# SOCIAL HOUSES AT CARSON MOUNDS, 22-CO-518,

# AS EVIDENCED BY DENTAL MORPHOLOGICAL

# ANALYSIS

by

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## ABSTRACT

Social house theory offers an interpretative framework in which to understand the complex social organization of Mississippian era societies. This research focuses on the social organization demonstrated by the secondary mass burials from the Mississippian site of Carson Mounds. The dental morphology of 115 individuals from Carson Mounds were compared to the dental morphology of 84 individuals from the Historic Creek town site of Fusihatchee, the latter as a control group for matrilineal descent. Dental morphology is used as a direct measure of genetic distance, as the morphological features of teeth are under genetic control. A social house is composed of a biologically based kin group and additional members who attach themselves to the social house estate. The genetic composition based on the dental morphology should reflect this. Using a computed Gower's matrix, which is included in the electronic supplements, from the statistical package R, hierarchical agglomerative clusters and average Gower distances were analyzed to determine the genetic heterogeneity present within burial groups at the two study sites. In general, the data suggest that Carson Mounds represents a homogeneous population that was genetically stable over several generations. Fusihatchee did not prove an effective control sample for what a matrilineal unit would look like genetically due to historic disruptions. Histograms of the Gower distances from individual burial groups at Carson Mounds show that each of the large burials contains a group of genetically related individuals and consistently includes genetically non-related individuals. This pattern reflects the group dynamics of social houses. Together with the mortuary practice and ancestor veneration at Carson Mounds, it can be concluded that social houses were present at Carson Mounds.

DEDICATION

This dissertation is dedicated to the people of Carson Mounds.

# LIST OF ABBREVIATIONS AND SYMBOLS

| | |
|---|---|
| C | Simpson's C, diversity measure |
| $\chi^2$ | Chi-squared correlation statistic |
| *df* | Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data |
| *n* | element in sample |
| *N* | total number of elements in sample |
| *p* | Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value |
| *r* | Pearson product-moment correlation |
| $\Sigma$ | Sum of |
| *t* | Computed value of *t* test |
| = | Equal to |

# ACKNOWLEDGMENTS

I would like to thank my colleagues, friends and faculty members who helped me with this project. Without the wisdom and determination of Dr. Knight, I would have never completed this project, especially the statistics. Keith Jacobi's vast knowledge of dental anthropology and the human spirit guided me through this research and ultimately to my true path as a person. I also would like to thank my committee members, Ian Brown, Michael Murphy, and Kathryn Braund for their input and support throughout my research and academic endeavors. Ian Brown deserves special recognition for granting me access to his enormous ethnographic library and sharp insight into Native Americans.

This research would not have been possible without all the students and volunteers who helped excavate the Carson Mounds material. In particular, Lindsey Gordon's friendship and osteological knowledge always kept me on track. My mentors in the field, Jay Johnson and John Connaway, made me worth my salt in the field, and in life.  I also am grateful for the insight and hospitality of Craig Sheldon and John Cottier, who shared their knowledge and laboratories at Auburn for my research with the Fusihatchee collection.

Lastly, I want to thank my family. They all have helped me excavate in the extreme heat and cold of the Delta and survive several computer crashes. Their enthusiasm and endless questions about my work have given me the determination to finish this project. Without their patience and support, especially that of my husband, Doug Allen, I would be even crazier.

CONTENTS

LIST OF TABLES

## LIST OF FIGURES

# CHAPTER 1

# INTRODUCTION

Increasingly sophisticated and variable accounts of socio-political arrangements among Mississippi period societies of the Southeast have been offered in recent years. Drawing on Levi-Strauss's concept of the "social house," James Brown (2007) re-examined burials from Etowah's Mound C and argued that its burial groups represented social houses rather than clans or lineages. In this study, I empirically test this alternative model using genetic dental morphological data analysis of Carson Mounds, a Mississippian site in the upper Yazoo Basin of Mississippi.

Carson Mounds has mass secondary burial pits, in which I expect to find a variable mixture of biologically related kin, affines, adoptees, and others as a result of social house processes of affiliation. Using genetic distances computed from dental morphological data, I hypothesize that greater variability will be demonstrated by relatively low measures of genetic homogeneity and less patterned ways in which individuals are genetically related to one another. To contrast the genetic heterogeneity expected from social houses, I will examine the genetic relationship between individuals from the historic Creek town site of Fusihatchee, which is of known matrilineal organization (Swanton 1928:79). By comparison, the burials from Carson Mounds should be more genetically heterogeneous than the burial groups from the historic Creeks, conforming to a social house model.

## Mississippian Political Organization

The Mississippian culture encompasses remarkably different environmental settings spanning the southeastern portion of North America into parts of the Midwest along the Mississippi River. Different regions developed Mississippian characteristics, such as maize agriculture, elite hierarchies, large earthworks, and shell-tempered pottery, at different times between 900 A.D. and European contact. This geographic diversity created various local histories specific to a region's development. Despite the inherent problems incorporating these regions under a unified theory of socio-politics and ideology, archaeologists persist in entertaining new ways of making the concept of the Mississippian chiefdom work as a model. According to the traditional power perspective on chiefdoms, a single apical chief governs a stratified society, where political elites control labor and demand tribute in exchange for their regulation of social functions (Peebles and Kus 1977; Service 1975). During the 1990s, archaeologists began to question the political stability and power of the short-lived Mississippian mound centers. Anderson's (1996) cycling model, Blitz (1999) fission-fusion model, and Hally's (1993) conception of short-lived mound centers models of chiefdoms addressed the instability and possible fluctuations in power of ruling elites. Knight and Steponaitis's (1998) reassessment of the spatial organization of mounds at Moundville suggested that power was not necessarily centralized in the hands of one, but was shared among kin-based groups, reminiscent of a form of organization that Brown (2007) recognized as social houses at Etowah. With the various local histories and particular trajectories of different Mississippian societies, there is a range of possible socio-political setups for these archaeological groups.

## The Social House

A social house is a strongly corporate group of genetically related and unrelated individuals, bound by a language of kinship and oriented to a specific estate of material and immaterial wealth (Levi-Strauss 1982:174). It is a form of kin group centered around the metaphor of the "house," emphasizing affiliation and residence as much as descent, in order to conserve and enhance the wealth of an estate (Ensor 2011:213-214; Marshall 2000:73; Sandstrom 2000:68-69). I argue that social houses are adaptive forms that arose historically in the Southeast from a background of unilateral, exogamous kin group organization (Knight 1990:6). With increasing wealth and land claims associated with the rise of agriculture, social ranking and the means to reproduce it became much more important. In this view, social houses arose in order to de-emphasize reciprocity and broad social integration in favor of the accumulation and transmission of wealth and property. Social house theory will elaborated upon in Chapter 3.

There are several processes variably associated with social houses to serve this purpose (Gillespie 2000a:13; Joyce 2000:190; McKinnon 2000:162). When viewed against a background of strictly unilateral, exogamous kin groups, affiliation becomes more optative in social houses, commonly taking the form of cognatic inheritance. Situational endogamy is preferred to strict exogamy, especially among elites. To enlarge the social house and conserve its property, there is a greater incorporation of affines, fictive kin, and ritual adoptees. Internal ranking within the house group results in the proliferation of titles. Ritual attention to ancestors increases as a means to give the house supernatural legitimacy and spiritual authority.

## Relevance of Southeastern Ethnohistory

The theoretical expectations of my research derive as much from ethnohistory as from abstract kinship theory, as the social processes considered here were important among Southeastern native groups. The majority of the historic tribes in this region, such as the Creeks, Cherokees, Seminoles, Yuchi, and Timucuans, possessed unilateral, exogamous kin groups. For example, the eighteenth- and nineteenth- century Creeks closely adhered to a matrilineal exogamous clan system, with matrilateral post-marital residence. Household estates were controlled by *hutis*, which were allied to the matriclan system as corporate groups of related women, their spouses, their children, and any man of that matriclan (Swanton 1928:170-1). Customary burial practices dictated that the individual be buried under his or her house floor (Swanton 1928:391).

However, the historic Chickasaw and the Choctaw exhibited clear elements of social house processes, a fact that strengthens the probability that social houses arose in the same area in earlier Mississippian times. In the eighteenth and nineteenth centuries, Chickasaw domestic life clearly centered on local groups that we can readily identify as social houses on the basis of features and processes conforming to those outlined above. Chickasaw towns consisted of numerous local “house groups.” These were groups of clustered households with collective property and hunting grounds referred to by the Chickasaws as House Names. These names were generally distinct from those of the matrilineal clan system. The broader, non-corporate Chickasaw clans appeared to govern little more than rules of hospitality. House Names, however, were highly corporate local groups that functioned as a means of transmitting property and wealth, especially in the form of personal names, war titles, land claims, and hunting territories. These groups were of greater significance in the daily lives of the Chickasaw than were their clan identities (Swanton 2006:31-35). House members tended toward out-marriage but were not strictly exogamous (Swanton 2006:53-56).

Eighteenth and early nineteenth-century Choctaw settlements were similar to those of the Chickasaw. Within a town there were multiple *iksas*. These were not equivalent to totemic clans but did seem to be subdivisions of moieties (Swanton 1993:79). Swanton, however, had difficulty articulating the nature of Choctaw local groups using the standard nomenclature of kin groups. This is a problem reminiscent of Boas's struggle with defining the Kwakiutl *numayma*, which were ultimately recognized by Levi-Strauss (1982) as social houses. Choctaw local groups tended to correspond in their form and functions to Chickasaw House Names, except that the Choctaw local groups were more uniformly exogamous (Swanton 1993:81). These local groups each had their own leaders and charnel houses. It might be inferred that local groups were the spatial aggregates of households from the same *iksa* within a town. If so, it would appear that like Chickasaw House Names, Choctaw local groups also represented social houses.

Moreover, the mortuary practices of the Choctaw are consistent with social house theory in their strikingly distinctive focus on collective secondary burial with a final burial ceremony focusing on ancestor veneration within the context of the local corporate group.

In summary, it is apparent that these groups, with social organizations prominently featuring social house processes and tribal locations within the present state of Mississippi, offer potentially productive organizational models for the earlier Mississippian Carson Mounds without the need to claim specific continuity across a period of extreme disruption.

## Study Site: Carson Mounds

Carson Mounds is located near Stovall Farm in Coahoma County, Mississippi (Figure 1). Most of the mounds at Carson are protected and owned by the Archaeological Conservancy,  while a few remain under private ownership. The remainder of the site and the research area is owned privately by an agricultural firm. There were originally 89 mounds surveyed by William H. Holmes in 1894 (Figure 2) (Thomas 1894). Despite little work prior to the fall of 2007, when the Mississippi Department of Archives and History (MDAH) and the University of Mississippi began salvage excavations, the site is of great importance in the region. By mound count alone, it the largest mound center in the area, with both small and large mounds accurately mapped by William H. Holmes. The ceramics collected from Carson mounds played a large role in defining the Parchman phase (Phillips 1970: 940), while the site shows an unusual settlement pattern for the Lower Mississippi Valley (Connaway 1984: 83-84).

To date, its significance is only enhanced by the large number of mass secondary burials and other archaeological features that have been studied since agricultural land-leveling began in the northeastern portion of the Mound A Enclosure. Since then, a full-time field archaeologist from MDAH has been stationed at the site with summer and winter field schools conducted every year by the University of Mississippi. In all of this work I have participated in a supervisory role. The primary goal of the excavations is to salvage human remains, artifacts, and to record associated features, as negotiations by the Archaeological Conservancy to purchase the entire site have failed.

## Dental Morphology, Genetic Distance and Social Organization

Using social house processes as a guide, I have formed a set of expectations with reasonably clear implications and corresponding methods to test whether social houses were an important organizing principle at Carson Mounds. In this dissertation, I not only examine the dental morphology and genetic distance of the community at Carson Mounds, but also that of the historic Creek town site of Fusihatchee. This was done to establish a baseline for genetic

Figure 1. Map of the Yazoo Basin (from Phillips et al. 1951:Fig. 1). A red star locates Carson Mounds.

distances among burial groups in a matri-clan social organization against which to contrast the alternative social house model proposed for Carson.

The Fusihatchee osteological collection was chosen for several reasons. One, it was an available osteological collection that had clear tribal affiliation. The collection is housed at Auburn University, and with the assistance of Craig Sheldon and John Cottier, tribal permission was obtained to study the Fusihatchee remains. Two, I argue that Carson Mounds did not follow a traditional matrilineal organizational pattern, while it is documented that the Creeks did so (Swanton 1928:79). In this way, the patterns of genetic relationship exhibited by Fusihatchee house group burials should serve to contrast the different genetic relationships seen in the Carson Mounds burial pits. Also, I argue that Choctaw and Chickasaw social organization resembles a social house structure and therefore, burial patterns from these two historic tribes would not serve as an appropriate contrast to the possible social houses present at Carson Mounds.

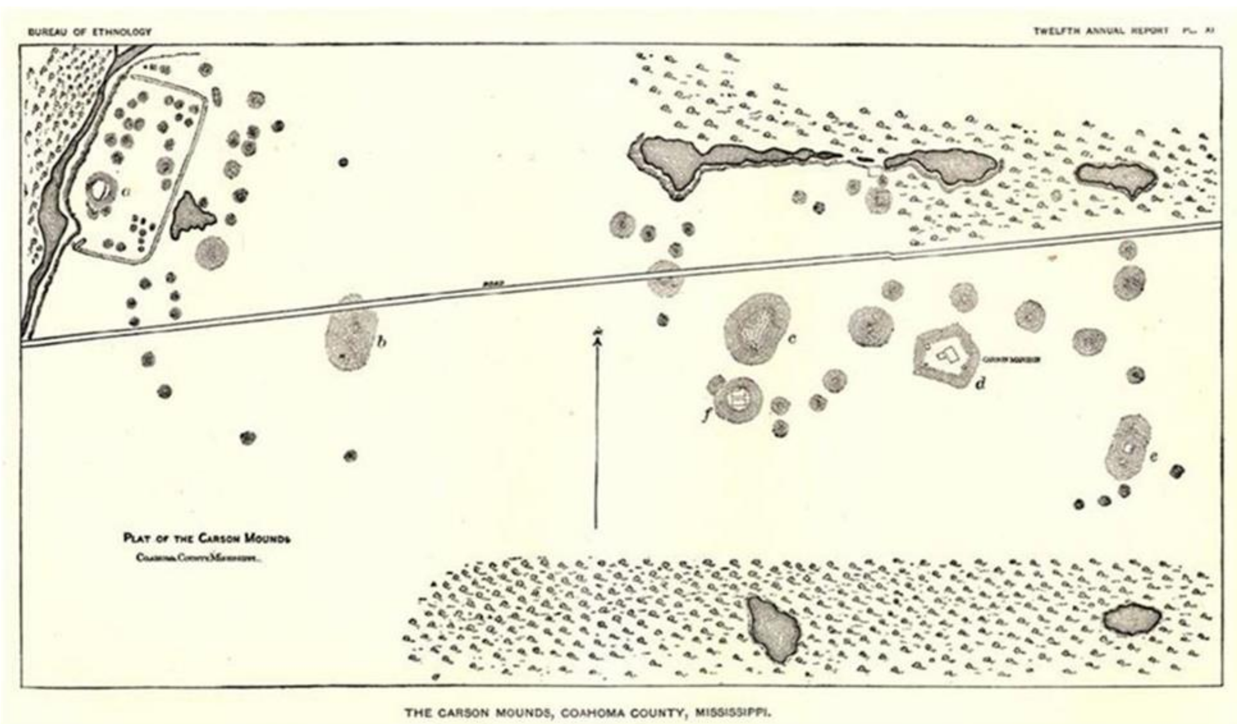


Figure 2. William H. Holmes's Map of Carson Mounds (Thomas 1894:Plate 11).

Non-metric dental morphology can demonstrate the genetic relatedness of individuals without destructive analysis. Due to the condition of the teeth and differential preservation of skeletons, I have chosen to focus on non-metric dental data from both sites as opposed to cranial and post-cranial non-metric or metric data. The dental data were collected according to the Arizona State University Dental Anthropology System (Turner et al. 1991). Each tooth from each individual was evaluated and scored for each trait known to be genetically controlled. The data were then analyzed following the methodology set out by Howell and Kintigh (1996). Each skeleton was grouped by cluster analysis based on the dissimilarity measure of Gower's coefficients between cases (Drennan 2010:280; Howell and Kintigh 1996:547). By this means, each individual received a cluster designation. The degree of concentration of biologically related skeletal individuals within each burial set or site area was quantified using a suitable measure, Simpson's C (Howell and Kintigh 1996:548). The overall result was a quantified assessment of the contribution of biological relatedness to sets of individuals buried together.

Using the historic seventeenth- through eighteenth-century Creek house burials excavated by Auburn University from Fusihatchee town, Alabama, I examined the genetic composition of house floor burials from different house groups. The biological ties within households expected for Fusihatchee provided a baseline against which to contrast the more variable forms of affiliation and more dilute biological expression of social houses expected for the mass burial pits at the Carson site. It is documented ethnohistorically that Creek domestic groups of the early historic period were matrilineal and matrilocal, and that members of a household were normally buried under their house floors (Swanton 1928:391). I expect most adult females and unmarried children in the household to be related biologically, and as such, I hypothesize that there will be a high degree of genetic homogeneity within Creek households.

I propose that each of the mass secondary burials of the Mississippian site, Carson Mounds, reflects a single event of a social house emptying bone bundles from its collective repository, in which case each burial pit represents a social house at a single point in time. There are over sixty excavated burial pits at Carson, each containing multiple bundled individuals of both sexes and most age groups from the area known as the Mound A Enclosure. The presence of these secondary burials is evidence of an extended ceremony focusing on ancestor veneration of the entire social group, which alone suggests social house organization.

At Carson, I expect to find a variable mixture of biological kin, affines, adoptees, and others as a result of social house processes of affiliation. I hypothesize that greater variability will be demonstrated by relatively low measures of genetic homogeneity and less patterned ways in which individuals are genetically related to one another, especially in comparison to the genetic homogeneity found at the Fusihatchee site. Therefore, if the social house model is correct, I hypothesize that genetic heterogeneity within Carson burial pits as measured by dental morphology will be greater than that within the Creek households. I will evaluate these expectations using the same dental genetic analysis laid out for the Fusihatchee study.

I also will analyze the possible relationship between genetic distance and spatial organization at Carson Mounds site. During the excavation the Mound A Enclosure, it was proposed that a central avenue exists, running north-south through the middle of the excavated cemetery. This area appeared to be void of the dense structures and postmolds found elsewhere within the excavated area. Looking at Holmes's map, this same area appears to be free of mounds. It has been suggested that this was a cleared path through the possible structures, burial scaffolds and pits of the cemetery. I hypothesize that this central avenue also spatially separated possible two genetically distinct groups representing opposing social houses within the cemetery.

Thus, through the analysis of dental morphology and genetic distance, I will address the social organization of the Mississippian society of the Carson Mound site. These analyses are grounded in both the theory of social houses, as well as the science of dental trait genetic transmission. Therefore, I will review the theory of social houses, mortuary analysis, and dental genetics in the following chapters before discussing the results and conclusions regarding the social house model proposed for Carson Mounds site.

## Tribal Consultation

Due to the sensitive nature of working with human remains, tribal consultation has been essential for each stage of research. Importantly, all methods used here are non-destructive, and all have been approved in consultation with American Indian tribes. An agreement with the Poarch Band of Creek Indians was reached with Auburn University before my data collection began at Auburn with the Fusihatchee burial remains, which are considered affiliated under NAGPRA to the Creek Indians and are subject to repatriation. The link between individuals from the Carson site and living ancestors is considered less clear. The Carson skeletal material is currently in the process of being inventoried under NAGPRA. The site falls into one of the areas ceded to the United States by the Quapaw in the Treaty of August 24, 1818 (Kappler 1904:176). The University of Mississippi and the Mississippi Department of Archives and History have been negotiating with the Quapaw Nation since 2008 about the removal and ultimate disposition of the burials that are currently being salvaged from the site. These negotiations led to a 2010 meeting in Jackson, Mississippi that was attended by the Tribal Historic Preservation Officer for the Quapaw, the State Archaeologist, the director of the Center for Archaeological Research at the University of Mississippi, and myself. At that meeting, a Memorandum of Agreement was outlined and agreed upon, which forms the basis for the present research.  Ultimately, it has been agreed upon that the Carson Mounds remains will be repatriated following the completion of the research.

# CHAPTER 2

# CARSON MOUNDS AND ITS MORTUARY PROGRAM

In order to understand the theory and the research of this project, it is necessary to review the archaeological site of Carson Mounds. I will begin by describing the larger physical setting followed by the cultural setting with a brief comparison to the sites nearest Carson Mounds. Next, there will be an overview of the archaeological investigations, focusing particularly on the portion of the site where burials have been recovered. Finally, I will discuss in detail Carson Mounds' mortuary practices as reconstructed in my Master's thesis (James 2010).

## Physical Setting

The Carson Mounds site, in Coahoma County, Mississippi is located in the Upper Yazoo River Basin (Figure 1). The Yazoo Basin is described by Phillips, Ford, and Griffin (1951:16) as the area of floodplain between the Mississippi River and the bluff line to the east, expanding to a width of nearly sixty miles at its midpoint, between Memphis, Tennessee on the north and Vicksburg, Mississippi on the south. More specifically, the site is within the Upper Yazoo Basin, delineated by McNutt (1996:155) as the portion from the "Tennessee-Mississippi state line approximately 120 miles south to the east-west line from the Winterville site on the river, to Greenwood, near the foot of the bluffs." While this landscape today may appear "tediously flat," this is a result of modern re-landscaping for agricultural purposes (McNutt 1996:158).

Prehistorically, this area would have contained river meanders and natural levees, such as the one upon which the Carson site sits. McNutt (1996:158) describes the importance of this terrain and the river flood stages to the soil that prehistoric and historic agriculturalists relied upon. This ideal landscape for farming was bolstered by a climate with a long growing season. The climate today, which can be cautiously used to approximate the prehistoric condition, is humid, with rain expected year-round (McNutt 1996). The summers are hot, and winters "mild" (although the author would like to point out from experience that the winters can be very cold, but lack intense winter precipitation). This environment also provided a year-round constant supply of both aquatic and terrestrial resources to guard against crop failure and protein and iron deficiency, common among maize agriculturalists.

## Cultural Setting

Carson Mounds belongs to the Parchman phase as defined by Phillips (1970:939-940). Starr (1984) geographically defines the Parchman phase as occupying the southern half of Tunica County, Mississippi, extending into the northern half of Coahoma County and northwestern corner of Quitman County, totaling an area less than 35 km north to south or east to west. It is bordered to the north by the Kent phase and to the south by the Hushpuckena-Oliver phase (Figure 3). Starr's (1984:175-185) ceramic analysis indicates that the phase lasts through the Late Mississippi-Protohistoric periods (ca. A.D. 1400-1600), evident by late ceramic markers like Nodena Red and White teapot vessels found at the Carson site and other Parchman phase sites. Connaway (1984:85) describes the settlement pattern of the Parchman phase as consisting of:

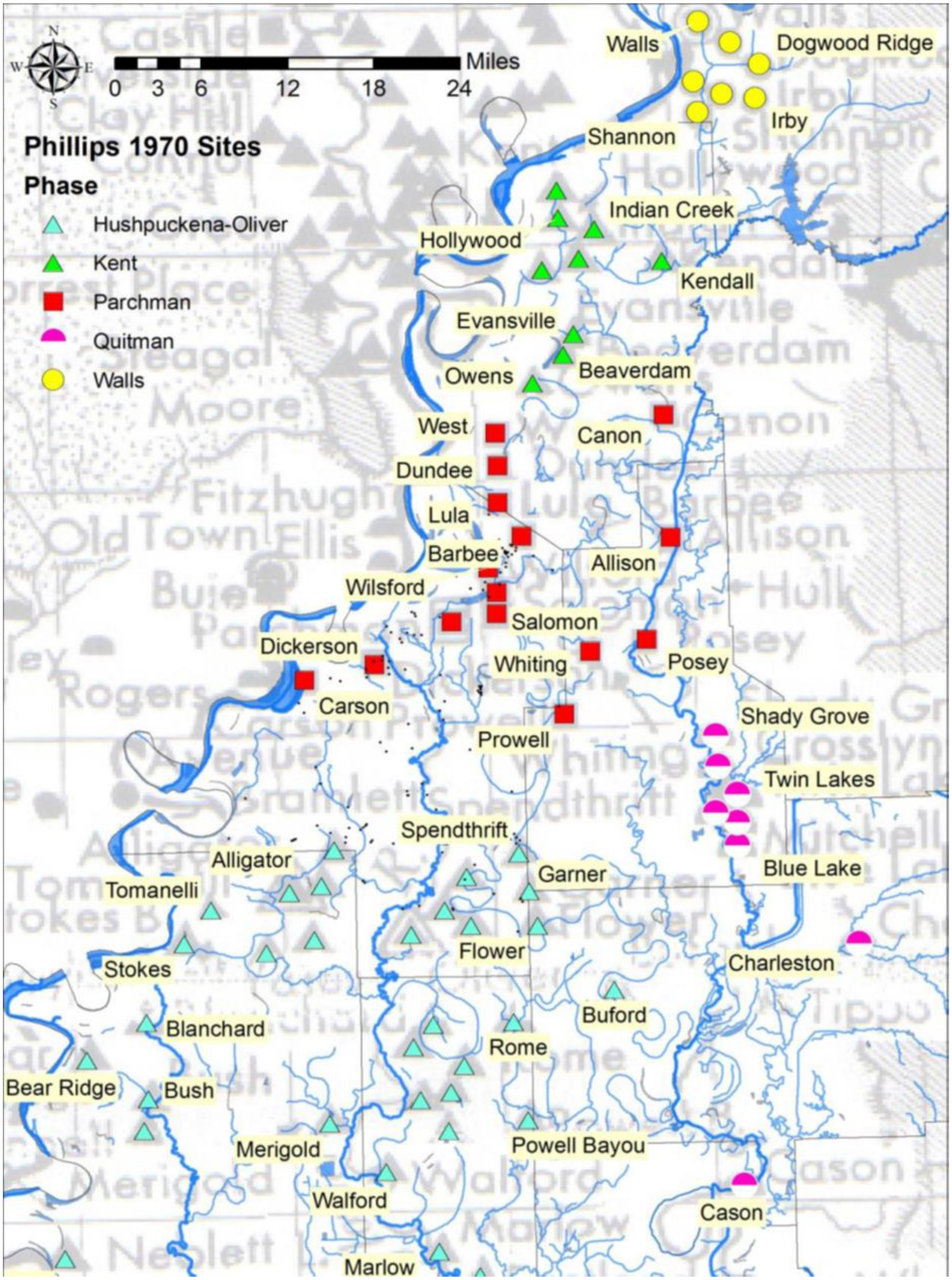


Figure 3. Map of Mississippian ceramic phases in the Upper Yazoo Basin, modified for clarity from Phillips (1970).

> large ceremonial centers with one or more large pyramidal mounds (Carson: Co-505, Parchman: Co-511, Salomon: Co-504, Dundee: Tu-501, West: Co-520); smaller centers with at least one smaller primary mound (Wilsford: Co-516, Canon: Tu-523, Posey: Qu-500, Allison: Qu-514, Lula: Co-517); villages with no mounds or possibly with one or more very small mounds (some of these mounds may have originated at earlier periods); farmsteads; and perhaps small special-purpose campsites (some of these may have been mistaken for farmsteads) [Connaway 1984:85].

He goes on to suggest, based on evidence from the Parchman and Wilsford sites, that cemeteries were not often located at the ceremonial centers and while it is often thought that mounds contain elite burials, such burials are not abundant in the Parchman phase. In fact, burials are rare at most Parchman phase sites (Connaway 1984). The Parchman site has produced only two burials. An in-ground cremation was found near the base of Mound A during the excavations by a University of Mississippi field school (Jay K. Johnson, personal communication, 2009). Another burial is recorded as having contained a Nodena Red and White teapot (Starr 1984:186).

It should be noted that the Mississippi period archaeological phase definitions in the northern Yazoo Basin are questionable (Brown 2008:380). As Phillips (1970:940) stated in regard to the Parchman phase, "it may be foolish to say anything about the chronological position of so ill-defined a phase." Brown (1978:44) notes that the phases offer valuable comparisons among contemporary sites in the Lower Mississippi Valley, but that "major differences are apparent *within* the Parchman phase." So, while I include here a discussion of the Parchman phase, it should be taken with the caveat that these phases do have problems. Such problems do not affect the conclusions or interpretations of this research.

## Archaeological Investigations at Carson Mounds

The Carson Mounds site had undergone minimal professional investigation prior to the Mississippi Department of Archives and History (MDAH) and the University of Mississippi's current excavations. As originally investigated by William H. Holmes in the nineteenth century, there were then over 85 mounds still visible at the site, of which six were assigned letters as major mounds (Thomas 1894:253-255). Holmes considered all mounds to be part of the same archaeological site on his 1894 map (Figure 2, page 8), a map which is still largely relied upon by investigators. The site was later designated by Phillips, Ford and Griffin (1951:372) as three separate archaeological sites: Montgomery (15-N-7), Stovall (15-N-7), and Carson (15-N-8). This division is reflected in the MDAH site records, which list them as Montgomery (22-Co-518), Stovall (22-Co-507), and Carson (22-Co-505). However, Phillips (1970:940) later reevaluated this designation and considered the three sites to be most likely only one. Current literature (Lansdell 2009; McNutt 1996) and investigators presently regard the entire complex as the Carson Mounds site. The site number used currently for investigations is 22-Co-518, as the area falling within the MDAH salvage operation was previously designated as the Montgomery site. Of the 85 mounds originally counted in the larger group mapped by Holmes, only the large, lettered mounds are still discernable, and even they have undergone historic alterations (Lansdell 2009:7-11). The Holmes map recently has been relied upon by current investigators to identify the approximate location of the smaller mounds.

To summarize briefly the description of the mounds given by Thomas (1894:253-255), the lettered mounds stretched along the full one-mile length of the site. To the north, Mound A was located within an area bounded by a three- to five-foot-high rectangular earthen embankment and ditch. The mound had a round base with a diameter of 192 feet, a height of 15 feet, and a top with a 66 foot diameter. The mound appeared to have been built upon a platform measuring five or six feet high. Early excavations of Mound A revealed “fire-beds” (hearths), ceramic sherds, and stone artifacts, but no bone. Mound B was described as two conjoined truncated conical mounds, which rose together to a height of 18 feet before becoming distinct from one another and rising another 8 feet. These mounds rested on an oval platform, 240 feet long at the base and potentially 10 feet high, giving the two mounds a total height of 38 feet from the ground surface. Mound C was a mound with a rounded top having a height of 16 feet and an oval base measuring 210 feet by 150 feet. Mound D was a highly symmetrical five-sided mound with a height of 25 feet. The base of the mound was 310 feet in diameter at the base and 210 feet at the top. Mound E was a double mound on a five-foot-high platform (Thomas 1894). A historic cemetery now rests in the depression between the mound peaks mapped by Holmes (1894). Ironically, the landowners reported while digging a grave that a poorly preserved skeleton was found under a floor of burned clay. Mound F was an oval, round-top mound, with base dimensions of 75 feet wide by 150 feet long and a height of five to six feet high. The criteria for Holmes’s lettering of the mounds is not entirely clear, as his map shows in plan view other mounds equal in size to Mounds A and F that were given no designation.

By the 1940s, when Phillips, Ford and Griffin (1951) surveyed the lower Mississippi Valley, agricultural practices had already disturbed Carson Mounds. The embankment, ditch and smaller unnumbered mounds from Holmes’s map were no longer present. As already noted, they gave Carson Mounds three site designations (Phillips et al. 1951). Mound A was given the LMS label of 15-N-6, later known as the Montgomery Site (22-Co-518). Mound B was designated 15-N-7, later known as Stovall (22-Co-505). Mounds C, D, E, and F were labeled 15-N-8; these bear the original name of Carson Group (22-Co-505). Today the site is considered one site with the designation of Carson Mounds (22-Co-518) (Connaway 2015).

Much of the material published about Carson Mounds relies upon very early excavations and surface collections. The largest surface collection is the result of the landowners who paid the local children a nominal amount for every sherd they found (John Connaway, personal communication 2009). In November 1951, an amateur dig by the Memphis Archaeological and Geological Society placed a 10 by 10 foot excavation unit near Mound A (Connaway 2015). The ceramics from this excavation confirmed that it was a Mississippian site. Supposedly, 12 bundle burials and two extended burials were found. The demographics given for these burials seem confused, giving contradictory or poorly presented age distributions. For example, according to the write-up (Beaudoin 1951) there were twelve bundle burials and four extended burials; 14 were adults and two were children. Fifteen skeletal remains were aged as less than 40 years, with only one aged over 45 years. No further information is given. The maps are also unreliable, as they are pace and compass maps with an ambiguous tree as the reference point, making it difficult to relocate the excavation. The fate of these skeletal remains is unknown.

In 1977, Ian Brown included Carson Mounds in his survey of Mississippian sites of the Upper Yazoo River Basin. He focused on describing and mapping the mounds in their current state, analyzing the ceramics and lithics from surface collections and the archived ceramic collections of the property owner. Brown identified the importance of Carson Mounds as a Mississippian ceremonial center, suggesting that future research be focused around Mound A (Brown 1978). He also identified from the lithic assemblage an earlier Baytown component, but Jay Johnson (1986) would later correct this conclusion.

Johnson's reanalysis of the Carson Mounds lithic assemblage identified a Cahokian connection (Johnson 1986). The white chert that Brown misidentified was actually Burlington chert. The points and perforators also were established to be Cahokian types. Thus, the Cahokian connection at Carson Mounds was established prior to the intensive archaeological activity that began in 2007.

The area under current investigation by MDAH and the University of Mississippi is located within the northern portion of the now-missing Mound A embankment (Figure 4). Land leveling in this area unearthed prehistoric remains during the winter of 2007. John Connaway was contacted, and the field was removed from cultivation in order to salvage the burials and cultural remains.

At the time the excavations began, Brent Lansdell was working with existing ceramic collections from Carson Mounds for his Master's thesis at the University of Mississippi. In 2007, Lansdell began conducting excavations on Mound E. During a surface collection near Mound A, he reported to John Connaway of MDAH that agricultural land leveling had exposed prehistoric human remains. The results of his ceramic analysis indicated that the site was occupied from the Middle Woodland through the Late Mississippian as originally suspected (Brain 1989; Brown 1978:12; Lansdell 2009; Phillips 1970; Phillips et al. 1951:372-373). There was, in general, a significant Early Mississippian occupation and, near Mound A, a Late Mississippian occupation. The fact that there were no distinguishable Middle Mississippian marker types could be due to the lack of clear diagnostics in this region for Middle Mississippian (Phillips 1970: 923-924). The paucity of material collected by Lansdell in pedestrian surveys north and south of Mounds C-F could be due to an alluvial deposit burying the older cultural material (Lansdell 2009:148). Lansdell (2009:151) goes on to comment on the cultural significance of the site due to its

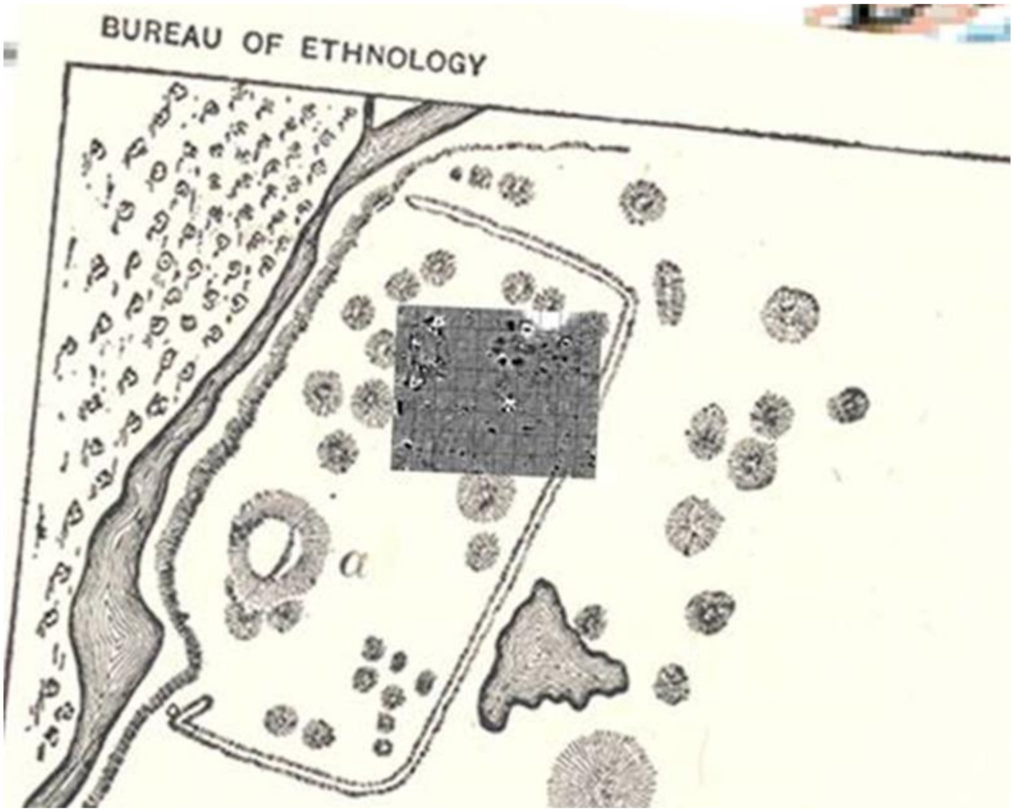


Figure 4. Holmes's Map of the Carson Mound A Enclosure (Thomas 1984:Plate 11) with overlay of the study area as a magnetometer map.

unusual quantity of decorated and painted ceramics in conjunction with the quantity of burials. As Lansdell's ceramic analysis showed ceramic diagnostics of both the Parchman phase and the Hushpuckena phase (the neighboring phase to the south), he suggested that the site was a pivotal center in possibly shifting polities. The important questions raised by Lansdell's work required further investigation and salvage of the extensive mortuary component at Carson Mounds. The salvage within the Mound A enclosure has been ongoing since 2007 under the direction of John Connaway, with the participation of Jay K. Johnson and myself, and is still underway at the time of this writing.

## Mound A Enclosure and Chronology

All of the burials found at Carson Mounds to date have been located within the Mound A Enclosure (Figure 5). The initial recovery of burials has resulted in the extensive excavation and mapping of all archaeological features found within the study area. During this time it became apparent that the wall trench structures and palisades were mostly oriented to the same azimuth, along a grid 18 degrees west of north. This orientation was dubbed the “Carson grid.” It also corresponds to the orientation of the embankment that Holmes mapped. Mound-top structures excavated on Mound C are also oriented to this same Carson grid, which ties the Mound A Enclosure to the site as a whole (Carpenter 2015).

Attempts were made to overlay the Holmes map with the modern archaeological map to relocate the smaller mounds. Mounds do appear to be loosely correlated with areas of archaeological features. It also appears that an avenue with scant archaeological features and no mapped mounds ran through the middle of the study area. It was referred to as a “central avenue,” noting possible differences between the two “sides” of the avenue as a demarcation reflecting social organization. This proposed “central avenue” is represented on Figure 5 as the thick orange line. I therefore hypothesized that this central avenue might reveal itself in the dental morphology analysis, showing that distinct genetic groups were buried on either side.

The flurry of archaeological research that Carson Mounds has churned out in the past decade is forming a foundation of understanding by way of an improved site chronology (Butz 2015; Carpenter 2013; Connaway 2015; James 2010; Johnson 2009; Lansdell 2009; McLeod 2015; Mehta 2012). It was apparent from the previous summaries of ceramic analyses that Carson Mounds, as a whole, had evidence of activity from the Middle Woodland into the Late

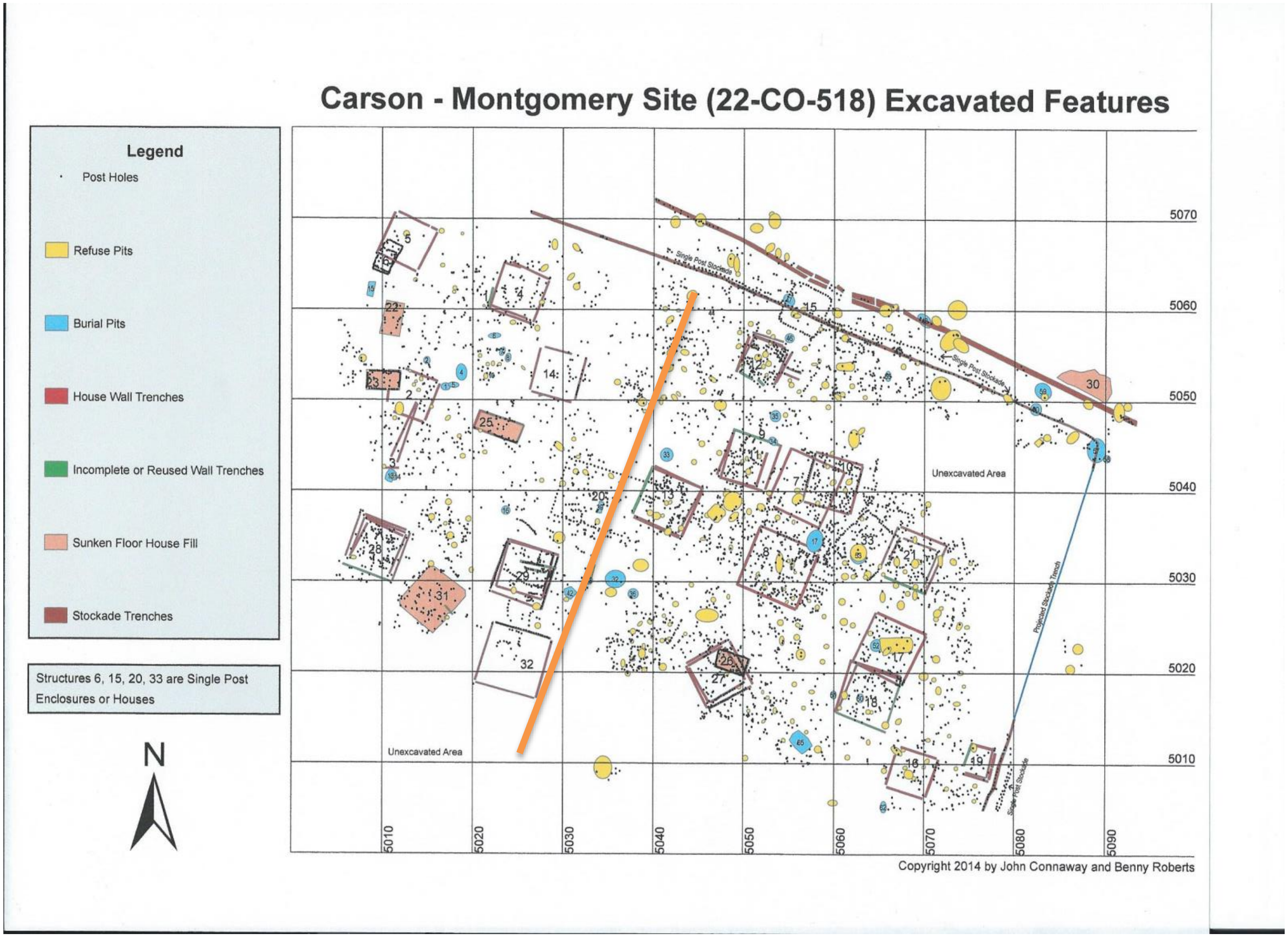


Figure 5. Feature map of Mound A Enclosure. Used with permission from John Connaway. Orange Line represents proposed "central avenue."

Mississippian. Within the Mound A Enclosure, a number of radiocarbon dates have supported these conclusions (Table 1).

McLeod (2015) has developed a refined chronology for the Mound A Enclosure based on intrusion sequences, further supported by radiocarbon evidence. According to this work, the Mound A Enclosure went through three distinct phases of activity. The first phase of activity reflects a period of occupation with clear connections to Cahokia culture to the north. It is represented by semi-subterranean, rectangular houses that are not oriented to the "Carson grid." Associated artifacts of Burlington chert, Cahokian microliths, and Cahokian ceramic types relate to this phase of activity. Additionally, Butz (2015) has identified Mound B, directly south of the Enclosure, as a ridge-top mound, a form of mound not seen outside of Cahokian culture, with a radiocarbon date of 1220-1230 AD.

The next phase of activity within the Mound A Enclosure is an occupation period. It is during this time that square wall-trench houses and other archaeological features began to be built along the "Carson grid" (McLeod 2015). Many square structures, of varying sizes, were built within the Enclosure at this time. As noted, excavations from Mound C have also uncovered wall trenched palisades that also fall along the "Carson grid." Carpenter (2013) argues that these palisades of Mound C were ceremonial rather than defensive. The palisade wall line of the Mound A Enclosure, which dates to this time, is also thought to be non-defensive, as there are no corner wall bastions; rather, the corners are open (Connaway 2015). The Enclosure palisade wall line was rebuilt at least twice during this time. The ceramic assemblage from this area includes diagnostic material from both the Early and the Late Mississippian occupations. Charred material from the remains of a platform house has yielded a radiocarbon date with an

Table 1. Radiocarbon dates for the Carson Mound A Enclosure (from Connaway 2015).

| **Radiocarbon Intercept Dates (Calibrated)** | **Calibrated Sigma range (95% probability)** | **Location of Sample** |
|---|---|---|
| AD 1210 | AD 1040-1280 | Charcoal in platform House 8 center post hole fill. |
| AD 1220 | AD 1160-1270 | Burned corner post in semi-subterranean House 22. |
| AD 1230 | | Organic residue on pottery deposit in semi-subterranean House 31. |
| AD 1263 | | Central post in semi-subterranean House 31. |
| AD 1292 | | Organic residue on Pottery Deposit #2 in semi-subterranean House 31. |
| AD 1410 | AD 1320-1350<br>AD 1390-1430 | Charred in situ center post, intact remnant, platform House 17. |
| AD 1420 | AD 1410-1450 | Charred post in north inner stockade trench under Burial 50. |
| AD 1444 | | Post mold 4823 in semi-subterranean House 31. |

| | | |
|---|---|---|
| AD 1450 | Cal AD 1420-1530<br>Cal AD 1560-1630 | Large burned post in north outer stockade trench. |
| AD 1460 | AD 1440-1520<br>AD 1570-1590<br>AD 1590-1630 | Burned post in east inner stockade trench. |
| AD 1460 | | Organic residue on sherds in posthole in semi-subterranean House 31. |
| AD 1490, 1600, 1610 | AD 1450-1640 | Burned post in House 12 floor. |
| AD 1500, 1510, 1600, 1620 | AD 1450-1640 | Burned support post in platform House 8. |
| AD 1520, 1580, 1630 | AD 1450-1660 | Unburned cypress bark covering on Burial 13. |
| AD 1640 | AD 1500-1500<br>AD 1510-1600<br>AD 1620-1660 | Burned wood timbers in bottom of Burial 60 pit, inside House 18. |
| AD 1640 | AD 1490-1600<br>AD 1610-1650 | Burned post in north central stockade post row. |
| AD 1640 | AD 1500-1500<br>AD 1510-1600<br>AD 1620-1660 | Burned post fragment in semi- subterranean House 26 floor fill. |

intercept of 1410 AD. Samples taken from charred posts of the palisade have revealed radiocarbon dates with intercepts of 1420 AD, 1450 AD, and 1460 AD.

The final phase of activity within the Mound A Enclosure was a necropolis, during which the entire enclosure area was transformed into a mortuary domain in which burial pits of variable size were created to contain the bundled skeletal remains of multiple individuals. The burial pits have no other archaeological features intruding them (McLeod 2015). Two burials with organic material have been radiocarbon dated with intercepts at 1520 AD and 1640 AD. It can be argued, and I intend to do so, that the necropolis represents people returning to an ancestral place to bury their dead, following a similar pattern to Moundville (Wilson 2008).

The low mounds formerly present within the Mound A Enclosure together with the enclosing ditch and embankment mapped by Holmes probably belong to the final necropolis period, with the ditch and embankment replacing the earlier, more simple palisade line of posts. Although portions of the palisade line have been found archaeologically, the ditch and embankment may never be relocated due to the extensive agricultural landscaping and land-leveling. It can be argued that, following a trajectory similar to that of the Moundville site in west Alabama (Knight and Steponaitis 1998), once the necropolis was established, it was enclosed by an embankment and trench delineating the area as sacred, just as the earlier palisade line had enclosed a village of the living. Overlaying the Holmes map onto mapped archaeological features yields no clear evidence that the low mounds are related to the burials, assuming they were accurately mapped by Holmes. It does appear that burials, houses, and mounds within the Mound A Enclosure may cluster together; however, more research is needed on this matter. The work presented in the chapters that follow focus on developing a model of social organization that could be applied to understand Carson Mounds society as a whole throughout its history. To do so I will build heavily upon the mortuary practices observed archaeologically.

## Mortuary Study

Carson Mounds' mortuary remains stand in stark contrast to surrounding Mississippian sites. As mentioned earlier, burials at Parchman phase sites are the exception rather than the rule. The only other large burial center in the area is the protohistoric Humber-McWilliams site, which is so close to Carson it can actually be seen from Carson's Mound C. The mortuary ritual at Humber McWilliams produced thousands of extended, fleshed burials with grave goods included (Tesar 1976). This pattern is in stark contrast to the Carson Mounds' secondary burials in mass pits with scant grave goods. Humber-McWilliams was occupied after the abandonment of Carson Mounds, as evidenced by the presence of historic material. Therefore, Humber-McWilliams is not only just different, but it reveals an important local shift in social organization as reflected in mortuary ritual.

Carson Mounds offers an outstanding opportunity to understand better the correlation between secondary burial and social organization in the Mississippian world. The burial excavations from Carson Mounds were conducted in such a manner as to fully recreate the details of each bone bundle. In this way, I have been able to reconstruct the burial program using osteological and archaeological data guided by the ethnohistoric accounts. Each step and action in the reconstructed burial ritual at Carson Mounds is evidenced by data, so that no part is conjectural.

There are historic accounts of secondary burials occurring among the historic Choctaw and Chickasaw. First, I will explain why it is unlikely that the bundles at Carson Mounds occurred due to processes similar to the ones that created the bundles of the Chickasaw, who typically interred their dead as primary, extended burials. Johnson and colleagues (1994) have attributed the secondary bundle burials found at the Chickasaw Meadowbrook site to increased warfare associated with European contact. According to Adair's (2005:189) account, bundle burials among the Chickasaw were reserved for those who died away from home in the pursuit of war. The deceased was interred temporarily, and subsequently the body was bundled for transport during the war party's return home. By analogy, bundle burials found in small quantities in the Chickasaw area and beyond during the Mississippi period could be attributed to similar, extraordinary circumstances. These manifestations of bundle burials can be distinguished from bundle burials that result from protracted ritual by the osteological elements present in the skeletal inventory and taphonomic damage to the bone, such as animal tooth marks and weathering. In a preliminary study conducted using the skeletal inventories from a series of Chickasaw sites (James 2011), I found that there were statistically fewer small bones from the hands and feet recovered from the Chickasaw bundled burials than are found in the bone bundles recovered from Carson Mounds, where the dominant mode of burial follows a Choctaw-like pattern. Thus, it is clear that mortuary practitioners at Carson Mounds were careful to protect and recover all skeletal elements for inclusion in the bundles. It is unlikely that the bundles of Carson Mounds were buried prior to bundling or allowed to be victim to predation by birds or other animals.

What follows is a brief review of my Master's thesis research (James 2010), with additional data from subsequent excavations and analysis of over 60 burial pits from the Mound A Enclosure study area. For my Master's thesis research, I conducted an in-depth inventory and detailed GIS-analysis of the largest burial from Carson Mounds, Burial 4 (Figure 6), to reconstruct the mortuary ritual responsible for such burials at the site. This burial contained at least nine juveniles and 27 separately bundled adults, of both sexes and all age groups. Bundles were deliberately placed in a tight stack within the burial pit. Analysis of bundle composition revealed minor commingling of remains from different bundles, demonstrating that these bundles were stored together at one time.

At death, an individual corpse would be placed in a secure location above ground. Evidence for this is suggested by the lack of scavenging animal marks on the bones.  There is also remarkably complete recovery of the small bones of the hands and feet, which are often lost with unprotected above-ground burial and in-ground inhumation followed by exhumation. The body was thus probably high enough to prevent depredation by large predatory or scavenging animals such as domestic dogs. A height of two meters would have been adequate, and this height is supported by Choctaw accounts. The recovery of small bones and the lack of weathering suggests that remains were covered and not left exposed to the elements, where wind and rain might wash bones from the scaffold. This covering would have kept small animals and birds away from the corpse as well.

Corpses were allowed to decompose on their scaffold until a mortuary practitioner was prepared to finish defleshing and disarticulating them. At Carson Mounds, the buried bundles of individuals that were disarticulated show various states of decomposition (James 2010:66). Som the hands, feet, lower legs, or vertebral column still articulated. The tightly packed nature of these bundles suggests that excess flesh, cartilage and ligaments were removed. In all but one e individuals were placed in the ground completely disarticulated, while others were buried with

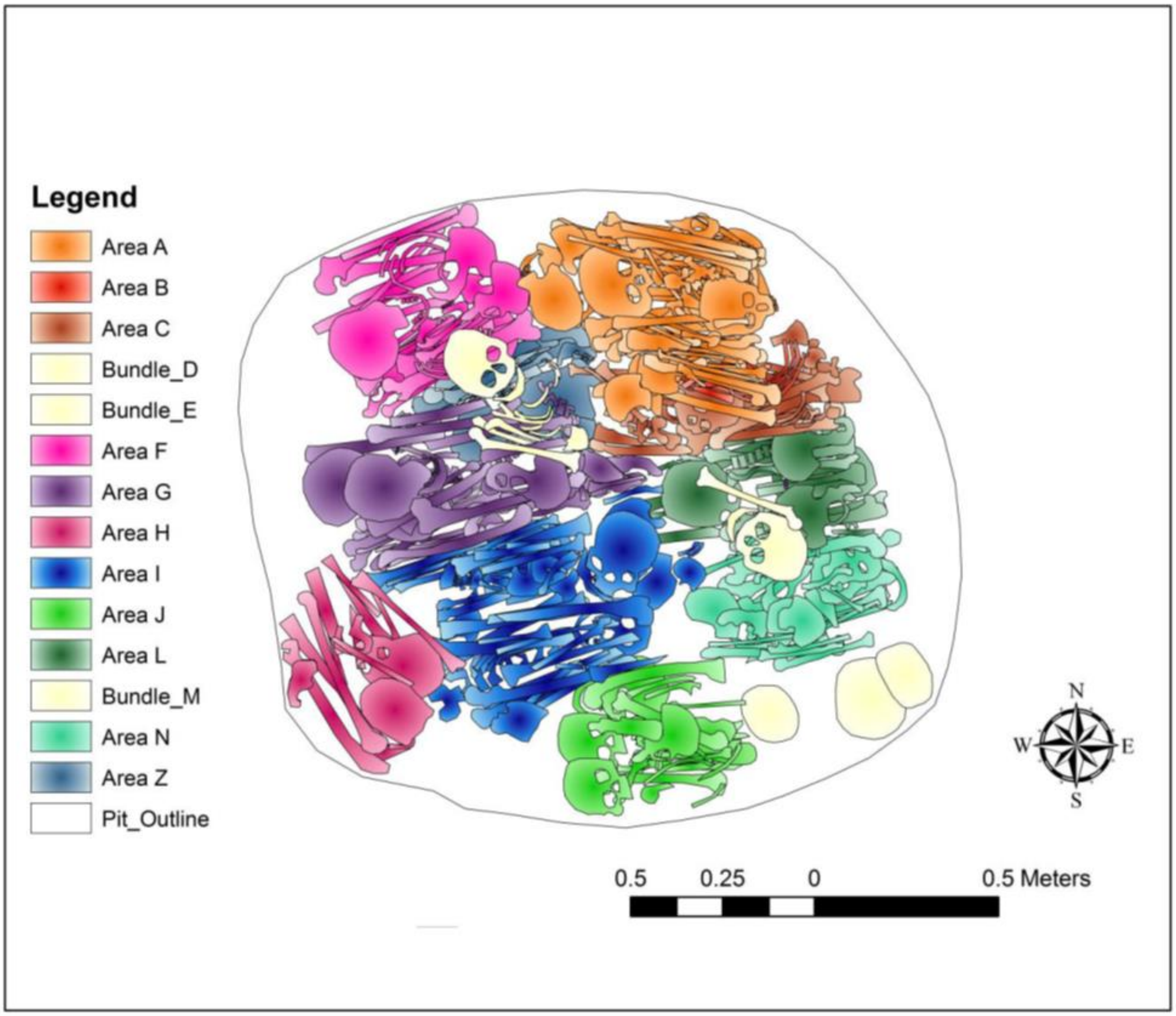


Figure 6. Map of Burial 4, Mound A Enclosure, Carson Mounds. Ecru-colored bundles represent bundles containing only juveniles.

possible case, the limbs were disarticulated from the body. The bones show no sign of cut marks or scraping from the use of tools, but this does not preclude the use of tools by experienced bone-pickers. A recent experimental archaeology project in which I replicated the Choctaw bone-picking ritual with a cadaver pig (James and Jacobi 2012) demonstrated that in many cases a tool such as a cane knife would definitely be required, especially in disarticulating the spinal column. There are limited details given about the tools possibly used historically for this task, but those observing my experiment never saw the small stone blade I held while disarticulating the pig skeleton. The lack of cut marks and damage to the bones from defleshing demonstrates the ability of the bone-picker, who I suspect was a full-time mortuary priest. Historically among the Choctaw, such individuals were itinerant, but at the time they were described, southeastern Native societies had been greatly impacted by European contact. During the Mississippian period, a community as large as Carson could have supported a full-time specialist, especially one whose job marginalized them due to its chronic state of pollution due to their contact with the dead.

Once the bones were defleshed, they were placed in some sort of organic container. There has been no recovery of large burial urns from Carson Mounds to suggest ceramic storage of the bones, as known elsewhere in the Southeast. Instead, these bones must have been kept in some sort of corporate bone-house, secure from scavenging animals and the elements. These bone-houses must have been elsewhere, as the house structures within the enclosure predate the burials, according to McLeod's (2015) intrusion sequence. While the structures present do predate the burials within the Mound A Enclosure, there are two (House 8 and House 12) that are possible candidates for bone houses. These are heavily daubed platform houses on stilts, with a large central support post, a grid of smaller platform-supporting posts, and wall-trenches around the perimeter (Connaway 2015). House 8 is the largest wall-trench house, measuring 52 square meters. This house also appears to have archaeological evidence of a ramp leading up to the platform. Such structures have also been found at the nearby Wilsford site (22-CO-516), however, no burials have been recovered from Wilsford (Connaway 1984). Connaway, who excavated and mapped both the Wilsford and Carson Mounds platform houses, has commented that House 8 at Carson Mounds is nearly identical to the platform houses at Wilsford (Connaway

2015). Originally, the lack of burials from Wilsford Site led Connaway to believe that the function of platform houses might have been ceremonial or flood-avoidance (Connaway 1984: 94). However, reviewing the literature, Ohio-Hopewell offers a possible ceremonial function for platform houses as bone houses (Greber 2015). Platform houses would serve the same protective purpose as a raised scaffold, preventing access by scavenging predators and signaling the symbolic importance of the “residents” of this house. Literally, the bundles are raised above the living in the platform house.

Inside the bone house, which I propose was a Willsford-style platform house similar to House 8, skeletal elements could have continued to disarticulate and the containers may have been replaced prior to the final burial ceremony, especially in the cases where there was still decomposing flesh on the bones. Within a burial, there are signs of commingling that had to have happened before the final burial. In several instances, long bones from one person were found in the bundle of another person on the other side of the burial pit. This commingling suggests that at some point the bones were unwrapped in a common facility, and then re-wrapped in an organic skin or cloth before burial. Moreover, this repackaging may have been done by someone other than the mortuary practitioner, such as a member of the family. Bone-pickers would have had an intimate knowledge of the human skeleton, and I doubt would have made such a mistake as giving someone an extra femur.

There appear to be three ways to bundle a human skeleton at Carson Mounds, and all three can be found in the same burial pit (James 2010: 63). Figures 7 and 8 show two of these ways. This suggests that multiple individuals were involved in the final burial process; again, the task probably fell to kin, but there were prescribed ways of bundling, based both on the need for structural integrity of the bundle and on its symbolic meaning. To create a bone bundle, a frame

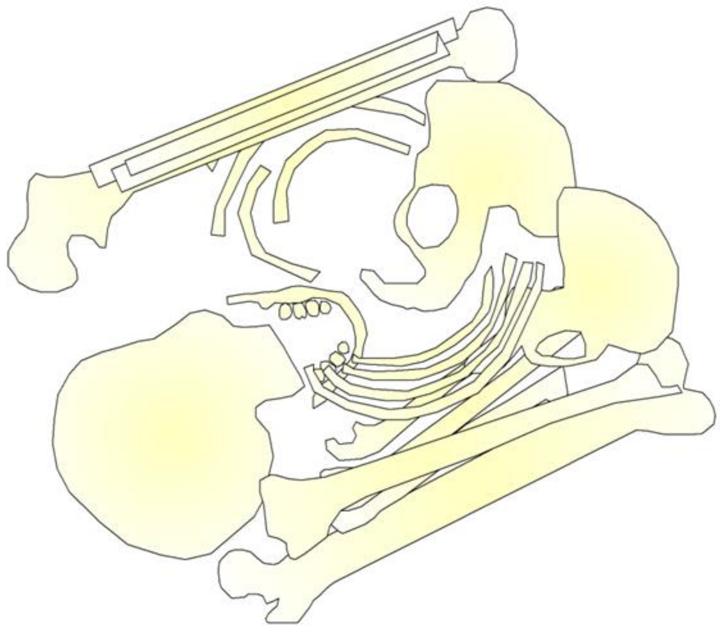

Figure 7. Schematic of a bone bundle with long bones framing two sides.

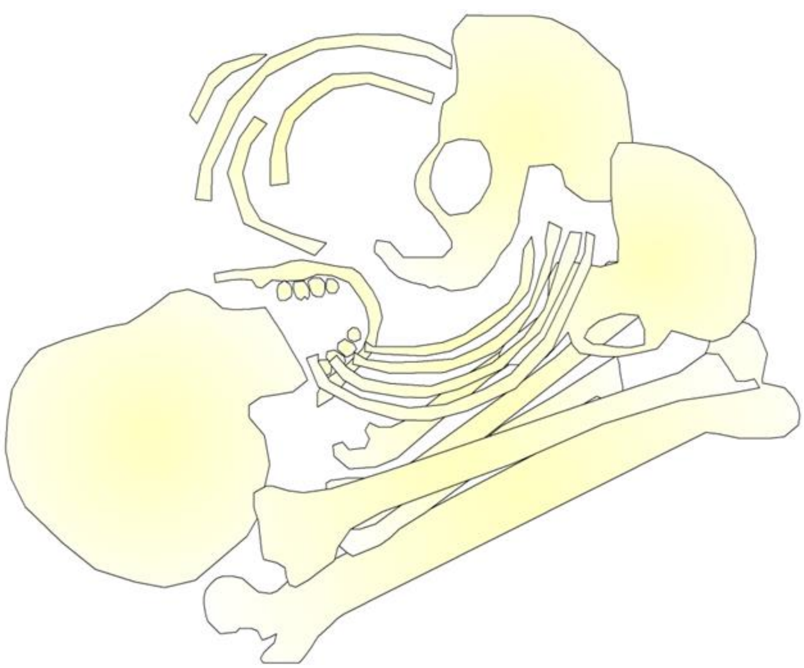

Figure 8. Schematic of a bone bundle with long bones framing only one side.

needs to be made. On top of the organic wrapping, say a deerskin, the long bones of the body would be placed flat across the wrapping, or placed in one or two stacks along the long axis of the bundle. This creates the base or frame. The ribs would be gathered in a neat stack, with the arches lined up. These were placed on top, or next to, the long bones on the inside of the bundle. The os coxae, or pelvic bones, are irregular shaped and showed the most variability in their placement. Some bundlers created an os coxae "basket" in which to set the skull or in which to place the smaller bones. Other bundlers simply tried to make the os coxae fit within the dimensions of the bundle, which was never longer than a femur or much wider than the skull plus two long bone epiphyses. All the other small elements, vertebrae, hands, and foot bones would then be placed inside. If the vertebral column was still articulated, it would be treated in the same manner as a long bone in the initial step. The skull was nearly always placed last, on top at one end of the bundle. The temporomandibular joint is one of the first to disarticulate in a decomposing skeleton, and in almost every bundle, I suspect that at Carson Mounds it was already disarticulated at the time of burial. However, mandibles were almost always placed in correct anatomical order to the cranium, recreating the articulated dentition of the individual. This is an important detail. The teeth are a visible, noteworthy feature both in life and death. Recreating the "smile" could have been a manner in which former individuals could be identified, individuals whose identity had been transformed into the ancestor, but who nonetheless had lives that were remembered.  The bundle was then complete. The remaining skin was folded over and secured to make a parcel of bones. No other items were included in the bundle; nothing of personal adornment, utilitarian, or ritual value.

Bundles were then placed in the burial pit. In general, it was observed that there is no distinction as to where particular individuals went relative to others. Males, females and children were arranged in the burial pit in two lines of bundles, and thereafter as room permitted. Bundles could be stacked one on top of the other, but this only happened in a few of the burials, most notably Burial 4. No particular individual was given spatial priority in the burial pit. The inclusion of grave goods with the bone bundles in the burial pit was the exception rather than the rule. When an item was included in the burial pit, it was usually a ceramic vessel which did not seem to be associated directly with any particular individual.

Upon excavation of the burials, it is difficult to see anything but a carpet of bones. But during careful excavation it was revealed that each pit contained a collection of distinct bundles with each bundle representing an individual. An individual's unique identity is not destroyed by a mass burial of the remains, as in an ossuary, which would be the ultimate subordination of an individual's importance to that of the group. Thus, in the Carson Mound A Enclosure, an individual is still highly visible until the very end, but the emphasis is, nonetheless, on the broader social group. Everyone receives an undifferentiated burial treatment, and covered in their wrappings, they would have looked the same, a uniform ancestor. All were of equal importance: men, women and children of all ages.

It should be noted that young children under the age of four did receive an abbreviated form of this treatment, but were still included in the burial. Young children were bundled, but their remains do not appear to have been defleshed as carefully and regularly bundled like adults. It appears from the bundles excavated to date that children were allowed to decompose, and then were wrapped all together in a single bundle. In a few cases, there is evidence that the bones of very young children were placed inside their own skull. Small juvenile phalanges and tiny unfused epiphyses have been recovered from juvenile and neonate bundles. There was also a tendency to bundle a young child from the age of eight years or younger with an adult female.

Bundles including juveniles tend to be placed at the edges of a burial pit. Proportionally, there are not enough infants to represent actual population demographics. According to the paleodemographic standards established by Lovejoy and colleagues (1977:292), it would be expected to find that at least 21.4 percent of the dead were under the age of two years old at death. In that light, a large part of the mortuary sample appears to be missing from Burial 4, where only four out of 36, or eleven percent were infants under the age of two. Thus perhaps not all infants were included in this mortuary program, or at least were not recoverable archaeologically. The rules of inclusion are not clear in this case.

At this point, the question is what form of social organization these burials and this mortuary program represent. It is clear that secondary burial ritual and mortuary programs in general can inform on a society’s organization, as people tend to organize the world of the dead as they do their living world. The studies that follow aim at addressing social organization at Carson through multiple lines of evidence, comparing and contrasting the patterns that emerge there to a known matrilineal, matrilocal kin organization of the historic Creeks by means of the genetic composition of the burials.

# CHAPTER 3

## SOCIAL HOUSE THEORY

Social house theory has gained ground in cultural anthropology, especially among ethnographers working with nonindustrial societies. However, it has only recently appeared in North American archaeology, best represented by Beck's 2007 edited volume *The Durable House*. Therefore, I will here review social houses and their utility in explaining nonindustrial societies, which include the Mississippian world of Carson Mounds.

As defined in Chapter 1, a social house is a corporate group of biologically related and unrelated individuals, bound to an estate of material and immaterial wealth, which is perpetuated by transmission through either real or fictive inheritance expressed in a language of kinship. The house is an "agent of socialization" (Cartsen and Hugh-Jones 1995:2). Houses exist as both physical and ideological entities, created by previous generations that shape a person's identity from infancy, framing the basic duality of "us" and "other." Houses can be considered types of kinship, as kinship is not a direct reflection of a biological reality and different forms of kinship are differentially valued (McKinnon 2002). Social houses as a category take into consideration the various processes groups will employ to consolidate and maintain power, without losing it through marriage or inheritance. Social houses can exist alongside other powerful institutions such as clans or religious groups, as they serve different functions (Howell 1995; Waterson 1995).

A growing body of literature positions social houses within Marxist theory, suggesting, as Levi-Strauss did, that social houses represent a transitional form of social organization where societies are still pre-capitalist but in which groups are beginning to amass wealth and property in ways that kinship-based reciprocity can no longer regulate (Cartsen and Hugh-Jones 1995; Gillespie 2000a; Helms 1998; Levi-Strauss 1964; McKinnon 1995; Sandstrom 2000). This makes social houses of particular interest to researchers studying societies with aggrandizing elites, like archaeological chiefdoms. Mary Helms defines a chiefdom as a

> hierarchical form of nonindustrial society and political organization that operates under the rubric of kinship and in which formal leadership is legitimately monopolized by members of one or more selective families, or "houses," who thereby constitute a political-ideological aristocracy and a social elite relative to the general population [Helms 1998:3-4].

The stratification of chiefdoms can be naturalized through cosmology, where the universe is controlled by archetypes that ruling elites may claim as their own origins. Often tensions are not between the elites and non-elites, but rather between the elites, who constantly vie with one another for power. As Gillespie (2000:26) suggests, echoing Levi-Strauss, we can understand these societies through our own history; the royal houses of medieval Europe were social houses that interacted in patterned ways that can serve as correlates to prehistoric, archaeologically known societies.

## Husbands and Wives

Houses exist as a dialectic between the husband and wife (Helms 1998:58). Affines enter the house as the "other," but they are necessary to reproduce the house. Strong houses can make good marriages and bring both the spouse and their kin under the influence of the house. Affines enjoy particular rights and obligations to the house, through their connection to the offspring of marriage. Incorporating affines into the house keeps these rights and obligations to the affines close, and thus prevents the loss of power and wealth (Cartsen and Hugh-Jones 1995:6).

Houses are linked to one another by marriage as well (McKinnon 1995). Alliances are formed through the exchange of spouses. Alliances between elites can mediate struggles for dominance, as both cooperate to ensure the strength of one another's house through a common goal. It is the children of marriage alliances that represent the wealth and benefit to each house, as they may belong to both, not necessarily one.

Marriage alliances also can interfere with the natural alliances formed within a house between siblings (Sandstrom 2000). For example, among the Nahuas of Northern Veracruz, widows can lose rights of inheritance to their sisters-in-law, as the reproductive value of the wife is of greater value than that of the sister. The bonds of siblings who might belong to different houses due to marriage can constitute some of the most powerful alliances between houses. Thus there is value in marrying a powerful man's daughter, as she will retain some form of access to her family even after the death of her parents. On the other hand, sibling marriage, a form of endogamy common to royal families, is a most effective strategy for maintaining wealth and power within the house to the detriment of others.

## Productive Units

The power behind house alliances does not lie in consanguinity or the use of kinship language to express house relationships. Instead, such power lies in the actual duties and obligations that these relationships require. A house is a productive unit. It represents the shared investment in the mundane and the sacred which ensures the survival of the house (Helms 2007;

Hendon 2007; Joyce 2000; Levi-Strauss 1982). Levi-Strauss's (1982) original concept of the social house focused on how these units of organization seem to defy social rules in order to maintain and enhance wealth through the manipulation of kinship. Because social houses employ a variety of strategies, it has been difficult in the past for researchers to identify them (Boas 1966; Levi-Strauss 1982). Individuals within a house are constantly negotiating the dialectics of the house and re-negotiating to maintain the estate in a dynamic society (Gillespie 2000a). Houses will appear different from one another as they interact and react to their particular histories.

The differentially valued forms of affiliation of the house create an internal hierarchy within the social house. This valuation is central to social negotiations, as individuals jockey for dominance in their own house. Ranks, titles, and family names can be given out according to one's position in the house. These can have value beyond the house in the larger social hierarchy as well.

While it can be difficult to identify social houses, Levi-Strauss (1982) and Gillespie (2000) maintain that they are best seen in opposition to one another. The alliances and competition between social houses creates contrasts between them. Hierarchies can be seen materially, as one house outproduces another in wealth or even in the number of members. Houses define themselves against one another, as "us" versus "other," as they "create and reiterate asymmetrical relationships" (Gillespie 2000b:30). Each has its own ancestors and perhaps its own origin myths to legitimize its history. This, in turn, takes material form in the shape of ancestor veneration and house temples or altars.

## Houses for Ancestors

Because houses have a physical correlate in the domestic dwelling, anthropologists have focused research on studying this structure, its functions, rituals, and life histories (Cartsen and Hugh-Jones 1995; Joyce and Gillespie 2000). Temples in social house societies are born from domestic houses. Either a dead ancestor's house becomes a sacred temple, or the house daily lived in is the temple (Kirch 2000; McKinnon 2000). This mode of origin follows Bradley's (2005) concept of ritualisation, where the routine and ordinary are given sacred meaning as a product of their importance to life. For example, among the Tikopia of the Solomon Islands, houses underwent a historical transformation to "holy houses" as the burial of sacred ancestors in the house floors made the space too sacred to inhabit by the living (Kirch 2000). These houses looked the same as domestic structures because they originally were, but they evolved the function of housing the ancestors, which gave them a sense of permanence. Among the Lio of eastern Indonesia, houses underwent a similar process of ritualisation. However, these temples became specific to certain social houses (Howell 1995). This process created an ideological hierarchy of elites descended from the great ancestors, who served as priests and leaders. Everyone else fell to the category of "poor relations" or slaves (Howell 1995:156). The most extreme manifestation of this process can be found in Japan (Waterson 1995). The royal family of Japan, the Meiji, out-competed all other social houses. The Meiji abolished the samurai, which were organized as social houses. They further legitimized their dominance by establishing their own ancestors as supreme, such that families no longer worshipped their own ancestors. Consequently, all people came to be thought of as descending from the Meiji. This action naturalized the god-worship of the emperor and the nation's allegiance to him. Everyone was related in some way to the emperor through his supreme ancestor. To relate this process to a society more geographically pertinent to the current study, the Natchez may have undergone a similar process with their ruling Sun lineage.

## Bones and Secondary Burials

Central to the temple of a social house are the ancestor relics and burials that give it supernatural potency. Secondary burial ritual focuses on the transformation of the dead to the role of ancestor, creating in the process powerful imagery and actual relics of veneration. The relics most often take the form of the durable bone. There is a tangible durability to bones and teeth (Helms 1998:164). They can withstand the supernatural metamorphosis of the living to ancestor and can be handled by powerful individuals as intermediaries with the supernatural. Given the uncertainty of change and death, bones provide a physical stability and order that reflect the qualities groups desire in their ancestors. In turn, as ancestor, these bones and relics are items of wealth. Their possession gives the house power and access to the supernatural. The more ancestors a house has, the more power it has. Therefore, the relics and bones of the ancestors kept in temples and cemeteries are tangible evidence of the wealth of the house. Large, powerful houses have such power because they have more members to produce wealth, and ultimately to produce ancestors when they die (Helms 1998:170). Archaeologically, where social houses were present, the open display of secondary burials might be expected as a correlate of ancestor veneration.

# CHAPTER 4

# SOCIAL ORGANIZATION AS VIEWED THROUGH MORTUARY RITUAL

Mortuary ritual and burial treatment have been long viewed as symbolic social acts that can convey information about a society's social organization through their treatment of the dead (Brown 2010). Death represents the ultimate threat to a society--discontinuation (Hertz 1960:76; Malinowski 2004; Radcliffe-Brown 1922). Yet, despite death, the community persists. The roles and obligations left behind by the dead person are taken up by another, and the dead person exists in a new state of social currency as an ancestor. Burial ritual addresses social solidarity, transmitting social roles from the dead to the living along appropriate channels of organization and repurposing the power once in the living person to that of the supernatural ancestor.

In order to address social organization through mortuary ritual at Carson Mounds, I will focus on the aspects of social house organization that may be apparent in burial treatment and cemetery arrangement. I will begin by discussing the general theory of secondary burial, using as an example the mortuary potlatch of the Pacific Northwest, which was originally identified by Levi-Strauss as corresponding to social house organization. Then I will focus more specifically on the Mississippian site of Etowah, where mortuary behavior is used to explain social house organization. Moving closer, geographically and chronologically, to Carson Mounds, I will discuss the ethnohistoric and archaeological data from a Natchez temple mound at the Fatherland site. Finally, ethnohistoric data on Choctaw secondary burial ritual will be summarized, as these data were largely used in modeling the Carson burial program discussed in Chapter 2.

## Theory of Secondary Burial

Both Hertz (1960) and Van Gennep (1960) spoke eloquently of secondary burial ritual as a rite of passage of the spirit from the profane world to the sacred world. Such rites manifest the process of a society recovering from the death of one its members through the initial separation, transition, and incorporation of the new reality. In social terms, death is neither biological nor instantaneous (Helms 1998:25; Straus 2004; Turnbull 1961:34). The social obligations and duties of the deceased must be disentangled from the individual in order to be transmitted to the survivors through protracted mortuary rites. As symbolic creatures, humans incorporate the visible changes of the body in death into their understanding of death and the process of becoming the ancestor. Following the dualities of the sacred and profane, the spirit and the corporeal body, the durable and the corruptible, symbolism is found in the hard bones of the skeleton and often becomes the focal point for secondary handling and ancestor veneration (Helms 1998:24; Kan 1989).

By definition, a secondary burial requires a second handling of the corpse after the initial treatment of the body (Sprague 2005:63-64). This usually takes the form of storing the body in one location and moving it to another place after a period of decomposition or cremation of the remains. As the flesh of the body breaks down with death, or burns during cremation, it is the bones with their inorganic components that become the most important handled objects in the ritual of secondary burial.

According with the three stages of rites of passage as outlined by Van Gennep (1960), the initial treatment of the body is to separate it from the immediate realm of the living, such as removing it from the house. While the body remains in this first location, it is said to be liminal, in a transition phase while the soul makes its journey to the afterworld and the society begins to cope with the changes incumbent on losing a member. The liminal phase ends when the spirit has completed its journey and social life returns to normal. This point is marked by the secondary handling of the remains. The bones or ashes of the body are taken from their original location to their final resting place. This is the incorporation stage of the rite of passage. The spirit is now fully part of the spirit world and society has renegotiated the deceased's former roles and obligations among the rest of the group. Because the spirit is now thought to have joined the world of the dead, the bones or ashes are usually placed in a communal burial location of all the dead, such as a necropolis. This final act incorporates the whole of society, demonstrating its solidarity and ensuring its survival as it honors its ancestors. In the cosmological conception, the dead remain members of society. In fact they can be its most important members, ones who act as intermediaries with the gods and spirits (Helms 1998:12). Veneration is practiced not merely in honor and remembrance of loved ones, but is motivated politically and economically to gain favor with the influential supernatural.

## Ethnographic Example: The Tlingit Mortuary Potlatch

To illustrate the ability to tease information about social organization from secondary burial ritual and its focus on ancestor veneration, I will draw upon Kan's (2004) ethnographic work with the Tlingit and their potlatch ceremony. The ceremony and accompanying destruction of wealth of the Tlingit potlatch are well known, but what is less strongly emphasized is that these ceremonies also are used to commemorate the dead in the form of secondary burial. Among the Tlingit the dead are cremated, but the spirit is not settled until it is placed in a new container or mortuary pole during the potlatch dedication ceremony. This pole is the "house" within which the dead will reside in the village of the dead. At the potlatch ceremony, a living person is chosen to represent the deceased. This individual receives gifts and speeches as though he or she were the dead themselves. The individual hosting the potlatch tries to please the deceased, as the deceased is now among the influential ancestors. The wealth and gifts bestowed upon the ancestors will be repaid by the ancestors to the living. This giving increases the host's status among the ancestors, and displays to the living the host's wealth and power in the material world. The power of the ancestor is of such great importance that it musters the labor and wealth of an entire village to ensure success and supernatural aid. The ancestor is sent off to the village cemetery with the dedication of a new mortuary pole. In this manner, secondary burial treatment is a means by which to settle the spirit of the ancestor and gain his or her favor through gifts and a final place in the cemetery. The Tlingit cemetery can be thought of as a village of the dead in which they organized the world of their dead just as they were organizing their living world (Hertz 1960:71-72; Kan 2004).

Social organization and values are visible in secondary mortuary rites because the ceremonies constitute interactions with the ancestors. It is a time when the group asks for the continuation of their lifeways, and gains favor for a promising future of prosperity. Through the rites, the group attempts to recreate an ideal social order, with all the powerful ancestors together in their rightful place in the otherworld, and with all the pollution and threat of death removed from the ancestral relics as the corruptible flesh is removed from the durable bone or ashes.

## The Manifestation of Social Houses in Archaeological Mortuary Remains

The aspects of social houses that may be seen in mortuary remains rely on the old hypothesis put forth by Saxe (1970) and later tested by Goldstein (1980), that corporate groups have the right to access particular resources through descent groups, which will have maintained discrete burial areas. It is within these burial areas or cemeteries that the corporate group is represented by its former members, who are now dead. In social houses, affines and servants are incorporated into the group and gain access to its cemeteries. Therefore, the genetic composition of the cemetery should reflect a mix of genetically related and unrelated individuals. This biological relatedness can be tested in the archaeological record, and can provide evidence for social houses.

Additionally, the internal ranking of the social house may also be reflected in the burials, following a representationist approach (Sullivan and Mainfort 2010). Individuals with higher rank in the social house may have more elaborate burial goods or treatment, while servants or affines may have minimal investment of wealth in their burial. Therefore, within the same cemetery there could be a spectrum of social ranks represented.

Social houses are usually found in multiples. This could result in multiple interment areas or facilities. The competition for wealth between social houses can lead to differences in the wealth and rank of houses. Some interment facilities would thus appear to have individuals of higher rank than others. The overall wealth of burial goods may also be different between facilities.

Ancestor veneration is an important process that helps a social house legitimize authority and rights through their connection with the past and with the supernatural. Mortuary treatment of the body can be seen as not only the disposal of the dead but also the veneration of the dead. In this way, elaborate rites can focus on the transformation of the dead to a new role as the respected ancestor. The emphasis may shift away from the individual to a communal idea of an ambiguous ancestral spirit, where the dead are treated and honored in a similar manner. Relics may be retrieved from the body, usually in the form of bones or ashes (Williams 2004). These removed items can access the ancestor, and legitimize the connection to the dead through tangible objects. Gaining power from the dead to benefit the social house is a process where the wealth and status of an individual may be maintained, and in some cases enhanced, through beliefs regarding the supernatural abilities of the dead.

## Social Houses in Mississippian Culture

James Brown (2007) brought social house theory to Mississippian archaeology in his re-examination of Etowah's Mound C, located northwest of Atlanta near Cartersville, Georgia. Mound C is a platform mound with a series of rebuilding episodes with pole and thatch temples on the summits (King 2003). There are 530 burials associated with this mound. Before discussing Brown's interpretation, I will summarize the most recent analysis of the burials by Barker (2004) and King (2010), who have re-conceptualized this burial mound as a cosmogram of the social order at Etowah. Together, they identified five different burial groups that they argue correspond to the idea of the square ground, a four-sided political-ceremonial structure seen later in historic Creek town organization in the same region.

At Etowah, according to this interpretation, important people from the dominant matriclans were buried along the sides of the mound in four groups, possibly following their ritual seating by rank in the square ground (King 2010). These burials along the periphery of the mound share a common status and association based on body treatment and artifacts, reflecting "redundant" kin groups (King 2010). Interestingly, men predominate in these burial groups.

In the fifth burial group, located at the lobed end of Etowah Mound C, women are found in greater numbers than men. This arguably reflects the importance of matrilineal descent in a society organized by matriclans. In one burial pit of five women, four were associated with the cardinal directions while a fifth woman and an altar were placed in the middle of the burial. King (2010) interprets this arrangement as consisting of the headwomen from each of the four redundant kin groups or matriclans, with the middle woman being of higher status, acting as an axis mundi of power.

According to this interpretation, the Mound C burials recreated in death the social organization of life. Further, King suggests that under the lobed end of the mound, supernaturals are cited by the burial of a young man and a female. He believes these to be referencing the myth of the Bird Man. In this interpretation, myth and the social organization were tied together through the symbolic axis mundi of the five female burials, which cited the four kin groups of the community and their power to access the myth of the Bird Man.

A less imaginative interpretation of Etowah's Mound C that addresses a few of the problems of King's and Barker's analyses is Brown's (2007) application of social house theory to this mortuary arrangement. There is no archaeological evidence that square grounds were used at Etowah or at other Mississippian sites. Additionally—and this points to a much larger misconception of the Mississippian era—clans were not strong corporate groups in the social organization of the Native Southeast. Instead, clans were merely social categories (Knight 1990:5). In this light, King's and Barker's identification of the basic social unit that lies behind this burial arrangement is unlikely. Brown (2007) instead agrees that the four groups of peripheral burials do reflect four different social groups, but that they were social houses rather than clans. The similar artifacts and body treatments in these burials do suggest four similar groups with no obvious status difference among them. To understand status differences, it is necessary to comprehend the fifth burial group under the mound's lobed end. There, the burial of five women, with one placed centrally with an altar, suggests there is ranking between and within the social houses. With a woman from each social house at the four corners of this burial group, the fifth woman would have come from a social house already represented among the four social houses. Her central location suggests greater importance, reflecting the internal ranking within the social house to which she belonged. The social house of this centrally-placed woman, then, was of greater importance compared to the other three houses. The young man and woman buried under the lobe of the mound may also be members of this dominant social house. The association of the temple mound and the burials suggests ancestor veneration. The possible axis mundi represented by the fifth woman could reflect the power and special access to the supernatural of the dominant social house, as a demonstration legitimizing and maintaining that power. Thus, according to Brown's reconstruction Etowah's Mound C, mortuary remains do appear to reflect a number of the social house processes discussed above.

## Secondary Burial among the Natchez

These concepts, reflected across cultures, can be projected into the archaeological past with visible correlates. In the North American Southeast, accounts of the secondary mortuary rites of the Natchez by Du Pratz and other French observers have been tied to observations at the Fatherland site near Natchez, Mississippi. While it remains questionable whether or not the Natchez Suns represented a social house as defined in Chapter 1, their mortuary rites featuring ancestor veneration suggests this as a possibility.

The Natchez represent an interesting case pertinent to understanding Mississippian mortuary ritual as, despite the fact that they belong to the Plaquemine culture with different roots than Mississippian, the Natchez are said to be the last Southeastern society manifesting traditional Mississippian-like socio-political hierarchy (Hudson 1976; White et al. 1971). The secondary burial ceremony of the Natchez emphasizes the inequality inherent in that society reflected in relations with the supernatural world. The Natchez were strongly hierarchical with a ruling lineage of Suns, whose power was near-absolute. At the death of a Sun, elaborate burial customs were followed. It was expected that certain individuals of the Sun's family and house would journey with them to the afterlife. This was the opportunity for other, non-nobles to raise their status in life and death by following their Sun to the afterlife. One of the most striking accounts of the mortuary rites of the Suns comes from the French Jesuit Gravier's account of the death of a female Sun, which commanded the immediate sacrifice of her husband, 12 infants, and 14 men during funerary dances and processions that culminated in the burial of the woman.

> When the march of this fine convoy was begun by two and two, the dead woman was brought out of her cabin on the shoulders of four savages as on a stretcher. As soon as she had been taken out, they set fire to the cabin. The fathers, who carried their dead children in their hands, marched in front, four paces distant from each other, and after marching 10 steps they let them fall to the ground. Those who bore the dead woman passed over and went around these children three times. The fathers then gathered them up and reassumed their places in the ranks… these children were in pieces when the fine convoy arrived [at the temple] [Swanton 1911:141].

The better known account of Tattooed Serpent's funeral shows less expenditure of life and resources, as the Natchez practiced restraint due to the political climate of the time (Swanton 1911). The Great Sun had wished to die with his brother Tattooed Serpent, but this would have resulted in many more deaths and the loss of an additional leader. At the urging of the Frenchman Le Page du Pratz, the Great Sun did not accompany his brother in death and only nine people were sacrificed, as well as a few older women whose number was not specified (Swanton 1911:145). These included wives and servants of Tattooed Serpent. Five to six of these people were sacrificed on a mound top where the temple was located, while only three were buried there (Brown 1990:9).

From these accounts, a mortuary program can be reconstructed for the Natchez Suns as follows. The initial burial ceremony of a Sun would include a procession to the temple mound, where some of the sacrifices and interments would occur. The body of the deceased Sun would be interred in a temple mound intended solely for the Suns, on which the temple was treated as an ancestor shrine to the Suns (Brown 1990:3). After a period of time, the body was exhumed and the bones placed in cedar boxes within the temple shrine. Du Pratz (1975) stresses the exclusive nature of these temple structures, which he refers to as "charnel houses."

Data from the Fatherland site (Neitzel 1965), the principal mound center of the colonial-era Natchez, can be understood in light of this historic account. There are three platform mounds designated Mounds A, B, and C at the Fatherland site. Of these, the temple mound was identified as Mound C based on its correlation with historic accounts and the excavation of mound-top structures there. Several versions of temples were constructed on the mound top, dating to different times of use. The last level of construction corresponds to the final occupation by the Natchez in the early eighteenth century. Only this level contained extended burials, which presumably had not yet been exhumed. This fact correlates with the Natchez's inability to complete the funerary process due to their impending war with the French. Thus the Suns from this terminal period remained interred in the mound, never reaching their final resting place in the temple. There were also empty pits from earlier versions of the temple at deeper levels in the mound, which have been interpreted as burial pits for previously exhumed Suns. In this mortuary program, the decomposition occurred in the ground, while later these bones were removed to the adjacent temple in which they were accessed exclusively by Suns.

The burial practices of the non-elites were not well recorded by the French. However, it was said that the deceased were placed on scaffolds and covered by wicker basketry, where the body decomposed, later to be cleaned for storage in baskets (Hudson 1976:334; Swanton 1911:143). The remains of the non-elite sacrificed during Tattooed Serpent's funeral were not buried in the temple mound but were taken to the temples of their home villages, according to Du Pratz (1975). It can be inferred that the bones of non-elites would have been curated by their relatives and kept as sacred ancestors in their own right, albeit not as powerful as the relics of their ruling Sun lineage.

This discussion of the Natchez demonstrates the form which secondary burial rites took in a Southeastern society with strongly hierarchical organization. It also highlights possible lines of evidence for social houses among the Natchez. Levi-Strauss (1982) argued that we can begin to understand social houses by looking at European history and its royal families and courts, which are well documented social houses. As a heuristic device, it is useful to draw parallels between the Great Sun as a king and his family and attendants as his royal court. In fact, White, et al. (1971) considered the Suns to be more like a royal family than a lineage. I argue that the Suns were a social house. The Great Sun and his male and female siblings received the same mortuary rites (Swanton 1911:143). The servants to the Suns were given special treatment. They were seen as so close to the Sun that upon the death of the Sun, the servants were required to accompany them and were sacrificed. The wives of these servants were also sacrificed. Further, their remains were kept next to their Sun in the temple (Swanton 1911:143). Such facts suggest that these people were part of the Sun's house—a social house. The Suns out-competed any other social house, probably through their ability to control ideological power through their ancestor shrines and powerful displays of dominance in their mortuary rites. The Suns, acting as a social house, incorporated affines and house servants in order to build a powerful ancestral house on their temple mound, which legitimized their power and influence through supernatural access to the ancestors.

Social Houses and Secondary Burial among the Choctaw

The Choctaw mortuary program is of special interest to this study because it provides the model on which I have reconstructed the Carson Mounds mortuary program, outlined in Chapter 2. In the introduction to this study, I laid out possible evidence for social houses among the Chickasaw and the Choctaw. Here I will argue that Choctaw local groups called *iksas* displayed characteristics of social houses, each of which belonged to one of two large moieties (Swanton 1993:79). These local groups each had their own leaders and separate charnel houses. The mortuary practices of the Choctaw exhibited social house processes, in their focus on collective secondary burial with a final burial ceremony focusing on ancestor veneration within the context of the local corporate group.

Based on the ethnohistoric record, Swanton (1931:179-189) inferred that the larger social unit that owned and controlled the bone houses and burial ceremonies of the Choctaw burial program were moieties. However, as already noted, southeastern clans were not strong corporate groups and it is questionable whether the aggregation of clans as moieties could muster sufficient corporate resources to support this type of extensive mortuary treatment and ancestor veneration. While it is unclear what *iksas* really were, they appear to have been partly hereditary corporate groups. Within a moiety, there were multiple *iksas*. Thus in contrast to Swanton (1931), I argue that it was the *iksas*, functioning as social houses, that in fact controlled the bone houses. In support, I point to the account of Adair (2005:192), who reported the presence of three bone houses in one village. If moieties owned bone houses, there could only be two.

The ethnohistoric accounts of the Choctaw provide some of the best detail regarding how secondary mortuary rites may have been practiced in the Mississippian world. According to sources summarized by Swanton (1931:170-189), corpses were placed on scaffolded structures near the home of the deceased person. Heights of the scaffolds varied, but they fell within the range of five to twelve feet high. The "houses" on top of the scaffold have been described as being made of wattle and daub like the homes of the living but in miniature form, or made of wicker and covered with animal hides or cloth (Cushman 1899:364-365). The dead were left in their scaffolded home to decompose during a period of supernatural pollution for the dead and their living relatives, until a bone-picker held a defleshing ceremony to end their state of pollution. In the interim, the living relatives would visit the scaffold to mourn the deceased and provide offerings of food and clothing to the dead.

At the discretion of a bone-picker, the defleshing ceremony would take place, where the corpse would be stripped of its remaining flesh and the bones gathered to be given as relics to the family. Accounts vary as to whether or not the bone-pickers would use tools to deflesh the corpse, but the most memorable account comes from Romans (1775:89-90), who elaborated on the bone-pickers' long fingernails of the thumb, index and middle finger, which were used to scrape the decomposing tissue from the bones. Possible tools used could have been cane knives, lithic tools, or even metal knives during the historic period. There was no set time given between death and the defleshing event, although there seems to have been a general belief that it had to do with seasonal variability related to the rate of decomposition and the ease of disarticulation of the body.

While the bone picker, who it should be noted could be either male or female, disarticulated the corpse, the family would be engaged in preparing a feast to be consumed at the end of the ritual. The bone picker would gather the bones from the decomposing flesh and place them in a bundle, or as Adair (2005) observed, a cane hamper. A second bundle of flesh would be left on top of the scaffold. The bones were given to the family to inspect, while the flesh and scaffold would later be burned. After handing the bones over to the family but before cleaning the decomposing flesh from their hands, the bone pickers would then serve the feast to the family and friends gathered at the ceremony (Swanton 1993:175). The family would in this way consume the last of the pollution and end their period of mourning.

The bones of the dead were then placed in a charnel house or bone house, to use a more accurate term. As noted above, according to my reading of the evidence, each social house or *iksa* had its own bone house to keep the dead at the edge of the village. These bone houses were raised above the ground upon stilts, and were open at both ends with markings on the arches corresponding to the families to which the bone house belonged (Swanton 1993:172). As far as European observers could gather, these bone houses were emptied when they were filled with the chests of bones. Upon being emptied, fresh paint would be applied to skulls of important individuals before being placed back in their chests, which also received fresh paint. According to Bartram, a tertiary burial would then occur by stacking the bone chests on the ground and then mounding them over with earth creating a burial mound (Swanton 1993:175). Knight (1980:124-125) highlights the interaction between members of the two moieties at this time. The opposite moiety would dance, while the other grieved as they buried their dead. The next day the roles would reverse, to show an end of ritual mourning for the one and the solidarity of the group as a whole mourning the loss of the other. This formal mourning incorporates the community as a whole, and is reminiscent of the Northwest Indian potlatch that brings the community together.

In this manner, Choctaw secondary burial ritual focuses on both the unity of the local group as a social house, and that of the broader community.

As Levi-Strauss found, the social house is better seen when they are in opposition to one another, in this case through possession of different bone houses and obligations to the dead. As a prolonged mortuary ritual, a focus of this program is ancestor veneration, where the descendants continued to pay respect through gifts and handling of the bones. Such links between social organization and mortuary ritual are at the core of this study.

# CHAPTER 5

# DENTAL ANTHROPOLOGY AND ANALYTICAL METHODS

Before the advent of ancient DNA testing, physical anthropologists had to be more creative in trying to assess ancient genetic relationships. The answer lay in the study of teeth. In North America, where Native American remains tend to be legally protected from destructive analysis, dental genetics are still largely used for this purpose. The theory is simple and elegant, because one's teeth look like the teeth of the people to which he or she are genetically related. In 1991, Turner and colleagues distilled the range of dental morphological traits down to those most useful and viable to genetic studies in their Arizona State University Dental Anthropology System. This system has been widely used, including in the current study, creating a standardized method of observation and recording of dental morphological features of the adult dentition. In this section, I will review the more pertinent foundational studies that established the use of the dentition in genetic studies, such as dental ontogeny, genetic expression, and transmission.

## Formation of the Dentition

Dental morphology and tooth size are results of the tooth development and enamel formation of the tooth crown, which come under the control of genetics (Hillson 1996; Scott and Turner 1997). Dental formation begins during the sixth week of embryonic development, from the ectoderm and mesoderm germ layers. Enamel originates from the epithelial cells of the ectoderm, while the dentine, pulp, cemetum, and periodontal fibers develop from the mesenchyme of the mesoderm. It is the interaction of these two layers that create the complex shape of the tooth.

Initial development of the tooth germ occurs during the bud stage, when the enamel bud develops. In the next stage, or the cap stage, the dental papilla forms from a hollow in the enamel organ bud. This papilla is surrounded by a pouch called the dental follicle, which will become the dentine. The enamel organ differentiates a layer that will become enamel. The enamel organ grows, the papilla becoming larger, and the folds form the shape of the tooth's crown. Cusps develop from small aggregates of cells that stop dividing, causing the epithelium to fold (Hillson 1996:119). Dental papilla cells differentiate into odontoblasts and secrete predentine matrix where cells have ceased division. The enamel is laid in layers, beginning in the deep folds of future cusps, where there are "tiny dome-like structures" (Hillson 1996:119). The cusps continue to widen and grow in height. Additional folds form ridges that will grow until the ridges and cusp meet. With the occlusal surface formed, the enamel of the tooth's sides form, overlapping with the adjacent sides until the entire crown is complete. Simultaneously with the enamel being laid down, predentine layers are deposited on the opposite side of the same hollow. This hollow will eventually become the pulp chamber of a completed tooth.

Dental timing is predictable and follows a set pattern. The first teeth to form during the intrauterine phase of development are the central deciduous incisors at 14 to 16 weeks. Between 16 and 18 weeks the lateral deciduous incisors form, then the deciduous canines a week later. At 15 weeks, the first deciduous molars form. The second deciduous molars begin to develop at 18 to 19 months. At 28-32 weeks, the first permanent molar begins to develop, but these are barely tips of cusps at the time of birth. These teeth will not be fully developed until after birth (Lunt and Law 1974). The upper and lower central incisors will be about 80 percent complete at birth, followed by the second incisors at 60 percent and the canines at 30 percent. The deciduous first molars have a complete occlusal surface at birth, but the second molar only has complete cusps joined by a ring of enamel.

After birth, the remainder of the permanent teeth begin to develop (Hillson 1996:134-5). Three to four months after birth, the central incisors form, followed shortly thereafter by the lower lateral incisors. The second upper incisor does not begin to develop until after the first year. The canines form at four to five months. The first and second premolars and the second molar will not begin to form until the end of the second year to the beginning of the third year. Crown completion will not occur until the third year for the first molar, the fourth or fifth year for the incisors, and the remainder of the teeth not until the age of twelve years. The third molar will form sometime between the seventh and thirteenth year; the crown will not be completed until between the ages of 17 and 20. It should be noted that girls develop earlier than boys, and some studies suggests that girls are a full year ahead of boys in dental development (Garn et al. 1958; Schour and Massler 1940).

## Genetic Control of Teeth

Now that the basics of dental development and timing have been reviewed, we may consider the genetics behind this development. The relationship between genotype and phenotype is not a direct one. Skeletal traits vary in a “quasi-continuous” manner (Gruneberg 1952). The regulatory, selector, and realizator genes are as much a deciding factor in the shape and function of a cell as the actual protein coding genes. There are an array of deranging factors, such as an environmental effect on the heritability of a trait via thresholds, or any slight disturbance in a morphogenetic field's development. Morphogenetic fields include all cells under the influence of the same regulatory genes.

Morphogenetic fields are easily seen in the dentition. As early as 1939, P.M. Butler developed, without today's advanced genetic knowledge, a field theory in respect to teeth. Looking at the teeth, it is apparent that each tooth has similar features to the teeth next to it, e.g., premolars are between canines and molars in their shape and function. Butler (1939:1) explained this phenomenon as the result of a "common morphogenetic cause acting on more than one tooth germ." In this view, different fields dictate the type of tooth, whether incisor, canine, or molar. Within these tooth type developmental fields, there are "anchor teeth," for example the first maxillary incisor, which constitute the full expression of the genotype, resulting in a highly distinct phenotype. The tooth adjacent to, and in the same tooth type field as the anchor tooth, typically forms later in development, making it further removed in the morphological field with less influence from it, resulting in a slightly less robust expression of the genotype. Lovejoy and his colleagues (2003:98) asserts that "small differences in the timing and spatial expression pattern of loci, as controlled by variants in their cis-regulatory architecture…can account for differences in morphology." The range of expression observed by specific features of the teeth can be explained by "thresholds," where there are multiple genes with additive effects that accumulate at specific levels and correspond with a specific level of the trait's expression (Gruneberg 1952, 1963). For example, agenesis of the third molar is a result of the threshold for tooth size of the third molar not being met and the tooth not fully developing (Gruneberg 1963). Even these thresholds are under the influence of morphogenetic fields, as the anchor tooth will always show a higher level of expression and each subsequent tooth a lower level of expression.

For example the Carabelli's cusp, whose range of expression is described by Dahlberg (1986), demonstrates the threshold model (Soafer 1969). If an individual possesses multiple genes that code for the expression of the Carabelli's cusp, the expression threshold will be met given proper environmental conditions, and the cusp will be expressed on the first maxillary molar. However, if only a few genes are present that code for expression, then a less robust cusp will result, such as a Y-shaped groove. A Carabelli's cusp cannot form on the second maxillary molar if none formed on the first. If a cusp was present on the first, the lower threshold trait could occur on the second maxillary molar as the threshold weakens with less expression, due to the lesser influence of the morphogenetic field on the second molar.

As mentioned in passing above, environmental factors can affect the manifestation of the genotype. Most genotypes set the precedent or the limit for the extent of the phenotype, commonly known as heritability. The nutritional circumstances and overall health of the individual's mother during gestation and of the individual during development directly correlate with the extent of heritability of a trait. If the genes are present for full expression of a trait, yet the environmental conditions are not conducive, then the trait associated with the lower threshold that is met will be expressed. Teeth also illustrate this concept of environmental interference with the pathology of hypoplasia. The thickness of the tooth enamel is set by the genotype, yet if there is an episode of illness or malnutrition during childhood, this episode reduces the enamel expression as there are inadequate resources available for the full development of enamel. Enamel hypoplasia is seen as grooves in the tooth where the enamel formation was halted until the episode was over (Hillson 1996:166).

## Inheritance of Dental Morphology

Now that the formation and genetic expression of the dentition have been discussed, the traits' heritability must be demonstrated. Heritability refers to the "correspondence between phenotypic values and breeding values" (Falconer 1960:165). The concept is used to understand the interaction of genetic and environmental components in phenotypic variation (Scott and Turner 1997:145). Heritability is population specific, relating to the environment that influences adaptation and the frequency of that trait in the population. Traits that have little variation and are difficult to change between generations are said to be of low heritability. If heritability is zero for a homozygous trait in a population, then any variation exhibited in that trait's phenotype will be a result of the environment. The development of the trait is still controlled by genes, but the variation arises from interference from the environment. According to Falconer (1960:167), trait heritability is related to that trait's impact on fitness. Traits that are related to fitness are highly conservative and have low heritability. They are too important to the survival of the organism to vary from the functional form. Traits that are not related to fitness have high heritability. There is more freedom for these traits to vary without impacting the survival of the organism (Scott and Turner 1997:156).

Because heritability is usually determined through breeding programs in laboratory settings, studies on humans must rely on twin and family studies (Scott and Turner 1997:147). Butler (1982) has demonstrated there is little variation seen in the formation of tooth crowns and roots, due to the necessity of a functioning set of dentition for survival. However, there is higher heritability in tooth size, and number of cusps and roots. Variation in these traits and their morphology are not as crucial to survival. I will discuss several studies that show the heritability and modes of transmission of two common traits used in dental morphology studies: shoveling and Carabelli's cusp.

Shoveling is a quasicontinuous dental trait that shows a range of expression. Its heritability is roughly 70 percent across several different populations of twins (Blanco and Chakrborty 1977; Hanihara et al. 1975; Scott and Turner 1997). Such a rate suggests that shoveling is free to vary, but that it varies in similar ways and at similar frequencies across populations. This reflects the quasicontinuous nature of the trait, and suggests its mode of transmission. Genes for this trait interact in a strongly additive manner with a strong correlation between expression and trait incidence. In this manner, the trait's expression is quantitative rather than qualitative.

The Carabelli's cusp has shown to have a lower heritability of 40 percent (Mizoguchi 1977; Scott and Potter 1984; Townsend et al 1992). This trait has a lower heritability than shoveling, due to the possible advantage it may give to fitness. An extra cusp could confer an advantage to individuals having a rough or chewy diet. The mode of transmission has been long established as dominant or codominant, with one major locus and smaller additive genes (Kraus 1951; Nichol 1990; Scott 1973). These smaller additive genes are potential additional thresholds that must be met after the initial threshold (Gruneberg 1963:267; Soafer 1969).

The traits used in the present study, as stated above, are those found to be under genetic control and which have minimal influence from the environment. Not to undermine the validity of their use, but to be clear about their potential variation, some researchers have proposed referring to these trait as "epigenetic" (Berry and Searle 1963). Some suggest that because of the potential distortion by environmental factors, these traits are less than reliable indicators of genetic relationships (Corruccini 1974; Ossenberg 1970). In biology, it is generally believed that genes represent the potential for a trait, but that environmental factors determine whether it meets the threshold for expression (Conner 1984). Despite this fact, researchers persist in the use of dental traits in genetic studies because there is a literature justifying its use (Scott and Turner 1988).

For example, while some dental traits are free to vary, they are not very plastic and, thus, not quick to change in an adaptive manner or be selected upon. This property makes dental traits good indicators of their genetic histories. For example, Scott and Alexandersen (1992) demonstrated that dental morphology did not change in an adaptive way over the course of the Norse colonization of Iceland and Greenland. These two areas represent different environmental clines, a moderate maritime climate and a subarctic climate. This environmental difference was reflected in changes to the craniofacial complex, but not in the dental morphology.

## Dental Morphological Data Collection

I will now turn to the dental morphological traits themselves and the procedure for collecting data, following that of the Arizona State University Dental Anthropology System, with specific comments on the samples used in this study.

Due to the preservation of the skeletal material from both Fusihatchee and Carson Mounds, it was most often not possible to view the complete dentitions in their alveolar bone. This was especially true of the maxillary teeth. The result was my inability to score the following traits: winging and labial convexity of the maxillary incisors and the torsomolar, rocker jaw, palatine torus, and mandibular torus. Caries, linear enamel hypoplasias, fracture and other pathologies of the teeth were recorded on visual dental inventory forms and described. Dental metrics were collected when possible according to Standards (Buikstra and Ubelaker 1994).

For the dental morphological traits recorded, I followed the written descriptions of the traits and their expressions for scoring as well as the corresponding dental plaques (Turner et al. 1991). A 10× hand magnifying glass was used during visual observation. Photographs were taken of unusual cases or expressions, and these were shown to various dental anthropologists to obtain their opinions. Worn and fractured teeth were scored when possible, and noted on the recording sheets by using parentheses. Data for the Fusihatchee site were collected during two separate weeklong sessions in the fall of 2011 at Auburn University. Data collection initially began on the Carson Mounds sample in the summer of 2010 and was completed in the winter of 2011-12. A sample of the data collected in 2010 was recollected in 2012 to serve as a comparative set, to determine if there was any intra-observer error; none was found. Dental metrics were not taken for the Fusihatchee collection; nor was pathology recorded unless it impacted the morphological trait. Most of the teeth from Fusihatchee were fractured and poorly preserved. Missing data were left blank on the recording sheet. If a peg tooth was present it was noted. Congenital absence was only noted if the age of the individual could be estimated as above 25 years and if the alveolar bone was complete. In many cases, the alveolar bone was not complete, so this trait must be considered inconsistent.

The skeletal material from Fusihatchee was not as well preserved as the Carson Mounds material. The roots were often missing, and the teeth were often in fragments which had to be held together while the morphology was observed. This limitation resulted in only 205 dental traits used. The traits that scored for upper or lower dentition enamel pearls, congenital absence of teeth, peg teeth, and presence of odontomes on premolars, were removed from the dataset due to missing data. These traits require the very best preservation to be recorded consistently, as in complete dentitions with minimal dental wear. These conditions were not present in either sample.

## Quantitative Analysis

There is no common standard for statistically treating dental morphological data. Current studies use different methods to test their hypotheses, such as model-bound methods, use of transformed data, and use of a variety of statistical tests (Atsushi et al 2010; Godde 2009; Harris and Sjovold 2004; Irish 2010; Manabe et al. 2012; Pilloud 2009; Sutter and Verano 2007; Ullinger et al. 2005). I have opted to follow methods set out by Howell and Kintigh (1996), which calculates a single measure of biodistance between every pair of individuals and employs a multivariate procedure to analyze these measures. I will highlight the statistical process here, and will provide a step-by-step guide in Appendix I for future students to replicate and improve upon.

Dental morphological data from the recording sheets were first entered into an Excel spreadsheet. Each box on the recording form corresponding to a dental morphological trait for a tooth became a row. Individual phenotypes were entered as columns. For Carson Mounds, I collected a maximum of 237 morphological dental traits for each individual. The data were then re-arranged according to the level of measurement of each trait. Most of the dental traits, 197 of 237, were scored as ordinal variables on a ranked scale. Ten of the dental traits consisted of asymmetrical binary variables; these were traits scored as present/absent, in which absent/absent matches were not as significant as a present/present match. The remaining ten dental traits were scored as nominal variables, as they coded for specific cusp organizational patterns.

I calculated the amount of missing data for each individual. Individuals with over 90 percent missing data were removed from the dataset. This step meant removing 29 of the original

144 individuals from Carson Mounds who had dentitions adequate to score, leaving 115 individuals.

The data were then exported into the statistical package R. Using R command syntax (see Appendix I), the data first had to be specified as factors, and then the ordinal data had to be further specified as "ordered." Following R protocols, the levels of measurement of the remaining data were specified directly in the command used to calculate Gower's distances (R Core Team 2014).

The Gower's coefficient, used here as a dissimilarity or distance measure, varies between 0 (perfectly similar) and 1 (perfectly dissimilar). The Gower's coefficient was originally defined as a proximity measure and is discussed that way in the literature (Drennan 2010). In this study, I am using its inverse as a dissimilarity measure to indicate biodistance. The Daisy routine in R allows for this. With this measure, all distances for all valid comparisons are composited to yield a single dissimilarity measure for each pair of individuals in the data set (Struyf et al. 2014). The Gower's measure was used for several reasons (Drennan 2010:280; Howell and Kintigh 1996:547). First, Gower's can accommodate data that incorporate different levels of measurement: nominal, ordinal, and binary. For nominal variables the Gower score is 0 if the two cases belong to the same category and 1 if they belong to different categories. Binary variables are compared and scored as 0 for present-present or 1 for present-absent mismatches. In the case of this analysis, absent-absent matches were omitted as irrelevant. Ordinal variables are treated by finding the absolute value of the difference between two ordinal values and then dividing by the number of possible ranks for that order (Drennan 2010:280). Finally, scores on all variables are mathematically combined to provide, in the present case, a unified measure of biodistance. Importantly, Gower's was specifically devised to handle missing data, which is a major problem with osteological data. The matrix of Gower distances can be further manipulated to reveal relationships such as strength of biological relatedness for various subsets of the data.

The function in R to create a dissimilarity matrix of Gower's coefficients is called Daisy. This function will produce NAs (not applicable) when there are no valid trait comparisons for a given pair of individuals. In the present case, the Gower's distance matrix did not contain any NAs for either of my samples.

With the Gower's distance matrix computed, I clustered the Gower distances using AGNES, a hierarchical agglomerative clustering procedure, chosen because the Gower distances represent a non-Euclidean measure (R Core Team 2014). Hierarchical agglomerative clustering has classical use in biological applications to create taxonomies. It begins with *n* clusters, and then one-by-one joins two cases with the smallest distance between them, creating subsequent clusters based on the unweighted pair-group average method, where the clusters are formed based on the average of dissimilarities between one cluster's cases compared to the other cluster's cases. This grouping procedure is continued until there is only one, all-encompassing cluster (Kaufman and Rousseeuw 2005:44). Plotting the output from AGNES produces a dendrogram. I considered the agglomeration heights to determine large "jumps" which would suggested that the clusters formed at that height represent a valid number of clusters.

Each individual then received a cluster designation, which I compared to the individuals buried in the same burial pits in the case of Carson Mounds or, in the case of Fusihatchee, the same house floors. Clusters can be thought of as groups of individuals having similar phenotypes, or a shared phenotype with slight variation.

A homogeneity score was next calculated for each burial feature; house floors in the case of Fusihatchee and burial pits in the case of Carson Mounds. As a homogeneity score I used

Simpson's C, which measures the concentration of the different clusters within each group. Pielou (1975:8-9) defines this measure as the sum of squares of proportions of species in a community. The higher the measure, the more homogeneous the community, with a few species having high proportions. In dental genetic terms, the more homogenous a burial feature is reflects the domination of one cluster or one phenotypic set, i.e., more genetically related individuals.

My analysis diverges here from the Howell and Kintigh (1996) study. In order to compare biodistances within and between burial pits at Carson Mounds, I employed the Gower's distances directly. I computed the mean biodistance between all individuals buried within the same burial pit. A t-test was used to compare these mean Gower's distances to all other Gower's distances between individuals from the cemetery. Burials that had significantly lower Gower distances than the mean biodistance for the cemetery were considered more genetically homogeneous. These measures will be discussed further in the following chapter.

# CHAPTER 6

# ANALYSIS OF THE CARSON MOUNDS DATA

The result of my application to my raw dataset of the Daisy command in the statistical software package R was a large triangular matrix of Gower's distance coefficients (See supplementary Excel files: Carson Mounds Gower Triangular Matrix). The dataset included 115 individuals from 24 burial pits at Carson Mounds. The Gower's coefficients represent an indirect measure of genetic distance on a scale ranging from 0 (complete genetic similarity) to 1 (greatest genetic distance possible) between each pair of individuals across 237 dental traits. Gower's distances are non-Euclidean, such that a distance of 0.2 is not necessarily half as related genetically as a distance of 0.4. The mean Gower's coefficient for the entire set is 0.275.

## Cluster Analysis Results

My original expectation regarding the Carson Mounds dataset was that clear clusters of genetically related individuals would emerge, that would directly correlate to the distribution of individuals in burial pits. This was not the case. Instead, a hierarchical agglomerative cluster analysis of the Gower's distances, performed using the AGNES procedure in R, arguably possesses only two clusters, together with four small groups of outliers with three or fewer individuals (Figure 9). The agglomeration heights in the dendrogram are relatively small and uniform, without large breaks or jumps, suggesting no great variability in the genetic distances. In other words, analysis of the dental morphology at Carson Mounds suggests a genetically homogenous population that has been stable over many generations.

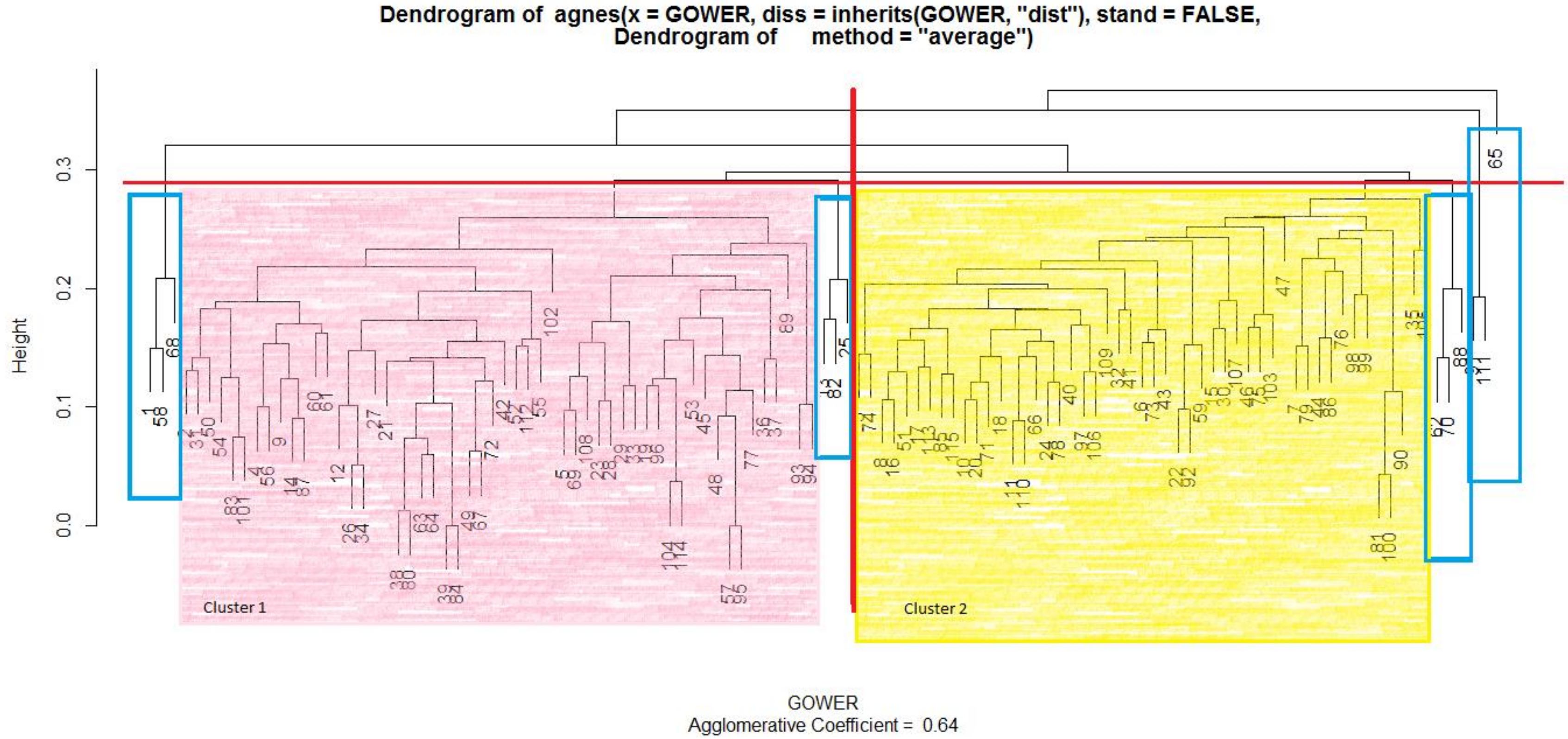


Figure 9. Dendrogram of hierarchical agglomerative cluster analysis of Carson Mounds Gower's distances, showing a two-cluster solution. The Horizontal red line indicates the agglomerative height which saw the greatest jump between values. The vertical red line separates the two clusters. Blue boxes indicate outliers.

Surprisingly, each burial with more than one individual contained individuals from both clusters (Table 2). This occurred even in the small burials containing only two or three individuals. This is excellent evidence that genetically distantly related individuals were included in burial pits together. For example, a husband and wife or two brothers-in-law could be buried together.

Table 2. Distribution of clusters across burials at Carson Mounds.

| Burial | Cluster 1 | Cluster 2 | Outliers | Totals |
|---|---|---|---|---|
| **2** | 3 | 2 | 1 | 6 |
| **4** | 6 | 10 | 2 | 18 |
| **13** | 5 | 2 | 0 | 7 |
| **15** | 5 | 1 | 0 | 6 |
| **17** | 8 | 7 | 0 | 15 |
| **18** | 1 | 0 | 0 | 1 |
| **32** | 5 | 1 | 2 | 8 |
| **33** | 1 | 0 | 1 | 2 |
| **34** | 1 | 1 | 0 | 2 |
| **35** | 2 | 2 | 2 | 6 |
| **39** | 0 | 1 | 0 | 1 |
| **42** | 0 | 2 | 0 | 2 |
| **47** | 5 | 6 | 1 | 12 |
| **49** | 1 | 0 | 0 | 1 |
| **52** | 1 | 0 | 1 | 2 |
| **53** | 2 | 2 | 1 | 5 |
| **54** | 1 | 0 | 0 | 1 |
| **56** | 1 | 0 | 0 | 1 |
| **57** | 0 | 1 | 0 | 1 |
| **58** | 0 | 1 | 0 | 1 |
| **59** | 2 | 2 | 0 | 4 |
| **62** | 0 | 1 | 0 | 1 |
| **63** | 1 | 0 | 0 | 1 |
| **65** | 3 | 7 | 1 | 11 |
| **Total** | 54 | 49 | 12 | 115 |

Clusters were spread relatively evenly across the cemetery, and dividing the Enclosure into eastern and western halves according to a putative "central avenue" (see Chapter 2) does not produce burial subgroups that are significantly associated with cluster assignments ($\chi^2$=0.711, df=1, $p$=.711). From the hierarchical agglomerative cluster analysis, I conclude that individuals at Carson Mounds are, in general, genetically homogenous, lacking quantitatively definable subgroups that are associated with burial groupings. Given this result, I did not pursue Howell and Kintigh's (1996) procedure of calculating Simpson's C in order to further determine the concentration of clusters within burials.

## Results and Conclusions from Gower's Distances

To explore the matter in greater detail, I departed from the methodology used in Howell and Kintigh's (1996) study, and examined the Gower's distances directly to explore any subtleties lost in the general clustering solution. Table 3 summarizes the burial characteristics and Gower's values from the Carson Mounds data.

I revisited my former hypothesis to determine if there was any correlation between genetic distance and location of the burial pit within the cemetery. I divided the burials into two groups, West and East, based on the burial location using the "central avenue" proposed earlier (see Chapter 2). To determine if burials from the same side were more closely related to one another, I considered a single tailed t-test assuming unequal variance. I computed the mean Gower's distance for all Gower's distances between individuals from the West (0.267) and from the East (0.282). The mean of all Gower's distances from comparisons of individuals within either the West or the East is 0.279. The mean Gower's distance between all individuals from different sides is 0.271. Thus the t-test is unnecessary, as the mean Gower's distance of burials from the same side is not smaller than the comparison group; the value is in fact larger.

Table 3. Selected summary characteristics of Carson Mounds burials.

| Burial | *n* | Cemetery side | *n* Juveniles | % Juveniles | Mean Gower's distance |
|---|---|---|---|---|---|
| B2 | 6 | West | 1 | 0.17 | 0.296 |
| B4 | 19 | West | 3 | 0.16 | 0.231 |
| B13 | 7 | West | 2 | 0.29 | 0.315 |
| B15 | 5 | West | 4 | 0.80 | 0.331 |
| B17 | 16 | East | 5 | 0.31 | 0.253 |
| B32 | 8 | East | 1 | 0.13 | 0.258 |
| B34 | 2 | East | 0 | 0.00 | 0.287 |
| B35 | 6 | East | 2 | 0.33 | 0.345 |
| B47 | 11 | East | 3 | 0.27 | 0.248 |
| B51 | 2 | East | 0 | 0.00 | 0.594 |
| B53 | 5 | East | 2 | 0.40 | 0.305 |
| B59 | 4 | East | 1 | 0.20 | 0.253 |
| B65 | 10 | East | 3 | 0.30 | 0.291 |
| Total west | 37 | | 10 | 0.27 | 0.248 |
| Total east | 56 | | 21 | 0.38 | 0.267 |

As previously seen in the cluster analysis, this result confirms that the location of the burial pit does not predict genetic similarity according to the Gower's distances.

I will now address my hypothesis regarding the genetic distances of individuals within burial pits. I hypothesized that in general, individuals within a burial pit should be more closely related genetically (smaller mean Gower's distances) than to individuals from different burial pits. These Gower's means are indeed smaller within burial pits (0.259) than between pits (0.277). Using a one-tailed t-test assuming unequal variances to judge if the mean Gower's coefficient for individuals buried within the same burial pit is significantly smaller than that for individuals from different burials, this difference is indeed significant with an associated p-value of .0000165. Thus in general, conforming to expectations, individuals who were buried together in the same pit are more closely related genetically than to individuals from other burials, despite the fact, already stated, that each burial with more than one individual contains representatives of both biodistance clusters generated by the cluster analysis.

From Table 3, it is apparent that the mean Gower's distances within larger burials are consistently lower than the mean for whole matrix, which is 0.275. Because the smaller burials do not follow such a pattern, I examined how burial size impacts the mean Gower's distances for the burials. The burial pits analyzed ranged in size from 2 to 19 individuals. A scatterplot showing the relationship of mean Gower's biodistances to burial size in number of individuals (Figure 10) shows a moderate negative correlation, in which it is clear that the smaller burials having fewer than five individuals yield more erratic Gower's distance scores than the larger burials. Therefore, I draw my conclusions from these larger burial pits as their larger sample sizes best illustrate the general trend of smaller biodistance scores—thus more genetically related individuals—within pits than between pits. It is these larger burials that are responsible for the overall trend of having more genetically related individuals within a burial pit than between burial pits.

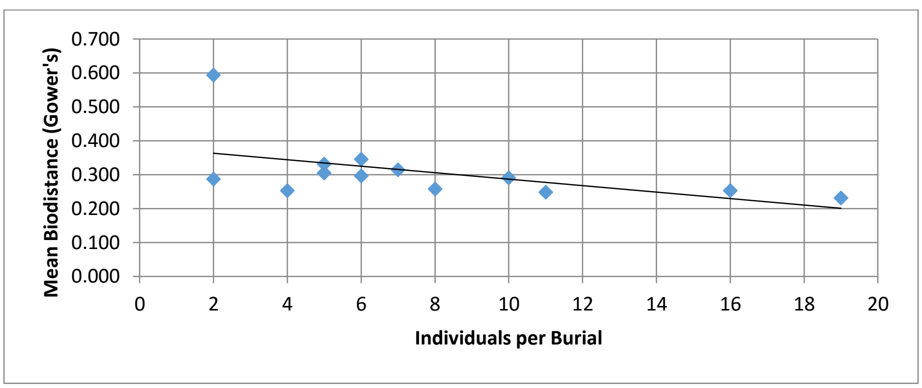


Figure 10. Relationship between mean biodistance and number of individuals per burial. Pearson's R = -0.527, a moderate negative correlation. Smaller burials of fewer than 5 individuals have more erratic biodistance scores.

The burials from Carson Mounds do contain juveniles (Table 3). This is important because the presence of juveniles in a burial pit could create more genetic homogeneity, even possibly showing relatedness to all people in the burial pit who themselves are not closely related. For example, wives and husbands will be genetically distant but their children will be related to both of them. Burial pits without juveniles thus could be missing this extra boost in relatedness. To examine this potential effect, a scatterplot showing the relationship of mean Gower's biodistances to the number of juveniles present in a burial (Figure 11), shows a negligible correlation. Thus the contribution of juveniles has no demonstrable effect on the mean genetic distance for a burial.

To better visualize the contributions of genetically closely related versus distantly related individuals buried in the same pit, I examined the distribution of genetic distances in the larger burials (Burial 4 with 19 individuals; Burial 17 with 16; and Burial 47 with 11) using a series of histograms (Figures 12, 13, and 14). Each distribution shows a normal-looking peak with a tail skewed to the right. Thus in each case, there are a few larger, outlying biodistances that diverge from a core group of genetically related individuals.

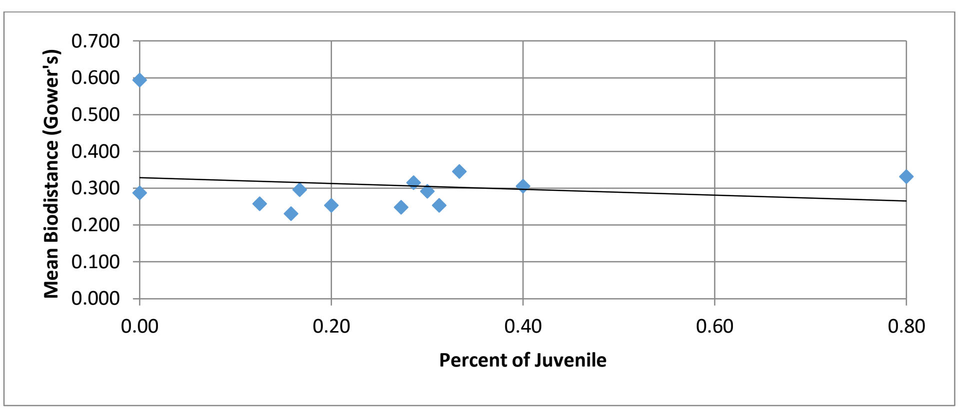


Figure 11. Relationship between mean biodistance and percent of juveniles within burials.

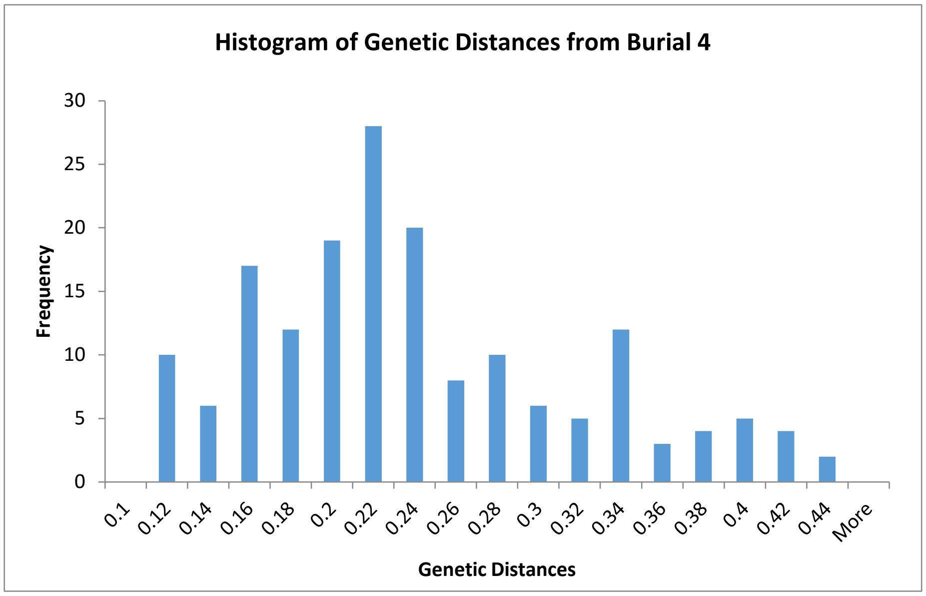

Figure 12. Histogram of genetic distances from Burial 4

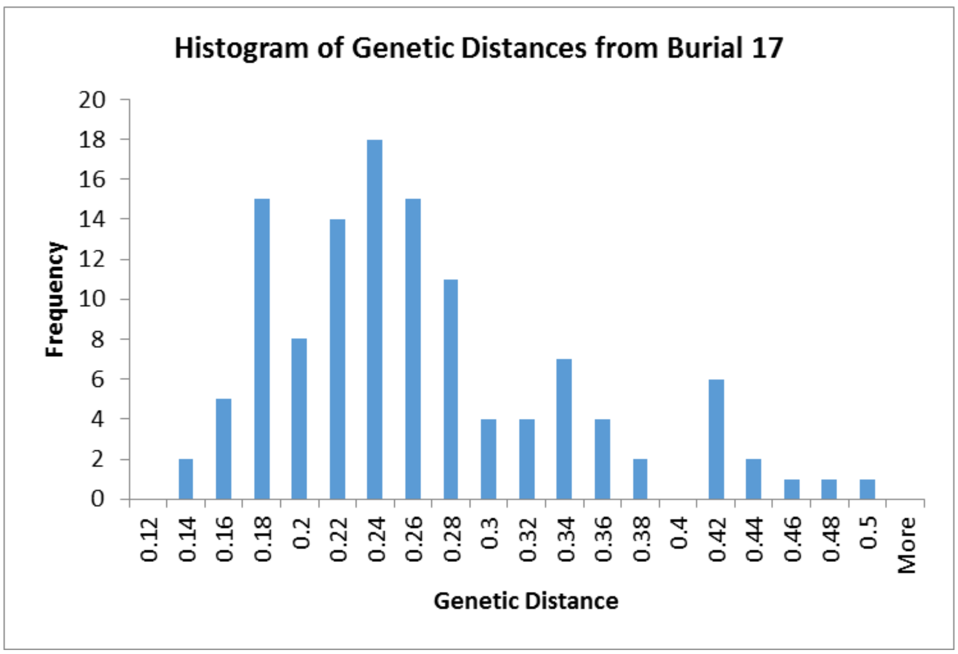


Figure 13. Histogram of genetic distances from Burial 17

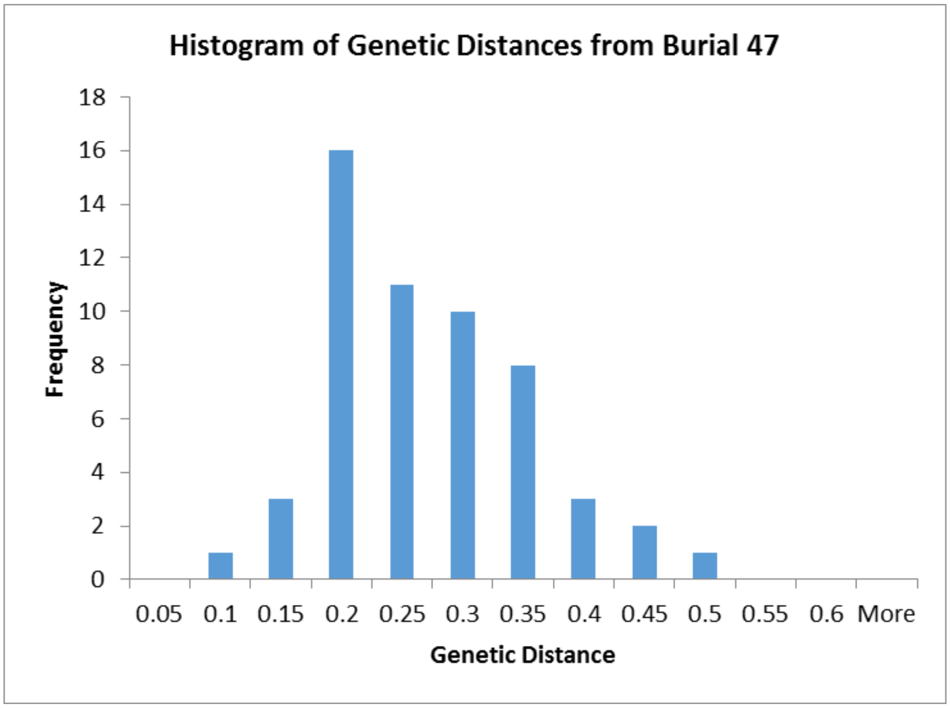


Figure 14. Histogram of genetic distances from Burial 47

As with the consistent representation of both biodistance clusters in every burial with more than one individual, cited earlier, this phenomenon can be interpreted as the inclusion of non-biological kin in a burial pit. These are potentially affines, adopted kin, servants, or slaves. However, one must remember that in general, as shown by the cluster analysis, this is genetically homogenous population, so although they might be non-biological kin in the context the social group sponsoring the burial, they may still show close biological relationships within the larger community. Therefore, it seems clear that biological kinship or consanguinity was only one criterion for inclusion in a burial pit, as genetically distant individuals are consistently found within these burials.  I propose that this systematic inclusion of biological others is evidence of a social house form of organization governing burial at Carson Mounds.

# CHAPTER 7

# COMPARISON GROUP: ANALYSIS OF THE FUSIHATCHEE DATASET

Originally, I had hoped to use the results of the historic Fusihatchee dental analysis to stand as an uncomplicated example of matrilineal, matrilocal kin organization, for comparison to the Carson Mounds dataset. I will briefly review Creek social organization, mortuary practices, and archaeological investigations of Fusihatchee to provide a background for the quantitative results.

## Summary of Creek Social Organization

Historic documents describe the Creek as a matrilineal, matrilocal society like many other Southeastern North American Indian groups (Swanton 1928:391). In Creek society Household estates were controlled by *hutis*, which were extended kin groups allied to the matriclan system—corporate groups of related women, their spouses, children, and any member of that matriclan (Swanton 1928:170-1). Households that made up these *hutis* were comprised of conjugal families. However, the reality of their household composition was more complicated and varied, especially given the disruptive forces of European colonialism. In general, the core of the house may have been genetically related women and their offspring, but other members would also have lived and died within the house on the *huti* estate, such as husbands, adopted children, displaced distant relatives, and slaves, among others (Spoehr 1947: 201).

## Summary of Creek Mortuary Practices

According to documentary sources (Swanton 1928:391), the mortuary practices of the Creeks dictated that individuals were buried under the beds in their own house floor, and this has been confirmed archaeologically. Thus the burial group created within a given house floor could potentially contain, at its core, genetically related females and their offspring with additional household members who may or may not be genetically related (Spoehr 1947: 201). It is not clear from the documentary record if husbands were returned to their natal home for burial, or instead were buried in the houses they shared with their wives and children (Spoehr 1947; Swanton 1928). These facts suggest that the archaeologically defined Creek house group burials would have a degree of genetic homogeneity greater than that expected for Carson Mounds burial pits, where more genetic heterogeneity is expected due to social house principles.

## Archaeological Overview of Fusihatchee

The historic Creek site of Fusihatchee was chosen because of its relatively large and available skeletal sample housed at Auburn University. Fusihatchee is a large, multi-component Creek town site that was occupied during the Protohistoric and subsequent Colonial eras, ca. AD 1650-1814. The site underwent extensive excavation by principal investigators Craig Sheldon and John Cottier during the eleven year period from 1994 to 2005, in the process of which 124 burials were recovered from 34 out of the 42 houses, which are currently housed at Auburn University (Sheldon 2010:144-147). Many of the historic burials were recovered beneath summer house floors, where architectural preservation in the best cases left evidence not only of house walls but even the posts of beds (Sheldon, personal communication 2011, Waselkov 1990:

39-40). Individuals could be assigned to the house where they most likely lived and were subsequently buried (Figure 15).

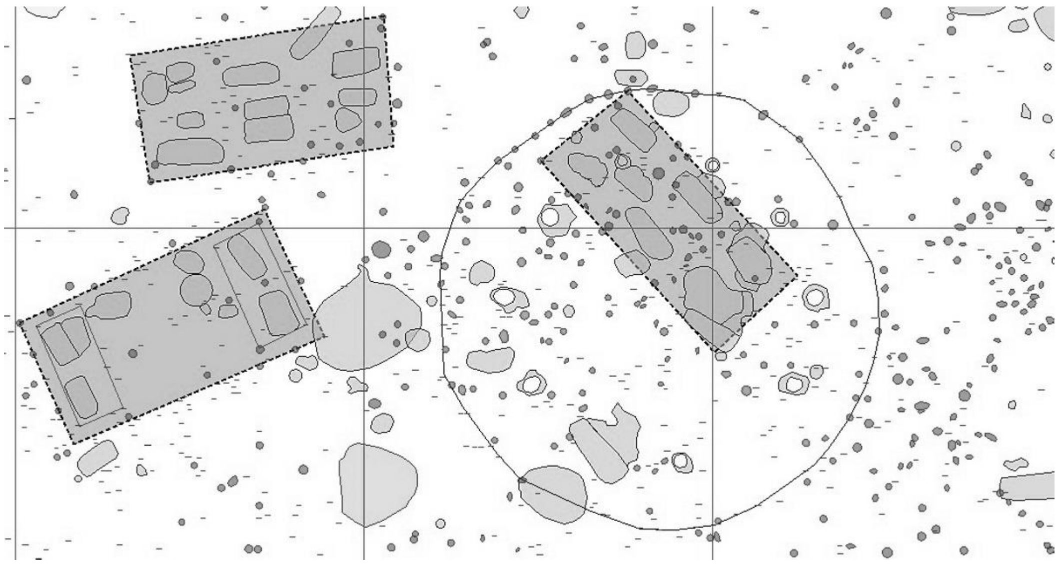

Figure 15. Map of a small portion of Fusihatchee's central area showing three rectangular summer houses with wall lines, bed location, and sub-floor burial pits, plus one earlier circular winter house. Provided by Kevin Taylor with permission.

## Review of Methodology and Quantitative Analysis

In general, my methodology for the Fusihatchee collection was comparable to that used for the Carson Mounds material. I sampled the skeletal population, examining only individuals who belonged to the Protohistoric or Colonial period that could be assigned to a summer house structure with a minimum of two interred individuals. The sample includes 22 houses with sub-floor burials ranging from two to eleven individuals for a total of 84 individuals, 16 being juveniles. The poor preservation of the Fusihatchee skeletal material did not allow for sexing of most of the individuals in my sample. I was able to identify 14 females and four males only, relying on long bone metrics, os coxae morphology, and skull robusticity. Additionally, the preservation of the dentitions reduced the quantity of dental morphological traits that could be scored to only 205, compared to the Carson Mounds dataset for which 237 dental traits were scored.

As before, the Gower's distance matrix produced by applying the Daisy procedure in the statistical software package R is a triangular dissimilarity matrix (See supplementary Excel files: Fusihatchee Gower Triangular Matrix). The Gower's values represent genetic distance on a scale from 0 (complete similarity) to 1 (complete dissimilarity) between each pair of individuals measured across the 205 dental trait variables.

## Cluster Analysis and Group Homogeneity

Using the hierarchical agglomerative procedure AGNES in R, I created a cluster dendrogram. The optimal clustering solution in this case yielded five clusters with three small groups of outliers (Figure 16). The procedure to determine the number of clusters was the same as for the Carson Mounds analysis. I viewed the agglomeration heights from the dendrogram and based the number of clusters on the most prominent break or jump in agglomeration heights.

The cluster analysis for Fusihatchee reveals a genetically rather heterogeneous population. Recall that for Carson Mounds, there were optimally only two clusters demonstrating a relatively homogenous population, which is why I departed from the method used by Howell and Kintigh (1996) for subsequently analyzing the genetic homogeneity of burial groups. In contrast, for Fusihatchee, following the procedure of Howell and Kintigh (1996: 546), I used Simpson's Index as a measurement of the genetic homogeneity of burials within each summer house based on the cluster assignments of the included individuals. The formula I used for Simpson's *C* is as follows (Pileuo 1975:8-9).

$$C = \frac{\sum_{i=1}^{R} n_i\,(n_i\ - 1)}{N(N-1)}$$

The homogeneity scores of house burial groups using Simpson's Index reveals inconsistency in their genetic homogeneity (Table 4). Overall, the homogeneity for the site is 0.277, a value that does not reflect a homogenous population. The scores for the separate house burial groups range from 0 (no individuals from the same cluster), to 1 (all individuals from the same cluster). The number of individuals is small for most houses, but examining just the large houses (House AB with 5 individuals; House AC with 10; House BV with 7; and House P with 5), there still is a range of Simpson's *C* values from 0.100 to 0.400 (Table 5). In general, the genetic makeup of a

Table 4. Distribution of clusters across house burial groups at Fusihatchee

| **House Group Burial** | **Cluster 1** | **Cluster 2** | **Cluster 3** | **Cluster 4** | **Cluster 5** | **Outliers** | **Totals** |
|---|---|---|---|---|---|---|---|
| **AB** | 2 | 0 | 0 | 2 | 0 | 1 | **5** |
| **AC** | 2 | 2 | 2 | 1 | 2 | 1 | **10** |
| **AH** | 1 | 0 | 1 | 0 | 0 | 0 | **2** |
| **BD** | 1 | 0 | 0 | 0 | 2 | 0 | **3** |
| **AY** | 0 | 1 | 1 | 0 | 0 | 0 | **2** |
| **BF** | 1 | 0 | 1 | 1 | 0 | 0 | **3** |
| **BG** | 1 | 0 | 0 | 2 | 0 | 0 | **3** |
| **BK** | 1 | 0 | 0 | 1 | 0 | 1 | **3** |
| **BV** | 4 | 0 | 0 | 1 | 1 | 1 | **7** |
| **CA** | 2 | 2 | 0 | 0 | 0 | 0 | **4** |
| **C** | 1 | 1 | 1 | 0 | 0 | 0 | **3** |
| **P** | 3 | 0 | 1 | 1 | 0 | 0 | **5** |
| **K** | 0 | 0 | 0 | 1 | 1 | 1 | **3** |
| **BU** | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| **BS** | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| **BT** | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| **AM** | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| **Y** | 0 | 0 | 0 | 0 | 1 | 1 | **2** |
| **Totals** | **26** | **6** | **7** | **10** | **7** | **7** | **63** |

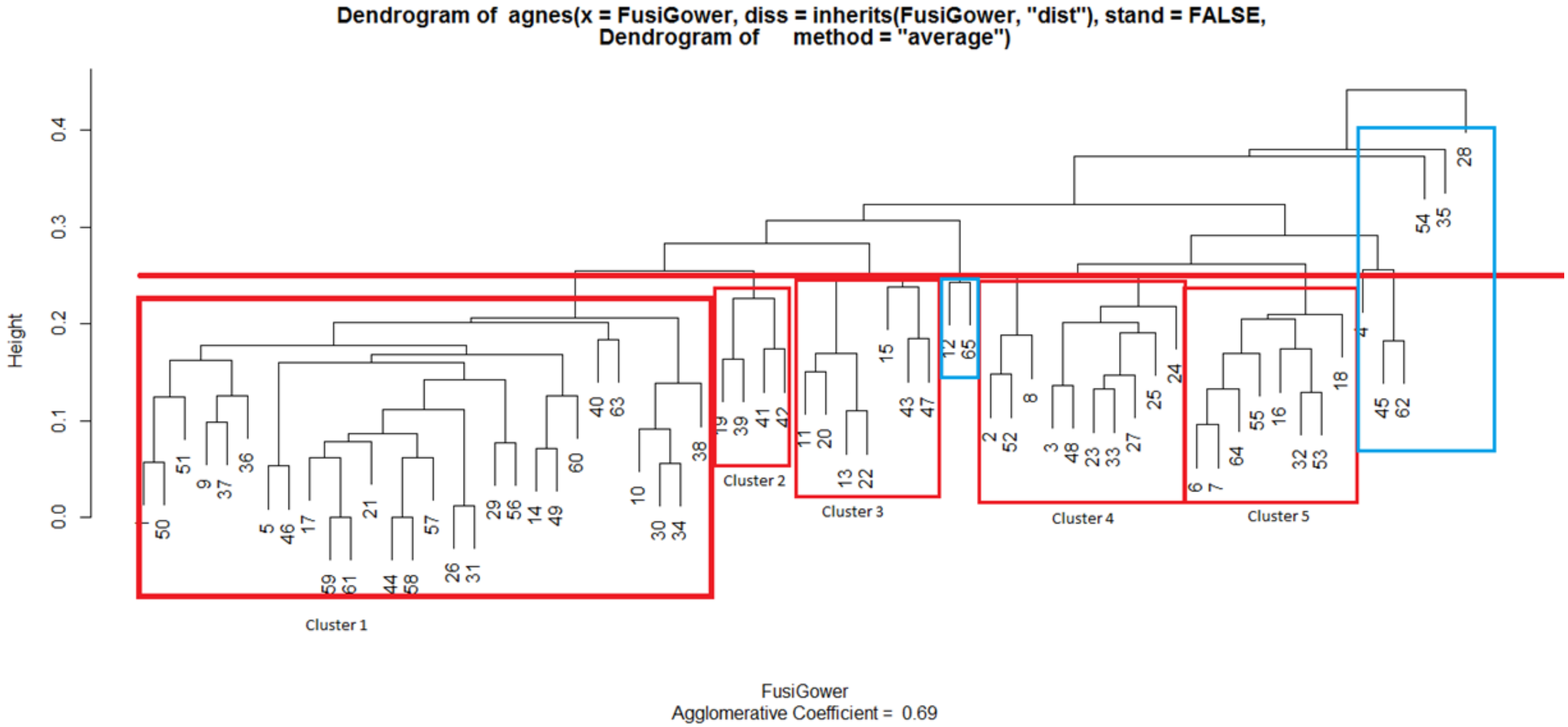


Figure 16. Dendrogram of a hierarchical agglomerative cluster analysis for Fusihatchee house burial groups, generated by the AGNES procedure in R. The horizontal red line indicates the agglomerative height which sees the greatest jump between values. Blue boxes indicate outliers.

Table 5. Homogeneity scores as Simpson's C of clusters in house burial groups.

| House Group Burial | Simpson's C |
|---|---|
| **AB** | 0.333 |
| **AC** | 0.111 |
| **AH** | 0 |
| **BD** | 0.333 |
| **AY** | 0 |
| **BF** | 0 |
| **BG** | 0.333 |
| **BK** | 0 |
| **BV** | 0.4 |
| **CA** | 0.333 |
| **C** | 0 |
| **P** | 0.3 |
| **K** | 0 |
| **BU** | 1 |
| **BS** | 0 |
| **BT** | 1 |
| **AM** | 1 |
| **Y** | 1 |
| **Totals** | **0.277** |

given house burial group is heterogeneous. The rule appears to be the inclusion of genetically distantly related individuals buried within the house floors, in particular husbands, together with their wives.

## Analysis of Gower's Distances

As I did for Carson Mounds, I directly examined the Gower's distances for the Fusihatchee dataset to examine any subtleties lost in the general clustering solution. Table 6

Table 6. Mean Gower's distances of Fusihatchee house floor burials.

| House Floor Burial | n | Mean Gower Distance |
|---|---|---|
| AB | 5 | 0.296 |
| AC | 10 | 0.303 |
| AH | 2 | 0.412 |
| BD | 3 | 0.219 |
| AY | 2 | 0.315 |
| BF | 3 | 0.417 |
| BG | 3 | 0.367 |
| BK | 3 | 0.303 |
| BV | 7 | 0.243 |
| CA | 4 | 0.230 |
| C | 3 | 0.332 |
| P | 5 | 0.266 |
| K | 3 | 0.388 |
| BU | 2 | 0.123 |
| BS | 2 | 0.057 |
| BT | 2 | 0.199 |
| AM | 2 | 0.443 |
| Y | 2 | 0.263 |

summarizes the burial characteristics and Gower's distance values for the Fusihatchee data. The mean Gower's coefficient for the entire dataset is 0.285.

I had expected there to be more genetic homogeneity within historic Creek house floor burials reflecting a historically documented matrilineal, matrilocal family unit. That homogeneity would appear as significantly smaller mean Gower's distance for all burials buried within house floors compared to the mean Gower's distance comparing individuals not buried within the same house group. In fact, the mean Gower's distance between individuals buried within the same house floor is 0.281. The corresponding mean Gower's distance between individuals buried in different house floors is 0.286. While the Gower's for the burials within the same house is somewhat smaller, a one-tailed t-test shows that this difference in means is not significantly lower (p=0.304). Thus surprisingly, in general, at Fusihatchee I cannot demonstrate that individuals buried together in summer house floors are genetically more closely related to one another than they are to the people buried in other house floors.

From Table 6, it is apparent that there is no clear pattern in the mean Gower's distances for the smaller house burial groups. The house burial groups analyzed ranged in size from 2 to 10 individuals. A scatterplot showing the relationship of mean Gower's biodistances to burial group size in number of individuals (Figure 17) shows no positive or negative correlation (Pearson's R= 0.014). Moreover, as with Carson Mounds, the smaller house burial groups with fewer than five individuals have erratic mean Gower's coefficients, showing again that sample size has a considerable effect on these mean scores.

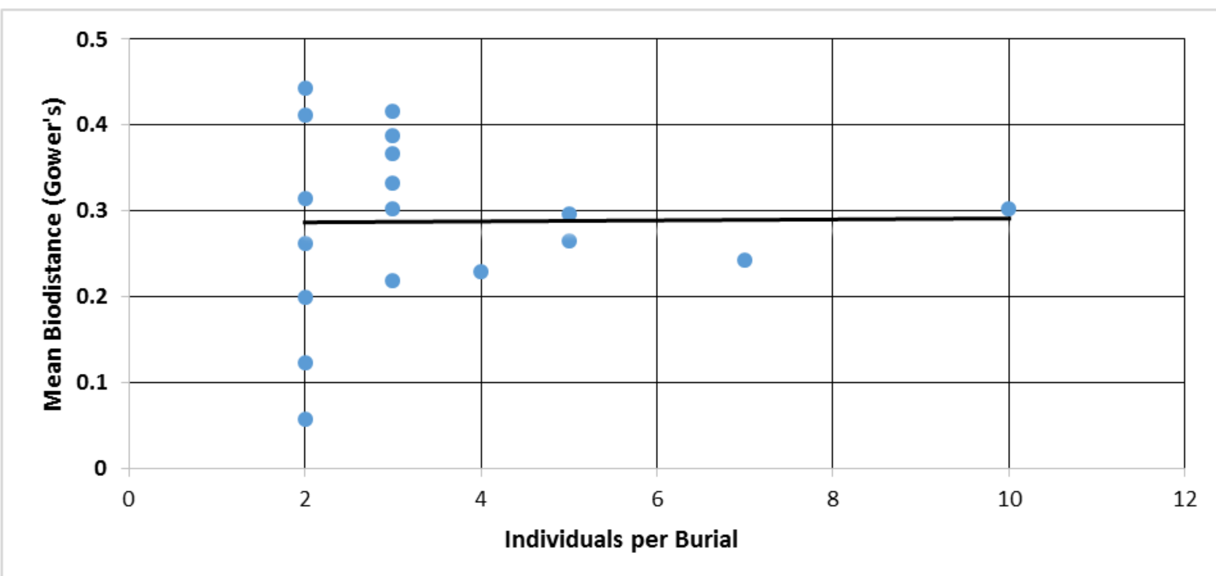


Figure 17. Relationship between mean biodistance and number of individuals per house burial group, Fusihatchee. Pearson's R = 0.014.

## Discussion

Overall, a quantitative analysis of Fusihatchee biodistance among summer house burial groups does not reflect a genetically homogenous outcome of social structure, where genetic relations are strongly manifested in the place of burial. Both the cluster analysis and the more direct analysis of Gower's distances reveal a society with high genetic diversity. Although households of people were tied together by a matri-clan system, the historic disruptions to the town of Fusihatchee are evident in these data. These were families and communities largely torn apart and dislocated by colonial processes, and regrouped according to adoptive family structures that the clan system allowed.

Considering the social implications of the dislocation of people across Southeastern America during the seventeenth and eighteenth centuries, Creek people may have closely adhered to matri-clan organization because it offered a home and family to individuals otherwise displaced from biological kin. These data demonstrate the functioning of an idealized kinship system within an unstable, genetically heterogeneous population over the span of a century or more. It thus offers a comparison to Carson Mounds in a different way than intended.

# CHAPTER 8

## DISCUSSION AND CONCLUSION

The objective of this research was to determine whether the organizing principle of the burials from the Mound A Enclosure, Carson Mounds site, Mississippi, was the existence of social houses. To summarize my work, I will briefly review the processes of social houses theoretically, and why that hypothesis was considered for this site. Next, I will discuss each finding from the dental analysis and the implication it has for social house theory. In the conclusion, I hope to have made a compelling case for the presence of social houses at Carson Mounds and perhaps the use of that framework for understanding the site as a whole.

Social houses are strongly corporate groups of genetically related and unrelated individuals, bound by a language of kinship and oriented to a specific estate of material and immaterial wealth (Levi-Strauss 1982:174). The purpose of the house is to maintain and enhance the wealth of the estate. To do this, social houses consolidate power through endogamous marriages, fictive kinship, adoption, and other means of enlarging the number of members of the house. Social houses focus their power onto a physical structure, and ritualize their human remains to form a powerful ancestor believed to exert influence in the supernatural world. Thus social houses can be seen as economically wealthy through the number of productive house members, and spiritually wealthy through the veneration of ancestors.

Archaeologically, these processes should manifest in several ways. Economic wealth results in increased access to resources. The members of the house will be healthy individuals with either few signs of illness or signs of healed illness or injury on their osteological remains (Gordon 2013; Powell 1985, 1988; Wood et al. 1992). Social houses will contain many individuals that are not closely related genetically, which will manifest in heterogeneous phenotypic profiles. This research addresses a number of these potential forms of evidence. Ancestor veneration can be noted through mortuary practices and treatment of the corpse, as in prolonged secondary burials. Mortuary practices can also testify to the amount of labor and access to resources available to the social house. Archaeology can also identify the physical house structure that may have served as the locus of social house power. This house may have been repeatedly built in the same location, with burials and relics connecting the space to the power of the ancestor.

A number of these archaeological correlates are present at Carson Mounds, reflecting positively on the hypothesis that social houses were present. According Gordon's (2013) study on the health status of the Carson Mounds burial sample, the people from the cemetery represent a healthy population with more than adequate access to resources and relatively low risk of injury associated with common hazardous activities, such as hunting. As discussed in detail in Chapter 2, the Carson Mounds burial program was a laborious process that gave special, sacred treatment to all individuals in the cemetery. This created a large body of ancestors with a visible metamorphosis from the living to the dead, and ultimately to the ancestor. Three separate areas, two possible structures, and a specialized practitioner were required to complete this mortuary process. The chronology of the Mound A Enclosure shows a pattern of residential occupation followed by the use of the site area as a necropolis. This is highly reminiscent of the chronology and activity Wilson proposes for Moundville (Wilson 2008). The re-use of the ancestor's house as a burial ground legitimizes a connection with the past and with the power of the ancestor (Kirch 2000). This is an important social house process that ritualizes the house as sacred and consolidates power (Bradley 2005: Howell 1995). The walled habitational and burial location was initially used during an Early Mississippian occupation period with trading ties to Cahokia. This setting aside of space could represent a community's effort to connect to that past Cahokian connection, adding power to the space.

One other major line of evidence led to the study's primary hypothesis. The ethnohistory of historic tribes in the area describes what can be considered social houses. The Chickasaw and the Choctaw possessed local groups that were highly corporate, which included fictive and adoptive kin. These groups controlled physical property and rules of inheritances (Swanton 1993). The Choctaw secondary (or, more precisely, tertiary) burial ceremonies also exhibit the kind of intensive labor and ancestor veneration common among social houses.

## Conclusions from the Carson Mounds Dental Morphology Analysis

The dental morphology study on Carson Mounds scored 239 dental traits from 115 individuals from the cemetery within the Mound A Enclosure. The dental morphological traits used in this study have been identified as viable measures of genetic relatedness between individuals (Butler 1939; Scott and Alexandersen 1992; Scott and Turner 1988). Using the statistical software package R, Gower's coefficient, a dissimilarity measure, was computed based on a comparison of dental traits among individuals. This pairwise comparison yielded a triangular matrix of Gower's coefficients representing the genetic distance between each pair of individuals in the sample. Gower's dissimilarity coefficient is ideal for this comparison because it can condense a very large number of trait comparisons to a single measure of biodistance between individuals, because it can mathematically combine traits scored at several different levels of measurement, and because it is explicitly designed to effectively deal with missing data.

A hierarchical agglomerative cluster analysis of the Gower's matrix was judged to have an optimal two cluster solution. The agglomeration heights in the clustering solution were relatively small and without conspicuous breaks. I interpret this finding as suggesting that the Carson Mounds population was highly homogenous, meaning that there was little genetic difference among individuals across the population. Such a condition would have resulted from a stable population, with little genetic variability being introduced over time. The chronology of Carson Mounds and its radiocarbon dates support this idea. The necropolis phase at Carson Mounds follow a period of residential occupation within the same Mound A Enclosure area. The use of the area within the Mound A Enclosure that postdates the "Carson grid" spans approximately AD 1410 and AD 1640, with an earlier Cahokia-related period beginning by at least AD 1210. The community may have been stable throughout that time, producing this sort of genetic homogeneity.

To address the genetic composition of the burial pits at Carson Mounds, I examined the mean Gower's distance of individuals buried within the same burial pit compared to that of individuals not buried in the same burial pit. As expected, the mean Gower's distance was significantly smaller for individuals buried together in the same pit versus those buried in different pits. Thus individuals buried together were genetically closer than those individuals not buried with them. This tendency toward smaller mean biodistances is especially apparent in the larger burial pits with more individuals buried in them. However, as demonstrated by histograms of the Gower distances within these larger burial pits, each has a few larger Gower's values skewed to the right of a more normally distributed remainder. This result shows that the individuals included in these pits are actually a composite group consisting of both a genetically related core, plus some smaller number of genetically distant individuals. These outliers are interpreted in an ethnographic framework as non-biological kin such as spouses, adoptees, servants, and slaves.

An earlier hypothesis suggested that there was a central "avenue" through the center of the Mound A Enclosure, clear of burials and other features, that might indicate a formal division of the space into east and west sides. Based on the suspicion that these large sections might reflect social divisions, I tested this hypothesis using the biodistance data. I did this in two ways. First, I found that individuals excavated from the east and west sides are not significantly associated with the two biodistance clusters derived from the cluster analysis. Second, I found that within-side biodistances are no smaller than between-side biodistances. Thus the hypothesis of an east-west structure governing burial placement is not supported by the biodistance data. Moreover, the most recently updated feature map of the Mound A Enclosure excavations (Figure 5) fails to show the burial and feature-free "avenue" that seemed much clearer in earlier work. Based on these findings, the idea of a bilateral structure for the Mound A Enclosure now seems doubtful.

## Fusihatchee Dental Morphology Analysis

As a comparative sample, I examined the dental morphology from the historic Creek town site of Fusihatchee located in Central Alabama. This sample included 84 burials from 124 excavated by John Cottier and Craig Sheldon from 22 out of 42 Protohistoric and Colonial period summer house floors dating to approximately AD 1650-1814 (Sheldon 2010:144-147). The Creeks were known historically to be organized into matrilineal, matrilocal groups called *hutis* (Swanton 1928:170-1). At death, individuals were buried beneath the house floor of their *hutis* (Swanton 1928:391;Waselkov 1940: 39-40). It is not documented in the ethnohistoric record whether or not in-married husbands were buried beneath their wives home or returned to their natal home (Spoehr 1947). This type of organization suggests a straightforward matrilineal kin organization with biodistances within house floor burials expected to be small, as households were organized around a nucleus of related females and their children.

The data were collected using the same methodology as for the Carson Mounds sample. The material was not as well preserved as the Carson Mounds sample, and as a result only 205 dental morphology traits were used. Using the statistical software R, a triangular matrix of Gower's distances between each pair of individuals in the sample was generated. A hierarchical agglomerative cluster analysis of the Gower's distances resulted in an optimal solution of five clusters based on agglomeration heights. The diversity measure of Simpson's C showed a range among house group burials, in which individuals from the same house were consistently assigned to different clusters. This suggests a genetically heterogeneous population with heterogeneous or genetically distantly related individuals within house burial groups. Moreover, the mean Gower's distance, or genetic distance, is no lower among individuals buried within the same house floor than the mean Gower's distance between individuals buried in different house floors. The analysis revealed that people buried together were no more genetically related to one another than to anyone else from the community.

Prior to this research, it was not known the extent of gene flow that occurred among Historic Creek people. It is now clear that the assumptions made at the beginning of the study are no longer valid. I attribute this result to the massive disruptions and dislocations of the historic era in the Southeast (Ethridge 2009). Stojanowski (2010: 168-169) examined dental variation through time among archaeological sites in Georgia and Northern Florida, and found that people were interacting in new patterns as early as the early 16th century and continued to do so throughout the 17th and 18th centuries. He attributes these new patterns of interaction, marriage, and subsequent gene flow to epidemic disease and interaction with Europeans that disrupted earlier, established patterns.

Despite the accounts of a matrilineal and matrilocal society, the reality was that historic southeastern households and small family estates exploited a variety of strategies to remain viable. These strategies are referenced in the literature as adoption, clan membership, and captives and slaves being admitted into the family or community as fictive kin (Spoehr 1947: 201).

Thus, at Fusihatchee genetic heterogeneity within corporate groups as seen in burials is more pronounced than at Carson Mounds due to historic displacements. The adoptive processes used by the Creeks were masked behind a seemingly straightforward matrilineal social organization. These processes are not unlike the process used by social houses to enlarge and preserve their estates.

Additionally, the analysis of Fusihatchee dental morphology resulted in a five cluster solution with no statistical significance between genetic distance and house group burial. These findings depict a heterogeneous community with processes, such as migration, that introduced new genetic material and maintained high genetic variability. The extreme historic disruption of the Creeks can account for these findings. It makes for a clear comparison to the Mississippian community of Carson Mounds, where the community appears homogenous as a result of a stable genetic pool. Thus Fusihatchee was not the expected, clear-cut case of matrilineal kin group social organization that might be used as a baseline of comparison for social houses. Instead, it highlights the stability that Carson Mounds genes must have maintained acreoss generations.

## Conclusion

In the relatively homogenous, genetically stable community of Carson Mounds, burial inclusion was largely based on a genetic component of kinship. It should be noted that within the Carson Mounds community, biological or genetic relatedness was a matter of degree, because the community was so genetically homogeneous. Age and sex were not determining factors. There was additionally, however, the regular inclusion of biologically distant members in the elaborate mortuary rituals leading to the ultimate burial of bone bundles from bone houses to burial pits. Together with genetically closely related individuals, these others were fully incorporated as ancestors to their corporate group. Following ethnohistoric accounts, these "others" could have been in-marrying spouses, adopted kin, servants, or slaves. This fact resonates with the composition of the house: inclusive of all economically and spiritually significant members. Each underwent the same extensive burial rites and were granted a place in the burial pit within sacred space remembered as ancestral, the burial pit being placed potentially in the same location as an ancestral home. They all became the ultimately anonymous ancestor, and they all conferred power to the house. Ethnographically, these are well-documented processes of the social house, and that is why I argue that social houses were the dominant organizing groups at Carson Mounds. Carson Mounds was a house society.

While the people of Carson Mounds found house society a successful mode of organization, ultimately the site was abandoned after its use a necropolis. With the abandonment of the Carson Mounds site, the concept of house society was also abandoned by the people of this region. Communities like the one from the Humber-McWilliams site exhibit single interment burials with lavish grave inclusions. These communities chose a different form of social organization, perhaps reflecting different pressures on these societies.

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APPENDIX 1

R SYNTAX FOR CARSON MOUNDS

From the R console dropdown menu, click on “Packages” then “Install packages”

In the new window click on the USA mirror.

In the next dropdown menu, install Rcmdr.

Repeat steps to install package “cluster”. This will be the package used to run GOWER and AGNES.

Working in R Commander

Through the dropdown menu Data, click on “Import Data”, then “from text file, clipboard, or URL…”

In the new window that opens “Read Text Data from File, Clipboard, or URL”

Enter name for dataset “Dataset”

Click the box for variable names in file

Missing Data indicator “NA”

Location of Data File: click on Local file system

Field Separator: Commas

*Note this is not the default and it must be changed to “Commas” if the file is .csv

Decimal-Point Character: Period [.]

Click “OK”. Then navigate through system files to the desired .csv file. Note the file location for the next step.

The readout script is as follows.

```
> Dataset <- read.table("C:/Users/Jenna/Documents/Carson Dental Data/Carson Comprehensive
Data R.csv", header=TRUE, sep=",", na.strings="NA", dec=".", +   strip.white=TRUE)
```

```
> Dataset$Burial<-NULL
```

*This prevents the following commands from reading the case IDs labeled" burial" as data.

```
> Dataset<-data.frame(lapply(Dataset, as.factor), stringsAsFactors=TRUE)
```

*This sets the variables as factors.

```
 Dataset[,1]<-as.ordered(Dataset[,1])
Dataset[,2]<-as.ordered(Dataset[,2])
 Dataset[,3]<-as.ordered(Dataset[,3])
 Dataset[,4]<-as.ordered(Dataset[,4])
 Dataset[,5]<-as.ordered(Dataset[,5])
 Dataset[,6]<-as.ordered(Dataset[,6])
 Dataset[,7]<-as.ordered(Dataset[,7])
 Dataset[,8]<-as.ordered(Dataset[,8])
 Dataset[,9]<-as.ordered(Dataset[,9])
Dataset[,10]<-as.ordered(Dataset[,10])
Dataset[,11]<-as.ordered(Dataset[,11])
Dataset[,12]<-as.ordered(Dataset[,12])
Dataset[,13]<-as.ordered(Dataset[,13])
Dataset[,14]<-as.ordered(Dataset[,14])
Dataset[,15]<-as.ordered(Dataset[,15])
Dataset[,16]<-as.ordered(Dataset[,16])
Dataset[,17]<-as.ordered(Dataset[,17])
Dataset[,18]<-as.ordered(Dataset[,18])
Dataset[,19]<-as.ordered(Dataset[,19])
Dataset[,20]<-as.ordered(Dataset[,20])
Dataset[,21]<-as.ordered(Dataset[,21])
Dataset[,22]<-as.ordered(Dataset[,22])
Dataset[,23]<-as.ordered(Dataset[,23])
```

```
Dataset[,24]<-as.ordered(Dataset[,24])
Dataset[,26]<-as.ordered(Dataset[,26])
Dataset[,27]<-as.ordered(Dataset[,27])
Dataset[,28]<-as.ordered(Dataset[,28])
Dataset[,29]<-as.ordered(Dataset[,29])
Dataset[,30]<-as.ordered(Dataset[,30])
Dataset[,31]<-as.ordered(Dataset[,31])
Dataset[,32]<-as.ordered(Dataset[,32])
Dataset[,33]<-as.ordered(Dataset[,33])
Dataset[,34]<-as.ordered(Dataset[,34])
Dataset[,35]<-as.ordered(Dataset[,35])
Dataset[,36]<-as.ordered(Dataset[,36])
Dataset[,37]<-as.ordered(Dataset[,37])
Dataset[,38]<-as.ordered(Dataset[,38])
Dataset[,39]<-as.ordered(Dataset[,39])
Dataset[,40]<-as.ordered(Dataset[,40])
Dataset[,41]<-as.ordered(Dataset[,41])
Dataset[,42]<-as.ordered(Dataset[,42])
Dataset[,43]<-as.ordered(Dataset[,43])
Dataset[,44]<-as.ordered(Dataset[,44])
Dataset[,45]<-as.ordered(Dataset[,45])
Dataset[,46]<-as.ordered(Dataset[,46])
Dataset[,47]<-as.ordered(Dataset[,47])
Dataset[,48]<-as.ordered(Dataset[,48])
Dataset[,49]<-as.ordered(Dataset[,49])
Dataset[,50]<-as.ordered(Dataset[,50])
Dataset[,51]<-as.ordered(Dataset[,51])
Dataset[,52]<-as.ordered(Dataset[,52])
```

```
Dataset[,53]<-as.ordered(Dataset[,53])
Dataset[,54]<-as.ordered(Dataset[,54])
Dataset[,55]<-as.ordered(Dataset[,55])
Dataset[,56]<-as.ordered(Dataset[,56])
Dataset[,57]<-as.ordered(Dataset[,57])
Dataset[,58]<-as.ordered(Dataset[,58])
Dataset[,59]<-as.ordered(Dataset[,59])
Dataset[,60]<-as.ordered(Dataset[,60])
Dataset[,61]<-as.ordered(Dataset[,61])
Dataset[,62]<-as.ordered(Dataset[,62])
Dataset[,63]<-as.ordered(Dataset[,63])
Dataset[,64]<-as.ordered(Dataset[,64])
Dataset[,65]<-as.ordered(Dataset[,65])
Dataset[,66]<-as.ordered(Dataset[,66])
Dataset[,67]<-as.ordered(Dataset[,67])
Dataset[,68]<-as.ordered(Dataset[,68])
Dataset[,69]<-as.ordered(Dataset[,69])
Dataset[,70]<-as.ordered(Dataset[,70])
Dataset[,71]<-as.ordered(Dataset[,71])
Dataset[,72]<-as.ordered(Dataset[,72])
Dataset[,73]<-as.ordered(Dataset[,73])
Dataset[,74]<-as.ordered(Dataset[,74])
Dataset[,75]<-as.ordered(Dataset[,75])
Dataset[,76]<-as.ordered(Dataset[,76])
Dataset[,77]<-as.ordered(Dataset[,77])
Dataset[,78]<-as.ordered(Dataset[,78])
Dataset[,79]<-as.ordered(Dataset[,79])
Dataset[,80]<-as.ordered(Dataset[,80])
```

```
Dataset[,81]<-as.ordered(Dataset[,81])
Dataset[,82]<-as.ordered(Dataset[,82])
Dataset[,83]<-as.ordered(Dataset[,83])
Dataset[,84]<-as.ordered(Dataset[,84])
Dataset[,85]<-as.ordered(Dataset[,85])
Dataset[,86]<-as.ordered(Dataset[,86])
Dataset[,87]<-as.ordered(Dataset[,87])
Dataset[,88]<-as.ordered(Dataset[,88])
Dataset[,89]<-as.ordered(Dataset[,89])
Dataset[,90]<-as.ordered(Dataset[,90])
Dataset[,91]<-as.ordered(Dataset[,91])
Dataset[,92]<-as.ordered(Dataset[,92])
Dataset[,93]<-as.ordered(Dataset[,93])
Dataset[,94]<-as.ordered(Dataset[,94])
Dataset[,95]<-as.ordered(Dataset[,95])
Dataset[,96]<-as.ordered(Dataset[,96])
Dataset[,97]<-as.ordered(Dataset[,97])
Dataset[,98]<-as.ordered(Dataset[,98])
Dataset[,99]<-as.ordered(Dataset[,99])
Dataset[,100]<-as.ordered(Dataset[,100])
Dataset[,101]<-as.ordered(Dataset[,101])
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Dataset[,103]<-as.ordered(Dataset[,103])
Dataset[,104]<-as.ordered(Dataset[,104])
Dataset[,105]<-as.ordered(Dataset[,105])
Dataset[,106]<-as.ordered(Dataset[,106])
Dataset[,107]<-as.ordered(Dataset[,107])
Dataset[,108]<-as.ordered(Dataset[,108])
```

```
Dataset[,109]<-as.ordered(Dataset[,109])
Dataset[,110]<-as.ordered(Dataset[,110])
Dataset[,111]<-as.ordered(Dataset[,111])
Dataset[,112]<-as.ordered(Dataset[,112])
Dataset[,113]<-as.ordered(Dataset[,113])
Dataset[,114]<-as.ordered(Dataset[,114])
Dataset[,115]<-as.ordered(Dataset[,115])
Dataset[,116]<-as.ordered(Dataset[,116])
Dataset[,117]<-as.ordered(Dataset[,117])
Dataset[,118]<-as.ordered(Dataset[,118])
Dataset[,119]<-as.ordered(Dataset[,119])
Dataset[,120]<-as.ordered(Dataset[,120])
Dataset[,121]<-as.ordered(Dataset[,121])
Dataset[,122]<-as.ordered(Dataset[,122])
Dataset[,123]<-as.ordered(Dataset[,123])
Dataset[,124]<-as.ordered(Dataset[,124])
Dataset[,125]<-as.ordered(Dataset[,125])
Dataset[,126]<-as.ordered(Dataset[,126])
Dataset[,127]<-as.ordered(Dataset[,127])
Dataset[,128]<-as.ordered(Dataset[,128])
Dataset[,129]<-as.ordered(Dataset[,129])
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Dataset[,131]<-as.ordered(Dataset[,131])
Dataset[,132]<-as.ordered(Dataset[,132])
Dataset[,133]<-as.ordered(Dataset[,133])
Dataset[,134]<-as.ordered(Dataset[,134])
Dataset[,135]<-as.ordered(Dataset[,135])
Dataset[,136]<-as.ordered(Dataset[,136])
```

```
Dataset[,137]<-as.ordered(Dataset[,137])
Dataset[,138]<-as.ordered(Dataset[,138])
Dataset[,139]<-as.ordered(Dataset[,139])
Dataset[,140]<-as.ordered(Dataset[,140])
Dataset[,141]<-as.ordered(Dataset[,141])
Dataset[,142]<-as.ordered(Dataset[,142])
Dataset[,143]<-as.ordered(Dataset[,143])
Dataset[,144]<-as.ordered(Dataset[,144])
Dataset[,145]<-as.ordered(Dataset[,145])
Dataset[,146]<-as.ordered(Dataset[,146])
Dataset[,147]<-as.ordered(Dataset[,147])
Dataset[,148]<-as.ordered(Dataset[,148])
Dataset[,149]<-as.ordered(Dataset[,149])
Dataset[,150]<-as.ordered(Dataset[,150])
Dataset[,151]<-as.ordered(Dataset[,151])
Dataset[,152]<-as.ordered(Dataset[,152])
Dataset[,153]<-as.ordered(Dataset[,153])
Dataset[,154]<-as.ordered(Dataset[,154])
Dataset[,155]<-as.ordered(Dataset[,155])
Dataset[,156]<-as.ordered(Dataset[,156])
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Dataset[,158]<-as.ordered(Dataset[,158])
Dataset[,159]<-as.ordered(Dataset[,159])
Dataset[,160]<-as.ordered(Dataset[,160])
Dataset[,161]<-as.ordered(Dataset[,161])
Dataset[,162]<-as.ordered(Dataset[,162])
Dataset[,163]<-as.ordered(Dataset[,163])
Dataset[,164]<-as.ordered(Dataset[,164])
```

```
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Dataset[,166]<-as.ordered(Dataset[,166])
Dataset[,167]<-as.ordered(Dataset[,167])
Dataset[,168]<-as.ordered(Dataset[,168])
Dataset[,169]<-as.ordered(Dataset[,169])
Dataset[,170]<-as.ordered(Dataset[,170])
Dataset[,171]<-as.ordered(Dataset[,171])
Dataset[,172]<-as.ordered(Dataset[,172])
Dataset[,173]<-as.ordered(Dataset[,173])
Dataset[,174]<-as.ordered(Dataset[,174])
Dataset[,175]<-as.ordered(Dataset[,175])
Dataset[,176]<-as.ordered(Dataset[,176])
Dataset[,177]<-as.ordered(Dataset[,177])
Dataset[,178]<-as.ordered(Dataset[,178])
Dataset[,179]<-as.ordered(Dataset[,179])
Dataset[,180]<-as.ordered(Dataset[,180])
Dataset[,181]<-as.ordered(Dataset[,181])
Dataset[,182]<-as.ordered(Dataset[,182])
Dataset[,183]<-as.ordered(Dataset[,183])
Dataset[,184]<-as.ordered(Dataset[,184])
Dataset[,185]<-as.ordered(Dataset[,185])
Dataset[,186]<-as.ordered(Dataset[,186])
Dataset[,187]<-as.ordered(Dataset[,187])
Dataset[,188]<-as.ordered(Dataset[,188])
Dataset[,189]<-as.ordered(Dataset[,189])
Dataset[,190]<-as.ordered(Dataset[,190])
Dataset[,191]<-as.ordered(Dataset[,191])
Dataset[,192]<-as.ordered(Dataset[,192])
```

Dataset[,193]<-as.ordered(Dataset[,193])

Dataset[,194]<-as.ordered(Dataset[,194])

Dataset[,195]<-as.ordered(Dataset[,195])

Dataset[,196]<-as.ordered(Dataset[,196])

Dataset[,197]<-as.ordered(Dataset[,197])

*These commands create ordered factors so Gower will recognize these variables as ordinal. Each command should entered one at a time and done in a batch.

>GOWER<-daisy(Dataset,metric = "gower",stand=FALSE,type=list(asymm=c(198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227)))

*daisy preforms the gower distance calculation. Under the “type=list” in the command, all the binary assymetrical variables, must be each listed by the column number. Adding “GOWER<-“ in front of the command stores the results of these calculations under the label “GOWER”. These calculations will be stored in a matrix on the diagonal. This is key for AGNES to compute properly.

Here is the output:

Metric : mixed ; Types = O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A,
A, A, A, A, A, A, A, A, A, A, N, A, N, N, N, N, N, N, N, N, N, N

Number of objects : 144

> summary(GOWER)

Here is the output:

10296 dissimilarities, summarized :

Min. 1st Qu. Median Mean 3rd Qu. Max.

0.00000 0.20521 0.26667 0.27885 0.34275 0.88333

Metric : mixed ; Types = O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,

O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O, O,
O, O, O, O, O, O, O, O, O, O, O, O, O, O, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A, A,
A, A, A, A, A, A, A, A, A, A, N, A, N, N, N, N, N, N, N, N, N, N

Number of objects : 144

MATRIX<-as.matrix(GOWER)

*Allows for the gower matrix to be saved in a format readable in Excel.

>write.csv(MATRIX,file=" C:/Users/Jenna/Documents/Carson Dental Data/MATRIX.csv")

* This saves the gower distance matrix in a file that can be viewed in Excel. The data must be checked for NA or missing data. AGNES cannot have missing data.

>agnes(GOWER, diss = inherits(GOWER, "dist"), stand = FALSE, method = "average")

*This command will cluster the cases using the gower calculations.

>plot(agnes(GOWER, diss = inherits(GOWER, "dist"), stand = FALSE, method = "average"))

* This produces the dendrogram used to view the clusters.

APPENDIX 2

R SYNTAX FOR FUSIHATCHEE

The same process was used to cluster the Fusihatchee data. The differences were in the file names, dataset name, and case ID value. Fusihatchee also had no asymmetrical binary data to list and only 196 variables to enter for the “as.ordered” command.

```
library(relimp, pos=4)
View(Dataset)
FusiDataset <-
  read.table("C:/Users/Jenna/Documents/Fusihatchee Folder/Fusihatchee Dental
Data/1EE191.DentalMorphDataForm.Rfile.90removed.csv",
   header=TRUE, sep=",", na.strings="NA", dec=".", strip.white=TRUE)
FusiDataset$Dendro.Num<-NULL
View(FusiDataset)
FusiDataset<-data.frame(lapply(FusiDataset, as.factor), stringsAsFactors=TRUE)
FusiDataset[,195]<-as.ordered(FusiDataset[,195])
daisy(FusiDataset,metric = "gower",stand=FALSE)
FusiGower<-(daisy(FusiDataset,metric = "gower",stand=FALSE))
FUSIMATRIX<-as.matrix(FusiGower)
write.csv(FUSIMATRIX,file="C:/Users/Jenna/Documents/Carson Dental
Data/FusiGowerMAtrix.csv")
ag<-(agnes(FusiGower, diss = inherits(FusiGower, "dist"), stand = FALSE, method =
"average"))
plot(ag)
```

# APPENDIX 3

## CARSON MOUNDS GOWER'S TRIANGULAR MATRIX

The Gower's triangular matrix for Carson Mounds can be found in the electronic supplementary excel file.

# APPENDIX 4

## FUSIHATCHEE GOWER'S TRIANGULAR MATRIX

The Gower's triangular matrix for Fusihatchee can be found in the electronic supplementary excel file.