RICH WOODS	23SO1	Malden Plain
6-Q-2	COUNTYLINE	23SO166	Malden Plain
6-Q-4	WULFING PLATES	223DU10*	not classified
6-R-1	LILBOURN	23NM38	Cairo Lowland
6-R-7	OTTER SLOUGH	23NM78	not classified
6-S-1	BARKER	23MI33	Cairo Lowland
6-S-2	SPANISH GRANT	23MI31	Cairo Lowland
6-S-3	SURVEY SITE	23MI30	Miss. Period
6-S-4	EAST BAYOU	23NM52	Cairo Lowland
6-T-1	BECKWITH'S FORT	23MI2	Cairo Lowland
6-3	O'BYAMS FORT		(Kentucky site)
6-T-9	BECKWITH'S RANCH	**	Cairo Lowland
7-P-1	HOLCOMB	23DU4	Malden Plain
7-Q-1	WARDELL	23PM28	Pemiscot Bayou
7-R-3	ESTES	23PM40	Pemiscot Bayou
8-O-1	COCKRUN LANDING	23DU12	not classified
8-O-2	WILKINS ISLAND	23DU13	not classified
8-P-1	OLD VARNEY RIVER	23DU5	Malden Plain
8-P-2	KENNETT	23DU2	Malden Plain
8-P-3	LANGDON	23DU1	not classified
8-Q-3	CANADAY (KERSEY)	23PM42	Pemiscot Bayou
8-Q-4	PERSIMMON GROVE	23PM13	Pemiscot Bayou
8-Q-7	HOLLAND	23PM2	Nodena
8-Q-8	COOTER (CAMPBELL)	23PM5	Nodena
8-Q-8	FRAKES	23PM46	not classified
8-R-1	CARUTHERSVILLE (MURPHY MOUND)	23PM43	Pemiscot Bayou
8-R-2	KINFOLK RIDGE	23PM15	Pemiscot Bayou
8-R-3	CHUTE	23PM21	Nodena

* The Wulfing Plates constitute an isolated find.
**Beckwith's Ranch has never been relocated

Williams discusses the regional chronology and includes the basic descriptions of the phases. Significant portions of those descriptions are presented below. Williams defined his four Mississippi-period phases as follows.

Cairo Lowland Phase

> The Cairo Lowland phase is the typical Mississippian manifestation in this region and will be discussed at length . . . Two levels have been recognized at the Crosno site. The early level with a predominance of loop-handled jars and some cord marked types shows an affiliation with the Obion culture to the east in Tennessee . . .The late level is the typical highly developed Mississippi culture of the Cairo Lowland phase [Williams 1954:29-30].
>
> . . . It may be characterized as having rather compact and well laid out sites often surrounded by a wall and ditch. A medium sized mound usually adjoins a well-defined plaza area. . . . In ceramics the Cairo Lowland phase is characterized by Kimmswick, Wickliffe, and O'Byam series; especially by Kimmswick Fabric Impressed and Wickliffe Incised [Williams 1954:273].

Pemiscot Bayou Phase

> The Pemiscot Bayou phase is partially defined by negative traits. It lacks the three characteristic Cairo Lowland series but does possess a new type-Parkin Punctate. The sites of this phase are not as well laid-out although the largest mound [23PM43] of the area falls into this phase. No walled or ditched villages have definitely been assigned to this phase [Williams 1954:275].

Malden Plain Phase

> The Old Varney River site shows two components. . . .The second component, the Malden Plain phase, is a variant of the general Mississippian tradition which is characterized by almost entirely plain shell tempered ware with handles rare to absent. Another characteristic most notable at the site was the Varney Red Filmed pottery type. This ware is characterized by large jars and salt pans with heavy red-filmed interiors and sometimes exteriors [Williams 1954:30].
>
> The Malden Plain. . . is a regional variant of the Mississippi tradition which "feels" early. The lack of decorated wares and the rarity of handles is suggestive in support of this hypothesis. Some of the vessel shapes are suggestive of this earliness and fit pretty well with the expectations of what this material should look like [Williams 1954:34].
>
> The Malden Plain phase is also partially defined by negative traits for it lacks in ceramics either Kimmswick Fabric Impressed or Wickliffe Incised. In positive traits it has Varney Red filmed and the provisional thin ware type. The sites vary, some are well laid-out with numerous mounds, while others, although evidencing a sizable population, had no mounds or low ones if at all [Williams 1954:275].

Nodena Phase

> The Nodena phase is characterized by a number of positive traits which is probably due to Anderson's intensive surface collections. Ceramically it is defined by Ranch Incised, Vernon Paul Applique, Fortune Noded, and Parkin Punctate. The shapes here are definitely Arkansas types with such varieties as the Pecan type head pot and the the tail-riding effigy. Bottle forms are also Arkansas in type having wide straight necks in contrast to the usually slender necked Missouri Bottles.
>
> In stone, the phase includes willow leaf projectile points and snub-nosed scrapers, as well as numbers of chipped celts. The Contrast between Cairo Lowland and Nodena, the two phases that are best known, is marked. If the Malden Plain and

> Pemiscot Bayou phases were as thoroughly studied, a similar contrast might well be made [Williams 1954:275-6].

Phillips' (1970) ceramic frequency graphs (his Figure 3.6) for the Nodena phase contain only three sites (Carson Lake, Notgrass, and Upper Nodena), none of which is located in southeast Missouri. The graph illustrates low frequencies of Barton Incised and Parkin Punctated and, according to Phillips (1970:935), "a complete reversal in the proportions of Mississippi Plain var. Neeley's Ferry, and Bell Plain" at two of the sites. Phillips suggests pothunter-induced bias may account for this reversal.

There are some basic contradictions in both Williams' named phases and application of those phase names to other sites he studied. Williams places both the Estes site (23PM40) and Canaday (Kersey) site (23PM42) within the Pemiscot Bayou phase even though neither site's collected ceramic assemblage contains the requisite Parkin Punctated ceramics. Although there are other examples of assigning sites that lack the requisite diagnostic materials within manuscript, the more significant problem associated with phase construction lies in using the guidelines stated previously. A phase, according to Williams (1954: 25) is a:

> space-time culture unit possessing traits sufficiently characteristic to distinguish it from all other units similarly conceived whether of the same or other cultural traditions, geographically limited to a locality or region and chronologically limited to a relatively brief span of time.

We must ask, "Do Williams' four phase units meet the criteria for phase definition stated above?" I think not. First, time or temporal duration of his phases is not addressed in his definitions. Second, geographically limited space is not explicitly considered. Williams (1954:274) illustrates the spatial distribution of his four phases but does not provide specific boundaries for the distribution of those phase units. As an example, the Richwoods site, identified as a Malden Plain phase site, lies outside the illustrated limits of the Cairo Lowland phase yet the ceramic collection made at the site contains both Kimmswick and Wickliffe ceramics--his primary horizon markers for the Cairo Lowland phase. Finally, we must ask, "Which traits sufficiently characteristic to distinguish a taxonomic unit are offered in the phase definition?" The absence of Cairo Lowland phase traits may be one approach, yet this seems inadequate. No definitive, replicable procedure or statement is available from Williams to define the concept of "sufficiently characteristic to distinguish."

Critical appraisal of Williams' phase definitions could focus on any number of small inconsistencies. No criteria are presently available to distinguish time, space, or content for many of the sites. In fact, sample size probably plays a major role in the development of archaeological taxonomic units in the Bootheel. We know that salvage excavations subsequent to Williams' surface survey at the Murphy Mound (Caruthersville) (23PM43) site recovered Walls Engraved and Campbell Applique/Punctated ceramics from burials at the site, neither type being represented in Williams' surface collection. This suggests that Murphy Mound could be assigned to both the Pemiscot Bayou phase and Nodena phase site (if Vernon Paul Applique and Campbell-type ceramics are contemporaneous). This would fit with Williams' suggestion that Pemiscot Bayou phase sites are precursors of the Nodena phase sites. However, mortuary practices at the Murphy site are identical to those identified at the Kersey site (23PM42), and this suite of mortuary attributes is assigned by Marshall (1965) to an Early Mississippi-period occupation (the Hayti phase, see below). Regardless, the lack of explicitly stated and defined criteria in Williams' dissertation coupled with the absence of any chronometric controls leave the Pemiscot Bayou phase assignment unresolved.

Marshall's Additions to Pemiscot Bayou Phase Horizon Markers

From the mid-1950s to the mid-1960s few archaeological investigation were undertaken in southeast Missouri. Williams' phase designation were accepted by *caveat* and, in fact, persist today virtually unchanged. However, highway salvage work during the mid-1960s did add a substantial data base for the formulation of additional taxonomic units and phase characteristics. The first notable change is the inclusion of Barton Incised ceramics as a characteristic trait of the Pemiscot Bayou phase (Marshall 1965a:72). Work at the Kersey site (23PM42) (also known as the Canaday site) by Marshall (1965a) identified three components --Kersey 1, Kersey 2, and Kersey 3. Kersey 2 is identified by Marshall as an Early Mississippi-period occupation postdating, but related to the newly named Late Woodland period Kersey phase (see Marshall 1965a:76). The Kersey 3 component fits a then newly expanded criterion of Williams' Pemiscot Bayou phase, and Marshall (1965a:76) adds additional criteria for inclusion in the phase.

> The Kersey 3 component fits the general description of the Pemiscot Bayou phase and is characterized by Parkin Punctated, Barton Incised, Bell Plain, Old Town Red, Neeley's Ferry Plain pottery types, small constricted mouth deep bowls, water bottles with high cylindrical necks, notched rim applique and occasional beveling of the inner rims of vessels, ground and polished chipped beveled-edge gouges or adzes, and the absence of salt pan and Wickliffe ware. Also present is the placement of pottery vessels with some of the dead, extended, supine, primary, and horizontal and vertical bundle burials intruded in a mound and

triangular and Nodena type projectile points.

Clearly, Williams (1954) did not recover many of the artifact classes Marshall assigns to the Pemiscot Bayou phase in his surface collection at Canaday (Kersey). Conversely, Marshall (1965a) may simply have added a significant number of attributes to Williams' original criteria in an attempt to refine the poorly understood phase. However, some of these attributes can not be considered exclusive to the Pemiscot Bayou phase and therefore should not serve as distinctive horizon markers associated with that phase. NFP, Bell Plain, Old Town Red ceramics, and Nodena points are all found at sites attributed to other Mississippi-period named phases as well. In fact, Nodena points (i.e., willow-leaf-shaped points) are the sole lithic attribute used by Williams (1954), and that point type is a hallmark of the Nodena phase. Marshall's inclusion of specific vessel forms/shapes and rim treatments reflects an attempt to use ceramic attributes that are not necessarily subjective in nature and are not linked to existing ceramic typologies.

Marshall's Hayti Phase

In addition, Marshall proposed a new Hayti phase as representative of the earliest Mississippi-period occupation in the southern area of the Little River Lowland. This phase is characterized by the Kersey 2 component at 23PM42 as having:

> large shallow bowls, often with rim grooves and carelessly smoothed exteriors and some cord marking on Neeley's Ferry paste, U-shaped pits, bone awls and ulna punches and chipped bevel-edged gouges." . . .Grassey Salt Pan, Varney Red Salt Pan, Varney Red Filmed, Wickliffe Incised, Cord Marked and Plain, Neeley's Ferry Plain pottery types and miscellaneous pottery

> most noticeable of which is the combed and cord marked Neeley's Ferry paste sherds and pottery vessels with recurved rims. Triangular and side notched projectile points are also typical. A charnel house, funeral preparation of the dead and the dismemberment of the skeletons and placing them in bundles, cremation burial, and low mound construction are also part of this complex [Marshall 1965a:76].

Marshall (1965a) provided an expanded list of attributes or horizon markers used in designating a new phase in southeastern Missouri. Included in this exhaustive trait list are vessel shapes, vessel-surface treatments, rim shape, subsurface pit morphology, modified bone tools, chipped-stone tools, newly named ceramic types, above-ground features (charnel house, low mound construction), pre-interment mortuary practices, and burial practices. Returning to the aforementioned Murphy Mound (23PM43) example, this site now has a Late Woodland Baytown component, a Pemiscot Bayou phase component, a Nodena/Armorel/Campbell phase component, and a Hayti phase component. This is, of course, entirely possible since the Early Mississippi-period component could include a Hayti phase occupation, the Middle Mississippi-period component could be a Pemiscot Bayou phase occupation, and the Late Mississippi-period occupation could be represented by a Nodena/Armorel/Campbell phase occupation. Note that there are no valid temporal parameters for any of these phase designations since 23PM42 or 23PM43 have never been subjected to rigorous absolute- or stratigraphic-dating methods.

Of greater importance to evaluating the Hayti phase is the association of vertical and horizontal bundle burials and cremation burials as horizon markers for the phase. First, these burial modes also are, in part, horizon markers for the Pemiscot Bayou phase. Second, if the Hayti phase dates to the

Early Mississippi period (ca. A. D. 900-1100) and those mortuary practices are exclusive to the period and phase, then one would expect Early Mississippi-period ceramic artifacts to be routinely associated with those burial modes. At Murphy Mound we find cremation burials associated with Fortune Noded ceramics (Nodena phase) and horizontal bundle burials associated with Walls Engraved and Fortune Noded ceramics (Walls and Nodena phases). Since Nodena is a Late Mississippi-period manifestation, one must question the use of these mortuary attributes as horizon markers for an Early Mississippi phase and for that matter, the Middle Mississippi- period Pemiscot Bayou phase as well. These findings do not appear to be consistent with the burial sequence proposed by Marshall (1965a:66). Perhaps this is not a temporal interpretation. These ceramic associations may be compatible with Marshall's sequence of burial placement, but they are not compatible with a Hayti phase, early Mississippi-period occupation since Fortune Noded and Walls Incised are hallmarks of the later Nodena and Walls phases.

J. Raymond Williams' Bryant Phase

J. R. Williams (1967) presented one new archaeological classification of the Mississippi period in southeast Missouri. He (J. R. Williams 1967:322) states:

> The Bryant site is tentatively given the status of a phase in this report and is called the Bryant Phase for lack of a better term. It is apparently Early Mississippian in time. Although there is some question, it seems to be too early for the Cairo Lowland Phase.

Clearly, this phase designation lacks much in the way of archaeological and analytical rigor. The attributes of the Bryant Phase are unstated. Williams did not assign the Early Mississippi-period component to the Cairo Lowland phase because there is more ". . . Baytown Plain pottery at the site than in either 'level' at Crosno" (cited in Klippel 1969:92). Klippel's assessment of the Bryant materials is that the assemblage is more closely related to the late (Middle Mississippi-period) component at Crosno than to an Early Mississippi occupation. Consequently, Klippel (1969:92) suggested that the Bryant materials be assigned to a subphase of the Cairo Lowland phase with a temporal limit of A.D. 1250 to 1450.

Phillips' Beckwith Phase

One cannot overlook Phillips (1970) treatment of the archaeological classifications pertinent to the Bootheel. Phillips (1970:912-913) proposed a Beckwith phase and related it to Late Woodland-Early Mississippi-period transitional assemblages at Beckwith's Fort (23MI2) and Williams' (1954) Crosno I (23MI1) (early Cairo Lowland phase). In part, this transitional period is based on the presence of Mississippi-like, clay-tempered vessels recovered from archaeological contexts in the Cairo Lowland. Teltser (1988), Williams (1954), and others have demonstrated that addition of clay- tempering agents to Mississippi-period vessels persists through the entire Mississippi period sequence. Therefore, the supposition that clay tempering temporally precedes and is entirely replaced by shell tempering in all cases is invalid. Phillips (1970:912) acknowledges that this phase is a "very shaky proposition."

> It is nothing short of ridiculous to attempt the definition of a Beckwith complex on such slender foundations. The outstanding feature would seem to be an overwhelming predominance of Baytown Plain over Mulberry Creek Cord Marked--658 Baytown to 13 Mulberry Creek in the Beckwith's Fort sample (Williams and Scully's field count, 1950). Also indicated is a high frequency of "clay-tempered Bell Plain and minorities of their Cairo Lowland decorated types (Wickliffe

> Thick, O'Byam Incised, Matthews Incised) in their "clay-tempered" versions. At Crosno there were also two distinct shell-tempered cord-marked types not yet incorporated into our present classification. These appear to have been associated with the Baytown--Mulberry combination in the site (Williams 1954a, Fig. 28). Other rare minorities are Wheeler Check Stamped and Larto Red. Whether this congeries will hold together as a recurrent complex remains to be seen.

In the intervening 21 years since Phillips penned the above passage we are no closer to resolving the problem of the persistence of clay-tempered Mississippian-styled ceramics nor are we any closer to refining our understandings of the "transition" of Late Woodland lifestyles into the Mississippi pattern (see Brain's [1991] review of Dunnell and Feathers [1991]).

Phillips On The Cairo Lowland Phase

Phillips (1970:925) considers the Cairo Lowland phase to be the "most profusely documented phase in the Lower Mississippi Valley, if not the entire southeast." However, that statement reflects more on the two dozen or so antiquarian-oriented publications detailing unprovenienced ceramic mortuary assemblages from Cairo Lowland phase sites than it concerns the status of rigorous classificatory-historical research.

As Phillips (1970:925) notes, description of the Mississippi-period ceramic complex in the Cairo Lowlands is difficult due to a perceived persistence in clay tempering from the Late Woodland period into the subsequent Mississippi period. Phillips' Beckwith phase discussed above suggests that clay-tempered pottery associated with Mississippi-period vessel forms and decorative motifs are temporally earlier. This observation remains unsubstantiated as of this writing because only limited ceramic seriations have been published, and no systematic chronometrically substantiated study of the problem has been undertaken.

Phillips also expands the list of ceramic type varieties that serve as "criteria" for the Cairo Lowland ceramic complex. This list is more extensive than S. Williams' (1954) horizon markers of Kimmswick Fabric Impressed and Wickliffe Thick (Incised). Phillips (1970:925) included Bell Plain, var. New Madrid, Matthews Incised, vars. Matthews, Beckwith, and Manley, Old Town Red, var. unspecified (more like Beaverdam), O'Byam Incised, var. O'Byam (including Williams' O'Byam Engraved), Kimmswick Fabric Impressed, var. Kimmswick, Wickliffe Thick, var. Wickliffe, Mound Place Incised, var. unspecified, and Nashville Negative Painted, var. Sikeston.

Phillips indicates that there is no perceived consistency in the distribution of these types among the 15 surface assemblages he studied. He also reported a lack of homogeneity between the collections and attributes that disparity to the poor (i.e., small sample size) quality of the samples from small sites. He assigns those small-sample sites to the Cairo Lowland phase on the basis of "characteristic settlement patterns and mortuary pottery illustrated in the copious literature" (Phillips 1970:925). However, he does not tell the reader how a small Cairo Lowland site differs from similar sites assigned to other regional phases in settlement patterns or mortuary pottery.

Phillips On The Malden Plain Phase

Basically, Phillips (1970:927-928) relies on S. Williams' (1954) existing definition of the Malden Plain phase. However, he does add the criterion of an unclassified, shell-tempered, cord-marked ware that is considered as a marker for the phase (Phillips 1970:927). Phillips' discussion of the Malden Plain Mississippi-period sites is interesting primarily because he introduces data from excavations conducted by Marshall (1965b) and Moselage (1962). These excavation reports stand in contrast to Williams' reported surface collections, as they illustrate the presence of strap and loop handles and decorative types identified as Wallace Incised by Moselage (1962). The presence of handles and decorative types at these Mississippi period Malden Plain sites suggest that sample source and sample size have again led to an erroneous conjecture concerning temporal parameters associated with the ceramic assemblage. Loop handles and strap handles, if we are to follow the temporal model for handles in the Cairo Lowland in the Malden Plain (i.e., loop handles predate strap handles), suggest both an Early and Middle Mississippi-period occupation, not the Early Mississippi-period occupation of the region indicated by S. Williams.

Phillips On the Pemiscot Bayou Phase

The best way to present Phillips' (1970:929) views on the Pemiscot Bayou phase is to cite his work directly. He states:

> This is one of our weakest Mississippian formulations as Williams would freely admit. It was prompted by the difficulty of assigning a small group of components in the Little River Lowland (north, i.e., above the Missouri line) to the Cairo Lowland phase. The components in question are practically without any of the more specific Cairo Lowland markers (O'Byam Incised, Kimmswick Fabric Impressed, and Wickliffe Thick). A few sherds show up in the counts as Matthews Incised, but Williams is not sure they were properly classified (1954:90). Some of the Pemiscot Bayou components, especially Persimmon (8-Q-4) and the type site Kinfolk Ridge (8-R-2), differ also in having elements such as Parkin Punctated and various unclassified shell-tempered incised, punctated, and noded types that are not present in the Cairo Lowland. The source of these features seems to be in the south, from which one might infer that Pemiscot Bayou is simply intermediate culturally, as it is

> geographically between the Cairo Lowland and Nodena phases. The difficulty with this simple explanation is that there are perfectly good Nodena components in the same locality . . . that are ceramically quite distinct from the Pemiscot Bayou sites.

This citation is important because it illustrates how many of these early phases were defined. Williams' (1954) classification and Phillips' (1970) subsequent evaluation of those phases make it clear that all phases were defined using the Cairo Lowland phase as the model or archetype for the Mississippian occupation in southeastern Missouri. Consequently, what occurred was the intuitive comparison of surface-based assemblages with materials recovered from the excavated assemblage from the Crosno site. Thus there are different kinds of samples (excavation and surface collection) and different sizes of samples being compared. In addition, although both Williams (1954) and Phillips (1970) use a geographic (spatial) model to order data, homogeneity within these diverse geographic regions is not as important as the apparent homogeneity between the Cairo Lowland and the region under study (see the example of the Richwoods site detailed previously). An assemblage, component, or ceramic complex was not necessarily examined for its regional distinctness but for its overall fit within the seriated Crosno samples.

Time was, and continues to be, a central problem with both Williams' and Phillips' ordering of materials. Williams (1954) relied on simple stratigraphic positioning to seriate the materials from Crosno. Statistical evaluation of the seriation curves is not provided. Crosno, like many of the large sites in southeastern Missouri appears to have been continuously occupied from Late Woodland, Baytown tradition times through the Middle Mississippi period.

Beckwith's Fort (23MI2), another Cairo Lowland phase civic-ceremonial center was occupied from <u>at least</u> A. D. 400 to 1430 with no notable interruption or hiatus in the occupation. Similarly, Crosno most likely exhibited a continuous occupation but we cannot subject the seriated materials to cross-dating.. Consequently, I perceive change in these ceramic assemblages as gradual with no significant, discernable breakpoints. Plog 1974:44-45) illustrates this point in that phases, based on significant artifact attributes, are analytical constructs that, as they incorporate more things and more variability, become less and less distinct as discrete time/space units. This underlies part of the difficulty when Williams "felt" that the Malden Plain phase materials were earlier. However, that feeling is based in part on the fact that Williams' comparative sample of Cairo Lowland materials exhibited substantially more diversity in decorative treatment than similar materials from the Malden Plain (cf. Dunnell and Feathers 1991).

Phillips On The Nodena Phase

Phillips' discussion of the Nodena phase actually centers on archaeological phenomena outside of southeastern Missouri. Holland's (1991) Figure 3 replicated below (Figure 2) illustrates the genealogy or genesis of the Nodena phase from earlier named phases. In southeast Missouri, Nodena is poorly understood. Although Phillips (1970:934) identifies the Campbell site (23PM5) as Nodena (as did S. Williams [1954]), subsequent investigators have included it either in a separate Campbell phase (Smith 1990) or Armorel phase (S. Williams 1980). Parenthetically, the Nodena, Parkin, Walls, Kent, Armorel, and Campbell phases are all considered to contain fairly late, regional manifestations of the Mississippian tradition. However, we lack radiocarbon dates for many of these phases and attendant sites and have

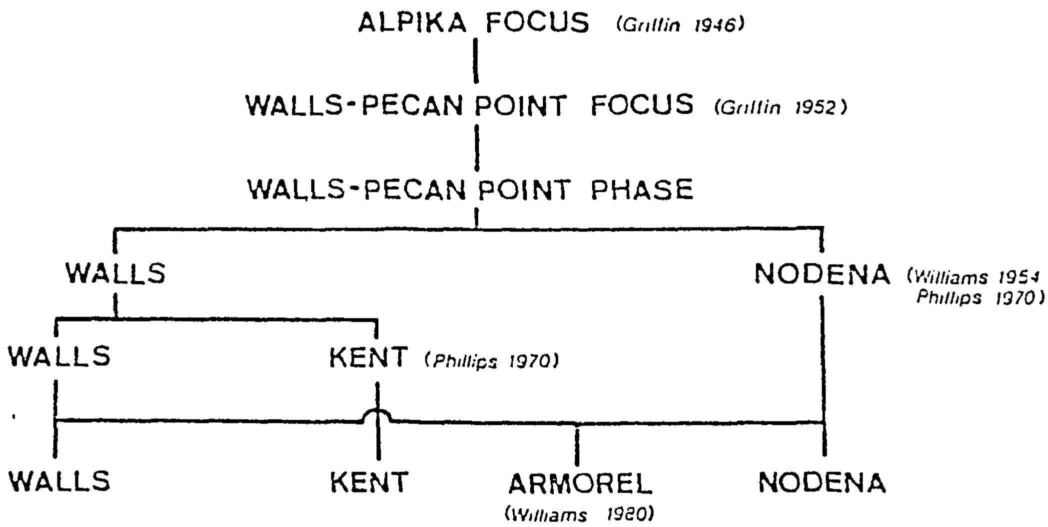


Figure 2. Genesis of the Nodena/Armorel Phases (from Holland [1991]).

relied primarily on intuitive comparisons of assemblages, in fact, relying extensively on limited information whose source generally is looters. Many sites of this period have been heavily looted and knowledge of the ceramics from these sites often relates to the mortuary assemblages rather than the potentially more diverse occupation assemblages.

Chapman's Early and Middle Mississippi Period Phases

Chapman (1980a) defined and discussed a number of phases and aggregates from the Bootheel region. Stating that "phase designations are confusing and not consistent in that they are not based on the same type of information (1980a:185)," Chapman attempted to introduce and impose a new set of phases for the region, and (1980:184-261) identified 14 separate taxonomic units for the Early and Middle Mississippi periods (Table 4). However, Chapman's unnumbered table illustrating the Cultural Sequence, Southeast Riverine Region (1980:268) identifies 11 Middle Mississippi phases and 14 Early Mississippi phases. No apparent reason for this numerical disparity can be found in either the text or the table. (One can only speculate on how many additional phases would be named if Chapman had completed his proposed volume on the Late Prehistoric/Protohistoric archaeology of Missouri.)

Chapman broke with the existing cultural classificatory frameworks in developing his taxonomic scheme. The large number of phases apparently resulted from Chapman's modeling of his Mississippi-period taxonomic units on the Powers phase model defined by Price (1973) and Price and Griffin (1979). Chapman's (1980a:138) definition of phase is noncommittal; for him a phase is:

> . . .a community or a set of closely related communities of people

> who lived within a geographically circumscribed locality, portion of a locality, or localities for a span of time within which there were no major overall changes in the cultural traits or items.

Table 4. Early and Middle Mississippi Phases Defined by Chapman

Early Mississippi	Middle Mississippi
Hunze Aggregate I	Hunze Aggregate II
Peter Bess I	Peter Bess II
Lakeville Settlement I	Lakeville Settlement II
Sandywooods I	Sandywoods II
Beckwith I	Beckwith II
Sikeston I	Sikeston II
Matthews I	Matthews II
Crosno I	Crosno II
Towosahgy I	Towosahgy II
Lilbourn I	Lilbourn II
Richwoods I	Richwoods II
Wardell I	Wardell II
Caruthersville I	Caruthersville II
Langdon I	Langdon II

Note: Additional mortuary pottery aggregates identified in Chapman (1980) as possible phases are: Evans, Spanish Grant, 23MI500, Bryant, 23MI544, and Hayti (Hayti phase as defined by Marshall [1965a]).

Chapman (1980a:138) also found it necessary in his discussion to define a Village Farmer (Mississippian) community as " usually consisted of a fortified civic-ceremonial center with sattelite villages, farmsteads, and collecting stations. Chapman acknowledged that there were most likely many spatial, temporal, and formal overlaps in phase characteristics and that some of his taxonomic units were based solely on perceived differences in ceramic assemblages from spatially separated ceremonial burial complexes. In addition, he admitted to the somewhat hypothetical nature of these phases.

The outcome of Chapman's taxonomic scheme is chaos. He (a) continued to employ the same inferential dating as previous investigators, (b) included sites with inferred ceremonial mounds as individual phases, (c) speculated on potentially associated sites, and (d) only occasionally presented data in support of these phase designations. Further, unlike the Powers phase defined by Price (1973), Chapman did not perform the requisite on-the-ground reconnaissance and extensive excavations to define a "geographically circumscribed locality." He simply named a phase after every major site associated with a civic-ceremonial mound, or after an aggregate of materials (often from mortuary contexts) that could not be directly related to a large mound site. Finally, although Chapman briefly mentions some Late Mississippi sites, he does not designate Late Mississippi-period phases. One assumes that the Berry, Campbell, McCoy, and other late sites would have been upgraded to phases and included in his taxonomic scheme.

Chapman's taxonomic scheme has never been adopted by archaeologists working in the Central and Lower Mississippi Valley. His attempt to order what are in essence archaeologically defined polities exhibits at least one fatal flaw. In most cases the material-culture assemblage of a single civic-ceremonial center cannot be distinguished from assemblages at either adjacent or more distant centers (violating the time, space, and content rule of phase definition). Note that all of Chapman's phases comprise long-term, Mississippi-period occupations, and most of those sites also exhibit Late Woodland components as well.

Armorel Phase

Stephen Williams, originator of the first comprehensive taxonomic scheme for the Bootheel, also is the architect of one of the most recent phases to be named in the Bootheel--the Armorel phase. Armorel is considered to be a terminal Mississippian phase dating from A. D. 1500 to 1700. Its geographic distribution includes southeastern Missouri and adjacent areas of northeastern Arkansas and western Tennessee. Williams (1980:105) has stated that Armorel "represents the latest aboriginal culture unit in the region just prior to significant decimation and dispersal by strong European contact." Therefore, Armorel is the Terminal or Late Mississippi-period phase in the region. Williams (1980:105) considers the Campbell site (23PM5) to be the best reported of any of the sites related to the phase (only three sites in Missouri are designated as components of the phase: Campbell, McCoy, and Holland).

Williams (1980:105-106) identifies a number of horizon markers for the phase including:

> *Ceramics*: Late Mississippi types and modes: Well executed Bell Plain, late Parkin Punctate, Campbell Applique, Fortune Noded; arcaded handles, "jar-necked" bottles and other composites (see Chapman and Anderson 1955; Moore 1910, 1911; also Hathcock 1976; White 1976 for Field Museum collection: *Lithics*: Snub-nosed scrapers--large and small (thumb-nail); Nodena (willow leaf) projectile points; "pipe" drills; basalt groundstone adzes; catlinite, especially Siouan disk pipes. *Special Horizon Traits*: Square engraved shell buttons (Williams 1956) and non-reposusse copper eagles (Moore 1911: Plate 10); Hamilton *et al.* 1974:165-68). Historic Trade Goods: Some of Spanish origin: Beads Parkin (Klinger 1977a); others at Campbell (Anderson collection); Rhodes and Bradley (Moore 1911); Clay Hill--a Clarksdale bell (personal communication, John House.

Williams invokes the authority of James B. Griffin to justify defining this new phase (knowledge by authority Salmon [1984]). Some questions persist, however, in operationalizing the Armorel phase. Williams makes frequent reference to his Markala horizon (1980:108), a late prehistoric/protohistoric horizon distributed throughout much of the southeastern United States, as justification for a late phase in the southeast Missouri. Interestingly, none of the attributes listed above necessarily occurs at a single site (i.e., non-repousse copper plates are not known from the Campbell site). Even more interesting, with the exception of one burial at the Campbell site (since lost to private collections), all of the historic trade goods are from surface contexts. As a final point, most of the shell buttons, catlinite pipes, and historical-period trade goods from the Parkin site were found not in an archaeological context by professional archaeologists, but are surface finds reported primarily by looters and collectors. Consequently, provenience remains suspect, particularly due to the problems of context and dating of the artifacts identified as horizon markers of the phase.

Williams may be correct in defining the Armorel phase as a discernable unit. However, the Campbell site, the best-reported Armorel site, has been classified as Nodena by Williams (1954), as a Campbell phase site by G. Smith (1990), and as a Armorel phase site by Williams (1980). All of these phases are considered to date to either the Late Mississippi or Protohistoric period. There are no formal analytical comparisons of the assemblages relating to this or any of the other sites and phases discussed above nor have any chronometric analyses been performed. For all intents and purposes, this best-reported site had only been partially described until Holland's (1991) doctoral research was completed.

The Big Lake Phase: Early Mississippi Occupation on the Malden Plain

Morse and Morse (1983, 1990) present extensive discussions concerning an Early Mississippi period manifestation on the Malden Plain. Much of this discussion focuses on extensive excavations at the Zebree site in northeast

Arkansas. Since little of the Malden Plain lies within the three-county study area, extensive discussions of this phase are not included. The Big Lake phase ceramic horizon markers are considered to relate to a "Varney" period (Morse and Morse 1983:218) and consist of Varney Red Filmed, Mississippi Plain and Wickliffe Thick. But remember that Wickliffe thick also is a horizon marker for the Middle Mississippi-period Cairo Lowland phase to the north. Varney Red-Filmed saltpans also are frequently found at Big Lake phase sites.

The Big Lake phase is suggested to date to the Early Mississippi period ca. A.D. 800-850 to A.D. 1000-1050 (Morse and Morse 1983:201). One radiocarbon date from Dunklin county has a date of A.D. 840 $\pm$ 130 (RL-1418). The date was obtained by Robert C. Dunnell of the University of Washington as part of his ongoing research in the Malden Plain area.

Miscellanea

In 1990 additional developments in the classification of archaeological phenomena were published. For the first time we see mention of a Campbell phase (G. Smith 1990:163-164). Smith notes that the Campbell phase is the best-known phase of the Pemiscot Bayou district. Since this is the first mention of such a phase in print it is difficult to determine how it is the best-known phase. Most likely, Smith is referring to the fact that initial, avocational excavations at the Campbell site (23PM5) were published (Chapman and Anderson 1955). Other sites related to the "phase" (McCoy, 23PM21, and Cagle Lake, 23PM13) have been mapped and surface collected, as well as having limited excavations (J. R. Williams 1968).

Smith (1990: 164) provides an extensive list of characteristic attributes for the Campbell phase:

> The ceramic complex shows a continuity of the trends developing in Pemiscot Bayou, with the addition of a wide variety of decorated types, most of them apparently introduced from the south. The decorated types include Nodena Red and White, Kent Incised, Barton Incised, Rhodes Incised, Ranch Incised, Fortune Noded, Walls Engraved, Campbell Punctate, Matthews Incised on Neeley's Ferry paste, Hollywood White Filmed, and Carson Red on Buff. Vessel forms include low- to flared-rimmed jars; water bottles with large globular bodies and relatively small cylindrical necks; water bottles with globular bodies and flared necks, often with flared annular bases; flared-wall and subhemispherical bowls; rime effigy bowls including tail-rider effigies; effigy water bottles; and head effigy vessels. While quite similar to the Nodena ceramic complex, that of the Campbell phase is distinguished by its higher frequency of Parkin Punctated, Old Town Red, and Campbell Punctate, much lower frequency of Kent and Barton Incised, and distinctive bottle forms.
>
> The lithic assemblage includes Nodena points, snub-nosed end scrapers, bipointed perforators, ground-stone celts, chipped and polished adzes and chisels, and ground-stone discoidals. Bone artifacts include bone pins, split bird-bone awls, antler tine flakers, and possible arrow points. Shell items include disk beads, conch columella beads, and mushroom shaped earplugs.

The inclusiveness of the attribute list results in a broadly defined phase. Thus it is not surprising that Nodena points are horizon markers for the Nodena phase, mushroom-shaped earplugs have been found in Middle Mississippi-period sites, disk beads are found in the Late Woodland period throughout eastern North America, and Barton Incised is an attribute of the Pemiscot Bayou phase. Smith's horizon markers obviously transcend not only the restricted temporal and spatial criteria of phase definition but appear to violate the criteria of similar content as well.

Ceramic analysis of the McCoy and Cagle Lake sites alluded to consist of sherds counts and percent by provenience with no accompanying inter- and intra-site statistical comparisons (Williams 1968). Although there were some excavations at Cagle Lake, the investigator identified the component as a Nodena phase occupation. It is difficult to see where Smith (1990:164) obtained his comparisons of Nodena and Campbell phase ceramics as he cites no published report nor does he provide any analytical results. The question remains as to whether Smith is following the Chapman model of phase designation (i. e., ceremonial center + large site = phase) or is he suggesting that the Campbell phase is sufficiently distinct from Williams' (1980) previously defined Armorel phase, or Williams' (1954) Nodena phase. Smith (1990) does not list the data that led him to separate Campbell phase components from these other two Late Mississippi-period phases. To the best of my knowledge, there are no formal statistical comparisons of Parkin, Armorel, Campbell, or Nodena ceramic assemblages. All existing comparisons are based on intuitive judgments apparently derived from perusing and replotting existing ceramic cumulative frequency charts. These percent frequency graphs may illustrate the composition of an an assemblage but plotting those frequencies does not constitute a rigorous analytical comparison of assemblages. Frequency graphs often are used to suggest that ceramic-type frequencies from contemporaneous sites are similar and therefore related (often stated under the auspices of a phase designation). That may be or may not be so. Those interpretation are evaluated in the next chapter.

In the same volume where the "new" Campbell phase is defined, Barry Lewis provides a possible escape route from the confusing and contradictory phase designations prevalent in southeastern Missouri. Lewis (1990:43-55) has developed an entirely new approach to archaeological cultural classification, one that drops any and all horizon markers in favor of arbitrary, non-overlapping 200-year-long blocks of time. The approach is designed to replace phases constructed in the manner of Williams' (1954) Cairo Lowland phase. However, to date, this temporal ordering scheme has only been applied to sites on the east bank of the Mississippi and has not been put to practical use in southeast Missouri. Lewis (1990:41-42) provides the following explanation for this using this phase approach:

> At the risk of oversimplifying something that is actually a very complex process, phase definition in the Lower Mississippi valley tends to be based on the delineation of a bundle of material culture attributes that co-occur within the archaeological record of a region. Some subsets of those attributes are taken to be diagnostic criteria for the identification of new components. The temporal dimensions of a phase, so defined are continually reassessed through cross-dating the diagnostic criteria, interpreting the absolute dating of contexts within which those criteria occur, and the analysis of stratigraphy. The approach followed here differs in that the temporal dimension of a phase is arbitrarily set. Its cultural content is then continually reassessed by cross-dating the material culture attributes that appear to be useful diagnostic features of that phase, interpreting the absolute dating of contexts within which those diagnostic features occur, and analyzing stratigraphy.

Lewis' primary purpose in proposing the new strategy for ordering archaeological data in the region reflects his concern that radiocarbon dating has been poorly incorporated into regional cultural chronologies. This concern is valid. His approach forces the culture historian to integrate absolute dating into the contextual interpretation of archaeological phenomena, alleviating one problem that plagued previous approaches. A detailed discussion of the usefulness of employing this scheme can be found in Lewis (1990). Lewis' four phases are temporally defined as follows: James

Bayou phase, A. D. 900-1100; Dorena phase, A. D. 1100-1300; Medley phase, A. D. 1300-1500; Jackson phase, A. D. 1500-1700.

Phase Summary

At this juncture confusion should reign supreme. The following listing is provided to illustrate the stated temporal period and ceramic horizon markers of the phases discussed previously. Note that the ceramics identified as horizon markers are of different analytical scale; that is type, type varieties, and unnamed types are used as horizon markers. Even though all of the originators of the above-named classificatory units generally followed Phillips and Willey's (1953) definition of a phase (with the notable exception of Chapman), none of the authors truly dealt with the space, brief span of time, and the sufficiently distinct assemblage content criteria required by that definition. S. Williams "felt" that something was early (Malden Plain phase) or invoked a higher authority to justify the formulation of a new phase (Armorel phase). J. R. Williams named a phase and never presented formal attributes to define it (Bryant phase). Phillips expounded on S. Williams' phases, adding ceramic attributes that are not necessarily time sensitive nor restricted solely to that phase, and named a new phase (Beckwith phase), the validity of which even he questioned. Marshall developed an Early Mississippi-period phase wherein the attributes might, in fact, represent a middle or late Mississippi component at a nearby site (Hayti phase). Nodena points represent a lithic attribute of both a Late-Middle Mississippi-period phase (Pemiscot Bayou phase) and a Late Mississippi- period phase (Nodena phase). Chapman named a number of new phases based on Price's Powers phase model but never identified the diagnostic attributes of those phases to classify outlying settlements associated with the civic-ceremonial centers

Listing of Phases, Cultural Periods, and Ceramic Horizon Markers

Phase Name	Cultural Period	Hallmark/Diagnostic Ceramics	Scale of Ceramic Type
Malden Plain	Early Mississippi	NFP	Type variety
		Varney Red-filmed	Type variety
		Shell-tempered cordmarked	Not typed
Big Lake	Early Mississippi	NFP	Type variety
		Varney Red	Subtype
Hayti	Early Mississippi	NFP	Type-variety
		Grassey Salt Pan	Type
		Varney Red Salt Pan	Type
		Varney Red Filmed	Type
		Wickliffe Incised	Type
		Wickliffe Cord Marked	Type
		Wickliffe Plain	Type
		Combed and Cord Marked NFP	Not typed
Beckwith	Early Mississippi	Clay-tempered	
		Bell Plain	Type
		Wickliffe Thick	Type
		O'Byam Incised	Type
		Matthews Incised	Type
Bryant	Early Mississippi	Unknown	Unknown
Cairo Lowland	Early and Middle Mississippi	Kimmswick Fabric Impressed	Super type
		Wickliffe Series	Type
		O'Byam Incised	Type
		Bell Plain var. New Madrid	Type variety
		Matthews Incised var. Matthews	Type variety
		Matthews Incised var. Beckwith	Type variety
		Matthews Incised var. Manly	Type variety
		Old Town Red var. unspecified	Type
		O'Byam Incised var. O'Byam	Type variety
		Kimmswick Fabric Impressed var. Kimmswick	Type variety
		Wickliffe Thick var. Wickliffe	Type variety
		Mound Place Incised var. unspecified	Type
		Nashville Negative Painted var. Sikeston	Type variety
Pemiscot Bayou	Middle Mississippi	Parkin Punctated	Type
		Barton Incised	Type
		Old Town Red	Type
		NFP	Type variety
		Unclassified shell-tempered incised, punctated, and noded	Not typed

Listing of Phases and Ceramic Horizon Markers (continued).

Nodena	Late Middle Mississippi	Ranch Incised	Type
		Vernon Paul Applique	Type
		Fortune Noded	Type
		Parkin Punctated	Type
		Pecan-type headpots	No formal type
		Tail-riding effigy pots	No formal type
Campbell	Late Mississippi-Protohistoric	Nodena Red and White	Type
		Kent Incised	Type
		Barton Incised	Type
		Ranch Incised	Type
		Rhodes Incised	Type
		Fortune Noded	Type
		Walls Engraved	Type
		Campbell Punctate	Type
		Matthews Incised	Type
		Hollywood White Filmed	Type
		Carson Red on Buff	Type
		Old Town Red	Type
		Parkin Punctated	Type
Armorel	Late Mississippi-Protohistoric	Well executed Bell Plain	Type
		Late Parkin Punctated	Type
		Campbell Applique	Type
		Fortune Noded	Type

Chapman (1980) and Lewis (1990) do not employ ceramic horizon markers and are not included in this listing.

forming the nucleus of those phases. Finally, Lewis rejected all of the Cairo Lowland horizon markers in favor of a simple stacked chronology based on arbitrary, nonoverlapping 200-year slices of time.

The basic problem with phase definition in southeastern Missouri is the use of the Cairo Lowland material as an archetype to which all assemblages are compared. Dunnell and Feathers (1991:41-42), for example, argue that the Malden Plain cultural sequence is an isolated sequence from Archaic times through at least the Late Woodland period due to the isolated nature of that physiographic feature. They admit that this isolation is not complete and identify two archaeological signatures that represent external relations during the Mississippi period--the presence of Mill Creek and Dover cherts. If, in fact that sequence is isolated, definition of the phases making up the cultural sequence should be developed in terms of the continuity and homogeneity of cultural materials within the area in conjunction with rigorous comparisons with materials from external locations.

Overall, in my opinion, while there may be some validity to the phases discussed above, the analytical development of those phases often is based on single-site surface collections; salvage excavations; small surface-collected samples from a limited number of sites; the intuition of the investigator, and a lack of rigor in either the development of the phase or its application as a classificatory device. Consequently, in an attempt to sort out some of the confusion, the statistical evaluations in the following chapter are undertaken. Although many of the phases discussed comprise multiple attributes, the attribute used most frequently to classify archaeological phenomena in southeast Missouri is the composition of the ceramic assemblages at the level of the site, excavation-unit level, and feature content.

Chapter Summary

This chapter illuminates a number of the major problems facing archaeologists attempting to perform cultural-historical classification in southeast Missouri. Only the prominent difficulties have been outlined but those problems relate to the basic problems of typology and the resulting interpretation and explanation of the Mississippi period embedded in those typologies. Cultural-historical classification of Mississippi-period occupations in the region is primarily based on ceramic typology. The ceramic typology currently in use does not account for much of the variation in the known ceramic samples nor are the embedded temporal and cultural interpretations associated with those types necessarily correct. Radiocarbon dating in the Bootheel has been nonsystematic and often haphazardly interpreted. Finally, the named phases are developed from small samples of cultural materials and are not cross-checked with detailed stratigraphic information or radiometric-dating techniques.

CHAPTER 5: A STATISTICAL COMPARISON OF ASSEMBLAGES

If it can't be expressed in figures, it is not science; it is opinion (Heinlein 1973:240).

To assess the relations among and between the multiple phases and components defined by Williams (1954) and others (e.g., Marshall 1965), a comparison of ceramic assemblages was undertaken. Contemporaneity of the various collections was not considered as much of the material comes from surface contexts and little detailed, dated stratigraphic information is available in either manuscript or published sources. The following comparisons are made by determining the degree of similarity among the ceramic assemblages using the Brainerd-Robinson coefficient of similarity. The standard "analytical" technique for comparing assemblages of ceramics in southeast Missouri and northeast Arkansas has been the compilation of cumulative-frequency tables. Similarities or differences between and among assemblages are then "interpreted;" that is, meaning is assigned to differences and similarities in percent frequencies of different types of ceramics. This, of course, does not constitute a rigorous analysis because differences and similarities are not evaluated as to whether they are statistically significant. Percent frequency charts only illustrate relative frequencies. In my opinion, statistical comparisons are necessary to <u>begin</u> any interpretation of those assemblages.

The intent of my research is not to set up a straw man as it is easy to criticize, through hindsight, work conducted in the 1950s and 1960s as new information accrues and the inconsistencies become apparent. Rather, my intent is to examine that same data in a more rigorous manner to first, determine if the original phase designations have statistical validity, and second, to determine if any new statistical ordering of existing data is possible. This chapter builds on previous investigations and adds to our knowledge of the Mississippi-period occupation of southeast Missouri even though it does, in part, deconstruct previously held assumptions concerning that period. The method employed is the statistical comparison of ceramic assemblages--as the original investigators described those assemblages.

Working Assumptions and Modifications to Previous Work

Statistical comparisons presented below use data derived from published and manuscript sources and from classification of collections held by the Museum of Anthropology, University of Missouri-Columbia. Body sherds identified to the level of type-variety also are included in the pooled assemblages at the level of type. This appears to be contrary to earlier classification efforts that often only included rimsherds in their data sets. Some data in the published sources are unavailable or are presented in a manner that cannot be used. Only data presented in the format of defined ceramic-type frequencies are used in these comparisons. Consequently, Phillips' (1970:Figure 448) presentation of cumulative-frequency percentages of ceramics of the Parkin, Nodena, Walls, and Kent phases could not be used because he does not provide actual percent frequencies or raw counts of ceramic types.

Ceramic types used in this evaluation are primarily those defined by Phillips *et al.* (1951) and Phillips (1970). Ceramics listed in site, level, or feature inventories not clearly identified to the level of type (e.g., fine ware, unidentified incised, unidentified punctate, etc.) have been omitted from consideration. Sortability is the key to ceramic typology, and only defined, sortable types have been included in my data base. In addition, I have taken the liberty of combining a few types due to perceived problems in the ceramic typologies. This step may be criticized. However, due to the nature of type descriptions, individuals sorting ceramics may have difficulty sorting similar types when they encounter small (1 to 2 inch) sherds or when sherds are weathered. Archaeologists conducting recent surface surveys in the Missouri Bootheel find few large sherds on the surface.

Therefore, Varney Red, Varney Red Salt Pan, and Old Town Red are lumped into the single category of red-filmed, shell-tempered ceramics (see the discussion of red-filmed ceramics in Chapter 4). For the same reasons, Matthews Incised var. Beckwith and Matthews Incised var. Matthews are lumped into a single type, Matthews Incised, while Matthews Incised var. Manly is maintained because of its distinctive decorative motif. Kimmswick Fabric Impressed/Plain, all subgroups of Wickliffe Thick, and O'Byam Incised/Engraved were lumped into Kimmswick, Wickliffe, and O'Byam supergroups respectively. To the best of my knowledge, there are no regional or temporal differences sufficiently documented to separate the combined varieties of the respective types.

There may be, however, one serious lumping flaw in the statistical evaluation. This concerns lumping Campbell Applique, Campbell Incised, and Campbell Punctated with Vernon Paul Applique into a single ware considered here as a Campbell Ware (see Figure 3). Identified as provisional types, Phillips (1970:61-62)) indicates that the Campbell Applique and Campbell Punctate decorative treatments, along with arcaded handles, possibly should be treated as decorative modes because they are found

Figure 3. Campbell Applique Rim with Vernon Paul Applique Body from the Campbell Site (23PM5).

associated with a number of types. However, Campbell Ware ceramics generally are sufficiently distinct to easily sort in large assemblages. Vernon Paul Applique is a ceramic type with applique restricted to the body of Mississippi paste vessels. Since the same applique body treatment occurs among the Campbell site ceramic collections, often in association with rim appliques, it appears appropriate to lump the two types into a late-period, applique/punctated ware.

Overall, the available data are derived from a total of 33 sites located in six Missouri counties and one Arkansas site (Table 5). Of these, 11 sites are in Pemiscot County, 11 sites in Mississippi County, 3 sites in New Madrid County, 5 sites in Dunklin County, 1 site in Scott County, and 2 sites in Stoddard County. (Sites in Dunklin, Scott, and Stoddard counties are included because they were used in the initial definition of the phases by Williams [1954].) The information was compiled in order to include all published surface collections, excavation units, and feature contents from the Bootheel region of sufficient size for comparison. The materials analyzed here represent the largest collection of Mississippi-period ceramic assemblages from southeast Missouri collectively examined to date (Powers phase materials excepted). Sites that are excluded from the data base consist of either unpublished, unanalyzed assemblages or collections that contain no Mississippi-period ceramics or that have a very small number of ceramics (less than 20). The University of Missouri-Columbia's Museum of Anthropology holds several additional collections from southeast Missouri (e.g., from sites 23MI1, 23M131, 23NM251) that are not included in the following evaluations as those collections currently are undergoing curation processing.

From the onset it is understood that sample size, sample source, sample richness, and sample diversity of the multiple assemblages pose a problem.

Table 5. Archaeological Sites Forming the Data Base for Statistical Comparisons

Site	Sample Source	Reference	Phase
23MI1	Pooled sample	Williams 1954	Cairo Lowland
23MI2	Surface collection	Williams 1954	Cairo Lowland
23MI10	Surface collection	Williams 1954	Cairo Lowland
23MI17	Surface collection	Williams 1954	Cairo Lowland
23MI30	Surface collection	Williams 1954	Cairo Lowland
23MI31	Surface collection	Williams 1954	Cairo Lowland
23MI33	Surface collection	Williams 1954	Cairo Lowland
23MI53	Excavated pooled sample	R. Williams 1968	Cairo Lowland
23MI55	Excavated pooled sample	Lewis 1982	Cairo Lowland
23MI71	Excavated pooled sample	Lewis 1982	Cairo Lowland
23MI69	Excavated pooled sample	R. WIlliams 1968	Cairo Lowland
23NM38	Surface collection	Williams 1954	Cairo Lowland
23NM68	Surface collection	Williams 1954	Cairo Lowland
23NM69	Surface collection	Williams 1954	Cairo Lowland
23PM2	Surface pooled sample	Marshall 1965	Pemiscot Bayou
23PM5	Multiple samples	Chapman and Anderson 1955, Holland 1991, Williams 1954	Nodena, Armorel Campbell
23PM11	Pooled sample	UMC Museum	Pemiscot Bayou
23PM13	Multiple samples	Williams 1954, UMC Museum	Nodena
23PM15	Surface collection	Williams 1954	Pemiscot Bayou
23PM21	Pooled sample	UMC Museum	Nodena, Armorel
23PM28	Surface collection	Williams 1954	Pemiscot Bayou
23PM40	Surface collection	Williams 1954	Pemiscot Bayou
23PM42	Excavated pooled sample	Marshall 1965	Hayti, Pemiscot Bayou
23PM43	Multiple samples	Williams 1954,UMC Museum	Hayti, Pemiscot Bayou, Nodena Armorel
23PM549	Excavated pooled sample	R. Williams 1972	Nodena, Armorel
23DU2	Surface collection	Williams 1954	Malden Plain
23DU4	Surface collection	Williams 1954	Malden Plain
23DU5	Surface collection	Williams 1954	Malden Plain
23DU12	Surface collection	Williams 1954	Malden Plain
23DU13	Surface collection	Williams 1954	Malden Plain
23SO1	Surface collection	Williams 1954	Cairo Lowland
23SO111	Surface collection	Williams 1954	Cairo Lowland
23ST26	Surface collection	Williams 1954	Cairo Lowland
Parkin	Excavated pooled sample	Klinger 1977	Parkin, Armorel

Note: Ceramic frequencies for the individual samples are found in Appendix 1.

The initial assemblages from which ceramic horizon markers are drawn, the phase definitions are derived, and subsequent interpretations are made are small. However, in the absence of an extensive excavation/collection program these small samples often are the only data available. Small sample sizes most likely account for many of the differences and similarities attributed to the various phases. In the following statistical evaluations, where possible, the effect of sample size will be noted.

Statistical Comparisons

It is at this point that the focus of my research shifts analytical scales. As noted in previous discussions, there are numerous levels of typological classification. Although my previous discussions have primarily focused on problems with ceramic typology (at the lowest typological scale), the following statistical analyses are predicated on ignoring those problems in order to evaluate phase designations using the same data as previous investigators. Assessing the phase designations shifts our focus to the higher typological scale of grouping archaeological components, defined by their ceramic contents, into cohesive units.

In order to maintain a chronological sequence, this chapter begins with a statistical evaluation of S. Williams' (1954) work at the Crosno site. An evaluation of his larger sample of surface collections from an additional 26 sites with published ceramic frequencies follows. Third, an examination of multiple collections from the Campbell site (23PM5) is presented to evaluate the similarity of multiple samples drawn from the same site. Fourth, an evaluation of all similarities among and between all major excavated assemblages from the Bootheel is provided. Finally, a discussion of late

Pemiscot County sites is presented to suggest that these sites are a cohesive unit that can be identified on the basis of their ceramic assemblages.

The Brainerd-Robinson Coefficient of Similarity

The statistical comparisons of ceramic assemblages listed in the archaeological literature are based on the application of Robinson's Index of Agreement (the Brainerd-Robinson coefficient of similarity). Frequency data for 25 ceramic types (Table 6) were converted to similarity scores (BR) using Kintigh's (1991) statistical program. This statistical method provides a similarity score ranging from 0 (no similarity) to 200 (identical). The degree of assemblage similarity is based on determining the proportion of an assemblage that is represented by each set of diagnostic materials (artifact classes), totaling the cumulative difference for each pair of assemblages, and subsequently converting this distance measure into a coefficient of similarity by subtracting that measure from 200. Consequently, a small cumulative difference will produce a high score, and a large difference will produce a low score. For the purpose of my research, high scores are considered to represent a cumulative difference of 20 points (BR of 180-200). Assemblages that are moderately similar have BR scores of 160-179 and slightly similar assemblages score a BR of 140-159. Dissimilar assemblages score below BR 140.

As stated previously, employing the BR statistic in this manner removes the intuitive rules for phase definition and replaces those arbitrary standards with standards that are replicable. The three ranges of similarity stated above also are arbitrary but the reader can use the statistical results without any question of their source. The similar range, from BR140 to BR200, comprises a conservative set of standards. However, readers are free to draw the boundaries of similarity wherever they desire as there are no formal rules

Table 6. Ceramic Types Used in Compiling Data for Brainerd-Robinson Coefficients of Similarity Matrices

Neeley's Ferry Plain
Bell Plain (includes Bell buff paste ceramics)
Matthews Incised var. Manly Punctated
Redfilmed (includes Old Town Red, Varney Red, and Varney Red Saltpan)
Barton Incised
Parkin Punctated
Campbell Ware (Campbell Applique, Incised, and Punctated, Vernon Paul Applique))
Crosno/Cahokia Cordmarked
Ranch Incised
Nodena Red and White
O'Byam Incised (includes Incised, and Engraved varieties)
Kimmswick (includes Plain and Fabric Impressed)
Walls Engraved
Hollywood White Filmed
Kent Incised
Wickliffe Series (includes all variation of tempering and surface treatment)
Fortune Noded
Moundplace Incised
Wallace Incised
Carson Red-on-Buff
Winterville Incised
Matthews Incised (includes vars. Matthews and Beckwith)
Rhodes Incised
Sikeston Negative Painted
Angel Negative Painted

Note: These types were derived from the AAD-NSF Curation Project and represent all possible types found in southeast Missouri assemblages curated by the Museum of Anthropology.

delineating ranges of similarity associated with the BR statistic.

The Brainerd-Robinson coefficient of similarity generally is employed to chronologically order assemblages although it also has been used to interpret cultural relations among archaeological components (see Connolly 1986). Brainerd-Robinson scores, as employed in this research, are not used to chronologically order ceramics in southeast Missouri as this will require detailed, systematic excavation, ceramic seriation, and dating of components.

The Brainerd-Robinson coefficient of similarity (BR) was selected as the appropriate statistical method to evaluate the similarity of ceramic assemblages from southeastern Missouri Mississippi-period sites. Cowgill (1990:513) provides a clear explanation of why BR is preferred over Pearson's *r* to examine similarities between pairs of collections:

> The task of comparing artifacts is quite different. A very common way to do this is to begin by characterizing each collection by sorting the objects into groups by means of some appropriate system of classification and computing the percent of the total collection constituted by objects assigned to each type. . . It is then perfectly possible to pose the question "Is there a nearly linear relation between the percentages of types in the collection along the perpendicular axis, can we find a sloping straight line that comes close to all the points?" Pearson's *r* is a logically correct answer to this question.
>
> The trouble is, the question posed is significantly different from what we usually have in mind in asking how similar assemblages are to one another. Thus, while *r* answers a question, it is one that bears a rather remote relation to the question we meant to ask. If we start with the idea that what we mean by high similarity between collections is that they both have very similar proportions of relevant types, and what we mean by low similarity is that the proportions of the types differ considerably in the two collections, then the Brainerd-Robinson coefficient, BR, is a more natural statistic. As defined by Robinson (1951) (see also Brainerd 1951; Doran and Hodson 1975:139; and Shennan 1988:208), it is related to the total of the absolute differences in type percentages between the two collections being compared. . . . As it stands, it is a "distance" coefficient. That is, it is zero for a pair of collections with identical percents of everything and it reaches a maximum of 200 for collections that have no types at all in common. It is customary to convert it into a similarity coefficient by subtracting the sum from 200.

There are problems with the BR statistic in that time, space, function, collection strategy, sample size, sample source, and other factors can all affect the comparisons. Lehmer (1951:151) was the first to criticize the statistic on the basis of comparing samples of different sizes. Regardless, interpretation of the coefficients of similarity resulting from calculating the paired comparisons can be achieved if one remains cognizant of the effects of the aforementioned factors.

Statistical Comparison of Williams' (1954) Analytical Units from Crosno

The obvious place to began any statistical evaluation of phase designations based on ceramic collections is at the type site of the archetype phase–the Crosno site (23MI1) assigned to the Cairo Lowland phase. I rely on the published ceramic frequencies of the analytical units devised by S. Williams (1954) and used by him to seriate the site ceramics and to define the two Mississippi-period components identified at the site. Although acknowledging the site was not excavated with the express purpose of performing that seriation, but rather with the intent of defining architectural features and to obtain a sample of artifacts, that seriation was performed and is still used today (Williams 1954:109). Williams' Figure 25 (1954:108) illustrates the locations of the excavation areas of the analytical units and his Figure 26 shows the depth below surface of those units. Table 7 lists the provenience of Williams' analytical units as illustrated in his Figure 25. Williams (1954:108) states that the units are not of equal size and do not necessarily follow the site's stratigraphic sequence. This poses a problem of dealing with unequal sample sizes from the three excavation sections.

The BR coefficient of similarity calculated on these data produced the similarity matrix in Table 8. Coefficients of similarity range from a high score of 197 to a low score of 159. The most similar assemblage comparison (BR 197) is between analytical units 10 and 11 from excavation section 2,

TABLE 7. Provenience of S. Williams' (1954) Analytical Units for the Crosno Site (23MI1)

Analytic Unit	Excavation Section	Level #	Depth Below Surface (ft. b.s.)
1	1	1-4	0.0-2.0
2	1	2	0.5-1.0
3	1	3	1.0-1.5
4	1	4	1.5-2.0
5	1	5	2.0-2.5
6	1	5-6	2.0-3.0
7	1	6-7	2.5-3.5
8	2	1	0.0-0.5
9	2	1-2	0.0-1.0
10	2	2	0.5-1.0
11	2	2-3	0.5-1.5
12	2	3	1.0-1.5
13	2	3-4	1.0-2.0
14	2	4	1.5-2.0
15	2	5	2.0-2.5
16	2	6-7	2.5-3.0
17	3	1-2	0.0-1.0
18	3	3-4	1.0-2.0
19	3	4	1.5-2.0
20	3	5	2.0-2.5
21	3	6	2.5-3.0
22	3	6-7	2.5-3.5
23	3	8	3.5-4.0

Table 8: Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Ceramic Analytical Units Derived from Excavations at Crosno (23MI1)

2:	185																					
3:	191	184																				
4:	193	190	190																			
5:	195	186	189	192																		
6:	188	185	195	188	188																	
7:	171	165	175	169	168	176																
8:	192	179	191	186	191	189	174															
9:	178	172	183	176	176	183	190	182														
10:	180	174	184	179	178	186	187	184	196													
11:	182	175	186	181	180	186	187	186	195	197												
12:	187	178	189	184	185	189	181	191	190	193	193											
13:	193	184	195	191	191	193	174	193	182	182	185	188										
14:	191	178	192	184	189	189	176	196	185	185	187	191	193									
15:	192	185	193	191	190	192	176	192	183	184	187	191	192	191								
16:	188	180	192	185	187	191	180	189	187	185	188	191	194	193	191							
17:	190	186	195	192	190	195	174	191	183	185	187	190	195	191	193	192						
18:	191	182	193	189	188	193	178	192	186	188	190	193	191	193	194	192	194					
19:	185	175	186	180	185	184	172	192	181	182	183	187	188	190	187	186	185	184				
20:	188	179	192	186	186	191	181	189	188	189	191	193	191	192	191	195	192	195	184			
21:	180	182	185	183	180	186	173	180	177	177	178	179	186	181	182	185	187	182	177	184		
22:	183	177	187	181	181	189	183	187	188	190	191	193	185	188	188	187	187	192	182	192	184	
23:	165	159	170	163	164	171	182	169	186	185	183	178	169	172	170	173	170	173	169	176	167	176
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Note: Numbers along the left-hand side and base of the matrix refer to the analytical-unit numbers assigned by Williams (1954) (see Table 7).

representing depths below surface of 0.5-1.0 ft and 0.5.-1.5 ft. The high similarity score is no surprise since the analytical units vertically overlap. The least similar coefficients are those comparisons of other units with analytical unit 23, the deepest analytical unit (3.5-4.0 ft, in excavation section 3). This is somewhat surprising as the unit contains all of the ceramic horizon markers of the Cairo Lowland phase as defined by Williams (1954), i.e., Kimmswick Fabric Impressed, Wickliffe, and O'Byam Engraved, yet does not contain any Crosno Cordmarked sherds (suggested to represent an Early

Mississippi- period occupation). Virtually all other ceramic types are absent in this particular analytical-unit assemblage (see Appendix 1). This deep analytical unit is very similar to analytical units 9 (BR 186) and 10 (BR185). Interestingly, the analytical unit that was compiled from the deepest excavation level at the site is most similar with two units that are closest to the surface--analytical unit 9 has a depth below surface of 0.0-0.5 ft and analytical unit 10 a depth below surface of 0.5-1.0 ft.

I suggest that the excavated Crosno assemblage is mixed and that "pure" Early and Late Mississippi-period components at the site (based on shell-tempered ceramics) cannot be identified on the basis of analytical units comprised solely of ceramic types. That excavation was in arbitrary levels may account for the mixing. Williams bases his interpretation of components at the site partially on the proportions of Late Woodland materials to Mississippi-period materials in the analytic units. The presence of Crosno/Cahokia Cordmarked ceramics in the assemblage, particularly at the deeper levels, may be indicative of that Early Mississippi- period occupation (Crosno I) as illustrated in Williams' (1954: Figure 28) seriation. However, that same seriation does not depict a normal battleship curve for Crosno Cordmarked ceramics. Rather it appears and disappears in the assemblage rather rapidly. (This curve most likely is affected by the very small sample of Crosno/Cahokia Cordmarked sherds recovered; n = 30 sherds.)

Phase Designation: Williams' Cairo Lowland Phase Sites

The ceramic horizon markers for the Cairo Lowland phase are Kimmswick Fabric Impressed, Wickliffe series, and O'Byam Incised. (Additional ceramic horizon markers were identified by Phillips [1970].) Two sites identified by Williams (1954) as components of that phase do not possess the requisite ceramic horizon markers for inclusion in the phase. In order to calculate a BR similarity matrix for all sites identified by Williams as components of the Cairo Lowland phase (Table 9) it was necessary to produce a composite assemblage for the type site of the phase--an archetype assemblage. This was accomplished by combining all of Williams' analytical units and surface collections containing Mississippi-period ceramics into a pooled sample.

Table 9. Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Surface Collections from Sites Assigned to the Cairo Lowland Phase

2:	114							
3:	140	141						
4:	126	158	172					
5:	121	102	146	134				
6:	137	129	166	159	166			
7:	130	112	156	149	184	181		
8:	126	118	165	159	169	188	181	
9:	134	108	148	142	186	179	193	175
	1	2	3	4	5	6	7	8

Note: 1--23MI1 (pooled analytical units from S. Williams [1954] excavations; 2--23MI2, Beckwith's Fort; 3-23MI10, Meyer's Mound; 4--23MI31, Spanish Grant; 5--23MI33, Barker; 6-23NM38, Lilbourn; 7--23NM68, Sikeston; 8--23NM69, Eastlake (combined surface collections); 9--23ST26, Sandywoods (combined surface collections).

The similarity matrix ranges from a high score of 193 (23NM68, Sikeston and 23ST26, Sandywoods) to a low score of 102 (23MI33, Barker and 23MI2, Beckwith's Fort). Comparisons of all identified components with the archetype Crosno sample result in less-than-high scores ranging from a low of 114 to a high of 140. These scores meet the minimum criteria for slightly similar assemblage in only one case--the Meyer's Mound (23MI10) comparison. Comparisons with the archetype site have the lowest overall set of BR scores of any other column or row in the matrix. Although this may be due to sample-size differences, it is doubtful, as the formula and program converts the raw frequencies into a percentage of the assemblage for all sites. It is more likely that sample source--excavated versus surface collection--may have contributed to this difference. Sites 23MI1 is the only excavated assemblages compared to other assemblages in this matrix. All other sites were surface collected. The archetype appears to be considerably different (in the neighborhood of a cumulative 30 percent difference) than other sites assigned to the Cairo Lowland phase.

Of the 36 BR scores generated in the Table 9 matrix, 44 percent of the scores (n = 16) are below 150. Interestingly, rows 8 and 9 (Eastlake and Sandywoods, respectively) appear to have the highest similarities with other sites (60 percent of the scores are above 150). However, BR comparisons of these same two sites also contain 37.5 per cent of the total scores less-than-150.

Column 2 in the matrix, depicting the comparisons of sites with 23MI2, Beckwith's Fort, also is interesting due to the six BR scores less-than 150. Collection area at 23MI2 may be a factor in producing those low scores. Healan (1972) demonstrated that there are temporal and possibly functional differences that correlate with horizontal area in the surface assemblage at Beckwith's Fort. The scores, therefore, may be more dependent on Williams' (1954) actual collection area (not mapped or identified) than on any real differences between 23MI2 and the other sites.

Table 9 indicates that the sites identified as belonging to the Cairo Lowland phase by Williams are not necessarily a cohesive group of high-value homostats (homogeneous statistical results). In fact, in terms of a cumulative percentage difference, there is nearly a 40 percent difference (79 BR points) between the highest similarity score and lowest similarity score (within the stated range of similarity). Consequently, intergroup variation among Williams' surface-collected sites and the excavated archetype site appears to be great.

Phase Designation: Williams' Malden Plain Phase Sites

Table 10 presents the similarity matrix for assemblages assigned to the Malden Plain phase by Williams (1954). The Malden Plain phase is characterized by the absence of Cairo Lowland phase ceramic horizon markers and the addition of Varney Red Filmed ceramics. Two of the six sites (23DU2--Kennett and 23SO111--Lakeville) assigned to the phase by Williams (1954) do not have red-filmed ceramics. In addition, two of the sites (23SO1--Richwoods and 23SO111--Lakeville) *do* have Kimmswick and Wickliffe ceramics (possibly these sites should have been assigned to the Cairo Lowland phase). A third site has Kimmswick but no Wickliffe (23DU2).

Table 10. Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Surface Collections from Sites Assigned to the Malden Plain Phase

2:	192			
3:	105	110		
4:	194	191	106	
5:	186	184	105	188
	1	2	3	4

Note: 1--23DU2, Kennett site; 2--23DU4 Holcomb site; 3--23DU5, Old Varney River site (combined samples excavations and surface collection); 4--23SO1, Richwoods site (combined samples); 5--23SO111, Lakeville Settlement.

The similarity matrix of BR scores ranges from a high of 194 (23DU2--

Kennett and 23SO1--Richwoods) to a low of 105 (23DU5--Old Varney River with 23DU2--Kennett and 23SO111--Lakeville). Williams (1954: 275) uses the Old Varney River site (actually located in Cross County, Arkansas) as the type site of the Malden Plain phase. On the basis of the lack of decorated ware at the site he suggests that the phase represents an Early Mississippi-period component on the Malden Plain. Of interest is the fact that the Old Varney River site is the only tested site outside of Crosno in Williams' report. However, in the case of the Malden Plain phase similarity matrix, these low scores do not appear to be related to sample source. Rather, there appears to be a temporal difference between 23DU5 and the other sites. This would be congruent with Morse and Morse's (1983) identification of the Big Lake phase on the Malden Plain as an Early Mississippi-period manifestation with the horizon markers of red-filmed and Neeley's Ferry Plain ceramics. Williams only recovered Neeley's Ferry Plain and Varney Red Filmed from both his surface collection and excavations at this site, consequently identifying the site as early. Other assemblages assigned to this phase appear to date to both the Early and Middle Mississippi periods, not simply the Early Mississippi period.

Of the 10 BR scores generated in this matrix, 40 percent of the scores (n = 4) are below 150. All of the low scores are directly associated with comparisons of the Old Varney River site. The remainder of the sites appear to be a fairly cohesive set of homostats. It is suggested here, based on Williams' (1954) work, that the Old Varney River site (23DU5) scores low because it is an early site lacking a Middle Mississippi-period component.

Phase Designation: Williams' Pemiscot Bayou Phase Sites

Williams (1954) assigned six sites from his survey to the Pemiscot Bayou phase. As noted earlier, three sites, or 50 percent of his sample, do not contain the requisite ceramic horizon marker, Parkin Punctated. Table 11 presents the BR similarity matrix for all sites identified by Williams (1954) as belonging to the Pemiscot Bayou phase.

Table 11. Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Surface Collections from Sites Assigned to the Pemiscot Bayou Phase

2:	174				
3:	146	168			
4:	167	179	177		
5:	123	125	112	120	
6:	190	168	147	168	123
	1	2	3	4	5

Note: 1--23PM13, Persimmon Grove site; 2--23PM15, Kinfolk Ridge site; 3--23PM28, Wardell site; 4--23PM40, Estes site; 5--23PM42, Canaday (Kersey) site (combined samples); 6--23PM43, Caruthersville Mound (Murphy Mound) site (combined samples).

BR scores in the matrix range from a low of 112 to a high of 190. Overall, although this phase is considered as the most poorly defined phase (see Phillips 1970:929), the matrix exhibits BR scores that appear to be evenly split. Eight of the 15 scores are higher than a score of 166, the remaining 7 are below 150, and 4 of those scores, all associated with 23PM42, are considered to represent dissimilar assemblages. The Canaday site (identified as the Kersey site [23PM42] through an ASM file search) has the lowest series of comparisons (highest score 125, lowest score 112) of all the sites assigned to the Pemiscot Bayou phase. Marshall's (1965) Hayti phase is defined on the basis of his excavations at Kersey where an extensive Early Mississippi-period component was identified. The site with the most similar mortuary assemblage, 23PM43, has the lowest score (BR 123) when compared with 23PM42 even though a similar, Early Mississippi-period component (Hayti phase) is present at 23PM43.

Phase Designation: Williams' Nodena Phase Sites

Little can be said about Williams' Nodena phase sites. Of the three sites assigned to the phase, only two were collected. A single BR score was generated (BR168) (Table 12). This score reflects a slight difference in the assemblages which may be related to the presence of Ranch Incised and Nodena Red and White at 23PM5 while the 23PM21 collection did not include those types. Once again, although Williams identifies the ceramic horizon markers for the Nodena phase--Ranch Incised, Vernon Paul Applique, Fortune Noded, Parkin Punctated--collections from 23PM21 contain none of the requisite ceramics and 23PM5 lacks Fortune Noded and Vernon Paul Applique. (Note: Applique ceramics at the Campbell site [23PM5] are more appropriately termed Campbell Applique in modern terminology.)

Table 12. Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Surface Collections from Sites Assigned to the Nodena Phase

2:	168
	1

Note: 1--23PM5, Cooter (Campbell) site; 2--23PM21, Chute site.

Phase Designation: Williams' Collected but Unassigned Sites

Four sites collected by Williams were not assigned to one of the four phases he defined. Table 13 illustrates the BR similarity matrix calculated for those sites. Of these, two sites have very similar ceramic assemblages (BR score of 191) (Charleston [23MI17] and the Survey site [23MI30]). Similarly, the two Dunklin County sites also are fairly similar with a BR score of 167. Little else can be said about the internal similarity of this matrix.

Table 14 is a master matrix of BR coefficients resulting from comparing all surface-collected sites with the excavated archetype Crosno site.

Table 13. Similarity Matrix of Brainerd-Robinson Coefficients for S. Williams' (1954) Surface Collections from Sites not Assigned to a Phase

2:	191		
3:	140	145	
4	140	145	167
	1	2	3

Note: 1--23MI17, Charleston site (combined sample); 2--23MI30, Survey site; 3--23DU12, Cockrun's Landing site (combined sample); 4--23DU13, Wilkins Island site (combined sample).

This matrix is provided to illustrate the intrasite variation in the survey sample when the region is viewed as a unit. Since the original classification was based on a comparison with the Cairo Lowland sites and phase, and most notably with the excavated archetype ceramic assemblage from the Crosno site, the matrix illustrates in column 1 the extreme variation among and between the individual site assemblages.

Table 14. Similarity Matrix of Brainerd-Robinson Coefficients of all Surface-Collected Sites and the Excavated Crosno Assemblage in Williams (1954)

2:	118														
3:	167	141													
4:	146	158	172												
5:	161	102	146	134											
6:	180	129	166	159	166										
7:	172	112	156	149	184	181									
8:	169	118	165	159	169	188	181								
9:	173	108	148	142	186	179	193	175							
10:	164	99	146	138	189	167	186	170	188						
11:	159	94	141	135	191	165	182	173	185	194					
12:	105	93	105	105	107	105	105	113	106	105	110				
13:	168	103	148	140	192	172	190	174	192	194	190	106			
14:	172	106	142	134	187	173	185	167	191	186	184	105	188		
15:	156	133	176	175	146	169	159	171	152	147	146	107	151	144	
16:	170	110	157	151	167	180	179	184	172	167	169	109	171	164	174
17:	158	93	140	134	190	163	181	172	184	194	198	110	190	184	146
18:	168	116	163	157	177	186	192	190	185	181	177	105	182	177	167
19:	119	109	124	123	110	120	120	128	116	111	113	181	114	107	123
20:	158	142	176	182	149	172	161	172	155	149	148	107	153	146	190
21:	160	137	175	178	149	174	164	174	156	153	149	105	155	149	184
22:	156	116	163	157	147	168	159	170	153	148	147	107	152	144	176
23:	153	152	182	189	141	165	155	165	148	146	140	105	147	142	180
24:	156	147	175	189	145	170	160	170	153	149	146	105	151	145	183
25:	160	95	141	134	192	165	183	169	185	195	196	107	191	185	146
26:	158	93	140	134	167	163	165	173	165	165	170	140	166	165	146
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

17:	168									
18:	179	177								
19:	125	112	120							
20:	168	147	168	123						
21:	166	149	172	120	190					
22:	170	147	167	122	173	168				
23:	156	140	163	124	187	183	162			
24:	161	145	169	120	192	189	167	191		
25:	166	197	177	109	148	149	147	140	145	
26:	168	170	165	143	147	149	147	140	145	167
	16	17	18	19	20	21	22	23	24	25

Note: 1--23MI1, 2--23MI2 , 3--23MI10, 4--23MI31, 5--23MI33, 6--23NM38, 7--23NM68, 8--23NM69, 9--23ST26, 10--23DU2, 11--23DU4, 12--23DU5, 13--23SO1, 14--23SO111, 15--23PM13, 16--23PM15, 17--23PM28, 18--23PM40, 19--23PM42, 20--23PM43, 21--23PM5, 22--23PM21, 23--23MI17, 24--23MI30, 25--23DU12, 26--23DU13. This BR matrix reflects the ordering of previous matrices by phase.

Considering first sites 23MI17, 23MI30, 23DU12, and 23DU13 Williams was unable to assign to phases, when compared with 23MI1 these unassigned sites have BR scores of 153, 156, 160, and 158 respectively, and generally are considered as only slightly similar to the archetype. Admittedly, the samples from these sites are limited. We could predict that materials from sites 23DU12 and 23SO1 would possess the highest coefficient of similarity of these unassigned sites (BR 160 and 153 respectively [moderately and slightly similar]) with the Cairo Lowland archetype since the assemblages include Neeley's Ferry Plain, red-filmed ceramics, O'Byam Incised, Kimmswick, and Wickliffe ceramics; that is, the collection contains the full gamut of horizon markers delineating that phase.

Unassigned site 23MI17's comparison with 23PM13 produced a BR score of 168 for the highest coefficient of similarity and a low BR score of 88 when compared with 8 sites (primarily sites located in New Madrid, Dunklin, and Stoddard counties). Site 23MI30 appears to be most similar with Pemiscot County sites (PM15, 28, 40, 42, 43), sites assigned to the Pemiscot Bayou phase by Williams (1954). The assemblage from this site is restricted to Neeley's Ferry Plain and Bell Plain and does not contain the requisite Parkin Punctated to be included in that phase following Williams' criteria. Site 23DU12's BR scores also indicate a close similarity to those same Pemiscot county sites just noted.

Cluster analysis of the BR scores in the matrix was completed using an average linkage method that averages all distances between pairs of objects in different clusters to decide how far apart they are (Wilkinson 1989:31). The resulting dendrogram (Figure 4) suggests that two macroclusters are present in the matrix. The first, Macrocluster 1, contains assemblages from

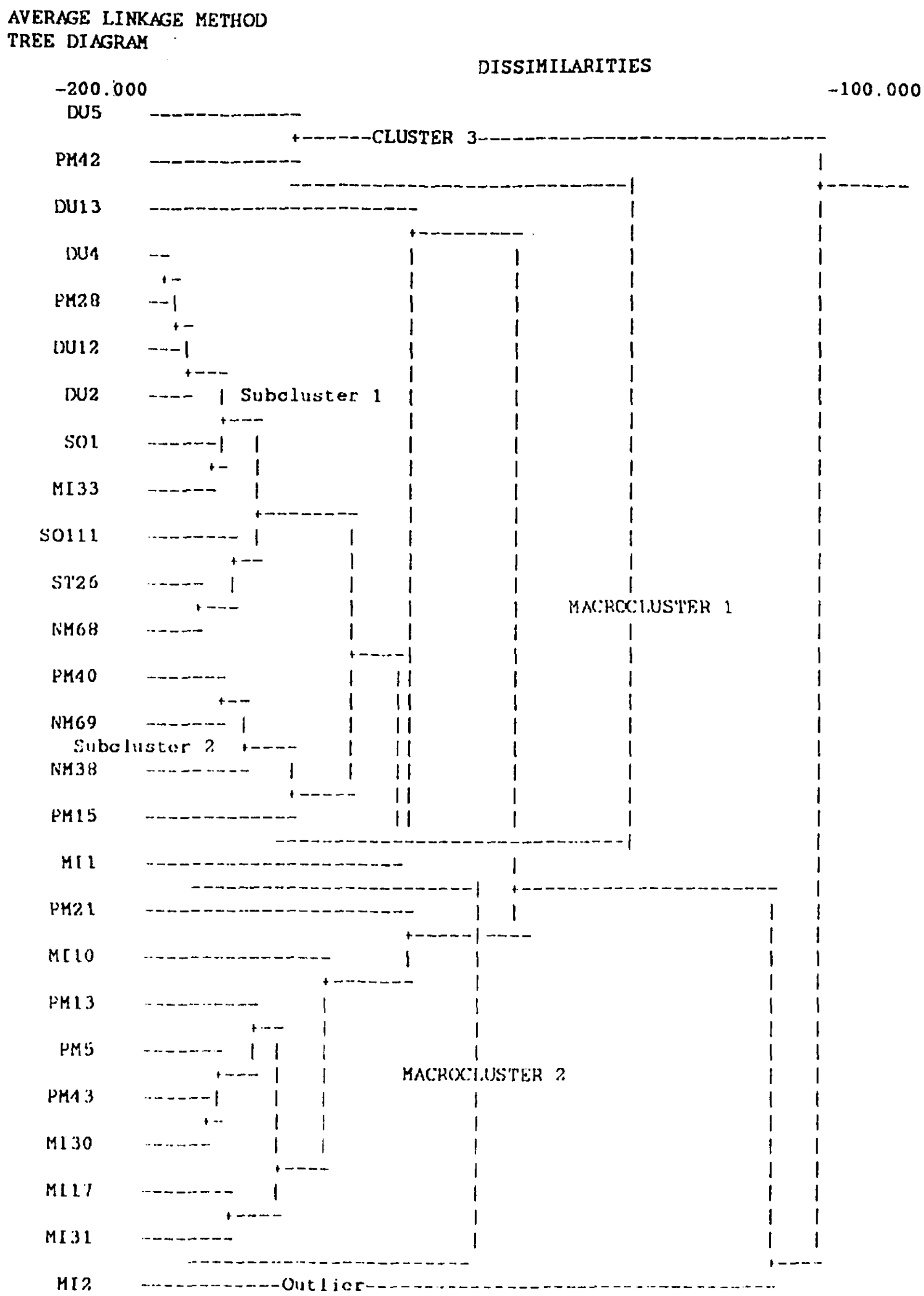
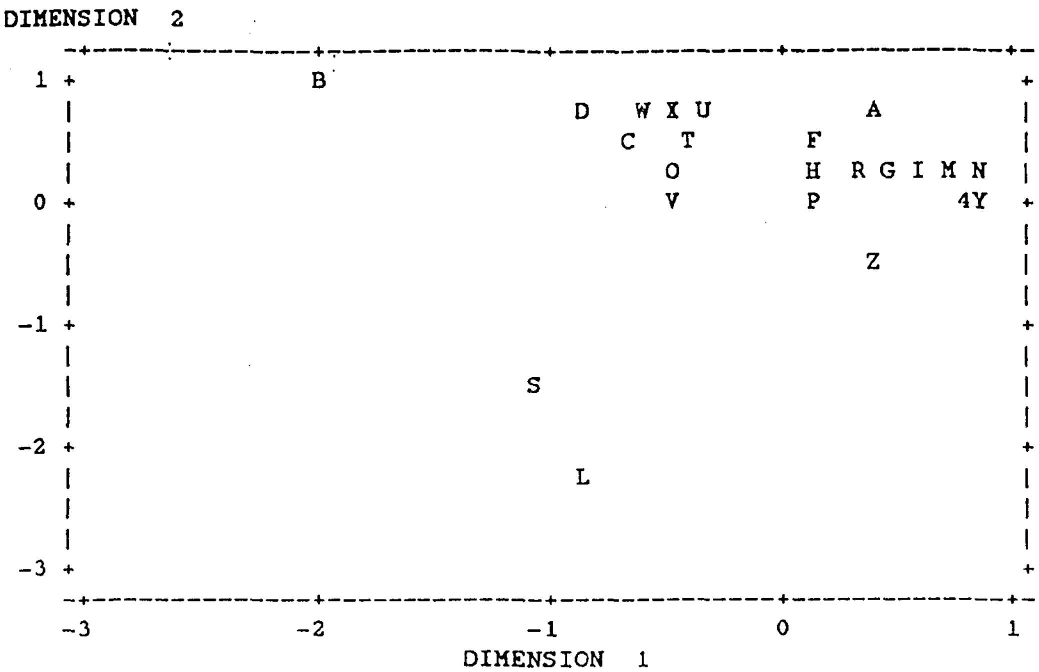


Figure 4. Cluster Analysis of BR Scores of Williams (1954) Surface-Collected Sites.

23DU13, 23DU4, 23PM28, 23DU12, 23DU2, 23SO1, 23MI33, 23SO111, 23ST26, 23NM68, 23PM40, 23NM69, 23NM38, 23PM15, with 23MI1 as an outlier at increasing distance to the macrocluster. Macrocluster 1 contains two subclusters with Subcluster 1 containing assemblages from 23DU4, 23PM28, 23DU12, 23DU2, 23SO1, 23MI33, 23SO111, 23ST26, and 23NM68. These sites are assigned by Williams (1954) to the Malden Plain, Pemiscot Bayou, and Cairo Lowland phases. Subcluster 2 contains ceramic assemblages from sites 23PM40, 23NM69, 23NM38, and 23PM13. Sites in this subcluster have been assigned by Williams (1954) to the Pemiscot Bayou, Cairo Lowland, and Nodena phases. Macrocluster 2 contains ceramic assemblages from sites 23PM21, 23MI10, 23PM13, 23PM5, 23PM43, 23MI30, 23MI17, and 23MI31. These assemblages are assigned by Williams (1954) to the Pemiscot Bayou, Nodena, and Cairo Lowland phases. Site 23MI2 is an outlier at increased distance to Macrocluster 2. Sites 23DU5 and 23PM42 represent a distinct cluster (Cluster 3) in the dendrogram. This is not surprising since the majority of the ceramic assemblages from the two sites date to the Early Mississippi period.

Figure 5 is a graphic representation of the similarity matrix using multidimensional scaling methods. Wilkinson (1989:94) indicates that multidimensional scaling (MDS) is a procedure for fitting a set of points in a space such that the distances between points correspond as closely as possible to a given set of dissemilarities between a set of objects. MDS procedures automatically change similarities to dissimilarities. Because MDS operates directly on dissimilarites there are no statistical distribution assumptions necessary. Multidiminsional scaling is a spatial model and to fit points in MDS space you must assume the data meets metric standards that; (1)



COORDINATES IN 2 DIMENSIONS				COORDINATES IN 2 DIMENSIONS			
VARIABLE	PLOT	DIMENSION		VARIABLE	PLOT	DIMENSION	
						1	2
MI1	A	0.40	0.61	SO111	N	0.86	0.14
MI2	B	-2.02	0.90	PM13	O	-0.49	0.24
MI10	C	-0.67	0.37	PM15	P	0.12	-0.13
MI31	D	-0.84	0.63	PM28	Q	0.79	-0.20
MI33	E	0.81	-0.10	PM40	R	0.31	0.14
NM38	F	0.14	0.28	PM42	S	-1.07	-1.70
NM68	G	0.47	0.11	PM43	T	-0.42	0.42
NM69	H	0.12	0.04	PM5	U	-0.31	0.51
ST26	I	0.62	0.10	PM21	V	-0.44	-0.15
DU2	J	0.79	-0.02	MI17	W	-0.62	0.59
DU4	K	0.78	-0.19	MI30	X	-0.47	0.56
DU5	L	-0.84	-2.35	DU12	Y	0.85	-0.07
SO1	M	0.71	0.01	DU13	Z	0.40	-0.70

Figure 5. Multidimensional Scaling of BR Cluster Analysis of Williams (1954) Surface-Collected Sites.

the distance from an object to itself is zero, (2) the distance from object A to B is the same as that from B to A, and (3) the distance from object A to C is less than or equal to the distance from A to B plus B to C. The two macroclusters in Figure 4 are clearly represented in Figure 5 as are the outliers 23MI2 (B), 23MI1 (A), and the two Early Mississippi-period sites 23DU5 (L) and 23PM42 (S).

An averaged Euclidean distance cluster analysis also was calculated using SYSTAT to assess whether any of Williams' surface-collected ceramic assemblages could be sorted into clusters on the basis of ceramic-type frequencies (Figure 6). The resulting dendrogram suggests only two clusters and one outlier (23MI1). Sites 23DU4, 23DU12, 23SO1, 23SO111, 23NM38, 23PM15, and 23PM28 represent a single cluster, reflecting samples containing in excess of 400 sherds of Neeley's Ferry Plain. A two-tailed Student's t test comparing the sample means of the two clusters was calculated to test the null hypothesis; C1 = C2. The result (Student's $t = 4.335$; $p < 0.05$) does not fall within the critical region of t and thus the null hypothesis is rejected. Sample size has influenced the derivation of these clusters because all samples in Cluster 1 have more than 450 sherds and all samples in Cluster 2 contain less than 450 sherds. Interestingly, Cluster 1 contains sites assigned to all of Williams' (1954) phases except Nodena, and Cluster 2 contains sites assigned to all four phases.

When Table 14 is examined as a regional comparison of sites collected by Williams the breakdown is quite interesting. Using the definitions of similarity stated previously, 61 (18.7%) of the comparisons reveal similar surface-collected ceramic assemblages, 100 coefficients of similarity (30.7%) indicate a moderate similarity, 92 coefficients (28.3%) reveal slight similarity,

DISTANCE METRIC IS EUCLIDEAN DISTANCE
AVERAGE LINKAGE METHOD

TREE DIAGRAM

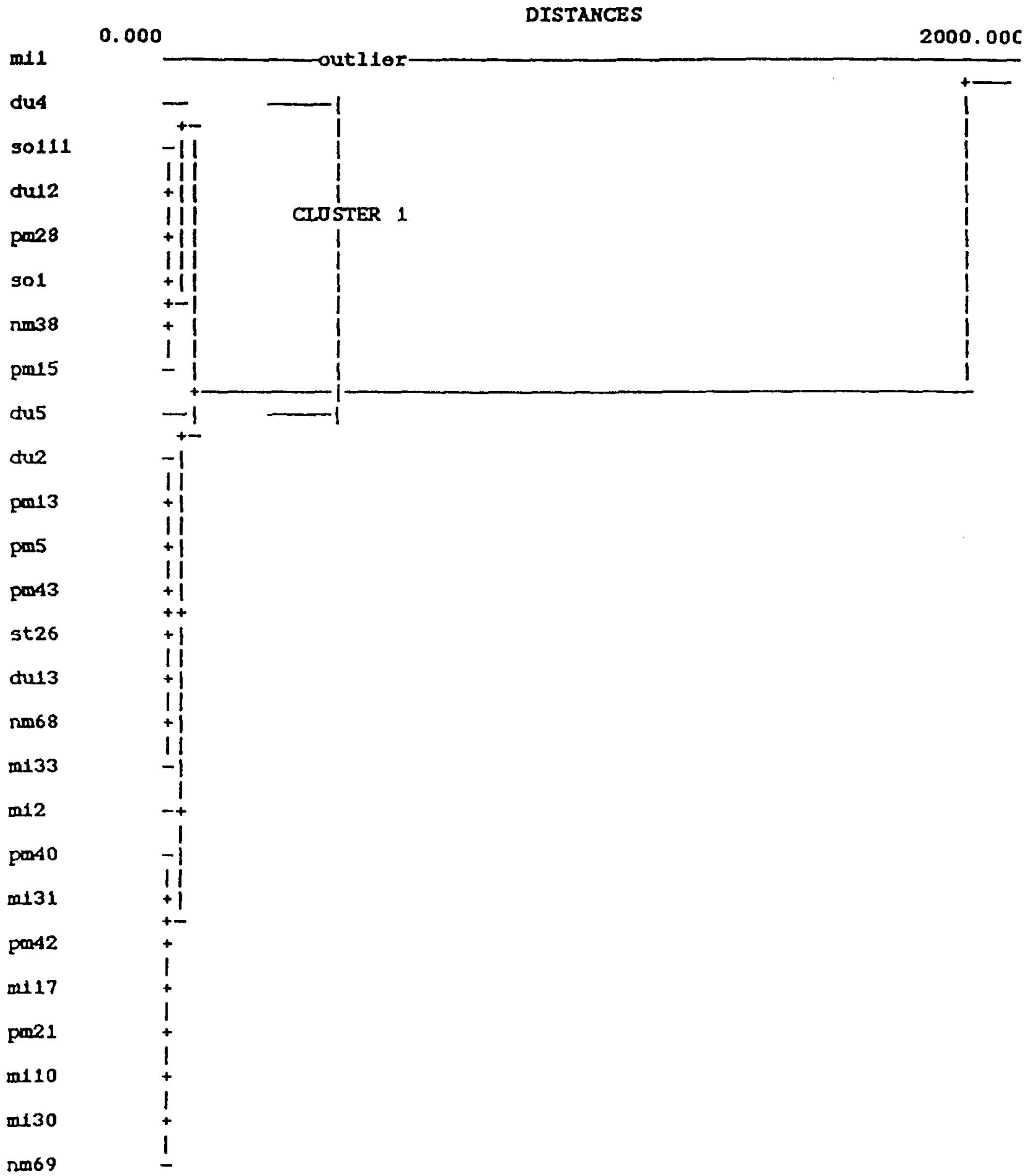


Figure 6. Averaged Euclidean Distances of Williams' (1954) Surface-Collected Sites.

and 72 coefficients (22.1%) indicate dissimilarity. However, assemblages from 20 sites used to generate this matrix contain both plainware default categories--Neeley's Ferry Plain and Bell Plain--with Neeley's Ferry Plain usually having the highest frequency of any one type collected from a site. Since all ceramic horizon markers used to delineate the phases under consideration are not plainwares, it is appropriate to compare the assemblages without the plainware types. As a consequence, nearly all remaining ceramic types in the data base represent horizon markers for one or more of the regional phases. By removing the plainwares we would expect those phases to be revealed by cluster analysis. A second BR matrix *sans* the two primary plainware categories (Neeley's Ferry Plain and Bell Plain) was calculated to assess the effect of removing the two default categories used in sorting assemblages. Table 15 lists the results of those calculations.

Removal of the categories of Neeley's Ferry Plain and Bell Plain results in some sites without ceramics. The sites now lacking ceramics were included in the calculations in order to maintain the integrity of the matrix. (The reader can use this matrix to return to those previous matrices run on the individual phases to evaluate the effects of removing NFP and Bell on those BR scores. Overall those matrices will now depict BR scores that are markedly lower.) Table 16 presents the total ceramic assemblages for each site and the percentage of each assemblage represented by Neeley's Ferry Plain and Bell Plain. Plainwares represent 90 percent of the surface-collected assemblages in 76.9 percent of the sites. Scores of 100 in Table 15 reflect comparisons where assemblages, after the removal of plainwares, have only one type remaining with each assemblage possessing a different type (see row 18). Scores of 200 reflect comparisons where the assemblages, after the removal of plainwares, contain the same, single type.

Table 15. Similarity Matrix of Brainerd-Robinson Coefficients of all Surface-Collected Sites in Williams (1954) *sans* Neeleys Ferry Plain and Bell Plain

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2:	95														
3:	114	98													
4:	3	39	40												
5:	51	113	62	0											
6:	98	87	17	0	51										
7:	130	88	50	0	44	**161**									
8:	2	0	0	0	44	11	0								
9:	99	86	17	0	56	**173**	**167**	17							
10:	107	18	120	0	22	11	50	0	17						
11:	14	24	16	0	68	25	8	**168**	25	0					
12:	2	0	0	0	44	11	0	**200***	17	0	**168**				
13:	**140**	81	75	0	89	85	113	50	96	75	58	50			
14:	109	88	29	0	44	**171**	**179**	0	**167**	29	8	0	91		
15:	5	17	17	17	23	11	0	23	17	0	23	23	23	0	
16:	9	12	8	8	46	15	4	42	21	0	46	42	46	0	**168**
17:	2	0	0	0	44	11	0	**186**	17	0	**168**	**186**	63	0	23
18:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
19:	5	10	10	10	44	11	0	**190**	17	0	168	**190**	50	0	33
20:	34	57	29	29	67	40	29	57	45	0	65	57	79	29	126
21:	0	0	0	0	0	0	0	0	0	0	0	0	13	0	29
22:	2	0	0	0	15	17	0	15	15	0	15	15	15	0	62
23:	53	58	90	150	22	11	50	0	17	50	0	0	50	29	17
24:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
25:	79	73	55	0	107	65	73	109	70	36	133	109	123	65	23
26:	2	0	0	0	44	11	0	**200***	17	0	**168**	**200***	50	0	23
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

	16	17	18	19	20	21	22	23	24	25
17:	42									
18:	100	100								
19:	50	**186**	100							
20:	**140**	57	100	67						
21:	29	14	100	0	29					
22:	62	15	100	15	62	29				
23:	8	0	100	10	29	0	0			
24:	100	100	**200***	100	100	100	100	100		
25:	46	109	100	109	86	0	15	36	100	
26:	42	**186**	100	**190**	57	0	15	0	100	109
	16	17	18	19	20	21	22	23	24	25

Note: 1-23MI1, 2-23MI2, 3-23MI10, 4-23MI31, 5-23MI33, 6-23NM38, 7-23NM68, 8-23NM69, 9-23ST26, 10-23DU2, 11-23DU4, 12-23DU5, 13-23SO1, 14-23SO111, 15-23PM13, 16-23PM15, 17-23PM28, 18-23PM40, 19-23PM42, 20-23PM43, 21-23PM5, 22-23PM21, 23-23MI17, 24-23MI30, 25-23DU12, 26-23DU13.

Table 16. Total Ceramic Assemblages and Percentage of Assemblage Represented by Plainware Types

Site Number	Total Ceramic Assemblage	Total NFP and Bell Plain	% of Assemblage of Plainwares
23MI1	13,229	11,134	84.1
23MI2	433	367	84.7
23MI10	40	35	87.5
23MI31	131	129	98.4
23MI33	147	138	93.8
23NM38	563	528	93.7
23NM68	203	199	98.0
23NM69	24	23	95.8
23ST26	261	249	95.4
23DU2	323	319	98.7
23DU4	788	763	96.8
23DU5	420	220	52.3
23SO1	497	481	96.7
23SO111	612	563	91.9
23PM13	409	374	91.4
23PM15	463	451	97.4
23PM28	503	489	97.2
23PM40	121	121	100.0
23PM42	97	58	59.7
23PM43	338	324	95.8
23PM5	379	365	96.3
23PM21	79	66	83.5
23MI17	86	82	95.3
23MI30	33	33	100.0
23DU12	533	522	97.9
23DU13	255	210	100.0

Note: Ordering of this table reflects the order of sites in the previous two BR matrices.

The BR matrix *sans* plainware has a noticeably different appearance than the matrix produced with Neeley's Ferry and Bell Plain included. Using the criteria of similarity stated previously, only 24 (7.4%) comparisons fall within the similar categories (i.e., above a BR score of 139). Of those, the BR matrix contains five BR scores of 200, representing identical assemblages.

These scores, however, simply represent assemblages wherein only one type (e.g., red-filmed ceramics) is present in each collection after removal of the plainwares.

The Malden Plain phase sites, when plainwares are removed, score low (BR 0-168). The only similar comparison is between 23DU4 and 23DU5 (BR168). All other Malden Plain component comparisons are below a BR score of 91. The Pemiscot Bayou phase sites fare somewhat better with three BR scores in the similar range. Comparisons of sites 23PM13 to 23PM15 (BR 168, moderately similar), sites 23PM15 to 23PM43 (BR 140, slightly similar), and sites 23PM28 to 23PM42 (BR 186, similar) indicate that there may be some cohesion to this particular grouping. The two Nodena comparisons (23PM5, 23PM21) score only a BR of 29 when the plainwares are removed from the assemblages.

Cluster analysis of the BR scores in the matrix of Williams' surface collected sites *sans* plainwares (Table 15) resulted in the identification of two macroclusters and one outlier (23PM5) (Figure 7). Macrocluster 1 contains sites 23PM21, 23PM13, 23PM15, 23PM43, 23DU12, 23DU4, 23PM28, 23PM42, 23DU13, 23NM69, and 23DU5. These assemblages were assigned by Williams (1954) to the Malden Plain, Pemiscot Bayou, and Nodena phases. Two subclusters can be defined within Macrocluster 1, the first, Subcluster 1 contains assemblages from 23PM13, 23PM15, and 23PM43. The assemblages in Subcluster 1 were assigned by Williams (1954, 1980) to the Nodena and Pemiscot Bayou, and Armorel phases. Subcluster 2 contains assemblages from sites 23DU12, 23DU4, 23PM28, 23PM42, 23DU13, 23NM69, and 23DU5. Williams (1954) assigned these sites to the Malden Plain, Pemiscot Bayou, and Cairo Lowland phases. Macrocluster 2 contains assemblages from sites 23MI33, 23MI2, 23PM40, 23MI30, 23ST26, 23NM38, 23SO111, 23NM68, 23MI1,

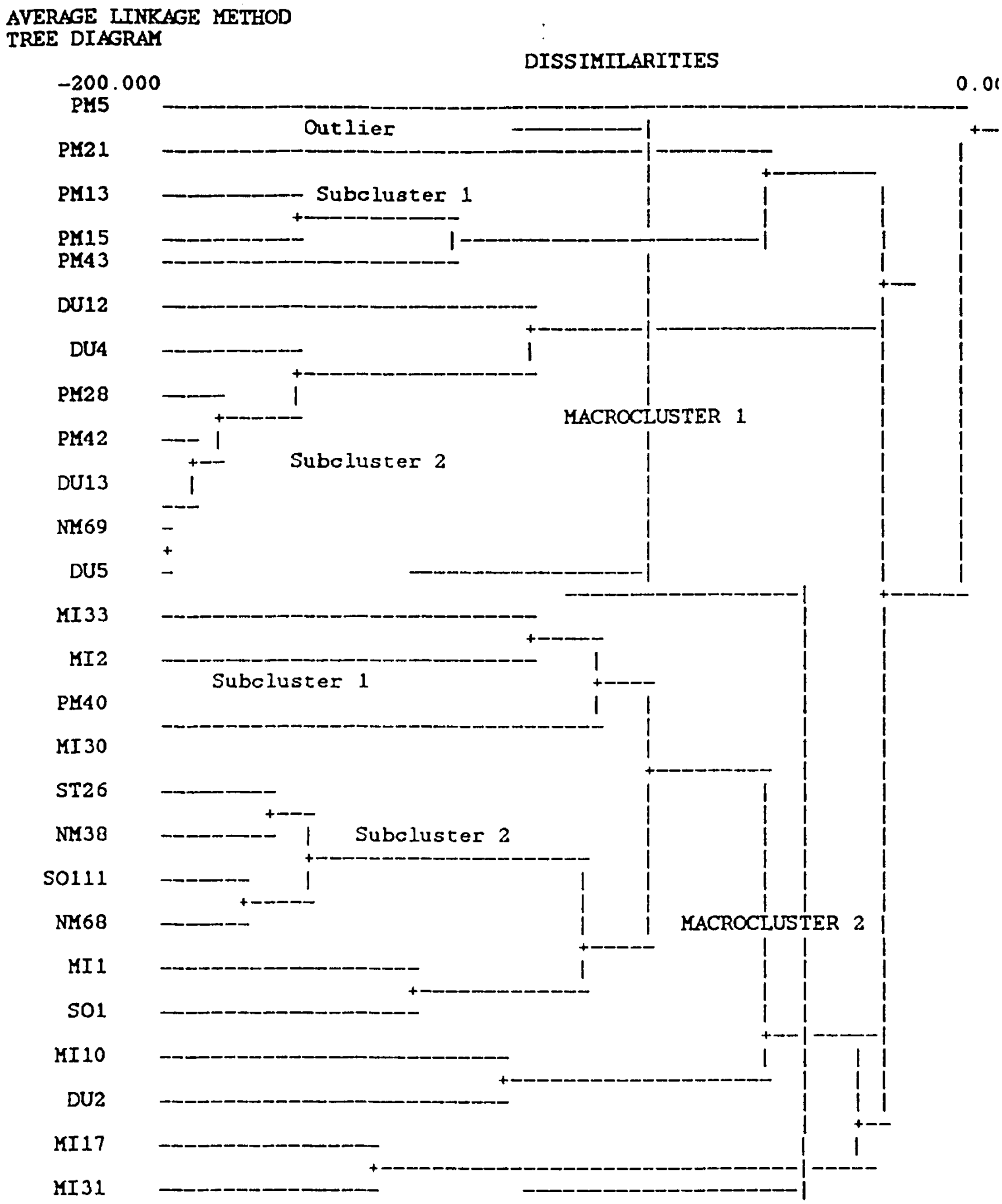
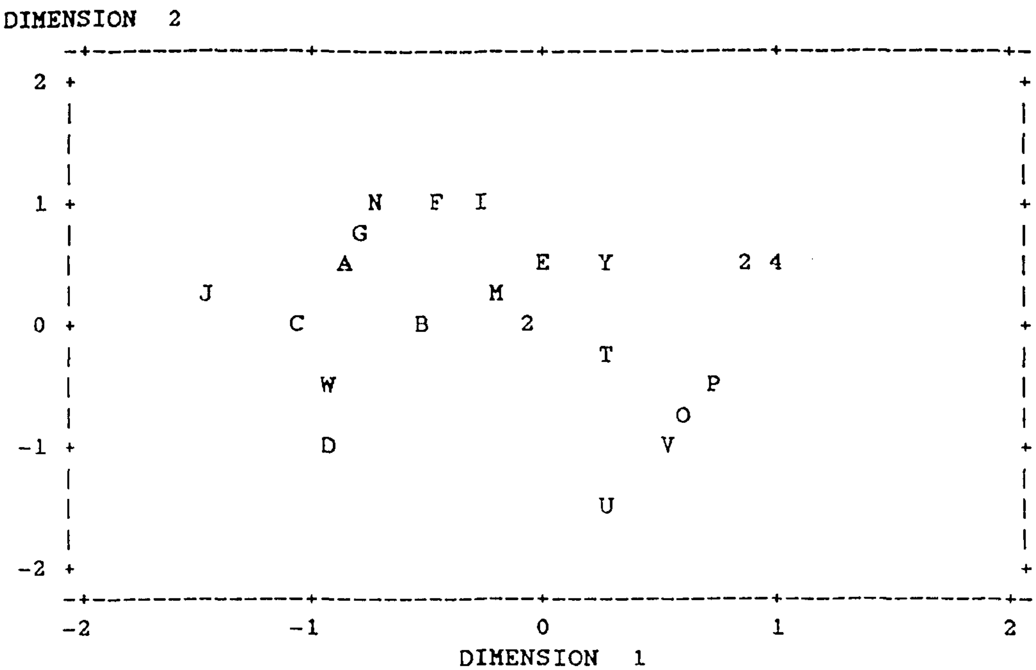


Figure 7. Cluster Analysis of BR Scores of Williams (1954) Surface-Collected Sites *Sans* Plainwares.

23SO1, 23MI10, 23DU2, 23MI17, and 23MI31. Williams assigned these assemblages to the Cairo Lowland, Malden Plain, and Pemiscot Bayou phases. Macrocluster 2 also contains two distinct subclusters. Subcluster 1 contains sites 23MI33, 23MI2, and 23PM40, assemblages assigned by Williams (1954) to the Cairo Lowland and Pemiscot Bayou phases. Subcluster 2 in Macrocluster 2 contains sites 23ST26, 23NM38, 23SO111, and 23NM68 all of which have been assigned to the Cairo Lowland phase. Macrocluster 2 also contains three paired assemblages at the bottom of the dendrogram relating primarily to Cairo Lowland phase sites (23MI30--23SO1, 23MI10--23DU2, 23MI17--23MI31).

Multidimensional scaling of the distances in this BR matrix are presented in Figure 8. The macroclusters are not as distinct in Figure 8 as they are in Figure 5. However, the outlier, 23PM5 (U) is clearly represented and 23DU2 (J) appears more as an outlier than as a distinct member of a cluster.

An averaged Euclidean distance cluster analysis of the surface-collected ceramic assemblages *sans* plainwares also was run using SYSTAT to determine if the previously defined phases could be defined through cluster analysis of the frequencies of ceramic types. Three clusters (Figure 9) and two outliers (23MI1 and 23DU5) result from those calculations. Cluster 1 contains seven assemblages, Cluster 2 contains eight assemblages, and Cluster 3 contains nine assemblages. Two-tailed Student's t tests comparing the means sample size per assemblage in each cluster yielded the following results:
Cluster 1 compared to Cluster 2 (Student's $t = 0.4136$; $p > 0.05$); Cluster 1 compared to Cluster 3 (Student's $t = 3.737$; $p < 0.05$); Cluster 2 compared to Cluster 3 (Student's $t = 1.865$; 0.1 is > p is > 0.05). In regards to the Student's t comparing Cluster 1 and Cluster 2 we cannot reject the null hypothesis Cluster 1 and Cluster 2 have the similar sample sizes. Cluster 1 and Cluster 3 have statistically different sample sizes and the null hypothesis (C1 = C3) is



COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
MI1	A	-0.84	0.29
MI2	B	-0.57	-0.16
MI10	C	-1.06	-0.11
MI31	D	-0.92	-1.21
MI33	E	0.01	0.32
NM38	F	-0.46	0.96
NM68	G	-0.78	0.68
NM69	H	1.00	0.42
ST26	I	-0.30	0.88
DU2	J	-1.44	0.08
DU4	K	0.83	0.50
DU5	L	1.00	0.42
SO1	M	-0.21	0.23

COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
SO111	N	-0.75	0.86
PM13	O	0.61	-0.76
PM15	P	0.70	-0.53
PM28	Q	1.00	0.31
PM40	R	-0.05	-0.18
PM42	S	0.89	0.28
PM43	T	0.29	-0.36
PM5	U	0.25	-1.69
PM21	V	0.55	-1.22
MI17	W	-0.95	-0.67
MI30	X	-0.05	-0.18
DU12	Y	0.26	0.41
DU13	Z	1.00	0.42

Figure 8: Multidimensional Scaling of Cluster Analysis of BR Scores from Williams (1954) Surface Collected Sites *Sans* Plainwares.

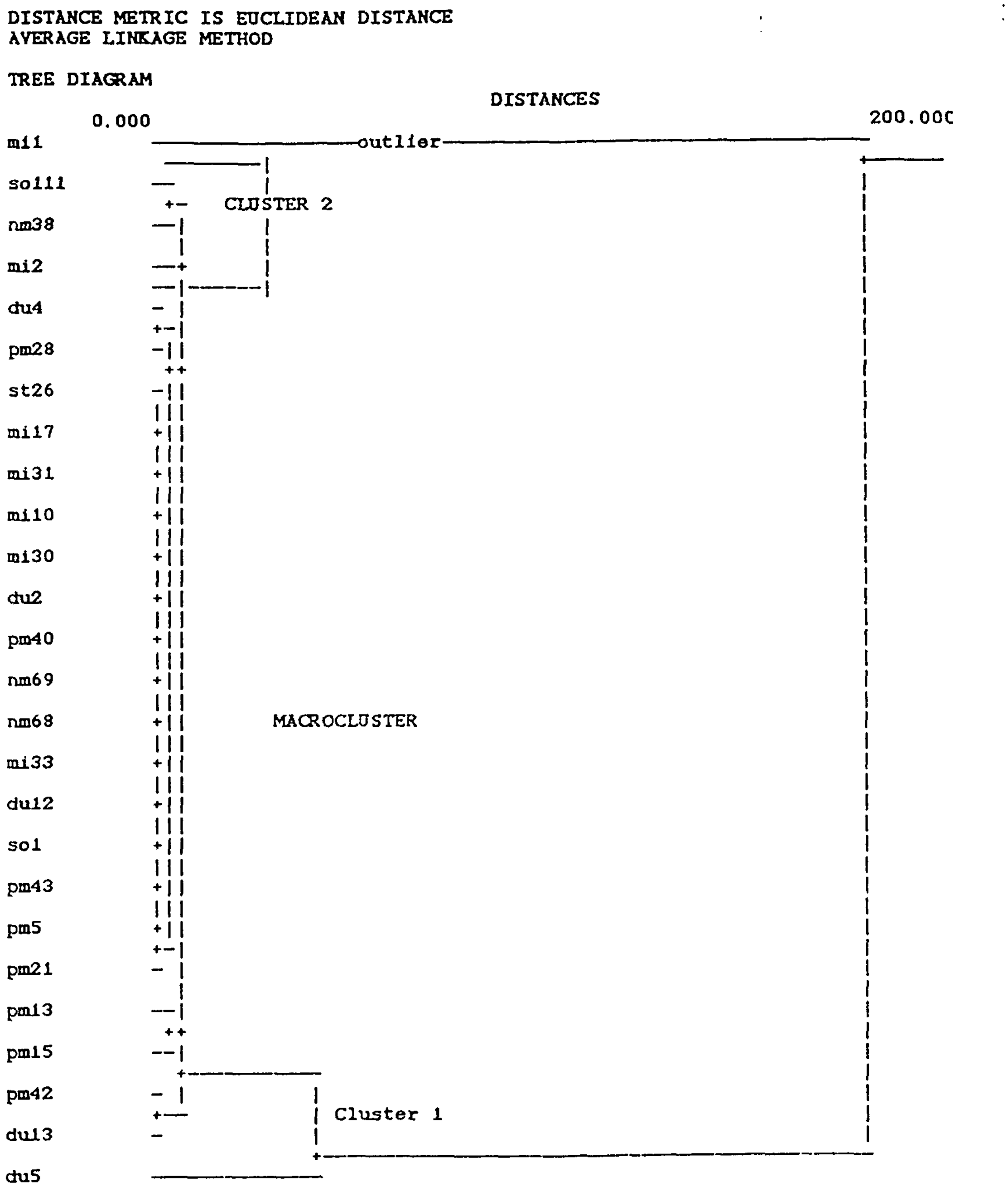


Figure 9. Averaged Euclidean Distances of Williams' (1954) Surface-Collected Sites *sans* Plainwares.

rejected. The *t* test of Cluster 2 and Cluster 3 are nearly statistically different. Cluster 3 contains a set of sites with considerably smaller assemblages ($\bar{x}$ = 8.22 sherds) than Cluster 1 ($\bar{x}$ = 28.29 sherds) or Cluster 2 ($\bar{x}$ = 24.75 sherds) and this may account for some of the clustering.

No clear grouping of Cairo Lowland, Pemiscot Bayou, Nodena, or Malden Plain phase sites are represented in either Figure 6 or 9. Sample size clearly is influencing the Euclidean distance cluster statistics. However, since neither the BR scores, the cluster analysis of those scores, or the Euclidean distance dendrograms indicate four separate, distinct clusters containing sites assigned to a single phase, it is suggested that none of the current phases, as based on ceramic surface collections, are cohesive units sufficiently distinct to be categorized as phases.

In summary, BR coefficients of similarity calculated on Williams' (1954) surface-collected sites appear to represent a fairly diverse, yet partially similar, group of ceramic assemblages when those assemblages are compared using assemblages containing plainware ceramics. However, when the two categories of plainwares are not included in the comparisons, sites assigned to individual phases do not appear to represent homogeneous, cohesive groups, even though the ceramic horizon markers for the phases remain in the assemblages. Cluster analysis of the BR scores produced only one subcluster (Macrocluster 2, Subcluster 2 [Figure 7]) that contains assemblages assigned to a single phase--the Cairo Lowland phase. That subcluster did not, however, contain the archetype site--Crosno. In part, sample-size differences and time may contribute to the problems of interpreting BR scores, BR clusters, and averaged Euclidean distance dendrograms. Since the majority of assemblages represent similarly sized samples from the same context (surface collections), cluster analyses employing either the BR scores or the ceramic-type frequencies should have produced clusters of sites similar to the groups of sites Williams assigned to the individual phases. This is not the case. Multivariate cluster analysis of BR coefficients of similarity and averaged Euclidean distances failed to produce any clusters consistently reflecting the phase assignment of sites indicated by Williams (1954).

A COMPARISON OF EXCAVATED ASSEMBLAGES FROM THE BOOTHEEL

Williams (1954) was not the only archaeologist to assign sites to the phases he identified. Virtually all other archaeologists working in southeast Missouri have used his model to classify sites. Since the statistical evaluations of Williams' surface-collected assemblages indicate that sample size is a problem when comparing the ceramic assemblages, the following evaluations employ only large, excavated, pooled samples of ceramics. Not all reports resulting from excavations could be used in the following comparisons as they do not possess the requisite information (i.e., types of ceramics reported as frequencies). Thus, the Hearnes site (23MI7) (Klippell 1965) and the Lilbourn (23NM38) (Chapman *et al.* 1977) excavations, among others, are not included.

The Campbell Site Assemblages

Before comparing all of the published, excavated assemblages from the Bootheel, it is imperative to explore the complexity of sample size and sample source problems inherent in those assemblages. The Campbell site (23PM5) was selected as a good example for this exploration. The site is considered to be the type site for Williams' (1980) Armorel phase and also is considered to be the best reported assemblage from any site associated with that phase (Williams 1980:105). Although the site is considered by some to be well reported, the referenced report (Chapman and Anderson 1955) is the direct result of Leo Anderson's long-term excavation activities at the site. The manuscript in fact only reports the initial excavations conducted by Anderson and Chapman and the limited (less than 100 square feet), formal subsurface testing performed by Chapman. Three provisional ceramic types are proposed in the report (Campbell Applique, Campbell Incised, and Campbell Punctated), no radiocarbon dates are available, and published maps are incorrect in their orientation (see Holland 1991). Additional work by Holland (1991) has discounted the infamous "shaman" interpretation of one supposedly isolated burial, and has provided considerably different interpretations of the skeletal population and the archaeology of the site than those provided in the original report.

Five sets of data were compiled to compare the multiple surface collected and excavated assemblages from the site--Chapman and Anderson (1955), Holland (1991), Williams (1954), a pooled sample from the UMC Museum collections (derived from the original Chapman and Anderson materials and subsequent collections made at the site), and an excavated assemblage from the Parkin site in northeast Arkansas (Klinger 1977). Chapman and Anderson (1955:29) acknowledge a collection bias, stating:

> This is a selective sample in that not all sherds, but only those that were rimsherds or that had some decoration or special shape characteristic were picked up. Plain body sherds got in the collection by chance rather than purposefully.

Since the Campbell site is the type site of the Armorel phase, the Parkin site (3CS29), a component of that phase (S. Williams 1980), was included for comparative purposes. Parkin was chosen because excavated ceramic assemblages are published in a usable format (Klinger 1977). Table 17 presents the Brainerd-Robinson similarity matrix calculated for the Campbell and Parkin assemblages.

The BR scores displayed in the matrix range from a high of 184 (Campbell

Table 17. Similarity Matrix of Brainerd-Robinson Coefficients for all Known Ceramic Assemblages from the Campbell Site (23PM5)

2:	169									
3:	178	183								
4:	163	150	161							
5:	162	147	158	177						
6:	171	175	181	155	155					
7:	126	105	118	129	126	103				
8:	107	96	103	131	140	106	158			
9:	160	184	176	145	138	172	101	89		
10:	153	148	145	146	162	155	110	124	136	
11:	140	156	142	109	106	135	80	54	158	112
	1	2	3	4	5	6	7	8	9	10

Note: 1--Fill above burials 10B, 11,12; 2--Fill above burials 15,16; 3--Fill above burial 17; 4--Test trench fill west and above burial 18; 5--West test pit; 6--Northwest test pit; 7--Chapman and Anderson (1955) surface collection; 8--S. Williams (1954) surface collection; 9--ceramic from Campbell burials (Holland 1991); 10--UMC Museum pooled sample; 11--Excavated sample (1966 excavations) from Parkin site (Klinger 1977).

mortuary assemblage compared to fill above burials 15 and 16) to a low of 54 (Williams' [1954] surface collection compared to excavated materials from the Parkin site). The scores related to those collections derived from above and around various burials (1-4) can be used to illustrate the homogeneity of a background sample from the site as all BR comparisons of those assemblages score in the moderately similar to similar range. This background similarity also is illustrated by the comparison of two test pits (5 and 6, BR 155). Similarly, Chapman and Anderson's (1955) surface collection compared to Williams' (1954) surface collection scores a BR of 158 indicating the two collections are slightly similar. Conversely, the Campbell mortuary assemblage is not similar to the surface collections (BR 101, 89). None of the BR scores from the pooled sample (10) appear to be strongly similar to the surface collections, the mortuary collection, or the Parkin assemblage.

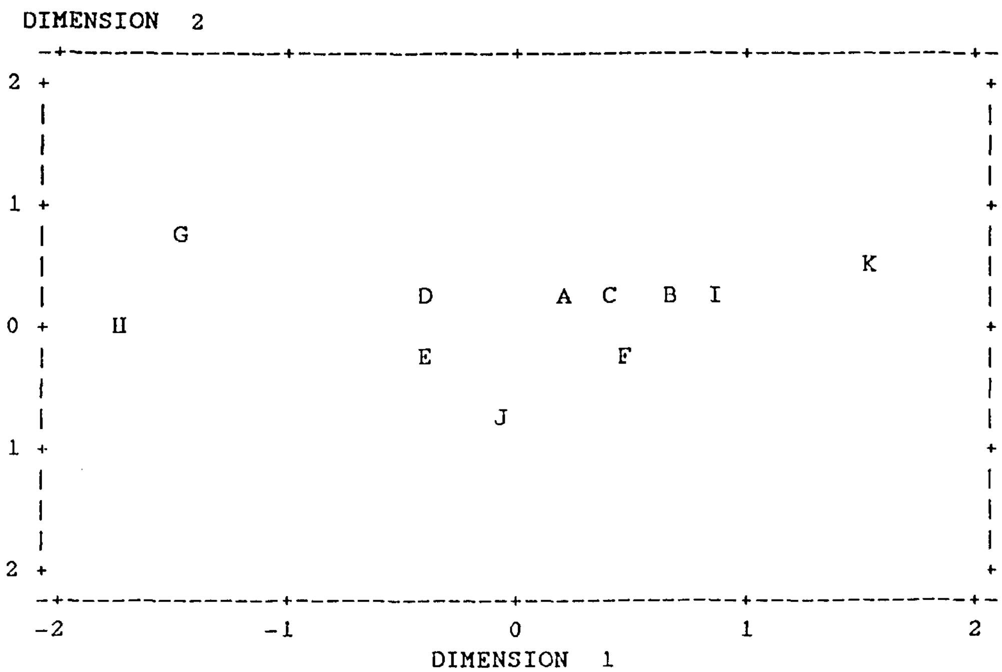
Three samples from Campbell, the type site of the Armorel phase, are in the slightly similar range when compared to the Parkin site. The remaining seven samples score in the dissimilar range when compared to Parkin. BR scores from the matrix indicate that the highest degree of similarity between Campbell and Parkin is found between the Campbell mortuary assemblage and the excavated assemblage from Parkin. Comparison of the excavated Parkin materials with the background assemblage (fill around burials and test units) from Campbell score in the dissimilar to slightly similar ranges (50% dissimilar and 50% slightly similar). This raises a number of interesting questions concerning both the cohesiveness of the phase and the occupation sequence at Campbell.

Cluster analysis of the BR scores from the Campbell matrix is illustrated in Figure 10 . Two clusters and one outlier (Parkin-A11) are represented in the dendrogram. Cluster 1 contains the surface collections (A8) made by S. Williams (1954) and Chapman and Anderson (1955) (A7). Cluster 2 contains the UMC pooled sample (A10), fill around burials (A1, 2, 3, 4), the two test units excavated by Chapman (A5, 6), and the mortuary assemblage (A9) compiled by Holland (1991).

Multidimensional scaling of the Campbell similarity matrix is illustrated in Figure 11. Of interest in this figure is the representation of the two

```
AVERAGE LINKAGE METHOD
TREE DIAGRAM
                                     DISSIMILARITIES
-200.000                                                           -100.0
  A7    -----------------------------
                                    +----CLUSTER 1---------------------
  A8    -----------------------------                                 |
                                                                      +---
  A10   --------------------------------                              |
                                       +--                            |
  A5    ----------------               | |                            |
                        +--------------- |                            |
  A4    ---------------                  |                            |
               CLUSTER 2                 +------------                |
  A1    ---------------------            |           |                |
                             +------------           |                |
  A6    -------------        |                       |                |
                     +--     |                       |                |
  A3    -------------   |    |                       |                |
                        +-----                       |                |
  A2    -----------     |                            |                |
                   +-----                            |                |
  A9    -----------                                  |                |
                                                     +-----------------
  A11   ---------Outlier-------------------------------
```

Figure 10. Cluster Analysis of BR Scores of the Campbell and Parkin Ceramic Assemblages.



COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
A1	A	0.18	0.20
A2	B	0.66	0.01
A3	C	0.42	0.04
A4	D	-0.39	0.08
A5	E	-0.41	-0.28
A6	F	0.47	-0.27
A7	G	-1.46	0.71
A8	H	-1.74	-0.12
A9	I	0.85	0.05
A10	J	-0.09	-0.86
A11	K	1.50	0.46

Figure 11. Multidimensional Scaling of BR Cluster Analysis of Campbell and Parkin Ceramic Assemblages.

surface collections (G and H) as outliers to the main grouping of ceramic samples from the Campbell site. The Parkin site (K) also is an outlier to the group and its closest member of the main cluster is (I), the mortuary assemblage. This supports the interpretation of the similarity matrix (Table 17) discussed previously (that the Parkin ceramic assemblage is more similar to the Campbell mortuary assemblage than the other assemblages from Campbell.

A second dendrogram displaying averaged linkage of Euclidean distances calculated on the Campbell ceramic-type frequencies is illustrated in Figure 12. One Cluster containing au4, 6, 3, 5, 1, and 2 and five outliers (au9, 8, 7, 11, and 10) resulted from those calculations. This dendrogram is interesting because Cluster 1 contains analytical units containing less than 60 sherds and is ordered from top to bottom based solely on increasing sherd frequencies (i.e., au4 contains 16 sherds and au2 contains 60 sherds). The outliers at increasing distance from the cluster also are arranged in the same manner, that is au9 contains 167 sherds, au7 contains 1068 sherds, and au10 contains 5835 sherds. Since the cluster and outlier configurations are strictly based on sample size, calculating a Student's *t* test is not necessary.

Removing the plainwares from consideration results in a matrix similar in content with the previous *sans* plainware calculations. That is, the overall number of similarity coefficients that are in the similar range (BR 200-140) is reduced (Table 18). BR scores representing comparisons of assemblages derived from fill around burials tend to retain some semblance of similarity. Comparisons with the Parkin site are all dissimilar and range from a BR score of 3 to 106. The pooled UMC collection also loses high BR scores, possibly as a result of the greater number of ceramic types in that assemblage.

```
DISTANCE METRIC IS EUCLIDEAN DISTANCE
AVERAGE LINKAGE METHOD

TREE DIAGRAM
                                           DISTANCES
       0.000                                                               1000.00C
au4         -
            |
au6         +
            |
au3         +
            |-------CLUSTER 1
au5         +
            +-
au1         +|
            ||
au2         -|
             +--
au9         -- |
               +----
au8         ----   |---Outlier CLUSTER 1
                   +------------
au7         -------         ---|------Outlier CLUSTER 1
                               +-------------------
au11        -------------------                   |
                                                  +--CLUSTER 2 ? ----------
au10        ---------------------------------------
```

Figure 12. Averaged Euclidean Distances of Campbell and Parkin Ceramic Assemblages

Table 18. Similarity Matrix of Brainerd-Robinson Coefficients for all Known Ceramic Assemblages from the Campbell Site (23PM5) *sans* Neeley's Ferry Plain and Bell Plain

2:	153									
3:	152	133								
4:	73	80	67							
5:	98	105	92	125						
6:	91	80	133	100	133					
7:	106	120	108	12	37	42				
8:	73	120	67	104	109	104	62			
9:	47	29	95	29	50	67	83	9		
10:	93	130	87	77	92	80	74	135	22	
11:	106	86	69	3	28	3	92	16	30	32
	1	2	3	4	5	6	7	8	9	10

Note: 1--Fill above burials 10B, 11,12; 2--Fill above burials 15,16; 3--Fill above burial 17; 4--Test trench fill west and above burial 18; 5--West test pit; 6--Northwest test pit; 7--Chapman and Anderson (1955) surface collection; 8--S. Williams (1954) surface collection; 9--ceramic from Campbell burials (Holland 1991); 10--UMC Museum pooled sample; 11--Excavated sample (1966 excavations) from Parkin site (Klinger 1977).

The impact that plainwares have on these assemblages is significant simply because the plainware categories constitute the greater part of the assemblages. Table 19 illustrates the plainware contribution to the total assemblage from the Campbell site. Figure 13 illustrates the results of the cluster analysis of the BR matrix of samples of Campbell site ceramics *sans* plainwares. Two clusters and one outlier (A-9, the mortuary assemblage) are identified in this dendrogram. Cluster 1 represents fill around burials (A1, 2, 3), Chapman and Anderson's (1955) surface collection (A7), and the Parkin ceramic assemblage (Klinger 1977). Cluster 2 is composed of fill around burials (A4), the two test units (A5, 6), S. Williams (1954) surface collection, and the UMC pooled sample (A10).

Multidimensional scaling of the similarity matrix (Figure 14) illustrates the scattered nature of the multiple assemblages when the plainwares are removed. The Parkin (K) and mortuary (I) assemblages are considered as outliers in this figure; they lie at an increased distance from the cluster relative to the previous plot of the assemblages with plainwares (Figure 11).

Removing the plainware categories also dramatically alters the averaged Euclidean distances cluster analysis of ceramic-type frequencies (Figure 15). However, the same sample-size clustering observed in Figure 6 is present. Cluster 1 (au9, 1, 5, 2, 6, 3, 4, 8) represents assemblages containing less than 50 sherds and the outliers at increasing distance reflect increasingly larger samples of ceramics.

Excavated Sites Comparisons

A total of 15 excavated sites were identified during the literature review as having samples of sufficient size for comparison. Of these, five are in

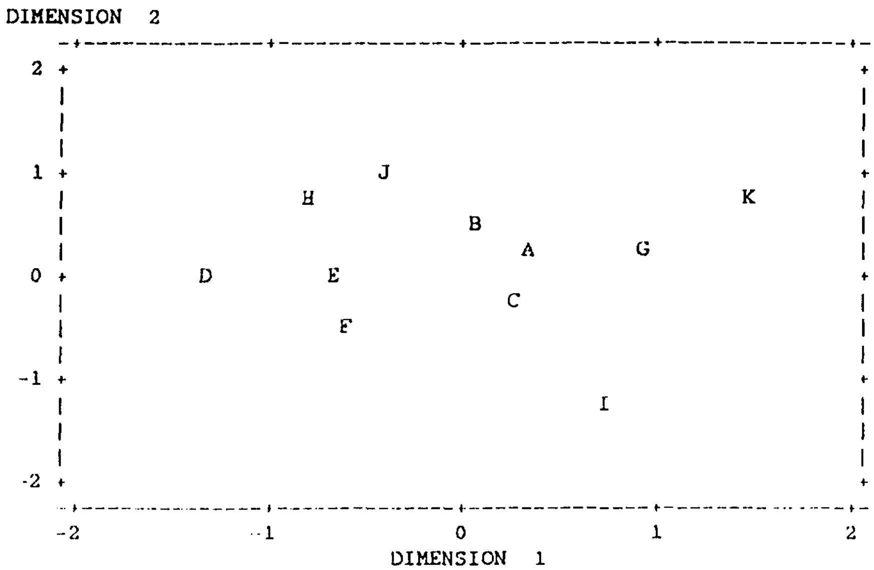
Table 19. Total Ceramic Assemblages and Percentage of Assemblage Represented by Plainware Types at 23PM5

Assemblage Source	Total Ceramic Assemblage	Total NFP and Bell Plain	% of Assemblage of Plainwares
1. Fill above burials 10B, 11,12 (1955)	59	48	81.3
2. Fill above burials 15,16 (1955)	60	55	91.6
3. Fill above burial 17 (1955)	33	30	90.9
4. Fill west and above burial 18 (1955)	16	14	87.5
5. West test pit	39	31	88.5
6. Northwest test pit	19	16	84.2
7. Chapman and Anderson surface collection (1955)	1068	824	77.1
8. Williams surface collection (1954)	379	365	96.3
9. Mortuary vessels (Holland 1991)	164	118	71.9
10. Pooled UMC collection	5836	3866	66.2
11. Parkin site (Klinger 1977)	1956	1581	80.8

Note: The 1955 dates listed above refer to the Chapman and Anderson publication on the Campbell site.

```
AVERAGE LINKAGE METHOD
TREE DIAGRAM
                                      DISSIMILARITIES
    -200.000                                                                  0.0
      A9     ------------outlier--------------------------------
                                                                +-------------
     A11     --------------------------------------            |
                                                  +-------      |
      A7     -------------------------------      |      |      |
                                           +-------      |      |
      A2     ----------------              |             |      |
                            +---           |             |      |
      A1     ----------------  |           |             |      |
                               +-----CLUSTER 1           |      |
      A3     -------------------                         |      |
                                                         +-------
      A6     -----------------------                     |
                                   +------               |
      A5     -----------------------      |              |
                                          +------        |
      A4     -----------------------------       |       |
                                                 +---------CLUSTER 2
      A8     ----------------------              |
                                  +-------------
     A10     ----------------------
```

Figure 13: Cluster Analysis of BR Scores from the Campbell Site Similarity Matrix *Sans* Plainwares.



COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
A1	A	0.33	0.21
A2	B	0.10	0.43
A3	C	0.28	-0.37
A4	D	-1.35	-0.19
A5	E	-0.66	-0.21
A6	F	-0.57	-0.62
A7	G	0.91	0.03
A8	H	-0.83	0.54
A9	I	0.74	-1.30
A10	J	-0.40	0.81
A11	K	1.45	0.66

Figure 14. Multidimensional Scaling of BR Scores from the Campbell and Parkin Ceramic Assemblages *Sans* Plainwares.

```
DISTANCE METRIC IS EUCLIDEAN DISTANCE
AVERAGE LINKAGE METHOD

TREE DIAGRAM
                                        DISTANCES
       0.000                                                200.000
au10        -----------------------------------
                                             +----------------------
au9         --                               |
             +---------                      |
au1         -|        |                      |
            ||        |                      |
au5         +|        |                      |
            ||        |                      |
au2         +|        |                      |
            ||        |  CLUSTER 1           |
au6         +|        |                      |
            ||        |                      |
au3         +|        |                      |
            ||        |                      |
au4         +|        |                      |
            +-        |                      |
au8         -         |                      |
                      +-------               |
au7         -----------     |                |
             outlier        +-----------------
au11        ------------------
                outlier
```

Figure 15. Averaged Euclidean Distances of the Campbell Site Assemblages *sans* Plainwares.

Mississippi County, eight in Pemiscot County, one in Dunklin County, and one in Arkansas. Other excavated materials exist, but generally those samples are small or are presented in such a way that they could not be used in my analysis.

The BR matrix (Table 20) calculated for this sample of 15 sites resulted in a correlation matrix with a different pattern than previous matrices. Similarity

Table 20. Similarity Matrix of Brainerd-Robinson Coefficients for Excavated Sites in the Bootheel with Plainwares

2:	133													
3:	153	170												
4:	159	118	142											
5:	167	118	143	172										
6:	96	139	139	86	88									
7:	107	166	150	97	99	168								
8:	166	131	160	156	158	130	130							
9:	92	122	127	80	84	137	135	111						
10:	94	94	97	92	96	97	100	100	150					
11:	105	134	138	95	97	159	155	139	156	121				
12:	162	120	144	154	155	116	125	166	92	92	112			
13:	105	106	110	106	107	96	105	114	150	186	125	105		
14:	170	133	157	170	179	107	118	175	102	91	116	163	105	
15:	122	155	159	112	114	152	157	148	157	124	175	125	138	132
	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note: 1--23MI1 (Williams 1954); 2--23MI71 (Lewis 1982); 3--23MI55 (Lewis 1982); 4--23MI69 (Williams 1968); 5--23MI53 (Williams 1968); 6--23PM21 UMC Museum collections; 7--23PM13 UMC Museum collections; 8--23PM549 (Williams 1972); 9--23PM2 (Marshall 1965); 10--23PM42 (Marshall 1965); 11--23PM5 UMC Museum collections; 12--Parkin site (Klinger 1977); 13--23DU5 (Williams 1954); 14--23PM11 UMC Museum collections; 15--23PM43 UMC Museum collections (Chapman 1955 salvage excavations). All samples represent total pooled shell-tempered ceramics from the excavated sites. Some UMC Museum collections represent excavations conducted by Williams (1967, 1968, 1972) and additional collected materials.

scores range from a high of BR186 to a low of BR 80. Only 1 comparison scores in the similar range (23DU5 to 23PM42), 15 comparisons score in the moderately similar range, 21 comparisons in the slightly similar range, and 68 comparisons score in the dissimilar range. (The high number of dissimilar scores could be predicted as comparisons are made across proposed phases, time, and geographic space.) Table 21 presents those similar, moderately similar, and slightly similar comparisons ranked in order of the BR scores.

As Table 21 indicates, BR correlations of similarity simply are not restricted to sites within bounded geographic regions. The highest BR score is between a Malden Plain/Big Lake phase, Early Mississippi-period site and a Hayti/Pemiscot Bayou phase site in the Pemiscot Bayou area. In the moderately similar range there are six correlations of Pemiscot County sites to Mississippi County sites, two correlations of Pemiscot County sites to Pemiscot County sites, three correlations of Mississippi County to Mississippi County sites, two correlations of an Arkansas site to a Pemiscot County site, and one correlation of an Arkansas site to a Mississippi County site. These widely spread (in terms of geographic space) correlations may be not only a function of sample size, but may illustrate the vast amount of variation in Mississippi-period ceramics. Variation in assemblage composition may have been suppressed by the existing phase designations. These are, however, the largest samples currently available from the Bootheel for analysis, and the assemblages are constantly used to compare and assign sites to phases and provide virtually the entire interpretive basis of Mississippi-period prehistory in the region.

Cluster analysis of the BR scores in the matrix of excavated sites with plainwares produced three clusters (Figure 16). Cluster 1 contains

Table 21. Ranked BR Similarity Coefficients for Excavated Sites in the Bootheel

Site Number	Correlated with	Site Number	BR Score
Similar Range (BR 200-180)			
23DU5		23pm42	186
Moderately Similar Range (BR 179-160)			
23PM11		23MI53	179
23PM11		23PM549	175
23MI53		23MI69	172
23MI55		23MI71	170
23PM11		23MI1	170
23PM11		23MI69	170
23PM13		23PM21	168
23MI53		23MI1	167
Parkin		23PM549	166
23PM13		23MI71	166
23PM549		23MI1	166
23PM11		Parkin	163
Parkin		23MI1	162
23PM549		23MI55	160
Slightly Similar Range (BR 159-140)			
23MI69		23MI1	159
23PM5		23PM21	159
23PM43		23MI55	159
23PM549		23MI53	158
23PM43		23PM13	157
23PM11		23MI55	157
23PM43		23PM2	157
23PM549		23MI69	156
23PM5		23PM2	156
Parkin		23MI53	155
23PM5		23PM13	155
23PM43		23MI71	155
Parkin		23MI69	154
23MI55		23MI1	153
23PM43		23PM21	152
23PM13		23MI55	150
23PM42		23PM2	150
23DU5		23PM2	150
23PM43		23PM549	148
23MI53		23MI55	143
23MI69		23MI55	142

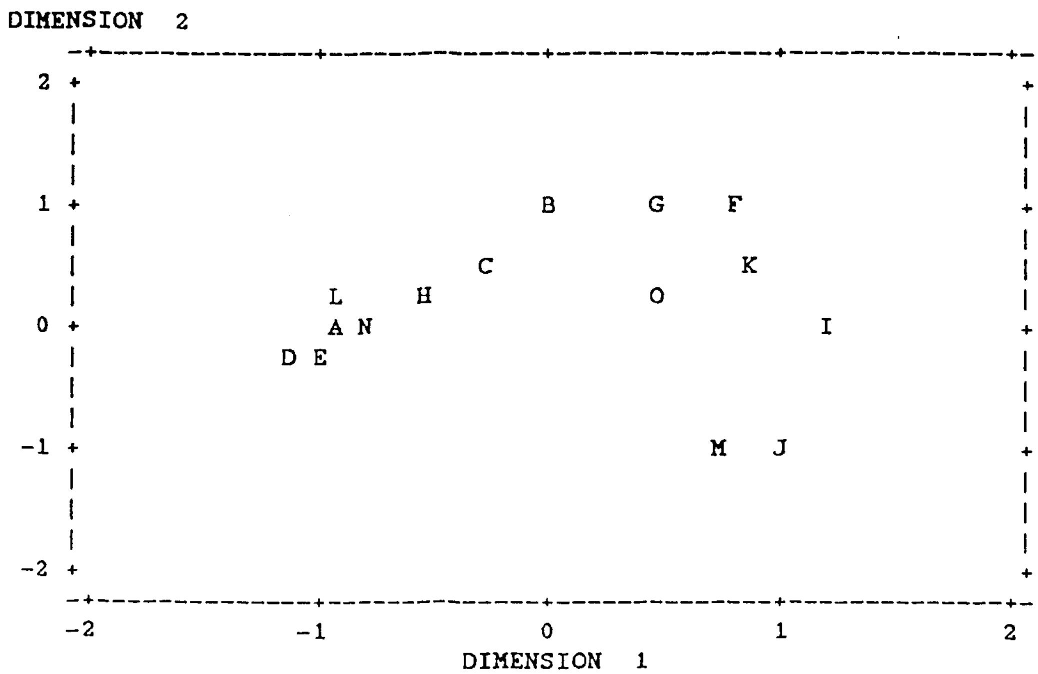
```
AVERAGE LINKAGE METHOD
TREE DIAGRAM
                                          DISSIMILARITIES
   -200.000                                                                   -100.0
   MI69    --------------------
                              +----
   MI53    --------------     |   |
                        +------   |
   PM11    --------------         |
                                  +---      CLUSTER 1
  PM549    -----------------------|  |
                                 +-  |
    MI1    ----------------------    |
                                     +----------------------------
 PARKIN    --------------------------                            |
                                                                 +------
   MI55    --------------------                                  |     |
                             +-------------------                |     |
   MI71    --------------------                 |                |     |
                                                +-CLUSTER 2-------     |
   PM13    ----------------------               |                      |
                               +------------    |                      |
   PM21    ----------------------          |    |                      |
                                           +----                       |
    PM5    -----------------               |                           |
                           +------------   |                           |
   PM43    -----------------           |   |                           |
                                       +----                           |
    PM2    -----------------------------                               |
                                                                       +---
   PM42    ----------                                                  |
                    +----CLUSTER 3--------------------------------------
    DU5    ----------
```

Figure 16: Cluster Analysis of BR Scores in the Excavated Sites Matrix.

assemblages from sites 23MI69, 23MI53, 23PM11, 23PM549, 23MI1, and Parkin. These sites were previously assigned to the Cairo Lowland, Nodena, Pemiscot Bayou, and Armorel phases. Cluster 2 contains sites 23MI55, 23MI71, 23PM13, 23PM21, 23PM5, 23PM43, and 23PM2. Previous phase assignments of sites in Cluster 2 include the Cairo Lowland, Nodena, Armorel, Campbell, and Pemiscot Bayou phases. Cluster 3 contains only two site assemblages--23PM42 and 23DU5. As stated previously, these sites are of Early Mississippi-period age. Consequently, Cluster 3 is considered to represent a temporal clustering of similar assemblages. Discussion of the similarity of the Parkin and Campbell materials presented previously is supported by the cluster analysis performed on the excavated site materials. Figure 16 illustrates that the individual sites are included in separate and distinct clusters. This further supports the previously stated conclusion that, based on ceramic types, the two sites (Campbell and Parkin) are not components of the same phase.

Multidimensional scaling of the similarity matrix (Figure 17) illustrates a fairly tight cluster (A, D, E, H, L, N) representing Cluster 1. Cluster 2 (C, B, G, F, I, K, O) is not as closely linked, and Cluster 3 is separate and isolated in the scatterplot.

An averaged Euclidean distance cluster analysis also was calculated for the excavated site assemblages (Figure 18) using ceramic-type frequencies. Distances between the assemblages are not large. Three outliers (23MI1, 23MI71, and 23PM5) and one macrocluster are represented in this cluster analysis. The macrocluster consists of three subclusters. Subcluster 1 contains sites 23PM42, 23PM43, 23MI55, 23PM549, and Parkin. Subcluster two contains 23PM21 and 23PM13. Subcluster 3 contains 23MI53, 223PM11, 23MI69, 23DU5, and 23PM2. Two-tailed Student's *t* tests comparing the sample means of the



COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
MI1	A	-0.96	-0.10
MI71	B	0.03	0.81
MI55	C	-0.23	0.33
MI69	D	-1.12	-0.38
MI53	E	-0.99	-0.49
PM21	F	0.80	0.88
PM13	G	0.45	0.82
PM549	H	-0.51	0.02
PM2	I	1.17	-0.22
PM42	J	1.03	-1.14
PM5	K	0.86	0.28
PARKIN	L	-0.93	0.20
DU5	M	0.73	-1.07
PM11	N	-0.81	-0.10
PM43	O	0.48	0.15

Figure 17. Multidimensional Scaling of the Excavated Sites BR Similarity Matrix.

DISTANCE METRIC IS EUCLIDEAN DISTANCE
AVERAGE LINKAGE METHOD

TREE DIAGRAM

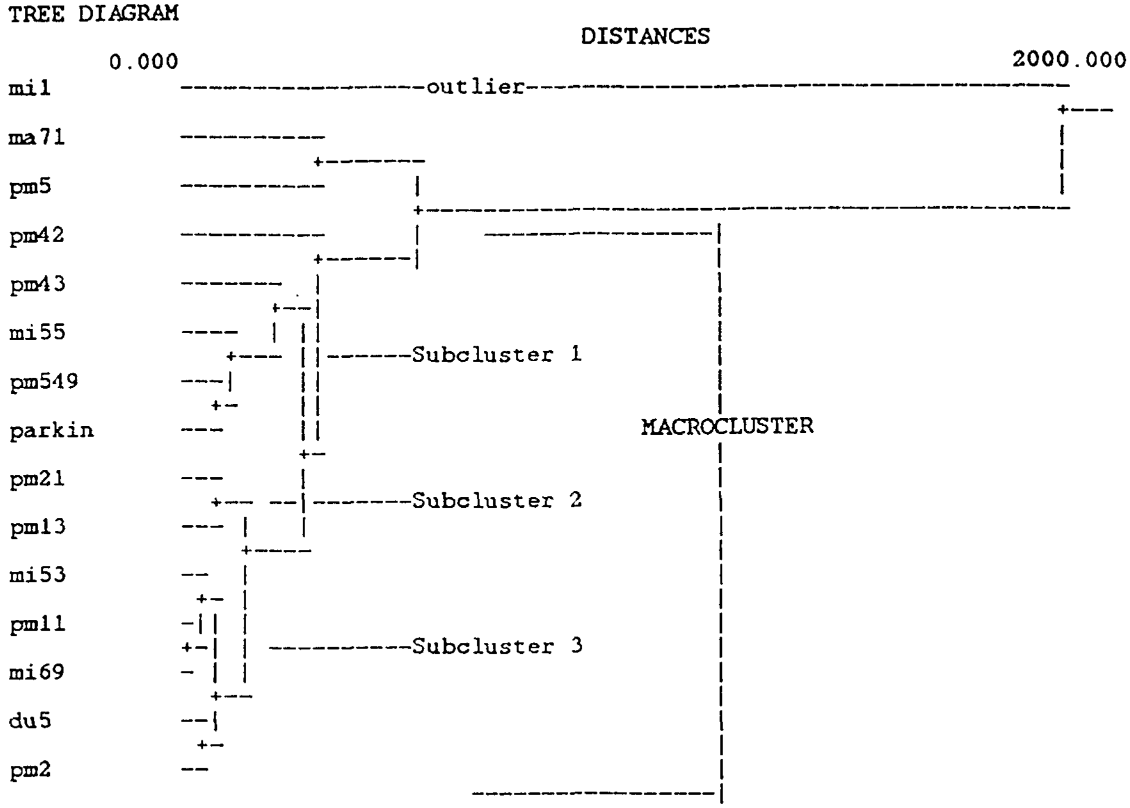


Figure 18. Averaged Euclidean Distances of Assemblages from Excavated Sites.

individual clusters were calculated and yielded the following results: Subcluster 1 compared to Subcluster 2 (Student's $t = 1.005$; $p > 0.05$); Subcluster 1 compared to Cluster 3 (Student's $t = 5.39$; $p < 0.05$); Cluster 2 compared to Subcluster 3 (Student's $t = 9.184$; $p < 0.05$). In regards to the comparison of Subcluster 1 with Subcluster 2 the Student's t does not exceed the critical value of t and we cannot reject the null hypothesis. Consequently, there is no statistical basis to assume that two distinct sample sizes are represented. In the case of the other two comparisons, Subcluster 1 to Subcluster 3 and Subcluster 2 to Subcluster 3, the calculated value of t exceeds the critical value. Subcluster 1 and Subcluster 2 have distinctly larger sample sizes than Subcluster 3. Subcluster 3 is comprised entirely of sites with small assemblages of ceramics (less than 680 sherds), and Subclusters 1 and 2 contain site assemblages in excess of 1300 sherds.

As with all other BR matrices calculated in this research, a separate matrix is presented without using the two plainware variables (Table 22). This matrix consistently produced lower BR scores as do the previous *sans* plainwares matrices. Overall, only one comparison scored in the similar range, three comparisons scored in the moderately similar range, and five comparisons scored in the slightly similar range. Table 23 presents those comparisons in ranked order by BR score.

As illustrated in Table 23, no Mississippi County, Cairo Lowland phase sites remain in the similar range. The two Early Mississippi-period sites (23DU5 and 23PM42) retain their similar standing. The remaining correlations are all confined to Pemiscot County sites.

Table 22. Similarity Matrix of Brainerd-Robinson Coefficients for Excavated Sites in the Bootheel *sans* Plainwares

2:	116													
3:	71	137												
4:	13	76	74											
5:	149	85	103	25										
6:	3	17	41	7	37									
7:	3	16	57	9	44	151								
8:	2	12	72	6	43	104	92							
9:	7	19	76	6	48	53	71	84						
10:	8	16	78	9	49	38	56	73	175					
11:	2	15	72	6	43	113	105	165	110	91				
12:	2	8	4	4	4	112	121	30	15	5	80			
13:	2	10	72	6	43	37	55	73	175	191	47	4		
14:	45	55	80	6	72	83	111	56	54	40	80	84	40	
15:	4	19	77	9	44	93	100	119	154	142	91	28	141	61
	1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note: 1--23MI1 (Williams 1954); 2--23MI71 (Lewis 1982); 3--23MI55 (Lewis 1982); 4--23MI69 (Williams 1968); 5--23MI53 (Williams 1968); 6--23PM21 UMC Museum collections; 7--23PM13 UMC Museum collections; 8--23PM549 (Williams 1972; 9--23PM2 (Marshall 1965); 10--23PM42 (Marshall 1965); 11--23PM5 UMC Museum collections; 12--Parkin (Klinger 1977); 13--23DU5 (Williams 1954); 14--23PM11 UMC Museum collections; 15--23PM43 UMC Museum collections (Chapman 1955 salvage excavations). All samples represent total pooled shell-tempered ceramics from excavated sites. Some UMC collections represent excavations conducted by Williams (1967, 1968, 1972) and additional collected materials.

Table 23. Ranked BR Coefficients of Similarity for Excavated Sites in Southeast Missouri *sans* Plainwares

Site Number	Correlated with	Site Number	BR Score
Similar Range (BR 200-180)			
23DU5 Malden Plain/Big Lake		23PM42 Hayti, Pemiscot Bayou	191
Moderately Similar Range (BR 179-160)			
23PM42 Hayti, Pemiscot Bayou		23PM2 Pemiscot Bayou	175
23DU5 Malden Pln		23PM2 Pemiscot Bayou	175
23PM5 Nodena, Armorel, Campbell		23PM549 Nodena, Armorel	165
Slightly Similar Range (BR 159-140)			
23PM43 Hayti, Pem. Bayou, Nodena. Armorel		23PM2 Pemiscot Bayou	154
23PM13 Nodena		23PM21 Nodena, Armorel	151
23PM43 Hayti, Pem. Bayou Nodena, Armorel		23PM42 Hayti, Pemiscot Bayou	142
23PM43 Hayti, Pem. Bayou, Nodena, Armorel.,		23DU5 Malden Plain/Big Lake	141

Cluster analysis of the BR scores presented in Table 22 produced the dendrogram illustrated in Figure 19. The analysis indicates three clusters that join at a greater distance than the clusters illustrated in Figure 16. Cluster 1 contains assemblages from sites 23MI69, 23MI55, 23MI71, 23MI1, and 23MI53, all sites that were previously assigned to the Cairo Lowland phase. Site 23MI69 may be considered as an outlier since its inclusion in the cluster is at an increased distance from the other sites included with the cluster. Clusters 2 and 3 could be considered as a Macrocluster. However, I have chosen to consider them as separate clusters. Cluster 2 contains sites 23PM11, Parkin, 23PM13, and 23PM21. These sites were previously assigned to the Pemiscot Bayou, Armorel, and Nodena phases, Cluster 3 contains sites 23PM5, 23PM549, 23PM43, 23PM2, 23PM42, and 23DU5. Sites in Cluster 3 were assigned by previous investigators to the Malden Plain/Big Lake, Nodena, Armorel, Campbell, Hayti, and Pemiscot Bayou phases. If Clusters 2 and 3 are considered as a single macrocluster, then sites located in the Pemiscot Bayou represent the largest, cohesive group of sites encountered during the course of my research.

Multidimensional scaling of the BR similarity matrix of excavated sites *sans* plainwares produced the scatterplot represented in Figure 20. Of interest is the representation of Williams'(1954) archetype site, Crosno (A), as an outlier. The other Cairo Lowland phase sites (B, C, D, E) are illustrated in a widely spread configuration corresponding with Cluster 1 identified above, although site 23MI69 (D) may be another outlier to that cluster. The Parkin site (L), and, to some extent 23PM11 (N), appear to be outliers to Cluster 3. The Pemiscot Bayou area sites (F, G, H, K) form a tighter cluster with 23PM43 (0) and 23PM2 (I) illustrating a possible connection with the the Early Mississippi-period sites 23PM42 (J) and 2DU5 (M).

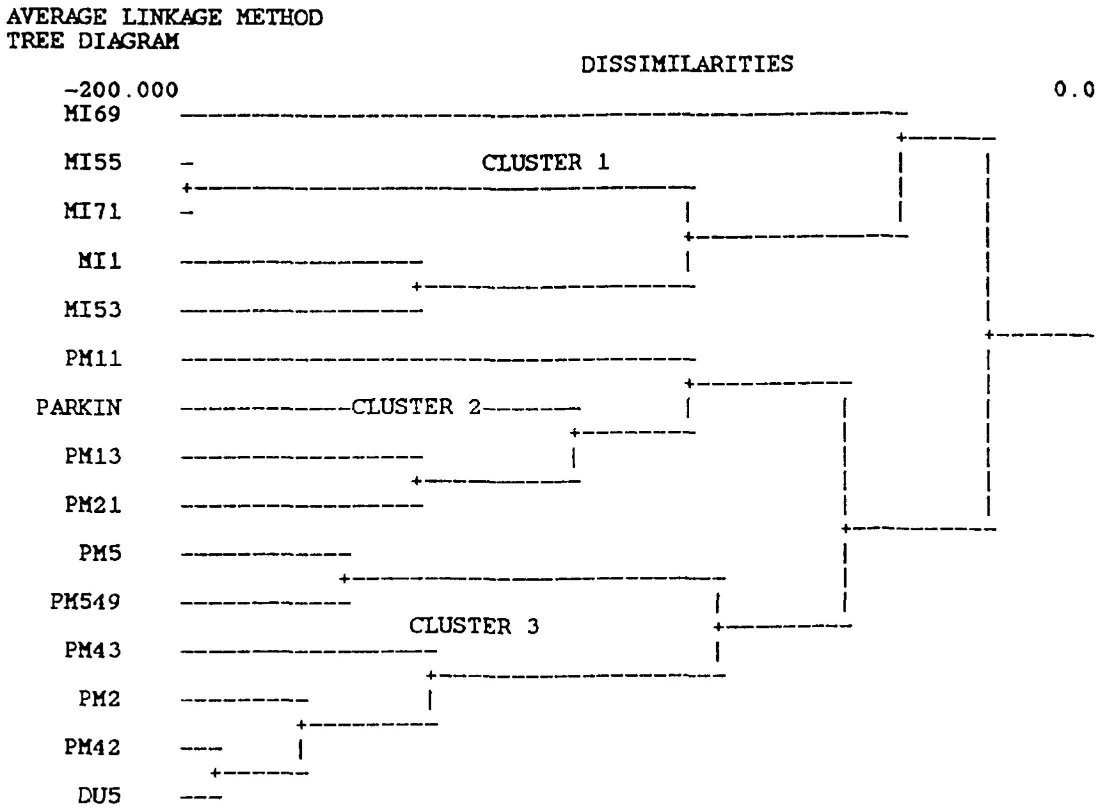
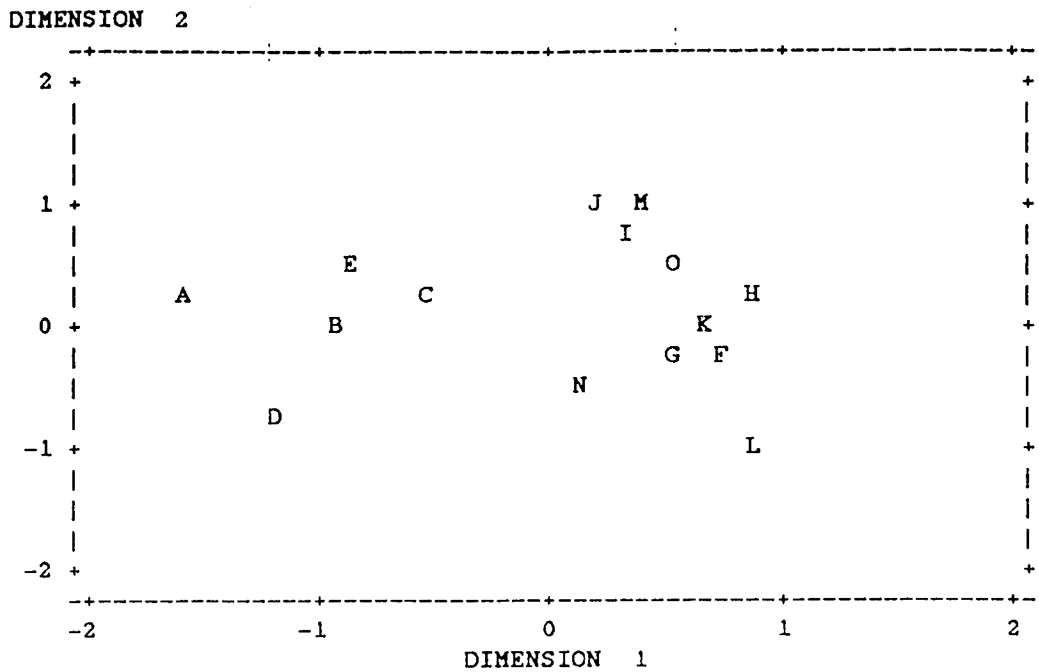


Figure 19. Cluster Analysis of BR Scores from the Excavated Sites *Sans* Plainwares Matrix.



COORDINATES IN 2 DIMENSIONS

VARIABLE	PLOT	DIMENSION 1	DIMENSION 2
MI1	A	-1.62	0.21
MI71	B	-0.95	-0.13
MI55	C	-0.56	0.12
MI69	D	-1.22	-0.96
MI53	E	-0.88	0.40
PM21	F	0.72	-0.49
PM13	G	0.55	-0.43
PM549	H	0.85	0.17
PM2	I	0.37	0.63
PM42	J	0.18	0.86
PM5	K	0.67	-0.01
PARKIN	L	0.88	-1.13
DU5	M	0.40	0.99
PM11	N	0.10	-0.61
PM43	O	0.50	0.40

Figure 20. Multidimensional Scaling of the Excavated Sites Sans Plainwares BR Matrix Cluster Analysis.

This scatterplot is perhaps the most instructive of all the plots completed in my research. Figure 20 illustrates that the ceramic assemblages from the archetype site (Crosno) do not fit closely with other assemblages assigned to the phase. Furthermore, the other excavated sites assigned to that phase exhibit considerable distances among the individual ceramic assemblages. The Pemiscot Bayou area sites, considered to represent primarily Late Mississippi-period sites exhibit closer similarities than do the Cairo Lowland phase sites. The Murphy Mound site (23PM43), a site with both Early and Late Mississippi-period components appears to lie equidistant between the two sites containing primarily Early Mississippi components (23DU5 and 23PM42) and the group representing Late Mississippi-period components (23PM5, PM13, PM21, and PM549). The Parkin site, considered to be a component of the Armorel phase, is located a considerable distance from 23PM5, the site considered as the archetype of that phase.

An averaged Euclidean distance dendrogram based on ceramic-type frequencies also was calculated for the excavated assemblages *sans* plainware. For all intents and purposes, this dendrogram (Figure 21) represents a simple rearrangement of the dendrogram of excavated assemblages with plainwares as we find the outliers are still 23MI1, 23MI71, and 23PM5. In addition, Parkin, 23PM21, 23PM43, and 23PM42 are identified as outliers at increasing distances. The macrocluster still contains all of the small-sample elements found in Cluster 3 of Figure 18 (23DU5, 23PM2, 23MI53, 23PM11, and 23MI69). However, 23MI55 has now become part of the core cluster and sites 23PM13 and 23PM549 as associated with that cluster at an increasing distance. Student's *t* tests were not run on this dendrogram as the standard error of the samples remains high.

```
DISTANCE METRIC IS EUCLIDEAN DISTANCE
AVERAGE LINKAGE METHOD

TREE DIAGRAM
                                              DISTANCES
         0.000                                                               500.00C
mi1           ----------outlier-----------------------
                                                      +-------------------------
mi71          --------                                |
                      +--                             |
du5           -----   | |                             |
                   +--| |                             |
pm549         ----+ || |                              |
                  | || |                              |
pm5           --  | || |                              |
                +--| || |       MACROCLUSTER          |
pm13          -- || || |                              |
                  +- || |                             |
pm2           -- |  || |                              |
               | |  || |                              |
mi55          -+ |  || |                              |
               +--  || |                              |
mi53          -|    || |                              |
              ++    || |                              |
pm11          -|    || |                              |
               |    || |                              |
mi69          --    || |                              |
                    +- |                              |
parkin        -------- |                              |
                       +------ Outliers at Increasing Distance
pm21          ----------      |                       |
                              +--------------------   |
pm43          ----------------                    |   |
                                                  +----
pm42          ------------------------------------
```

Figure 21. Averaged Euclidean Distances of Assemblages from Excavated Sites *sans* Plainwares.

That is, the main cluster contains assemblages with less than 270 sherds (from 5 to 268 sherds) and the outliers represent assemblages with more than 370 sherds (from 375 to 3866). The identified cluster contains site assemblages originally assigned to the Cairo Lowland, Pemiscot Bayou, Nodena, Armorel, Campbell, and Malden Plain phases.

Pemiscot County Sites

All available data from Pemiscot County sites have been provided in previous sections of this chapter. Of all excavated sites in southeast Missouri, the sites from the area of Pemiscot Bayou exhibit the greatest degree of similarity as evidenced in Table 26 wherein the nonplainwares continue to score in the similar range. In addition, as depicted in Table 26, the Early Mississippi-period Malden Plain/Big Lake phase site (23DU5) consistently correlates with the Early Mississippi-period Hayti phase sites (23PM42, 23PM43). All other excavated assemblages from Pemiscot County are correlated according to their initial phase assignments. There apparently is an overlap in the Nodena, Armorel, Campbell, Pemiscot Bayou phase ceramics as "pure" Pemiscot Bayou phase sites correlate in the slightly similar range with multicomponent Pemiscot Bayou, Campbell, Nodena, Armorel sites. This is not surprising as neither the Pemiscot Bayou phase or the Armorel phase employs discrete ceramic types as their collective horizon markers.

Despite the fact that there are BR coefficients suggesting the Pemiscot Bayou region sites are similar, the phases remain poorly defined. Campbell, the type site of the Armorel phase, does not correlate in the similar range with the Parkin site, a purported component of that phase. Consequently, Armorel should be dropped as a phase until such time as additional work can be completed and additional statistical comparisons of the component assemblages are undertaken.

CHAPTER SUMMARY

At best, of the statistical evaluations of phase designations in southeast Missouri are disappointing if the reader anticipates some new ordering of the Mississippi-period cultural sequence. However, those results are nor surprising given the subjective assessment of similarity that McKern's method (1939) and Willey and Phillips' system (1958) call for. The phases originally outlined by Williams (1954) are not the cohesive groupings of homostats most archaeologists believe them to be. The surface-collected assemblages those phases are based on prove to be widely disparate samples that can not be clustered by BR scores or Euclidean distances. Widely disparate sample sizes appear to be the underlying problem in the Euclidean distance cluster analyses of ceramic-type frequencies.

Removing the two default plainware categories, Neeley's Ferry and Bell Plain, only serves to lower the BR scores. Few if any assemblage comparisons remain within the similar range as defined previously when plainwares are removed. Perhaps the stated ranges of similarity are too strictly applied. However, a BR score of 100 essentially means a 50 percent cumulative percentage difference between 2 assemblages. This does not meet the criterion of phase definition stated by Willey and Phillips (1958:22) and reiterated by Williams (1954:25) as "sufficiently characteristic to distinguish it from all other units similarly conceived".

Comparisons of the Campbell materials indicate that sample sources may play a large part in confusing issues of assemblage similarity. The excavated matrix samples from Campbell are a cohesive group of high value homostats. The surface collections and mortuary assemblages generally do not appear to be homogeneous sets of ceramics. This, of course, is not surprising, as we know collection strategies for both sources of assemblages are biased toward decorated ceramics. The BR comparisons indicate that Campbell, as the type site of Williams' Armorel phase, does not score highly when compared to one component of that phase, the Parkin site.

One positive result of these statistical evaluations is the possibility that sites in the Pemiscot Bayou area represent a more closely related group of sites than those sites located in the Cairo Lowland. BR scores from excavated sites indicate that the Pemiscot Bayou sites generally have higher coefficients of similarity than other sites from different regions (e.g., sites assigned to the Cairo Lowland phase). Furthermore, when the plainware categories are removed, comparisons of sites in the region of Pemiscot Bayou continue to produce BR scores in the similar range suggesting that the nonplainware ceramics reflect cohesive, similar assemblages..

In addition to the problems inherent in the existing ceramic typologies, sample size and sample source are perceived as the two major problems inhibiting reliable phase definition in southeast Missouri. The one large excavated assemblage from the Crosno site (n=13, 229 sherds) is more than twice as large as the assemblage from 23PM5 (n=5,835 sherds). Increasing sample size is associated with increasing class richness, a problem which continues to plague investigators (Jones *et al.* 1983) when attempting to compare multiple assemblages with disparate sample sizes.

CHAPTER 6: SUMMARY AND DISCUSSION

Pluralitas non est ponenda sine necessitate.
Ockham's Razor

SUMMARY

The focus of this research is a critical examination of the interpretive framework of the Mississippi-period archaeological record in southeast Missouri as it pertains to current classification systems. That interpretive framework is predicated on phase designations based primarily on ceramic assemblages and the temporal and spatial meanings assigned to those basic units of classification and analysis. This critical examination is, by its very nature, an immense task. The problem lies in the perspective of what constitutes a critical examination. Need we return and reexamine the original collections *in toto* or can we examine those assemblages simply from the published information in a manner similar to, yet more rigorous than those employed by the original investigators? Is that critical review yet another intuitive examination of the same material? Admittedly, the discussion of the current ceramic typologies, named phases, and radiocarbon dates could be considered in the realm of opinion. If so, it is opinion based upon conclusions derived from other critical examinations of the archaeological record in the region (see Dunnell and Feathers 1991; Teltser 1988). Unlike these scholars, however, it is my opinion that we must reexamine what has preceded before we can proceed. In other words, we must influence those archaeologists using a typological paradigm by exposing them not only to a new paradigm but to the subjective nature of their interpretations.

Phase designation in southeast Missouri is based on the principals of typology wherein an archetypical phase is described and all assemblages are compared to that archetypical phase to determine if they are similar. If dissimilar, those other assemblages are relegated to an alternative phase. Those alternate phases, however, are not necessarily developed from any excavated and analyzed assemblage but from a perceived difference that may not be statistically significant. The alternate phases consequently become archetypes in their own right. Those new and different cultural phases are considered axiomatic by their originators when in fact they often are anecdotal.

The Brainerd-Robinson coefficients of similarity calculated tc evaluate the similarities of ceramic assemblages in southeast Missouri illustrate the anecdotal nature of the development of cultural phases in the region. What appeared to be cohesive, congruent sets of ceramics to the original investigators are statistically, only slightly similar sets of material in many cases. When the plainware categories are removed from the assemblages those same sets of ceramics often exhibit no statistical similarity whatsoever. The cluster analysis of the BR matrices, the multidimensional scaling procedure, and the averaged Euclidean distance cluster analyses performed on ceramic-type frequency data were intended to (1) examine whether assemblages assigned to existing phases would cluster, (2) the nature of those clusters, and (3) to examine whether new orderings of those materials could be discovered. These statistical procedures produced few clusters composed of elements assigned to a single phase. Statistically significant differences in the sizes of the samples under scrutiny consistently influenced the Euclidean distance analyses to the point where the old ordering (the phases) did not cluster. Cluster analysis of the BR matrices produced two clusters composed of assemblages assigned to the Cairo Lowland phase, yet one of those clusters did not contain the archetype assemblage from the Crosno site, and the second cluster is represented by multidimensional scaling not as a tight cohesive group but a widely scattered cluster.

Although the Cairo Lowland phase is considered to be "without a question the most profusely documented phase in the Lower Mississippi Valley, if not the entire Southeast" (Phillips 1970:925), statistical comparisons of ceramic assemblages assigned to that phase do not consistently generate high BR scores in the similar range (180-200). Rather, the BR scores illustrate considerable differences among both the collected and excavated assemblages. This is particularly true when the plainware categories are removed from the assemblages. Conversely, comparisons of sites assigned to the Pemiscot Bayou phase, a phase considered as "one of our weakest Mississippian formulations" (Phillips 1970:929), produced numerous BR scores in the similar range and continued to score in that range when plainwares were removed from the assemblages. I suggest that the 1970 perspective cited above reflects the level of interest, time spent, and approach of the original investigators. That is, considerable effort went into describing the Cairo Lowland materials and considerably less effort went into describing the Pemiscot Bayou materials.

DISCUSSION

Variation in the Mississippi-period archaeological record from southeast Missouri is immense. Past attempts to order that variation in terms of the dimensions of time, space, and content are based on subjective comparisons of assemblages of varying degrees of similarity. Less-than-rigorous interpretations of radiocarbon dates have served only to strengthen those intuitive interpretations. Statistical comparisons of assemblages from the region indicate that those past attempts to order the phenomena have in fact masked a great deal of the variation necessary to develop any explanatory framework of the Mississippi period in the Bootheel region. Scholars attempting to introduce a materialist paradigm for documenting the diversity of the archaeological record have failed to take into account the zeitgeist of other scholars working in the region. If we are to advance our knowledge it will be necessary to illustrate the flaws in the essentialist-derived interpretations (O'Brien and Holland 1990) currently governing archaeological research in the region.

Of primary importance in deconstructing current thinking is the necessity of demonstrating that phenomena once thought to be the same now are known to vary in their level of similarity. If the concept of similarity can be perceived as relatedness, some assemblages are closely related, some are more distantly related, and some sets of assemblages possess no statistically significant relation whatsoever. Phases in southeast Missouri were developed implicitly from the essentialist concept of the archetype and reflect the typical typological thinking that variation is measured as distance from a true and real type. S. Williams' development of the original four Mississippi-period phases reflects that typological paradigm wherein all classification is based on the excavated assemblage from the Crosno site and sites assumed to be related to it. Continued use of the phase concept as originally presented by Williams (1954) and others without a critical examination of the underlying nature of classification system employed to define phases constitutes an acceptance of the system as a "reality."

Consequently, current and future students of the region's prehistory, lacking first-hand knowledge of those early excavations and the nature of the assemblages, are misled by the continuing pronouncement of chronologically and statistically unsubstantiated interpretations and explanations.

A second major problem in archaeological classification and interpretation of Mississippi-period archaeological phenomena in southeast Missouri is embedded in current ceramic typologies. Most notable is the attempt to indiscriminately extend ceramic types defined for materials located farther south in the Mississippi Alluvial Valley (Klippel 1969:89). Furthermore, factor analysis has demonstrated that some of the underlying constructs of the type-variety system, particularly in the area of plainwares, have no statistical basis (Green 1974). Current phase assignments of ceramic assemblages are based in part on geographic location rather than on detailed, statistical comparisons of ceramic assemblage content and other attributes of the phases.

If archaeologists are ever going to be able to document variation in the archaeological record and examine the evolution of Mississippi-period culture, then changes must be made in the way we observe material culture. In particular, the way we examine the ceramic assemblages must change. As suggested in an earlier chapter, the three dimensions of ceramic typology (paste, surface treatment, and design) are difficult to use because the individual attributes under the separate dimensions of paste and surface treatment overlap. However, the dimension of design may be the most sensitive to change and is the dimension where variation may be easily documented. Phillips (1970) proposed we examine decorative modes as temporal and culturally sensitive attributes of the design dimension. This is a useful approach as long as the existing, overlapping types are discarded so that design becomes the primary discriminatory dimension. Style, as measurable attributes of the the design mode, will be a difficult area in which to document cultural selection and evolution (O'Brien and Holland 1992).

Most of all, however, we collectively need to publish data in a format useful for statistical comparisons. Many collections have been lost over the years, through neglect, transfer, disaster, and sale (the Leo Anderson collection being a significant example). In resorting collections currently held by the UMC Museum, I found that the breadth of variation in temper type and size, vessel form, and combinations of design elements reflects nothing currently described, and a number of sherds did not resemble described ceramic types. We should no longer accept the passing on of intuitive interpretations of similarities or differences, but demand documentation of variation in the observed phenomena.

The diversity of the excavated samples used in the statistical comparisons illustrates the variation in the archaeological record of southeast Missouri. As Dunnell (1989:142) notes, "Diversity is properly addressed in quantitative terms rather than by intuitive assessment." Dunnell's definition of diversity also is instructive here as it reflects what previous investigators have attempted to do in compiling ceramic cumulative-frequency graphs. Dunnell (1989:142) defined diversity as "the structure of distribution of cases among categories." The cultural-historical meanings of those very structures are what archaeologists have attempted to extricate from cumulative-frequency graphs.

Dunnell (1989:145-146) also notes that when diversity measurements are based on situations where the population is greater than the data set, they are used to "describe a sample which is used to infer a description of a population." Samples used in this research were not probabilistically derived, and thus are perhaps not statistically representative of their respective populations. Consequently, Figure 22 is presented not to explain, but to illustrate, the effect of "sample size" on the richness of the assemblages. (Richness calculated using Kintigh's [1991] statistical package where richness equals the number of classes represented.) Normally we could predict that as sample size increases so too does the richness of the assemblage. This is not the case with the excavated site assemblages from southeast Missouri. Figure 22 illustrates that as sample size increases, the number of classes in the assemblages does not necessarily increase proportionately nor should it; these tend to be semi-logarithmic or log-log relations.. There is a general trend for richness to increase with sample size to the left of 23MI1 in Figure 22. However, 23PM2, a small surface- collected assemblage, scores a richness of 8 and has the same richness score as the much larger sample from 23PM42. To the right of 23MI1 in Figure 22, the four Pemiscot county sites--23PM5, 23PM21, 23PM13, and 23PM43--exhibit the highest richness scores of all the sites considered, even though their samples generally are smaller than a few sites that score lower. There is a reason for this unexpected result. The late period ceramic types generally are based strictly on the dimension of design and more specifically on motif. As an example, Walls Incised and Rhodes Incised are based on specific forms of incised motifs regardless of the paste and surface treatment of the vessels. Other types are based strictly on surface treatment (e.g., Carson Red on Buff, Nodena Red and White, Hollywood White Filmed). Consequently, the number of types present at the sites to the right of MI1 generally is greater than at the Middle-to-Late Mississippi-period sites to the right of MI1 where there are fewer decorated ceramics.

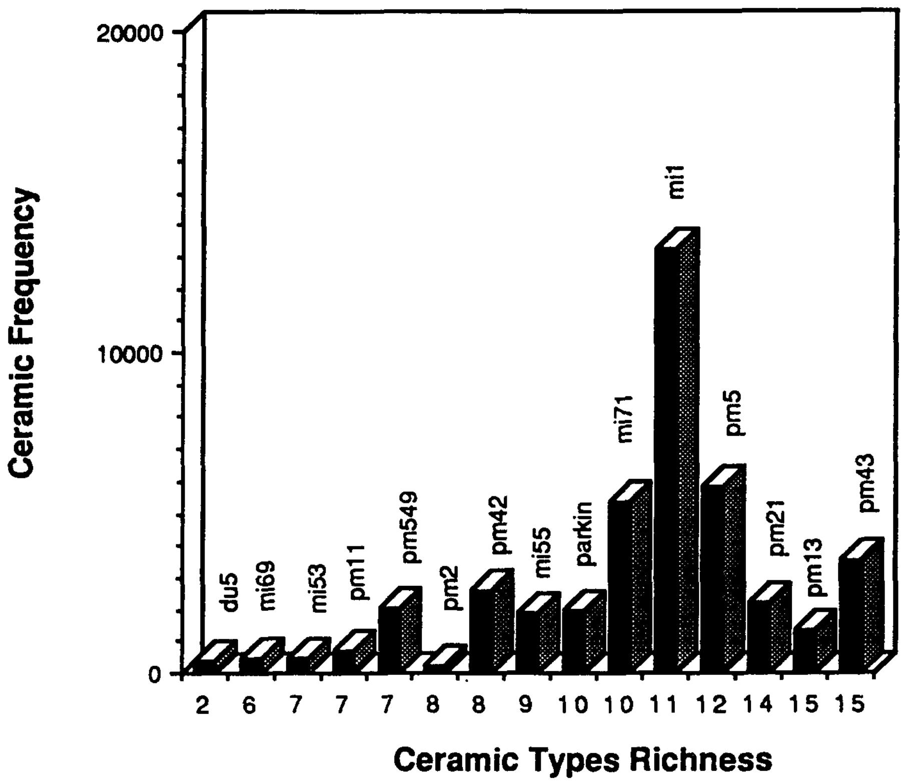


Figure 22. Richness of ceramic types plotted against ceramic frequencies by site.

Using Williams' (1954) 13,229-sherd ceramic sample from Crosno (the largest excavated assemblage in southeast Missouri) we can predict that not only will more classes be present in this assemblage than at other excavated Cairo Lowland sites, but more members of the classes will be represented as well. This leads us to the question of the diversity of the southeast Missouri ceramic assemblages. Using the Kintigh (1991) statistical package, a Shannon Index of Diversity was calculated for the 15 excavated assemblages. Kintigh's (1991:45) program calculates the index using common (base 10) logarithms to derive the diversity values. The index essentially describes eveness against richness. The higher the index value, the greater the diversity in the assemblage. With a greater diversity one can not predict what type of individual will be drawn from the assemblage. Figure 23 depicts a plot of Shannon Index values against ceramic frequencies from the excavated site assemblages. The simple regression line does not explain the variation observed around the that line ($r = 0.17$, $R^2 = 0.03$). The late-period Pemiscot County sites have the greatest Shannon Index values. The small sample from 23PM2 is now included in the group of sites with high Shannon values even though it has a lower richness value than the other Pemiscot County sites. Interestingly, 23MI1 still remains an outlier as it has in many of the statistical procedures performed in my investigation.

The Crosno site's frequent status as an outlier in the statistical procedures performed has far-reaching consequences. Crosno is the archetype site from which all the original Mississippi-period phases were defined on the basis of perceived similarities or differences with the components identified at the

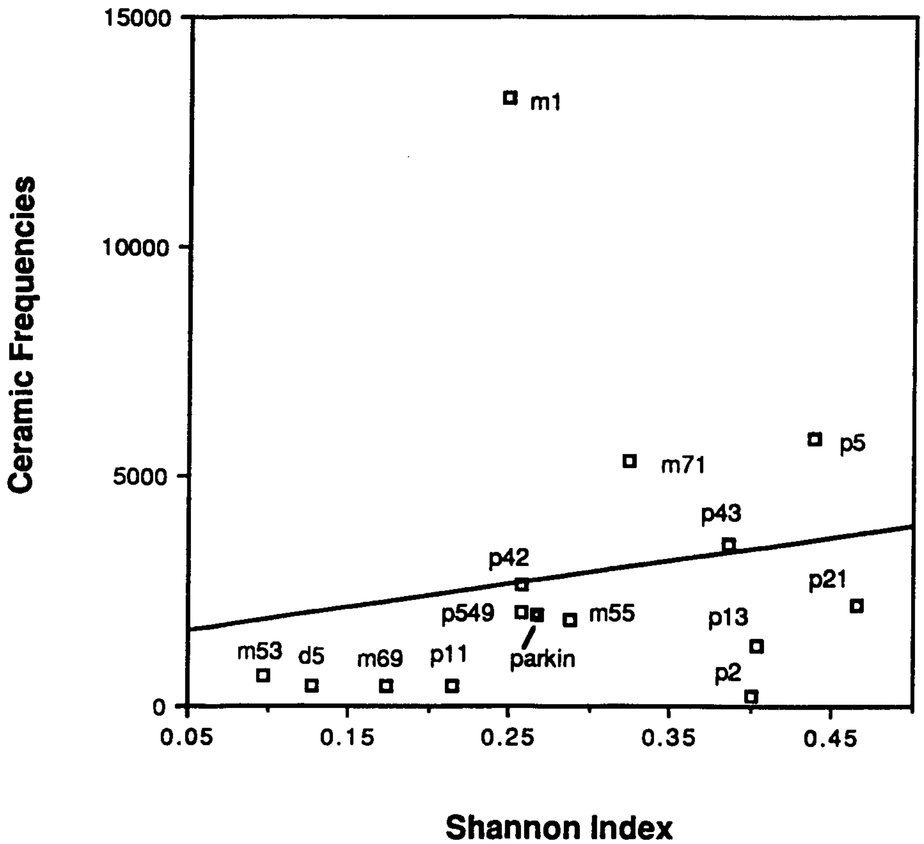


Figure 23. Shannon index of diversity plotted against ceramic frequencies ($y = 1397.3826 + 5047.5712x$, $r = 0.17$, $R^2 = 0.03$) (p = Pemiscot, m = Mississippi, d = Dunklin counties).

site. If in fact the archetype (Crosno) is an outlier, and consequently somehow qualitatively or quantitatively different from all other sites, it stands to reason that all of the phases based upon intuitive and subjective comparisons with that site are most likely flawed.

CONCLUSION

My research clearly indicates that the two questions stated in the introduction can be answered. First, ceramic attributes (McKern's determinants) used to identify the components that define phases in southeast Missouri are not consistently similar among the sites assigned to the individual phases. Furthermore, some ceramic assemblage comparisons indicate high similarities between assemblages assigned to temporally and geographically separate phases. Second, cluster analyses of the BR score matrices and ceramic-type frequencies failed to consistently produce statistically significant, homogeneous groups analogous to the Mississippi-period phases currently in use in southeast Missouri.

The reader is left with the choice of accepting the existing intuitive ordering of archaeological phenomena or recognizing that there are inherent problems with existing phase designations. Statistical evaluations of the similarity of ceramic assemblages from multiple Mississippi-period archaeological sites have produced more questions than answers. Certainly there are archaeological phenomena in southeast Missouri that can be defined as belonging to a particular phase. Current phase designations, however, lack sufficiently distinct ceramic signatures for easy assignment of assemblages to the individual phases. Time, space, and content of the assemblages are influenced by collection strategies, the resulting sample sizes, and a lack of explicitness and rigor in the application of phase-assignment criteria.

New phases cannot be defined as a result of this research. Much information has been lost in the 20 years since a comprehensive archaeological program was conducted in southeast Missouri. Although R. Barry Lewis' (1990) "phase" assignments for the east bank of the Mississippi have their own set of inherent problems, procedurally, the underlying ideas of his approach are worthwhile. We should begin to use a stacked, regional chronological model until adequate, radiometrically dated samples of more assemblages become available for analysis. Simply stated, we should drop the existing phases and begin a detailed examination of cultural materials from dated contexts employing a systematic approach to the myriad problems of cultural classification and history. We do know the basics of the Mississippi occupation, i.e., they were agriculturists, they lived in ceremonial centers, villages, hamlets, made both shell- and clay-tempered ceramics, and were present in the region from approximately A.D. 850 until sometime in the fourteenth or fifteenth centuries. However, we cannot, using the present system, readily isolate those phenomena and place them into distinct sets of related components. Consequently, future comparisons and statements of associations should consider the statistical differences among and between the assemblages rather than any intuitive similarities and differences.

As a suggestion for future research, the results of this study tend to indicate that the late-period Pemiscot Bayou-area sites present our best opportunity to develop criteria for documenting variation in the region, as these sites appear to be the most statistically similar. Further work at these sites may afford us the opportunity to develop a set of criteria to document variation that can subsequently and independently, be applied to other sets of sites in the region

Although early efforts to classify archaeological phenomena dating to the Mississippi period in southeast Missouri are to be applauded, those classifications should no longer be applied. This study has demonstrated that the current phases do not necessarily encompass similar sets of distinctive ceramic materials. We are indebted to those early scholars but should not be constrained by their initial interpretations of the archaeological record. At this point we should begin to build a new set of data based on a more rigorous paradigm. That paradigm should dictate documentation of all variation within and between assemblages only where stringent chronological controls are available and can be applied. As Chapman and Anderson (1955:98) noted in their analysis of materials from the Campbell site "This investigation is necessarily preliminary in nature since it is based on surface surveys . . . much more research is needed."

APPENDIX 1

WILLIAMS ANALYTICAL UNITS--23MI1

	1	2	3	4	5	6	7	8	9	10	11	12	13
AU1	377	36	36	10	16	4	1	0	0	0	0	0	0
AU2	358	23	55	5	18	0	1	13	1	0	0	0	0
AU3	344	23	35	6	7	6	1	2	1	0	0	0	0
AU4	497	35	62	13	28	1	0	0	1	1	1	0	0
AU5	116	12	12	2	5	0	0	0	2	0	0	0	0
AU6	530	29	55	6	14	2	1	5	5	0	2	1	1
AU7	78	0	4	2	0	0	1	1	0	0	0	0	1
AU8	412	45	29	9	11	2	0	1	2	0	0	0	0
AU9	218	11	10	3	1	0	0	1	0	0	0	0	0
AU10	1249	63	58	10	28	3	0	0	1	0	0	0	1
AU11	389	21	20	7	8	0	0	0	0	0	0	0	0
AU12	947	69	59	8	27	1	0	2	0	0	1	0	0
AU13	176	15	19	4	3	1	0	1	0	0	0	0	0
AU14	1111	116	85	18	14	7	2	2	0	0	0	0	0
AU15	98	7	8	2	5	0	0	1	0	0	0	0	0
AU16	115	9	11	2	0	0	0	1	0	0	0	0	0
AU17	659	46	76	9	17	1	0	0	3	0	0	0	0
AU18	913	58	74	19	29	3	2	0	5	1	0	0	1
AU19	111	17	6	1	2	0	0	1	0	0	0	0	0
AU20	928	61	79	16	12	1	0	0	0	1	0	1	8
AU21	138	6	22	1	0	0	0	0	0	0	0	0	5
AU22	493	23	31	6	14	2	3	1	0	0	0	0	13
AU23	146	3	2	0	1	0	0	0	0	0	0	0	0

1. Neeley's Ferry Plain
2. Bell Plain
3. Wickliffe Thick Series
4. Kimmswick Plain
5. Kimmswick Fabric Impressed
6. O'Byam Engraved
7. O'Byam Incised
8. Matthews Incised var. Beckwith/Matthews
9. Old Town Red
10. Angel Negative Painted
11. Moundplace Incised
12. Matthews Incised var. Manly
13. Crosno/Cahokia Cordmarked

WILLIAMS (1954) SURFACE COLLECTED SITES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
23MI1	10406	728	2	21	0	0	0	30	0	0	46	1119	0	0	0	838	0	4	0	0	0	32	0	0	3
23MI2	201	166	0	0	0	0	0	0	0	0	24	6	0	0	0	23	0	0	0	0	0	13	0	0	0
23MI10	28	7	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	1	0	0	0
23MI31	88	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
23MI33	138	0	0	2	0	0	0	0	0	0	5	1	0	0	0	1	0	0	0	0	0	0	0	0	0
23NM38	458	70	1	2	0	0	0	0	0	0	1	2	0	0	0	28	0	0	0	0	0	0	0	0	1
23NM68	184	15	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
23NM69	20	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23ST26	239	10	0	1	0	0	0	0	0	0	0	1	0	0	0	9	0	1	0	0	0	0	0	0	0
23DU2	313	6	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
23DU4	761	2	0	21	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0
23DU5	220	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23SO1	467	14	0	4	0	0	0	0	0	1	0	6	0	0	0	5	0	0	0	0	0	0	0	0	0
23SO111	563	0	0	0	0	0	0	0	0	0	0	7	0	0	0	42	0	0	0	0	0	0	0	0	0
23PM13	294	80	0	4	0	24	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	2	0	0
23PM15	411	40	0	11	0	38	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
23PM28	489	0	0	13	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23PM40	107	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23pm42	52	6	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
23PM43	245	79	0	4	0	6	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0
23PM5	282	83	0	0	0	2	0	0	7	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
23PM21	57	9	9	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23MI17	60	22	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0
23MI30	24	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23DU12	522	0	0	6	0	0	0	0	0	0	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0
23DU13	210	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1-Neeley's Ferry Plain
2-Bell Plain
3-Manly Punctated
4-Redfilmed
5-Barton Incised
6-Parkin Punctated
7-Campbell Ware
8-Crosno Cordmarked
9-Ranch Incised
10-Nodena Red and White
11-O'Byam Incised
12-Kimmswick Saltpan
13-Walls Engraved
14-Hollywood Whitefilmed
15-Kent Incised
16-Wickliffe Series
17-Fortune Noded
18-Moundplace Incised
19-Wallace Incised
20-Carson Red on Buff
21-Winterville Incised
22-Matthews Incised
23-Rhodes Incised
24-Sikeston Neg. Painted
25-Angel Neg. Painted

CAMPBELL SITE SAMPLE SOURCES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
au1	33	15	0	0	0	6	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
au2	42	13	0	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
au3	21	9	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
au4	8	6	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
au5	18	13	0	0	0	1	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
au6	12	4	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
au7	274	550	0	61	0	107	0	0	51	0	0	0	5	3	15	0	0	0	0	1	0	0	0	1	0
au8	282	83	0	0	0	2	0	0	7	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
au9	35	83	0	12	1	0	24	0	0	1	0	0	3	1	1	0	0	0	0	3	0	0	0	0	0
au10	2735	1131	0	898	80	148	740	0	51	1	1	0	8	4	18	0	1	0	0	4	0	0	15	0	0
au11	1502	79	0	7	141	194	5	0	0	2	0	0	0	0	0	0	2	0	0	7	0	0	17	0	0

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22-Matthews Incised
23-Rhodes Incised
24-Sikeston Negative Painted
25-Angel Negative Painted

EXCAVATED SITES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
23MI1	10406	728	2	21	0	0	0	30	0	0	46	1119	0	0	0	838	0	4	0	0	0	32	0	0	3
23MI71	2947	1913	12	24	10	0	0	0	0	0	87	61	0	0	0	201	0	1	0	0	0	68	0	0	0
23MI55	1261	453	2	52	0	0	0	0	0	0	28	8	0	0	0	36	0	1	0	0	0	18	0	0	0
23MI69	372	0	0	2	0	0	0	0	0	0	43	1	0	0	0	0	0	1	0	0	0	20	0	0	0
23MI53	638	4	0	8	0	0	0	0	0	0	1	20	0	0	0	6	0	0	0	0	0	2	0	0	0
23PM21	938	585	8	129	19	337	172	0	8	1	0	0	4	0	1	0	1	4	0	0	0	0	5	0	0
23PM13	624	455	0	63	35	93	23	0	3	1	0	0	2	1	2	0	1	3	0	0	0	1	1	0	0
23PM549	1571	192	0	98	2	19	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
23PM2	86	44	0	77	2	2	2	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
23PM42	1183	4	2	1367	1	0	0	0	0	0	0	39	0	0	0	2	23	0	0	0	0	0	0	0	0
23PM5	2735	1131	0	898	80	148	740	0	51	1	1	0	8	4	18	0	1	0	0	4	0	15	0	0	0
Parkin	1502	79	0	7	141	194	5	0	0	2	0	0	0	0	0	0	2	0	0	7	0	0	17	0	0
23DU5	220	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23PM11	398	47	0	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
23PM43	1950	755	17	589	14	71	120	1	3	0	4	0	2	0	0	0	1	7	0	0	0	1	5	0	0

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