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On the Cover: Bird/Human petroglyph from 11th Unnamed Cave, Tennessee (*Photo: Alan Cressler)*.

EDITORS CORNER

Welcome to the first issue of Volume 9 of *Tennessee Archaeology*, including a set of articles that nicely span the kinds of themes that are the reason the journal was created – exciting current and on-going research on archaeology in Tennessee, primary data on CRM projects past and present not readily available elsewhere, and the stories of Tennessee archaeologists and their projects. With this issue, we're launching what we anticipate will be a regular research report section from the Cave Archaeology Research Team at the University of Tennessee documenting their annual reports on new discoveries of cave and open-air rock art across the state. We appreciate the offer from Jan Simek and "the team" to use the journal as an appropriate outlet for that important research. Our efforts to maintain a high-quality, peer-reviewed state journal just for this type of report increasingly "pays off," as we note a continuing upward trend in citation of the journal content in regional and national journals and in books coming out from major publishers. As always, we appreciate the contributions of the authors and extend our thanks to the reviewers who help make this peer-reviewed e-journal possible. We report several items of note on activities in Tennessee archaeology since our last Editors Corner.

We are always pleased to note the special efforts by private citizens to commit to preservation of major archaeological sites that they own. Senator William H. "Bill" and Tracy Roberts Frist recently purchased a significant portion of the major Mississippian mound center in Williamson County known as "Old Town" for preservation, including the launch of a significant collaborative project to promote public knowledge about the site – information and updates are available at: http://capone.mtsu.edu/oldtown/. Seeing this particular site receive some preservation attention is personally important to the editors, as this was the location of one of our first joint field efforts over 25 years ago – salvaging some information during construction of an addition to the house back in May 1991.

FIGURE 1. Salvage archaeology at Old Town by Tennessee Division of Archaeology staff in May 1991. Mike Moore standing. "Pits" are footers dug for a porch addition.

FIGURE 2. Salvage archaeology at Old Town in May 1991 with an exuberant Kevin E. Smith.

While perhaps more paleontological than archaeological, one of Tennessee's most iconic "archaeological discoveries" once again made the news in a major way this past year – the recovery of the sabertooth tiger in 1971 during construction of the First American Center in downtown Nashville (covered in detail by John Dowd in *Tennessee Archaeology* Volume 5, Issue 1). After nearly 35 years of display in the 28-story sky-scraper (now the UBS Tower) built above the site, the bones that inspired the name Nashville Predators for the city's National Hockey League team were permanently relocated to the Bridgestone Arena and unveiled during the game on November 8, 2016 ("Saber-tooth bones that named the Preds get new home at Bridgestone Arena," *The Tennessean* 6 Nov 2016). Informal feedback suggests that the new location is much higher visibility than the former – and joins an increasing number of recent efforts to highlight and promote the paleontological and prehistoric heritage beneath Nashville. Hopefully, those public education efforts will result in additional preservation efforts in the future.

FIGURE 3. Former display at the First American Center (*Photo: Les Leverett*).

We also take the opportunity to recognize the passing of three valued avocational contributors to Tennessee archaeology, one of whom participated in the recovery of the saber-tooth cat in 1971. We extend our condolences to their family, friends, and colleagues. They will be missed.

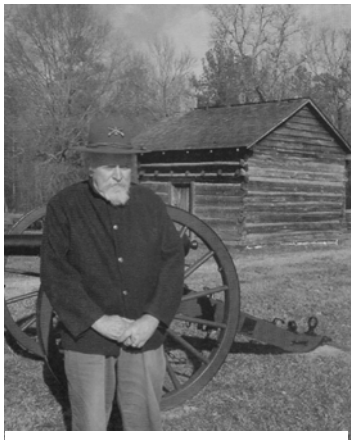

FIGURE 4. E. Ray Evans ca. 2008 (*Photo courtesy Nick Honerkamp).*

Estill Raymond "Ray" Evans (15 Mar 1939 – 17 Jun 2016) died in Chattanooga, Tennessee at the age of 77. Born in Grandview, Tennessee, Ray traveled extensively in Southeast Asia during his service in the 3rd Marine Division, Mexico and Central America, and across the United States as a union organizer. Upon resettling in Chattanooga about 1970, those experiences, which he termed "swimming in the sea of the people" (*The Chattanoogan*, 27 Jun 2016), led him to pursue a bachelor's degree in sociology and cultural anthropology at the University of Tennessee, Chattanooga, where he graduated in 1980. Having developed a friendship and strong working relationship with the late Jeffrey L. Brown, he was for many years involved in Chattanooga-area projects undertaken by the Brown Institute of Archaeology. A prolific writer, Ray edited the newsletter of the Tennessee Archaeological Society during the mid-1970s, until joining the Tennessee Anthropological Association in 1976 as a founding and long-time board member.

His most recent curriculum vitae listed over 70 field investigations; over 200 books, articles, and manuscripts; multiple museum projects in Tennessee, Alabama, and California; and many educational programs for schools. His research and writing was

extensive, including many key publications on Cherokee and Muscogee history; the Underground Railroad in Chattanooga; and the American Civil War (particularly the Chickamauga and Atlanta campaigns and the role of the 42nd and 44th U.S. Colored Troops). In 2014, his book *Paths to Valor: The Medal of Honor in the Civil War and the Chattanooga Area* received a National Historic Preservation Week Certificate of Merit from the Tennessee Historical Commission. For archaeology, he will be remembered best for his decades of advocacy for the preservation of significant archaeological resources in the Chattanooga area.

Willard Smith "Will" Bacon (17 Sep 1935 – 21 Jul 2016) passed away at his home in Manchester, Tennessee at the age of 80. Born in Oil City, Pennsylvania, Will was introduced to archaeology by his grandfather, whose collection of artifacts from the family farm in Missouri provided a topic of common interest. He was channeled in the right direction by the excavation of a Late Woodland stone mound (23LN75) on the farm under supervision of Dr. J.B. Watson of Washington University in 1952. Bacon received his degrees in Chemical Engineering (B.S. 1958) and Nuclear Engineering (M.S. 1964) from the University of Missouri, Columbia.

FIGURE 5. Will Bacon accepting his Avocational Lifetime Achievement Award in 2005 (*Photo: Kevin E. Smith*).

He was a member of the Missouri Archaeological Society for over 60 years, along with briefer memberships in the Ohio Archaeological Society and Archaeological Survey Association of Southern California when he lived in those areas. He moved to Tennessee around 1965 as an engineer at Arnold Engineering in Tullahoma where he joined the Tennessee Archaeological Society (Coffee/Franklin County Chapter). He was a sponsor of the 1972 TAS meeting in Tullahoma, served on the board of directors (1974-1976) and received the outstanding TAS member award (1974). After creation of the Tennessee Anthropological Association, he became a charter and life-time member (1976-2000). In recognition of his decades of service, Will was awarded an Avocational Lifetime Achievement Award by the Tennessee Council for Professional Archaeology in January 2005.

In addition to officially recording almost 200 sites in Missouri, Southern California, and Middle Tennessee, Will volunteered literally thousands of hours on professional archaeological projects over 60+ years as an avocational archaeologist. Briefly, those include work at a number of sites on Tims Ford Reservoir on the Elk River beginning in 1966, and work as a volunteer supervisor of projects on the Normandy Reservoir project from 1972 to 1975 on the Duck River with Charles Faulkner. The names of the sites that he worked on will be familiar to many of you – Owl Hollow, Banks I, III, and V, McFarland, Parks, Eoff I, Jernigan II, Yearwood, and Old Stone Fort – the full list is much longer.

He has dozens of unpublished manuscripts and reports on file in Missouri and Tennessee. Between 1954 and 1995, he published a number of articles in the *Missouri Archaeological Society Newsletter*, *Missouri Archaeologist*, *Tennessee Archaeological Society Miscellaneous Papers*, *Tennessee Archaeologist*, *Archaeology of Eastern North*

America, *Tennessee Anthropologist*, and the *Midcontinental Journal of Archaeology*.

In later life, Will helped to resurrect the local archaeological society as the Old Stone Fort Archaeological Society at Old Stone Fort State Archaeological Park, where he gave his final public program on the archaeology of the Upper Duck and Elk River valleys in December 2015.

FIGURE 6. Lib Roller volunteering at the 1993 Rutherford-Kizer Mounds project (*Photo: Kevin E. Smith*).

Elizabeth "Lib" Roller (24 Apr 1924 – 17 Nov 2016) passed away in Nashville, Tennessee at the age of 92. Born in Pulaski, Tennessee, Lib spent most of her life in Nashville where she received her bachelor's degree in Physical Education (B.S. 1947) from Peabody College. In 1948, she was awarded a Master of Science degree in recreation and camping education from New York University – reportedly one of the first ten such degrees in the United States. After stints as director of women's athletics at Florida Southern and Belmont College, Lib was hired by the Metro Nashville school system where she spent 35 years engaging K-12 students in outdoor education involving history, paleontology, archaeology, and Native American studies. In 1970, Lib joined the Southeastern Indian Antiquities Survey (now known as the Middle Cumberland Archaeological Society, MCAS) and participated in the excavation of the sabertooth tiger at the First American Bank site mentioned previously. This would be the first of many such paleontological digs she would work on over the course of the next 35 years. She spent many two-week Earthwatch sessions digging at the mammoth site in Hot Springs, South Dakota – participating in the discovery of several of the dozens of Columbian and wooly mammoths buried there. Always intrigued by paleontology, she also worked for many years as a volunteer at the Gray Fossil site in East Tennessee – a Miocene-era fossil bed where she participated in the discovery of extinct tapirs and many other animals.

Lib also volunteered on virtually every archaeology project needing volunteers in Middle Tennessee from the 1990s onwards – including everything from slave residences (Wynnewood; Sam Davis Home) to Mississippian sites of all kinds (Kellytown, Rutherford-Kizer Mounds, Castalian Springs Mounds). When the MCAS sponsored a shoreline survey of Cordell Hull Reservoir during the winters of 1994-2000 "while the water was down – or as some of the members have noted, the ice was floating low," Lib was a major participant – resulting in the recording of information on approximately 200 archaeological sites. Outside Tennessee, she participated for untold summers in the Arkansas Archeological Survey certification program and volunteer work at Parkin as well. All that while maintaining an active presence in school programs, heritage events, Archeofest at Pinson Mounds, the MTSU American Indian festival, and others. Her display tables always demonstrated her skilled artisanship as a potter, basketweaver, and many other native and pioneer craft traditions – and her appreciation of her own Creek Indian heritage. Her public service in public education, paleontology, and archaeology was recognized in 2000 with an Avocational Archaeologist Lifetime Achievement Award from the Tennessee Council for Professional Archaeology.

PALYNOLOGICAL AND CHEMICAL ANALYSES OF PREHISTORIC PIPE RESIDUES AS EVIDENCE OF TOBACCO USE IN TENNESSEE

Stephen B. Carmody, Maria A. Caffrey, Belinda S. Lady, and Sally P. Horn

The prehistory of tobacco (Nicotiana spp.) in the New World has long interested archaeologists, anthropologists, and geographers. Nicotiana rustica (Aztec tobacco), the most widespread tobacco species in prehistoric eastern North America, is an Andean hybrid that was transported to Central America and Mexico by at least 7000 cal yr BP, and reached the Mississippi Valley between 4000 and 3000 cal yr BP. Because Native Americans also smoked other plant materials, archaeological pipes do not necessarily document tobacco use. Additional evidence comes from analyses of pollen and other components in unburned pipe residues, or dottle. Here we describe our efforts to build upon previous tobacco research by performing pollen and chemical analyses of dottle in 14 pipes from archaeological sites in Tennessee. Dottle samples were prepared for pollen analysis using conventional techniques and compared to samples prepared from commercially available tobacco. Pollen results together with initial analyses of chemical signatures using GC/MS positively identified the use of tobacco in four of the 14 pipes. These results contribute to ongoing investigations of the transmission, use, and customs surrounding tobacco and the smoking culture in eastern North America.

The use of tobacco by Native Americans in eastern North America has been well-documented in both historical and ethnographic records. At the time of European contact, tobacco was being cultivated throughout the eastern United States, with its range rivaling that of maize (Asch 1994; Ford 1981; Gilmore 1991; Goodspeed 1954; Haberman 1984; Heiser 1969; Sauer 1975; Setchell 1921; Yarnell 1977). Tobacco was so well established across the continent that its use and customs were described by the earliest European explorers, beginning with Columbus (Linton 1924; McGuire 1897; Robert 1949; Safford 1917; Spinden 1950). Direct evidence for tobacco use in prehistory has been somewhat elusive because organic material is not well preserved in archaeological sites. Traditionally the identification of tobacco in archaeological contexts has been limited to small (0.5–1.1 mm) carbonized seeds. To date, these seeds have been recovered from approximately 200 sites in eastern North America, with the earliest evidence coming from Middle Woodland contexts at the Smiling Dan site (11ST123) in Illinois (Asch and Asch 1985; Haberman 1984; Wagner 2000).

Smoking pipes are one of the most widely recognizable and prominent artifacts recovered from archaeological contexts in eastern North America (Von Gernet 1995). While pipes from archaeological sites have traditionally been associated with the use of tobacco, there is a substantial gap between the appearance of pipes in the archaeological record during the Late Archaic period and the earliest direct evidence for tobacco use, a positive chemical signature for nicotine from a pipe dating to the early Woodland period (ca. 2075 ± 70 ^{14}C yr B .P.) (Rafferty 2002, 2006, 2007, 2008). This gap of more than a millennium leaves many questions unanswered

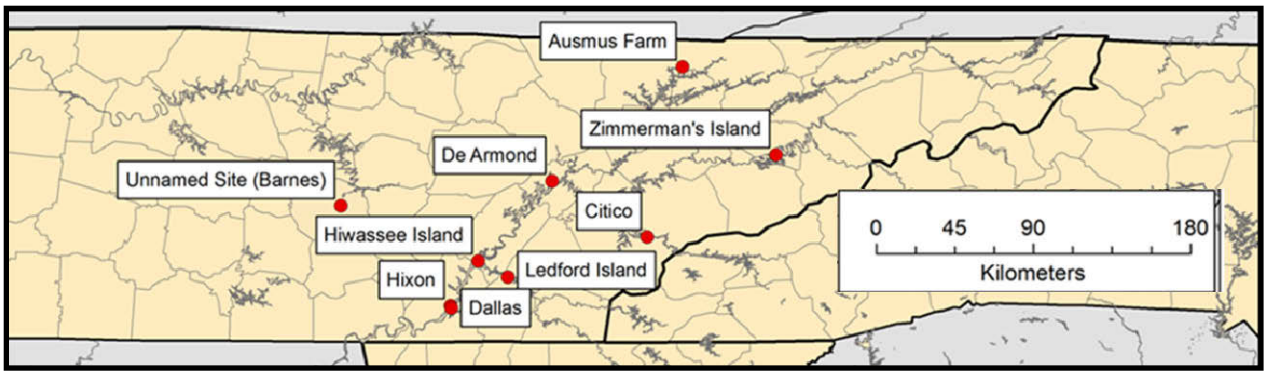

FIGURE 1. Archaeological sites that yielded pipes analyzed for evidence of tobacco.

Table 1. Pipes Analyzed for Evidence of Tobacco.

Pipe Number	Catalogue and Site Number	Site	TCA	Pipe Context	Analysis	Evidence
1	22-3CE10	Ausmus Farm	Mississippian	Mound	GC/MS and Pollen	Nicotine
2	Duck Effigy	Barnes Collection	Woodland	N/A	GC/MS and Pollen	Tobacco pollen
3	B-143(8)	Citico site	Mississippian	Mound	GC/MS	
4	65/7HA1	Dallas	Mississippian	Mound	GC/MS	
5	91-2/3RE12	De Armond	Mississippian	Mound	GC/MS	
6	93-1/3RE12	De Armond	Mississippian	Mound	GC/MS	
7	905-38MG31	Hiwassee Is	Mississippian	Village	GC/MS and Pollen	
8	66-37MG31	Hiwassee Is	Mississippian	Mound	GC/MS and Pollen	Tobacco pollen
9	39-37MG31	Hiwassee Is	Mississippian	Mound	GC/MS and Pollen	Tobacco pollen
10	109-37MG31	Hiwassee Is	Mississippian	Mound	GC/MS and Pollen	
11	580/1HA3	Hixon	Mississippian	Mound	GC/MS	
12	510/1HA3	Hixon	Mississippian	Mound	GC/MS	
13	5530/16BY13	Ledford Is.	Mississippian	Mound	GC/MS	
14	2JE4/2JE2	Zimmerman Is.	Mississippian	Mound	GC/MS	

regarding tobacco use and the evolution of smoking in eastern North America.

The widespread recovery of pipes from archaeological sites makes the analysis of pipe residues a promising source of evidence for the use of tobacco and the evolution of smoking in prehistoric societies. In this study we analyzed residues from 14 pipes recovered from nine Woodland and Mississippian period archaeological sites across the state of Tennessee (Table 1; Figure 1). Pipes were selected based on the presence and quantities of residues that were available for analysis. We used two methods to identify tobacco, palynology and gas chromatography / mass spectrometry (GC/MS), both of which have been used successfully in previous studies (Bryant et al. 2012; Donaldson and Stephens 2010; Hall 1984; Rafferty 2002, 2004, 2006, 2007; Tushingham et al. 2013). Our results demonstrate the efficacy of these techniques for recovering evidence of plant remains and allow us to consider the uses of plants in ritual practices.

Materials and Methods

Six pipes were selected for pollen analysis from the collections at the McClung Museum at the University of Tennessee: four from the Hiwassee Island site, one from the Ausmus Farm site, and one in a private collection that was collected in Warren County. Pipe residues were prepared for analysis using preparation techniques established by Faegri and Iverson (1975), including KOH treatment and acetolysis. We omitted

Table 2. Results of Pollen Analysis on Selected Pipes.

Pipe Number	Site	Context	Pollen Types and Fungal Spores Identified
1	Ausmus Farm	Mound	No pollen identified
2	Barnes Collection	N/A	Amaranthaceae, Apiaceae, Asteraceae, *Cephalanthus*, Lauraceae, *Nicotiana*, *Pinus*, Poaceae, *Typha*,
7	Hiwassee Island	Village	Poaceae
8	Hiwassee Island	Mound	Amaranthaceae, *Ambrosia*, Asteraceae, Ericaceae, *Nicotiana*, Solanaceae, *Sphaerodes*, *Typha*
9	Hiwassee Island	Mound	Amaranthaceae, Asteraceae, Melanosporaceae, *Nicotiana, Pinus*, *Pleospora*, Poaceae, *Sphaerodes*, *Typha*, Urticaceae
10	Hiwassee Island	Mound	Asteraceae

treatment with hydrofluoric acid because the samples contained very little silica, and to minimize loss of pollen during processing by using the fewest steps possible. Some dottle samples may require HF treatment (Bryant et al. 2012). Samples were mounted in silicone oil and examined at 400× magnification. One slide from each sample was examined, along transects spaced $\leq$ 1 mm apart. We also prepared six reference pollen samples from modern pipe residues, the leaves of *Nicotiana rustica*, and seed pods of a modern tobacco (*Nicotiana* sp.) plant. These reference samples were prepared to aid in the identification of tobacco pollen and to make sure that our pollen recovery method was sound prior to employing it on the archaeological samples.

GC/MS was used to explore chemical constituents in the six dottle samples examined for pollen and in residues from an additional eight pipes (Table 1). The modern pipe residue and plant samples were first used as reference samples to develop extraction techniques and verify methods for analysis of nicotine by GC/MS. All crude pipe residues were extracted with hot organic solvent to separate the soluble components from insoluble matter, following methods outlined in similar studies (Rafferty 2002, 2006). Extracted liquid was concentrated, dissolved in a small volume of methanol, and analyzed using an HP6890 Gas Chromatograph with an HP 5973 Mass Selective Detector. GC/MS was employed as a qualitative method used to separate out the individual chemical components in the pipe residue and identify them based on mass spectra. The soluble matter from the pipe residue was injected into the GC, heated into the gas phase, and carried through a heated capillary column. Based on the temperature and interactions with the column, chemical components will elute as separate peaks, creating a graph of relative abundance vs. retention time, with the retention time indicating how long the compound took to travel from the injector to the detector. As each component is separated, it enters the mass selective detector where the compound is fragmented and the ion intensity plotted against the mass of the fragment, generating a mass spectrum. The detector was run in scan mode ranging from 30 - 550 mass units. Peaks were searched against the database of mass spectra for a wide array of compounds. The mass spectrum of a

FIGURE 2. Pipes that contained tobacco pollen. The duck effigy pipe from the Barnes Collection (Pipe 2) and the two smaller pipe bowl fragments recovered from excavations at the Hiwassee Island site (upper right; Pipes 8 and 9) are all curated by the McClung Museum of Natural History and Culture.

compound is unique to that component and aids in identification of chemical constituents isolated during this process.

Results of Pollen Analysis

All six samples contained low amounts of pollen. Three of the six pipes contained pollen from several different plant families, including grains identified as tobacco pollen (Table 2). These pipes include Pipes 8 and 9 from the mound at the Hiwassee Island site in Tennessee, and Pipe 2 from a private collection (Figure 2). The pollen grains identified as tobacco pollen were tricolporate grains that measured ca. 25 µm in equatorial diameter (Gish 2000). This pollen morphology matched our reference samples of tobacco; however, it was difficult to examine the grains from the polar view because they had been disfigured. The pipes with tobacco each contained several other pollen types, including pollen from *Pinus* (pine); the flowering plant genera and families Amaranthaceae, Apiaceae, *Ambrosia*, Asteraceae, Ericaceae, Lauraceae, Poaceae, *Cephalanthus*, Solanaceae, *Typha*, and Urticaceae; and fungal spores that resembled *Pleosphora spherodes*. The other three pipes contained significant amounts of carbonized material that precluded pollen identification, with a few exceptions. Only Poaceae pollen was identified from pipe residues removed from Pipe 7 (905/38MG31) recovered from the village area of the Hiwassee Island site, while Pipe 10 (109/37MG31) from the mound area of the same site only had identifiable pollen from the Asteraceae family.

Results of GC/MS

As proof of principle, and to optimize the method for detection of nicotine by GC/MS, two modern samples were

Table 3. Plants Smoked in Pipes in the Eastern Woodlands.

Family	Scientific Name	Common Name	Plant Part Smoked
Anacardiaceae	*Rhus aromatica*	Fragrant sumac	Leaves
	Rhus coriaria		
	Rhus glabra	Smooth sumac	Leaves
	Rhus typhina	Staghorn sumac	Leaves
Apiaceae	*Cicuta maculata*	Masquash / Poison Hemlock	Root
	Taenidia integerrima	Yellow pimpernel	Seeds
Asteraceaee	*Achillea lanulosa*	Wooly yarrow	Flowers
	Anaphalis margaritacea	Pearly everlasting	Flowers
	Antennaria plantaginifolia	Indian / Ladies tobacco	
	Artemesia gnaphalodes	Wild / White sage	
	Aster cordifolius	Blue wood aster	Root
	Aster macrpphyllus	Starwort	
	Aster novae-angliae	New England aster	Powdered root
	Aster puniceus	Aster	Root
	Erigeron canadensis	Horseweed	Flowers
	Erigeron philadelphicus	Philadelphia fleabane	Flowers
	Solidago graminifolia	Fragrant goldenrod	Flower
Betulaceae	*Betula lenta*	Black birch	Bark
	Carpinus caroliniana	Ironwood	Bark
Campanulaceae	*Lobelia inflata*	Indian tobacco	
Caprifoliaceae	*Viburnum acerifolium*	Dogmackie	Bark
	Viburnum dentatum	Southern arrowwood	Bark
Celastraceae	*Eunonymous atropurpureus*	Burning Bush	
Cornaceae	*Cornus alternifolia*	Alternate-leaved dogwood	Bark
	Cornus amomum	Red willow	Bark
	Cornus obliqua	Swamp dogwood	Leaves
	Cornus racemosa	Panicled-leaved dogwood	Bark
	Cornus rugosa	Round-leaved dogwood	Bark
	Cornus stolonifera	Red osier	Bark
Ericaceae	*Arctostaphylos uva-ursi*	Bearberry	Leaves
	Kalmia latifolia	Laurel	Flowers
	Vaccineum stamineum	Deerberry	Leaves, bark
Fabaceae	*Amorpha canescens*	Lead plant / Shoestring	Leaves
Hamamelidaceae	*Liquidambar*	Sweetgum	Bark
Orchidaceae	*Spiranthes gracilis*	Slender Ladies Tresses	
Poaceae	*Torresia odorata*	Sweet grass	
	Zea mays	Maize	
Polygonaceae	*Polygonum coccineum*	Swamp persicaria	Dried flowers
Primulaceae	*Trientalis borealis*	Starflower	Root
Ranunculaceae	*Rannunculus pensylvanicus*	Bristly Crowfoot	Seeds
Rosaceae	*Crataegus sp*	Hawthorn	Bark
	Prunus serotina	Black cherry	Bark
	Spiraea alba	Meadowsweet	
Rubiaceae	*Mitchella repens*	Partridge berry	
Salicaceae	*Salix lucida*	Shining willow	Bark
	Silax nigra	Black willow	Bark
Scrophulariaceae	*Verbascum sp*	Mullein	
Solanaceae	*Datura innoxia*	Jimsonweed / Thorn apple	
	Datura stramonium	Jimsonweed	Seeds
	Nicotiana quadrivalis	Tobacco	
	Nicotiana rustica	Tobacco	

Table constructed from Densmore 1974, Yarnell 1964.

analyzed by GC/MS. In each sample a major peak occurred with a retention time of 6.3 minutes. The mass spectrum corresponding to this peak matched with greater than 90% confidence to the mass spectrum corresponding to nicotine. The retention time will vary with differences in instruments, columns, and method

FIGURE 3. Pipe that tested positive for nicotine (Ausmus Farm; Pipe 1).

parameters, explaining why the retention time differs from that observed by Rafferty (2002). However, the mass spectra remain constant, regardless of changes to instruments, columns, or method parameters. Additional peaks were observed late in the chromatogram (>17.0 minutes). These peaks did not match with high certainty to any database entries, but contained siloxane patterns which were attributed to the injector septa on the instrument. As this study was qualitative in nature, peaks heights and area are not included.

GC/MS analysis of the archaeological pipes showed that one tested positive for the alkaloid nicotine (Table 1) matching both the retention time and mass spectra of nicotine observed in the modern samples, although the peaks within the archaeological samples were less intense. The pipe (Pipe 4) was recovered during the excavations at the Ausmus Farm site in Claiborne County, located on the south bank of Davis Creek in the Powell Valley near Speedwell, Tennessee (Figure 3). Two mounds were present at this Late Mississippian Dallas phase site (Webb 1938).

Discussion and Conclusion

That four of 14 pipes included in our study showed evidence for the use of tobacco is not surprising, as it has long been assumed that prehistoric pipes in eastern North America are directly linked to tobacco use. The diffusion of tobacco, specifically *Nicotiana rustica*, through the New World and its use by Native Americans in eastern North America has been largely attributed to its high level of nicotine, which is believed to have led to the plant's central role in religious ceremonies as a means to induce visions and to put the user into direct communication with the spirit world (von Gernet 1995). Tobacco was considered to be the premier sacred substance for making offerings to the spirits (Dobkin de Rios 1977; Janiger and Dobkin de Rios 1973, 1976; Kroeber 1941; Morgan 1904; Winter 2000a). For these reasons it played a critical role in the evolution of more complex religious organization and provided a vehicle that tied individuals, groups, and cultures together across time and space (Winter 2000b). Tobacco was thus at the core of Native American culture and at the heart of religions and rituals (Setchell 1921; Winter 2000b). The antiquity and power of tobacco to Native Americans is evidenced by its role in creation stories and mythological histories. Tobacco was believed to have supernatural powers as well as supernatural origins; its use was always ritualistic or in a sacred context and never for enjoyment or indulgence (La Barre 1972; Wilbert 1972; Winter 2000c).

Most tobacco seeds have been recovered from secondary or domestic contexts, as opposed to special or ritual contexts, possibly because of the difficulty

of establishing ritual contexts from archaeological sites, and because it is the leaves, stems, and blossoms of tobacco that are smoked, not the seeds (Wagner 2000). However, the evidence provided in this study supports the use of tobacco in ritual artifact and contexts. The pipes containing evidence for the use of tobacco were recovered from mound contexts that are considered ritual or religious in nature.

Our sample size is small but the ritual context of the pipes studied makes our findings noteworthy. Further chemical analyses of residues in archaeological pipes can be expected to strengthen evidence of the use and role of plant use in ritual or ceremonial practices.

The results from pollen analysis may also contribute to knowledge of the smoking culture in eastern North America. The gap of over 1000 years that exists between archaeologically recovered pipes in the Late Archaic and evidence for the use of tobacco in the Middle Woodland period suggests that upon its introduction tobacco was incorporated into an existing smoking complex that included a variety of plants used for ceremonial, medicinal, and spiritual purposes. Yarnell (1964) and Densmore (1974) have elaborated on these taxa (summarized in Table 3), which include many of the plant families represented by pollen in the pipe residues we examined. While some of the pollen we recovered could have been trapped on sticky tobacco leaves by aerial dispersal (Donaldson and Stephenson 2010), other pollen grains may be from plants that were intentionally added to the smoking mixture and were part of a larger smoking culture (Erichsen-Brown 1979; Ford 1981; Jones and Morris 1960; Knight 1975; McGuire 1897; Paper 1988; von Gernet 1995, 2000; Yarnell 1964).

An additional point of interest in our data is the lack of overlap between the results produced by the six pipes examined for both pollen and alkaloids. Though evidence for the use of tobacco was discovered in three pipes in the form of pollen grains, those three pipes did not return a positive alkaloid signature for nicotine when analyzed using GC/MS. In addition, Pipe 4 produced no evidence for the use of tobacco in the form of pollen but did return a positive signature for nicotine. Our failure to find pollen in Pipe 4 may have been due to the abundance of carbonized material in the pollen preparation, which obscured pollen grains. The lack of an alkaloid signature in the pipes that did contain tobacco pollen may indicate that the amount of nicotine present in the small samples was below the detection level of the GC/MS. Differential preservation of pollen or alkaloids in certain archaeological contexts could also explain the lack of overlap, which argues for the use of multiple methods to detect tobacco.

The use of tobacco by prehistoric populations is an example of a complex language of social and chemical interactions that has always mediated the human cultural relationship to the world at large (McKenna 1992). Pipes, their contents, and the contexts from which they are recovered may be instrumental in helping researchers better understand that complex language. Here we have demonstrated the value of two methods to document the use of tobacco by prehistoric societies. Combining pollen and GC/MS analyses of pipe residues can help researchers use the archaeological record to better understand the complex interrelationships that exist between individuals and the natural landscape.

Acknowledgements. We would like to thank the staff of the McClung Museum and Dr. Dennis Blanton for contributing pipes or pipe residues used in our study. We would also like to thank

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THE KELLEY'S BATTERY SITE (40DV392): ARCHAEOLOGICAL INVESTIGATIONS AT A MIDDLE CUMBERLAND MISSISSIPPIAN VILLAGE

J. Scott Jones

The Kelley's Battery site (40DV392) is a multi-component prehistoric site located on the Cumberland River in western Davidson County, Tennessee. Salvage excavations were conducted in 1998 prior to destruction of the site by development. Evidence of Paleoindian through Mississippian period occupations was recovered. Of particular interest is the excavation of two Mississippian stone-box cemeteries and associated village. An overview of the excavation is presented along with investigation results. A single radiocarbon date of 670±60 B.P. with a single-sigma calibrated range of AD 1282-1390 was obtained for the Mississippian occupation. The excavation and analysis results determined the Mississippian occupation of Kelley's Battery comprised a nucleated village primarily occupied during the period of regional decentralization (AD 1325-1425).

The Kelley's Battery site (40DV392) is (or was) a large, multi-component prehistoric archaeological site located on the south bank of Bell's Bend of the Cumberland River, Davidson County, Tennessee (Figure 1). The site was recorded in 1988 during the Tennessee Division of Archaeology (TDOA) survey of Civil War period archaeological sites in Middle Tennessee. The site was recorded as a Confederate battery with associated earthworks overlooking the Cumberland River along with a cluster of stone-box burials located in an old fencerow berm or earthwork. The extent of the stone-box cemetery and Mississippian occupation was not determined at the time the site was recorded. Prior to the proposed development of a 372,000-square-foot shopping center, the author conducted a Phase I survey in 1997 during which additional probable Civil War earthworks, an extensive prehistoric habitation area, and a second stone-box cemetery were identified. The primary Civil War component was largely protected from development and later became an interpreted part of the Metro Parks greenway system (Brookmeade Park at Kelley's Point Battlefield). Despite public protests from many constituencies, the prehistoric component was subject to almost total destruction with minimal opportunities for controlled data recovery. Because the shopping center was entirely a private development, the only legal protection for the Mississippian component was the Tennessee State cemetery vandalism law (*Tennessee Code Annotated* [39-3-1327]) and cemetery termination statute (*Tennessee Code Annotated* [46-4-101, *et. seq.*) which apply only to the identification, removal, and relocation of human burials and not to other features of archaeological sites (see Moore 1998). Following the procedures recommended for prehistoric burial location and removal at the time, all features greater than 30 cm in diameter were to be sampled to determine whether they were burials or not – those confirmed as burials were to be professionally excavated and removed. The results of the salvage investigations and cemetery removal within those constraints are presented here.

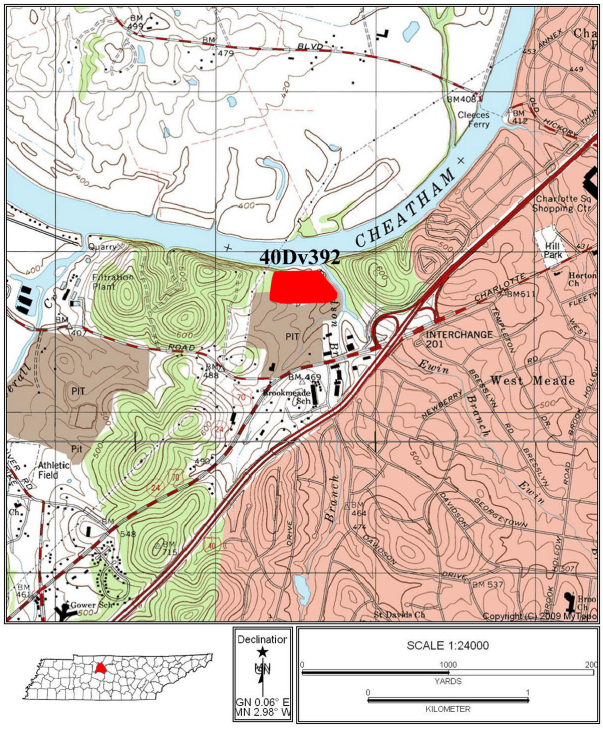

FIGURE 1. Location of the Kelley's Battery site; Scottsboro 1:24000 USGS topographic quadrangle.

The Excavation

Approximately 9400 square meters were investigated during the salvage operations, including five areas (Figure 2): (a) Cemetery Area 1; (b) Cemetery Area 2; (c) Village Area 2; (d) Village Area 3; and (e) Village Area 4. Each of these areas is described below.

Cemetery Area 1 is located west of the primary habitation areas on a small shelf on an otherwise rather steep slope (Figure 3). Bedrock and very shallow soil are present immediately to the east of the cemetery and mark the eastern boundary. No evidence of habitation in the form of subsurface features was encountered during excavation of this area although numerous artifacts were observed in general surface contexts. This area also included a large "mound" of stone slabs labeled as Mound A (Figure 4). Similar features have been identified at other sites with large stone box cemeteries and have been attributed to prehistoric construction, field piles of early historic Euro-American farmers, or looter stockpiles. The presence of burials in Mound A at 40DV392 and the similar feature at the Gordontown site (40DV6; Moore and Stripling 1998:22) suggest that these features may actually be remnants of burial mounds. Stone mounds or similar features have been reported from the Sellars Farm site (40WI1), Sycamore Creek (40CH74), and Castalian Springs Mounds (40SU14). Fifty-eight burials were removed in this area.

Cemetery Area 2 is located near the northern periphery of the investigation boundary (Figure 5) on a small knoll much closer to the habitation areas. This cemetery represents the original cemetery recorded on the site survey form. Fifty-nine burials were removed from this area (only 55 of which were mapped).

Village Area 2 is located immediately to the south of Cemetery Area 2 (Figure 6). Three structures and five features greater than 30 cm in diameter were investigated in this area.

Village Area 3 is located in the northern portion of the eastern half of the area of investigation (Figure 7). Thirteen human burials (including three Archaic period flexed burials), 32 features greater than 30 cm in diameter, and a minimum of four structures were investigated.

Village Area 4 is located to immediately to the south of Village Area 3 (Figure 8). Two infant stone box burials, eight features, and six structures were identified in this area. Feature descriptions are summarized in Table 1. Forty-five features were sampled including prepared clay hearths (*n*=5; Figure 9), pits of various sizes (*n*=38; Figure 10), one large post, and a single dog burial (Figure 11).

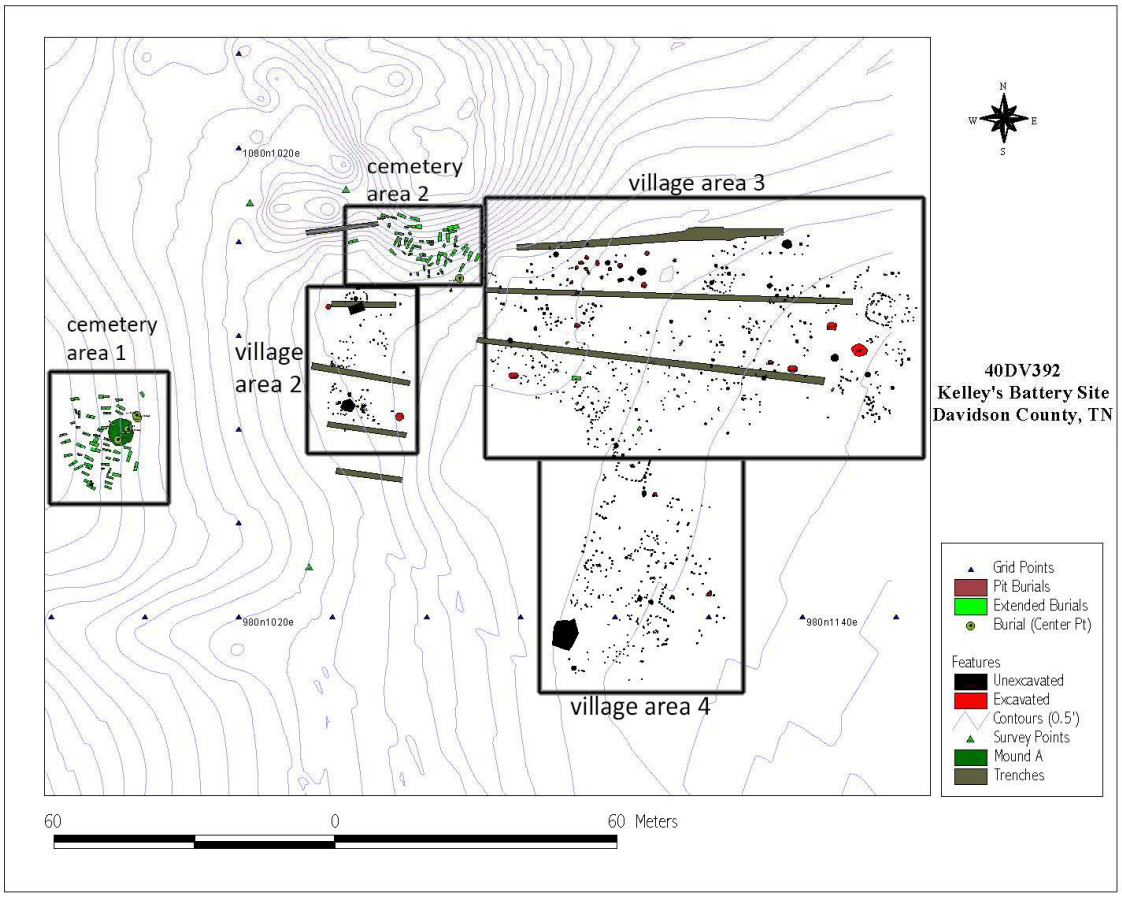

FIGURE 2. Site Plan of 40DV392.

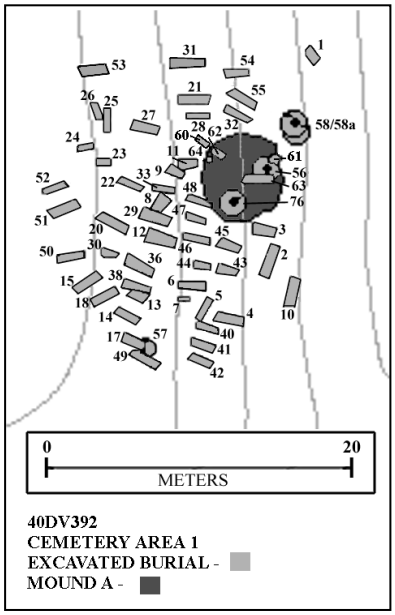

FIGURE 3. Cemetery Area 1 (rectangular polygons are stone-boxes; circular polygons are dispersed burials).

FIGURE 4. Stone “mound” in Cemetery Area 1.

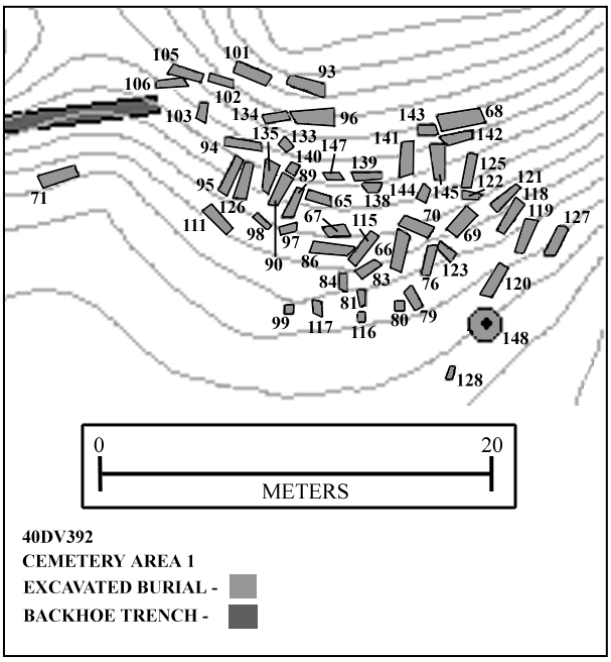

FIGURE 5. Cemetery Area 2 (rectangular polygons are stone-boxes; circular polygons are dispersed burials).

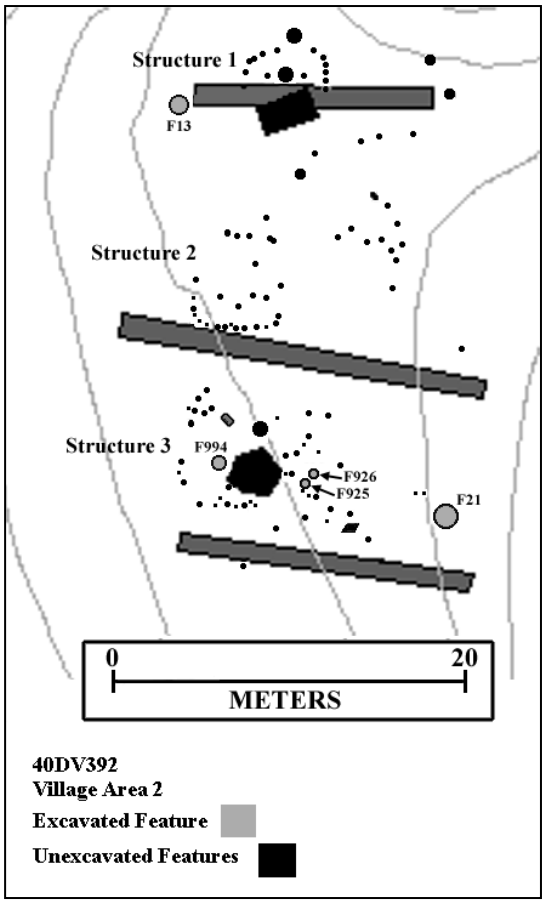

FIGURE 6. Village Area 2.

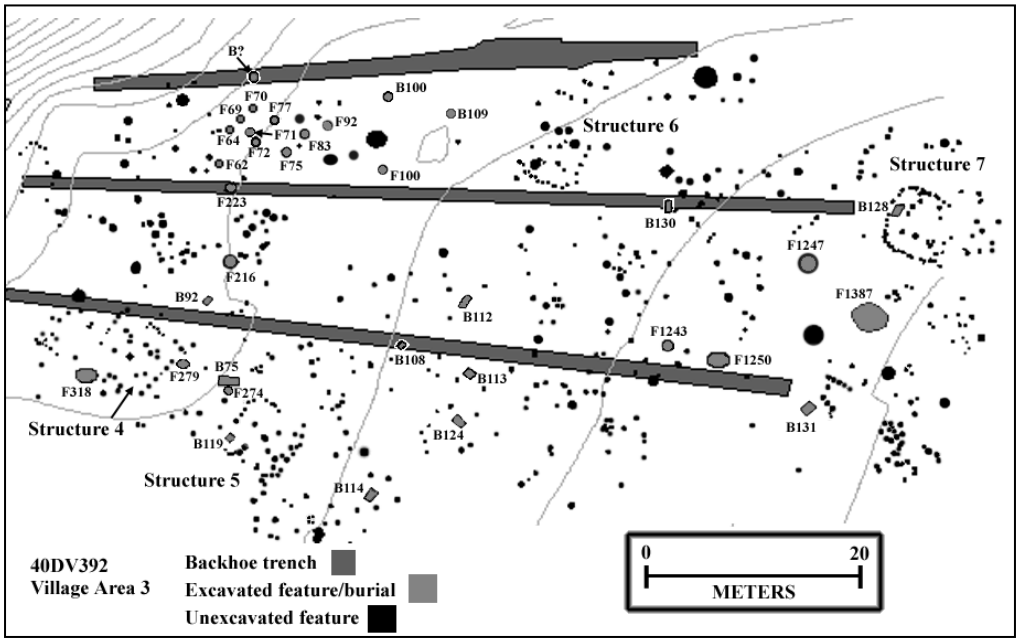

FIGURE 7. Village Area 3.

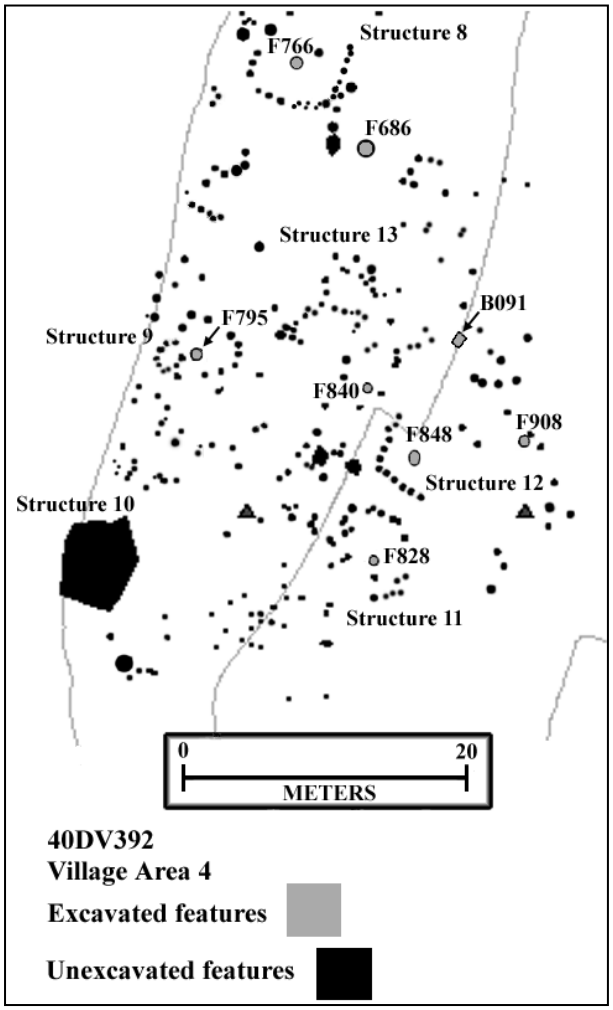

FIGURE 8. Village Area 4.

FIGURE 9. Feature 828, prepared clay hearth.

FIGURE 10. Feature 1387, large pit.

FIGURE 11. Feature 274, dog burial.

Table 1. Features Investigated at 40DV392.

#	Type	N/S (cm)	E/W (cm)	Depth (cm)	Cultural affiliation	remarks
13	Shallow basin	132	95	18	Mississippian	
21	Pit	ca. 170	ca. 170	30	Mississippian	Human effigy water bottle recovered
62	Small pit	54	56	15	Archaic (?)	
64	Small pit	64	40	8.5	Archaic (?)	
68	Small pit	57	60	7	Indet.	
69	Pit	100	85	30	Archaic	Benton pp/k recovered
70	Shallow pit	80	83	7	Archaic (?)	
71	Shallow pit	70.5	81	10	Archaic (?)	
72	Shallow pit	70	54	7	Indet.	
75	Small pit	68	63	9.5	Archaic (?)	
77	Shallow pit	118	80	9	Archaic (?)	Biface cache
80	Pit	122	87	14	Archaic (?)	
83	Pit	77	66	18	Archaic (?)	
87	Small pit	59	35.5	22.5	Archaic (?)	
88	Pit	133	119	19	Archaic (?)	
91	Pit	70	71	20	Mississippian	
92	Pit	100	71.5	25.5	Archaic (?)	
98	Pit	170	70	19	Indet.	
100	Pit	123	116	29	Archaic (?)	
216	Pit	101	127	52	Mississippian	
219	Large pit	421	159	165	Early Archaic (?)	Dalton pp/k recovered
223	Shallow pit	45	60	11	Archaic (?)	
224	post	30	32	39	Indet.	
274	Dog burial	59	48	-	Archaic (?)	
279	Shallow pit	40	40	10	Archaic (?)	
318	Shallow pit	201	130	7	Archaic, Mississippian	Possible overlapping pits
686	Small pit	71	67	12	Indet.	
693	Prepared clay hearth	37	36	13	Mississippian	
766	Prepared clay hearth	62	53	9	Mississippian	
795	Prepared clay hearth	49	38	5	Mississippian	
828	Prepared clay hearth	64	51	5	Mississippian	
840	Shallow pit	82	92	15	Indet.	
848	Hearth/small pit	63	63	18	Mississippian	
903	Shallow pit	95	93	14	Mississippian	
925	Small pit	50	48	15	Indet.	
926	Shallow pit	50	54	9	Indet.	
991	Large pit	360	260	70	Mississippian	
994	Prepared clay hearth	44	40	15	Mississippian	
1024	Pit	140	88	12	Indet.	Possible bioturbation
1243	Pit	105	82	22	Mississippian	
1247	Pit	210	160	34	Mississippian	Produced 670±60 B.P. date
1250	Pit	114	133	43	Mississippian	Large number of Matthews incised, var. *Beckwith* sherds
1280	Obscured pit	55	56	20	Mississippian	Concentration of charred organics including corn cobs
1387	Large pit	365	320	34	Mississippian	
1414	Pit	89	172	19	Mississippian	

Radiocarbon Determinations

Two radiocarbon dates were obtained from the site. Feature 1247 produced a conventional age of 670±60 B.P. (Beta 156263) with a single-sigma calibrated range of AD 1282-1390 (CALIB Rev. 4.2, Stuiver et al. 1998). This date securely places the Mississippian occupation of the site within the regional decentralization period (A.D. 1325-1425; Moore and Smith 2009). This large pit produced a substantial amount of Mississippi Plain (*n*=206), Bell Plain (*n*=30), Matthews Incised (*n*=3), and Kimmswick (*n*=34) ceramic sherds. The second radiocarbon date from Feature 1250, yielded an age of 350±60 B.P. (A.D. 1460-1640; Beta 156264; CALIB Rev. 4.2, Stuiver et al. 1998). This feature is also a large pit that contained Mississippi Plain (*n*=76), Bell Plain (*n*=11), Matthews Incised (*n*=8), and Kimmswick (*n*=2) ceramic sherds. While a mid-15th century to early 17th century occupation is not out of the question, this date appears to be too late based upon the artifact assemblage and comparison with other local Mississippian villages.

Lithic Artifacts

A moderate lithic assemblage (*n*=2196) was collected during the 1998 investigations. The assemblage was divided into 23 categories representative of the morphological, functional, and technological variation observed within the assemblage (see Table 2 for a detailed breakdown by context).

Chipped Stone Artifacts

Debitage (*n*=1982). Debitage is the largest lithic artifact category present in the assemblage (90.3%), and includes all waste material derived from production of stone tools. Cores (*n*=74) consist of cobbles of raw material exhibiting patterns of flake removal. The majority of cores were fragmented and obtained from locally available sources.

Several flake types were identified based upon the presence or absence of certain criteria. Flakes with platforms were separated from non-platform bearing flakes. Platform-bearing flakes were categorized according to the amount of cortex present and characteristics of bifacial thinning. Primary flakes (*n*=49) represent the initial stage of lithic reduction with cortex on 100% of the dorsal surface, and were derived from decortication of raw material cobbles. Secondary flakes (*n*=148) also exhibit cortex on the dorsal surface but less than 100% with previous flake removals evident on the dorsal surface. Interior flakes (*n*=208) have no cortex on the dorsal surface and do not exhibit the characteristics of bifacial thinning flakes. Interior flakes represent complete decortication of raw materials prior to discard. Bifacial thinning flakes (*n*=547) generally do not exhibit cortex on the dorsal surface. The defining characteristic of bifacial thinning flakes is a pronounced "lip" at the point of detachment from the flake source. Flake fragments (*n*=654) are non-platform bearing flakes that cannot be categorized. Blocky debris (*n*=258) consists of angular fragments of raw material often produced during percussion flaking of raw materials. Thermal spalls (*n*=44; aka “potlids”) are the result of breakage from excessive heating of raw materials.

Blades (*n*=3). Single specimens were recovered from Features 69, 219, and 1247. The examples here meet the criteria of width:length ratio and display dorsal ridges extending from the platform to the flake termination.

Table 2. Lithic Artifacts by Provenience.

Proven	Prim Flake	Secd Flake	Ist Flake	BifTh Flake	Flake Frag	BlkyDebris	Blade	TherSpall	Flake Tool	Util debris	PP/k	Biface	Uniface	Knife	Drill	Core	Hmrstone	Celt	Abrader	Hoe	Adze	Discdl	Polishedstone	Total:
Gen. Rec.									1		68	12		1	1	4	1	4		2	1	2	1	98
F 13	1	1	1	11	9	6						1				1								31
F 62	1		3	3		4																		11
F 64		4	1	2		1										1								9
F 68			1																					1
F 69		5	5	18	3	4	1		2		2	2												42
F 70		1		1		2										1								5
F 71			1	3	1																			5
F 77	1			11					1			5				1								19
F 80				1																				1
F 81	1		1	2	5	3																		12
F 83		3	2	7	5	1			1							3								22
F 87	1	4	1	12	3	3																		24
F 88		2	1	1																				4
F 91		2	1	9	5	3																		20
F 92	4	11	23	47	28	12			3	3		1												132
F 216	8	26	33	101	111	32	1	1	6		1	2				5								327
F 219	2	4	7	8	14	8			2		4	3				1								53
F 223	1	1	1	6	3	1																		13
F 224	1	1	4	3	5	2																		16
F 279					3																			3
F 283		1		1							1													3
F 304				1																				1
F 318											1													1
F 334		3	1						1							2								7
F 575			1		2	3			1			1												8
F 628		2	1	1							1													5
F 686			1	1																				2
F 704						1																		1
F 840	1	3		3	4	4																		15
F 848					1																			1
F 903			1	1					2		1						1							6
F 925									1															1
F 992	1		2	6	4	3										1								17
F 1060	1	3																						4
F 1102		1	2	6	5	3						1												18
F 1243	1	1	4	3	2	4			1		2					1								19
F 1246				1															1					2
F 1247	1	7	16	14	16	9	1		2		1					2								69
F 1250	1	2	1	8	4						1					1								18
F 1387	1	2	7	13	2	10					5					3								43
F 1413				1																				1
F 1414		5	1	5	5	2					1													19
B002		2	2	6	4	6										4								24
B003					2																			2
B004					4			1								1								6
B005			1	3	1	3																		8
B006			2	1	4			1			1				1								1	11
B007		1			3																			4
B008			1	3																				4
B012				1	2	1		1																5
B014		1	2	7	9	1						1				2								23
B015				3	1			1																5
B017	2				3							1												6
B018									1															1
B019	1		1	2	8	2										1								15
B020				1	1			1																3
B021				1																				1
B022					1																			1
B023			1		2	2																		5
B024					2							1				1								4
B025					2	1		1																4
B026	2		1	2	2	1					1	1												10
B027				2	3	2		2																9
B032					1																			1
B033				1		1																		2
B036					1							1												2
B038		1			2			1								1								5
B041	1		1	4	4			3								1								14
B042	1		2	3	3	3																		12
B043				4	2																			6
B045			1	5	6	3										1								16
B047			1	5	6	2		3				1												18
B048				5	10	3																		18
B049					3																			3
B050			2	3	1																			6
B051			1	1	2																			4
B053		1		1	4											1								7
B054		1			3	3																		7
B056									1															1
B057				1																				1
B061				3	2																			5
B062	1																							1
B063					6			2																8
B066		1			2			1																4
B068	1	1	2	14	37	1		1	1			1												59
B069	1	1		1	4																			7
B070	1	2	5	5	8	3		2				1												27
B071		4		9	35	3					1					1								53
B072				2	2			2								1								7
B073					5																			5
B074			1						1															2
B075		3	4	8	12							2				9								38
B078	1	3	4	2	10	2										1								23
B079	2			2	4	4		3				1												16
B080					1																			1
B081		2		1	1			1								1								6
B084					2	1																		3
B086		1	3	1	10			1			1					2							1	20
B089		2		2	2	1																		7
B090											2	1												3
B092		1	1	4	3	1																		10
B093	1	2	4		1	2		1	2		1					2								16
B094																1								1

Continued…

Table 2. Lithic Artifacts by Provenience (continued).

Proven	Prim Flake	Secd Flake	Int Flake	BifTh Flake	Flake Frag	BlkyDebris	Blade	TherSpall	Flake Tool	Util.debris	PP/k	Biface	Uniface	Knife	Drill	Core	Hmrstone	Celt	Abrader	Hoe	Adze	Discdl	Polishedstone	Total
B095			1	1																				2
B096	2	2	2	5	5	4		2								2								24
B097		1			1	1		1			1													5
B100			1		3			1																5
B101	1	1	1	3	7	1																		14
B102				2	3																			5
B105			1	3	5	7			1			1				1								19
B106			1	7	1											1								10
B107		1	5	17	28	3										1								55
B108			1	1	1	2					1					2								8
B109		3	1	3		1					1													9
B111	2		2	6	20	7																		37
B115				2																				2
B117				3	4							1												8
B118		1	1	11	12	11		6	2															44
B119		3	1	3	6	4		1	2			1				1								22
B120		2	10	24	32	28		1				2												99
B121			2	3	7	2		1				1				3								19
B124				1	1	1																		3
B126				3	4	2																		9
B127		1		2	1	2																		6
B130				2		1																		3
B132								1																1
B135		3	1	2	1				1			1												9
B137			2	2	3											1								8
B138											2		1											3
B139		1	2	1	3	5			1							3								16
B140					1																			1
B141		2	2	2	5							1												12
B142	1	2	1	1	5				1			1												12
B144			2	2	3	2																		9
B145					2	1																		3
B146				2												1								3
B148				1																				1
B155			1	2	1						1													5
TOTALS	49	148	208	547	654	258	3	44	38	3	102	49	1	1	2	74	2	4	1	2	1	2	3	2196

Flake Tools (*n*=38). The flake tool category is comprised of flakes that exhibit either steep, intentional retouch along at least one margin or a series of small flakes indicative of use-wear. Functional variation in flake tools is often related to the retouched/utilized edge angle. No attempt to differentiate flake tools on the basis of edge angle is conducted. Twenty-four specimens were recovered from features while the remainder (*n*=14) were recovered as secondary associations in mortuary contexts.

Utilized Debris (*n*=3). Utilized debris consists of blocky or angular fragments that exhibit intentional retouch or use-wear along at least one margin. Feature 92 produced the three specimens identified in the current sample.

Projectile Points (*n*=102). A total of 102 diagnostic projectile points was recovered during the 40DV392 excavations. The vast majority of items were recovered from general contexts but several derived from features. This sample was classified according to previously established morphological types and represents the entire span of Middle Cumberland Region prehistory (Table 3; Figures 12-14).

Bifaces (*n*=49). This category includes lithic artifacts that display flake scars on both faces originating from each margin and extending across the artifact surface. The Kelley's Battery bifaces were in various stages of manufacture from features (*n*=16), burials (*n*=21), and general contexts (*n*=12). A biface cache recovered from Feature 77 contained a total of five bifaces in various stages of manufacture.

Uniface (*n*=l). This artifact from Burial 138 exhibited flaking restricted to the dorsal margin with an unmodified ventral surface, and probably comprises an intrusive artifact.

Knives (*n*=2). Two bifacially-flaked artifacts were placed in this category due to their formal character. One knife recovered from Burial 53 measured 17.6 cm long, 4.91 cm wide, and 0.82 cm thick (Figure 15). This particular object was manufactured from a cobble of local

Table 3. Projectile Points/Knives.

Type	#	Proven.	Length	Width	Thickness
Adena	2	GR* (n=1); F219 (n=1)	24.5	28.2-33.4	5.7-9.8
Bakers Creek	6	GR (n=4); F1387 (n=1)	42.7-53.7	21.9-29.8	5.6-8.4
Beaver Lake	1	GR (n=1)	-	26.9	6.7
Benton	1	GR (n=1)	42.1	28.3	9.5
Big Sandy	5	GR (n=5)	36.8-48.1	19.6-30.9	5.2-7.2
Corner-notched	4	GR (n=4)	-	19.7-25.5	5.3-6.8
Cotaco Creek	2	GR (n=2)	-	35.8-39.3	7.7-8.4
Dalton	1	F219 (n=1)	-	26.1	8.1
Distals	15	GR (n=10); F69 (n=2); F219 (n=1); F283(n=1); F1250 (n=1)	-	-	-
Eva	2	GR (n=2)	-	28.5-30.7	8.2-8.4
Fragments	4	GR (n=2); F219 (n=1); F1387 (n=1)	-	-	-
Kanawha stemmed	1	GR (n=1)	-	26.2	5.9
Kirk cluster	17	GR (n=13); F216 (n=1); F318 (n=1); F628 (n=1); F1387 (n=1)	34.4-65.1	19.4-41.3	5.9-8.8
Lanceolate	1	GR (n=1)	68.5	28.3	8.7
Large corner-notched	2	GR (n=2)	52.8	33.7-36.4	8-8.9
Large Triangular	1	GR (n=1)	42.2	25	6.1
Ledbetter	1	GR (n=1)	55.4	26.8	8
Little Bear Creek	1	GR (n=1)	-	26.3	5.4
McFarland	1	GR (n=1)	39.5	24.9	5.7
Morrow Mtn	3	GR (n=3)	50.1-60.4	25.4-35	8-11.8
Small corner-notch	1	GR (n=1)	258.3	21.5	4.7
Small triangular	2	GR (n=1); F1243 (n=1)	26.3	15.3-15.8	3.9-5
Spike Cluster	2	GR (n=1); F1247 (n=1)	54.6-63	19.3-23.8	7.4-9.4
Stemmed Indet.	6	GR (n=4); F1243 (n=1); F1414 (n=1	49.6-62	23.8-34	5.4-11.7
Basal-notch	1	GR (n=1)	44.1	22.1	6.5
Wade	1	GR (n=1)	65.4	36.3	10
Woodland Stemmed	5	GR (n=3); F903 (n=1); F1387 (n=1)	51.6-69.8	21.1-32.6	6.8-9.4
Total:	89				

* General Recovery

FIGURE 12. Paleoindian and Early Archaic projectile point/knives: Dalton, late Paleoindian lanceolate, Big Sandy, Kirk cluster (n=2).

material, most likely a variant of Fort Payne chert. Cortex is incorporated as the hafting element or stem.

A second knife, recovered from Burial 120, was made from cherty limestone. This artifact measured 15.6 cm long, 3.85 cm wide, and 1.29 cm thick (Figure 16).

Drills (*n*=2). Two drills were identified by their narrow bits. One drill was

FIGURE 13. Middle and Late Archaic projectile point/knives: Stanley, Eva, Benton, Wade, Cotaco Creek.

FIGURE 14. Woodland and Mississippian projectile point/knives. Top row: Adena, large corner-notched, Bakers Creek, Woodland stemmed; Bottom row: small corner-notched, Small triangular (n=2).

recovered from the general surface with the other found in Burial 6.

Non-Chipped Stone Tools

Hammerstone (*n*=l). A single hammerstone of rose quartz, weighing 205.5 g, was recovered from Village Area 3.

Celts (*n*=4). One complete and three fragmented groundstone celts occur in the lithic assemblage (Figure 17). The complete specimen was made of greenstone and measured 10.46 cm long,

FIGURE 15. Chert bifacial knife, Burial 53 (*Photo: Tennessee Division of Archaeology*).

FIGURE 16. Limestone bifacial knife, Burial 120 (*Photo: Tennessee Division of Archaeology*).

FIGURE 17. Celts (all from general recovery).

5.32 cm wide at the bit, 2.69 cm thick, and weighed. 207.5 g. Two fragmented artifacts, also made of greenstone, weighed 87 g and 171 g, respectively. The fourth celt fragment was manufactured from a cherty limestone and weighed 205.5 g.

Abrader (*n*=l). A limestone pebble from Feature 1246 displayed V-shaped grooves on one surface. This artifact

FIGURE 18. Limestone hoe.

FIGURE 19. Adze, Feature 1412.

weighed 36.5 g.

Hoe (*n*=l). This category contains a large limestone slab recovered from general contexts in Village Area 4. The object has been pecked into a hoe-like shape and displays small indentations near the tapered end that were possibly used for hafting (Figure 18). This broken artifact measured 7.25 cm wide and 2.91 cm thick, and weighed 325.5 g.

Adze (*n*=l). This artifact of cherty limestone was retrieved adjacent to Feature 1412, and exhibits a triangular cross-section with heavily polished lateral edges and surfaces (Figure 19). Possibly employed in wood-working or similar activities, this specimen has a maximum width of 3.7 cm and thickness of 1.69 cm.

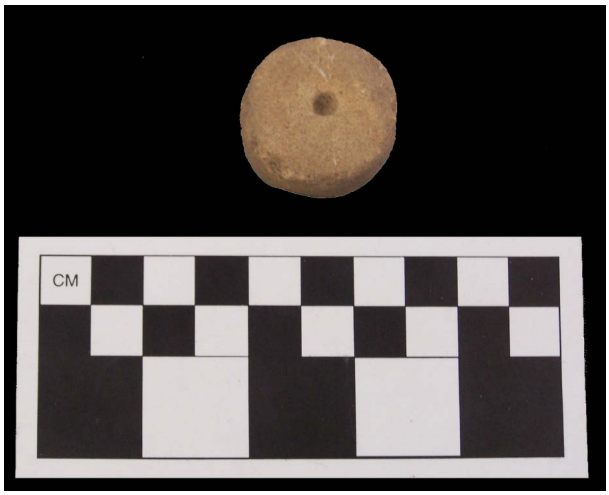

FIGURE 20. Discoidal, Village Area 2

Discoidal (*n*=l). This small, rounded, and weathered limestone fragment was recovered from Village Area 2. The object measures 3.3 cm in diameter and 1.25 cm thick, and both faces of have been drilled (Figure 20).

Polished Stone (*n*=l). A fragment of polished Dover chert from the general surface was present in the lithic sample. This item could represent a hoe, although that determination is tentative at this time.

Additional Lithic Artifacts (*n*=2). This category includes a bi-lobed, roughly dumbbell-shaped geode recovered from Burial 6. The constriction appeared polished while one end of the geode exhibited an abraded or pecked wear pattern.

A large waterworn cobble recovered from beneath the pelvis of Burial 86 was also placed in this category. This artifact weighed slightly greater than 2 kg, but no distinctive use-wear has been observed on either surface of the cobble.

Ceramic Artifacts

The 4,563 ceramic artifacts discussed in this section includes sherds/sherdlets (*n*=4561), complete or partially reconstructed vessels (*n*=24), earplugs (*n*=7), and ceramic pottery trowels (*n*=4). Characterization of the ceramic assemblage by type varieties and associated vessel forms represents the focus of this analysis.

All sherds were size sorted through a 1" screen in order to separate sherds from sherdlets. After size-sorting, the ceramics from each provenience were classified according to the attributes of temper type, temper size, paste texture, and surface treatment or decoration, which provide the basis of typological classification. Rim sherds were analyzed for diagnostic attributes such as vessel type, edge treatment, stance, appendages, decoration, and orifice diameter.

Table 4 presents the total composition of the ceramic assemblage. Following size-sorting, non-diagnostic sherdlets accounted for 58.3% (*n*=2661), while 41.7% of the sherd assemblage was represented by sherds and diagnostic sherdlets (*n*=1902). The inclusion of complete vessels from mortuary contexts (*n*=26; Table 5) brings the total to 1,928 artifacts. Only the latter portion of the sherd subassemblage is presented in the analysis.

Mississippi Plain (*n*=1396)

Mississippi Plain accounts for 73.39% of the total ceramic sherd assemblage. This total includes 1,174 body sherds and 222 rim sherds. A total of 83.33% (*n*=185) of the rim sherds was employed in the vessel analysis with a minimum number of 135 vessels. The remaining rim sherds were too small or incomplete to be analyzed. A total of 14 vessel types including jars, bowls, shallow bowls/pans, and carafe-neck bottles are defined for this ceramic type. Specific vessel types include strap handle jars (MNV=12; Figures 21-23), flattened-loop handle jars

Table 4. Tabulation of Ceramic Sherds by Type and Provenience.

Provenience	Mississippi Plain # sherds	Bell Plain # sherds	Mathews Incised, Var. Beckwith # sherds	Mathews Incised, Var. Mathews # sherds	Kimmswick # sherds	Nash. Neg. Paint # sherds	O'Byam Incised # sherds	Sand-temper # sherds	Lime/shell temper # sherds	Shell/sand temper # sherds	Historic # sherds	Total
feature 13	14	-	-	-	-	-	-	-	-	-	-	14
feature 21	36	18	-	-	-	-	-	-	-	-	-	54
feature 83	1	-	-	-	-	-	-	-	-	-	-	1
feature 283	6	-	-	-	-	-	-	-	-	-	-	6
feature 304	28	8	-	-	-	-	-	-	-	-	-	36
feature 318	4	-	3	-	-	-	-	-	-	-	-	7
feature 334	14	-	1	-	-	-	-	-	-	-	-	15
feature 575	17	13	-	-	-	-	-	-	-	-	-	30
feature 628	9	2	-	-	-	-	-	-	-	-	-	11
feature 665	5	-	-	-	-	-	-	-	-	-	-	5
feature 687	6	6	-	-	-	-	-	-	-	-	-	12
feature 701	3	-	-	-	-	-	-	-	-	-	-	3
feature 703	-	-	-	-	-	-	-	7	-	-	-	7
feature705	16	3	-	-	-	-	-	-	-	-	-	19
feature 735	-	-	17	-	-	-	-	-	-	-	-	17
feature 736	8	-	-	-	-	-	-	-	-	-	-	8
feature 755	7	-	-	-	-	-	-	-	-	-	-	7
feature 756	1	2	-	-	-	-	-	-	-	-	-	3
feature 757	9	17	-	-	-	-	-	-	-	-	-	26
feature 760	-	24	-	-	-	-	-	-	-	1	-	25
feature 762	11	2	-	-	-	-	-	-	-	-	-	13
feature 848	1	-	-	-	-	-	-	-	-	-	-	1
feature 992	2	-	-	-	-	-	-	-	-	-	-	2
feature 1102	5	-	-	-	-	-	-	-	-	-	-	5
feature 1243	42	4	-	-	1	1	-	-	-	-	-	48
feature 1246	8	2	-	-	1	-	-	-	-	-	-	11
feature 1247	206	30	-	3	34	-	-	-	-	-	-	273
feature 1250	76	11	8	-	2	-	-	-	-	-	-	97
feature 1387	124	28	1	-	2	-	-	-	-	-	-	155
feature 1411	60	13	2	-	-	-	-	-	-	-	-	75
feature 1413	78	-	-	-	-	-	-	-	2	-	-	80
feature 1414	43	-	6	-	3	-	-	-	-	-	-	52
burial 7	1	-	-	-	-	-	-	-	-	-	-	1
burial 19	2	-	-	-	-	-	-	-	-	-	-	2
burial 21	6	-	-	-	-	-	-	-	-	-	-	6
burial 31	3	-	-	-	-	-	-	-	-	-	-	3
burial 36	4	-	-	-	-	-	-	-	-	-	-	4
burial 41	53	-	-	-	-	-	-	-	-	-	-	53
burial 43	-	2	-	-	-	-	-	-	-	-	-	2
burial 52	9	-	-	-	-	-	-	-	-	-	-	9
burial 70	2	3	-	-	-	-	-	-	-	-	2	7
burial 74	15	-	-	-	-	-	-	-	-	-	-	15
burial 75	2	8	-	-	-	-	1	-	-	-	-	11
burial 78	1	-	-	-	-	-	-	-	-	-	-	1
burial 79	3	-	-	-	-	-	-	-	-	-	-	3
burial 86	2	-	-	-	-	-	-	-	-	-	-	2
burial 89	-	1	-	-	-	-	-	-	-	-	-	1
burial 90	8	-	-	-	-	-	-	-	-	-	-	8
burial 93	-	4	-	-	-	-	-	-	-	-	-	4
burial 94	-	-	-	-	1	-	-	-	-	-	-	1
burial 95	2	1	-	-	-	-	-	-	-	-	-	3
burial 96	8	1	-	-	-	-	-	-	-	-	-	9
burial 99	3	-	-	-	1	-	-	-	-	-	-	4
burial 101	1	2	-	-	-	-	-	-	-	-	-	3
burial 102	4	-	-	-	-	-	-	-	-	-	-	4
burial 106	8	-	-	-	1	-	-	-	-	-	-	9
burial 110	4	-	-	-	-	-	-	-	-	-	-	4
burial 111	8	-	-	-	3	-	-	-	-	-	-	11
burial 113	-	-	-	-	25	-	-	-	-	-	-	25
burial 114	22	-	-	-	1	-	-	-	-	-	-	23
burial 118	1		-	-	-	-	-	-	-	-	-	1
burial 119	-	-	4	-	-	-	-	-	-	-	-	4
burial 124	1	-	-	-	-	-	-	-	-	-	-	1
burial 125	1	-	-	-	-	-	-	-	-	-	-	1
burial 129	91	-	-	-	-	-	-	-	-	-	-	91
burial 130	-	-	-	-	-	-	-	-	-	-	-	
burial 133	1	-	-	-	-	-	-	-	-	-	-	1
burial 135	5	-	-	-	-	-	-	-	-	-	-	5
burial 137	4	-	-	-	-	-	-	-	-	-	-	4
burial 139	2	5	-	-	-	-	-	-	-	-	-	7
burial 141	9	-	-	-	-	-	-	-	-	-	-	9
burial 142	1	-	-	-	-	-	-	-	-	-	-	1
burial 143	2	-	-	-	-	-	-	-	-	-	-	2
burial 144	17	-	-	-	-	-	-	-	-	-	-	17
burial 145	4	-	-	-	-	-	-	-	-	-	-	4
burial 150	-	-	-	-	-	-	-	-	-	-	-	
subtotal	310	27	42	3	32	-	1	-	-	-	2	376
Village Area 2	5	4	-	-	-	-	-	-	-	-	3	12
Village Area 3	182	60	8	-	-	-	-	-	-	-	-	249
Village Area 4	59	80	4	-	-	-	-	1	-	-	-	143
subtotal	246	144	12	-	-	-	-	1	-	-	3	406
Total	1396	354	54	3	77	1	1	8	2	1	5	1902

(MNV=2; Figures 24 and 25), bifurcate lug jars (MNV=15; Figures 26 and 27), indeterminate lug jars (MNV=8), indeterminate handle jars (MNV=48; Figure 28), flanged lip jar (MNV=1; Figure 29), simple bowls (MNV=9; Figure 29), everted rim bowls (MNV=6; Figure 29), constricted rim bowls or "ollas" (MNV=2; Figure 30), filleted appliqué bowl (MNV=17; Figure 31), notched lip bowl (MNV=1; Figure 32), constricted rim, noded bowl (MNV=1), carafe-necked bottles (MNV=2; Figure 33), and shallow bowls/pans (MNV=11; Figure 34).

Table 5. Ceramic Vessels from Mortuary Contexts, 40DV392.

Burial	Description
14	Mississippi Plain double lug jar, Mississippi Plain strap handle jar
24	Bell plain duck effigy bowl
25	Mississippi Plain strap handle jar
26	Mississippi Plain carafe neck bottle, Bell Plain mussel shell effigy bowl
48	Mississippi Plain strap handle jar
99	Bell Plain fish effigy bowl
101	Mississippi Plain strap handle jar
102	Indet. Shell tempered vessel
105	Bell Plain fish effigy vessel
106	Bell Plain notched rim bowl
112	Bell Plain notched rim bowl
114	Matthews Incised jar (?)
119	Matthews Incised jar (frog effigy)
122	Notched rim bowl, strap handle jar
129	Mississippi Plain constricted rim bowl
130	Matthews incised var. *Matthews* jar, Mississippi Plain strap handle jar
144	Human hooded effigy bottle, fish effigy bowl, conch/gourd effigy bowl, notched rim bowls (n=2) (All Bell Plain)
150	Bell Plain fish effigy bowl

FIGURE 21. Mississippi Plain strap handle jar sherds.

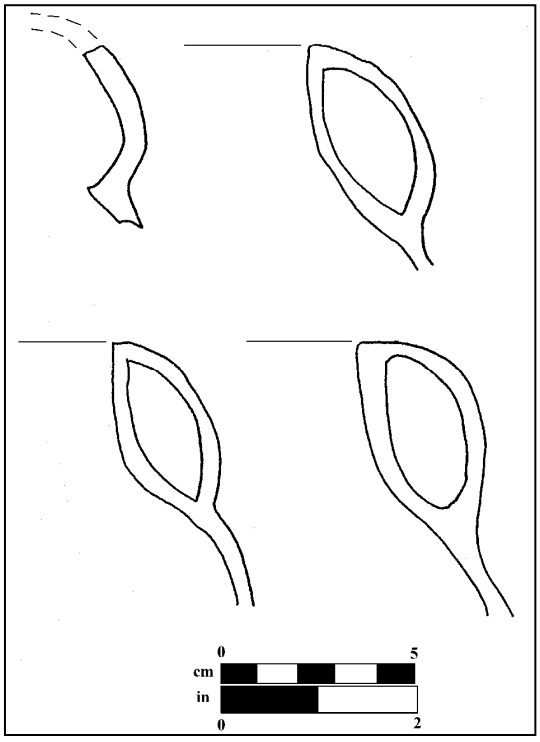

FIGURE 22. Mississippi Plain strap handle jar rim profiles.

FIGURE 23. Strap handle jar, Burial 101 (*Photo: Tennessee Division of Archaeology*).

FIGURE 24. Mini-flattened-loop handle jar, Burial 25 (*Photo: Tennessee Division of Archaeology*).

FIGURE 25. Mini-flattened-loop handle jar, Burial 130 (*Photo: Tennessee Division of Archaeology*).

FIGURE 26. Mississippi Plain bifurcate lug handle jar sherds.

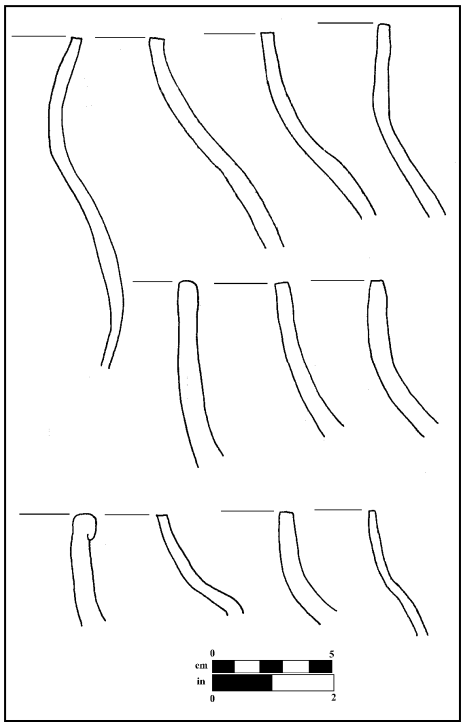

FIGURE 28. Mississippi Plain jar rim profiles.

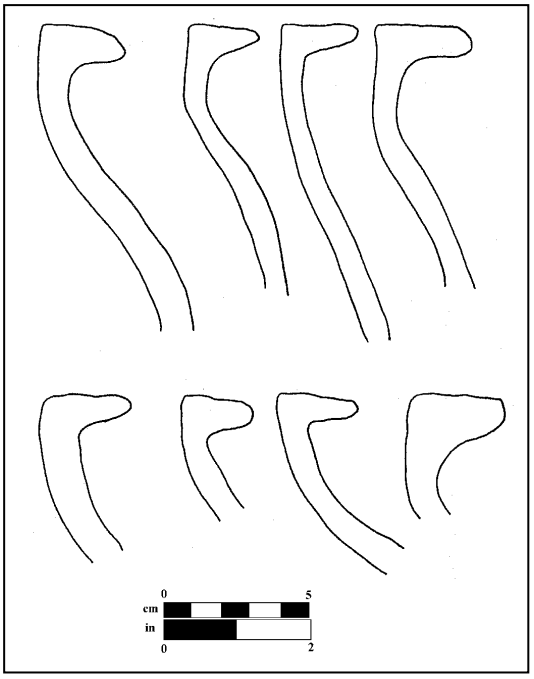

FIGURE 27. Mississippi Plain bifurcate lug handle jar rim profiles.

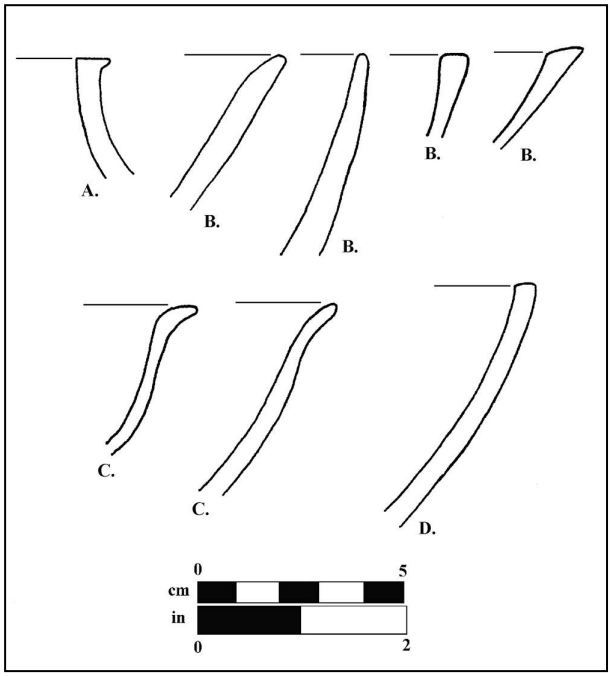

FIGURE 29. Mississippi Plain bowl rim profiles (A) flanged; (B) simple bowl, undecorated; (C) everted rim; (D) notched lip.

FIGURE 30. Mississippi Plain constricted rim jar or "olla."

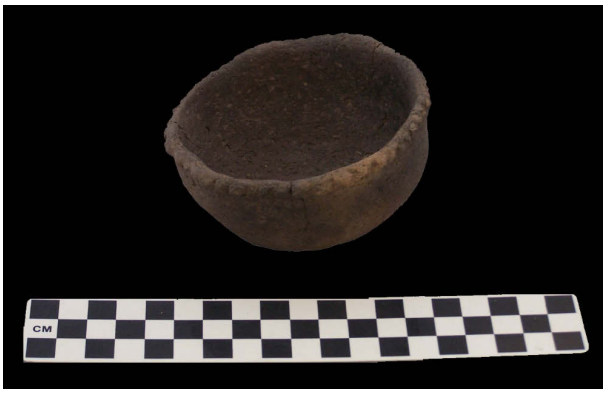

FIGURE 31. Mississippi Plain filleted appliqué bowl, Feature 1413.

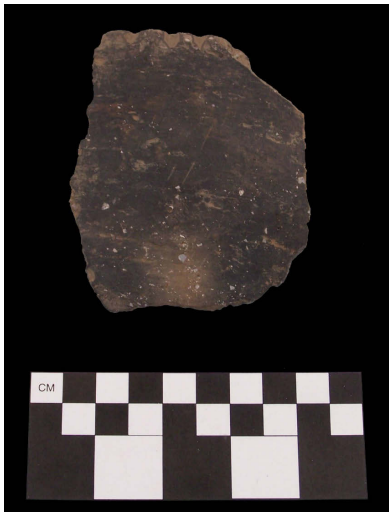

FIGURE 32. Mississippi Plain notched-lip rim sherd.

FIGURE 33. Mississippi Plain carafe-neck bottle; Burial 26 (*Photo: Tennessee Division of Archaeology*).

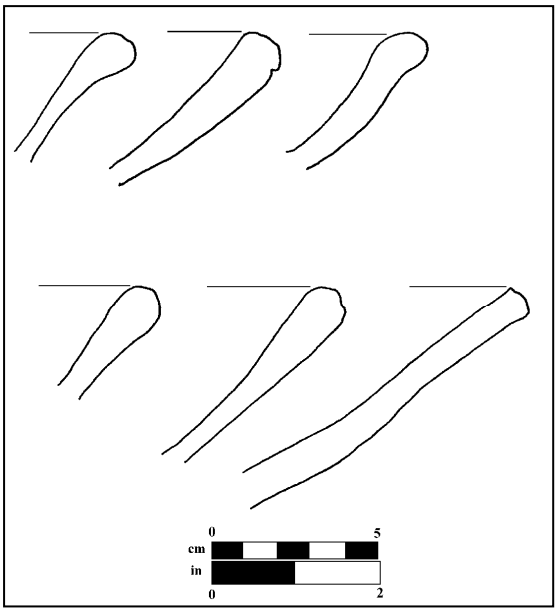

FIGURE 34. Mississippi Plain shallow bowls/pans rim sherd profiles.

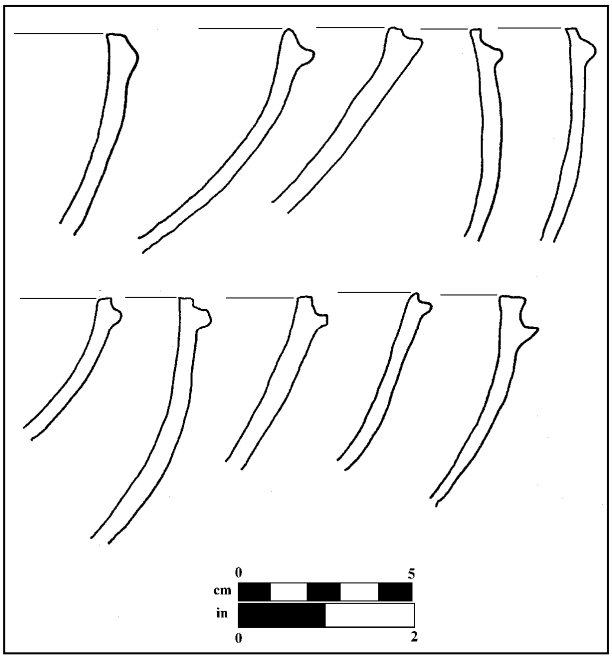

FIGURE 35. Bell Plain filleted appliqué bowl rim sherd profiles.

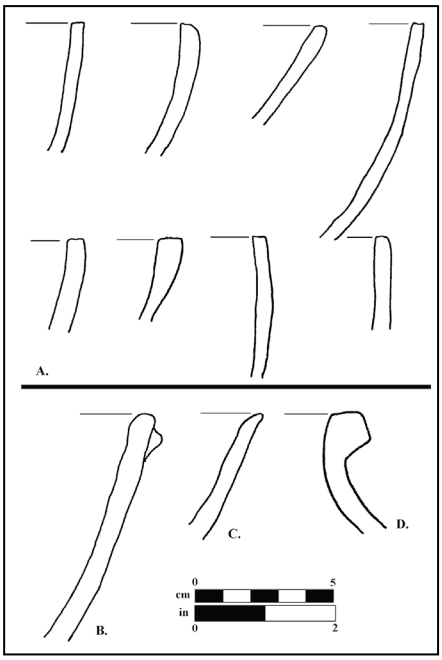

FIGURE 37. Bell plain rim sherd profiles: (A) simple bowl; (B) unnotched appliqué strip; (C) flaring; (D) indeterminate handle.

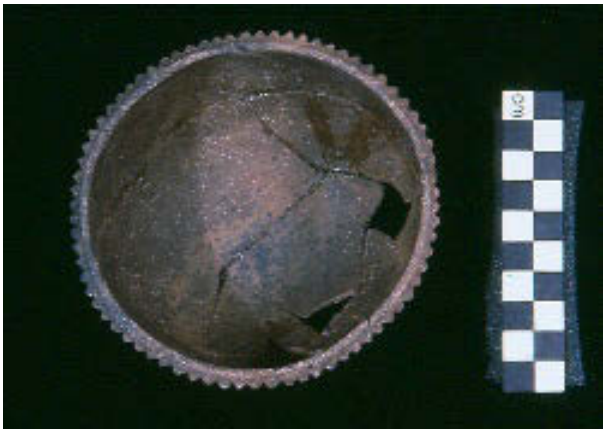

FIGURE 36. Bell Plain filleted appliqué bowl, Burial 144 (*Photo: Tennessee Division of Archaeology*).

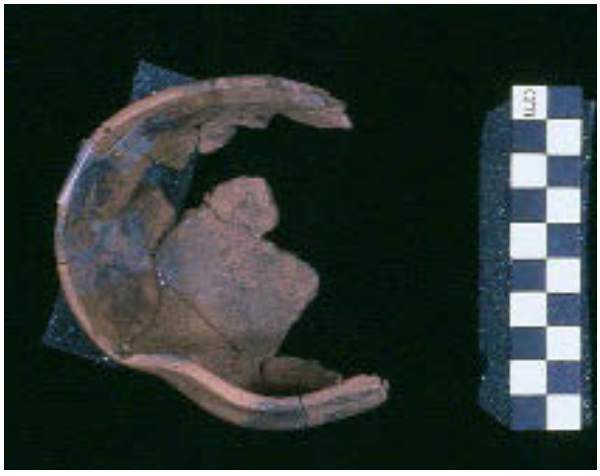

FIGURE 38. Bell Plain mussel shell effigy bowl, Burial 26 (*Photo: Tennessee Division of Archaeology*).

Bell Plain (*n*=354)

This type variety represents 18.61% of the total ceramic sherd assemblage, and includes 236 body sherds, 118 rim sherds, and eight effigy fragments (two rims and six non-rims or appendages). Of the total rim sherds, 95.76% (*n*=113) represent a minimum number of 85 vessels.

Thirteen vessel types represented in the Bell Plain assemblage include bowls, jars, hooded bottles, and various effigy vessels. Specific vessel types include

FIGURE 39. Bell Plain duck effigy bowl, Burial 24 (*Photo: Tennessee Division of Archaeology*).

FIGURE 40. Bell Plain fish effigy bowl, Burial 150 (*Photo: Tennessee Division of Archaeology*).

filleted appliqué, simple bowls (MNV=49; Figures 35-36), plain rim, simple bowls (MNV=8; Figure 37), unnotched appliqué strip, simple bowl (MNV=1; Figure 37), simple bowl, noded (MNV=1; Figure 37), mussel shell effigy bowl (MNV=7; Figure 38), flaring rim bowl (MNV=1; Figure 37), effigy bowl, duck (MNV=3; Figure 39), effigy bowl, fish (MNV=5; Figures 40), effigy bowl, conch/gourd (MNV=1; Figure 41), blank face hooded bottle (MNV=1; Figure 42), human effigy bottle (MNV=2; Figures 43 and 44), and indeterminate handle jars (MNV=6).

Two effigy fragments are present that are not or only tentatively assigned a vessel form. The first of these is a sherd

FIGURE 41. Bell Plain conch/gourd effigy bowl, Burial 144 (*Photo: Tennessee Division of Archaeology*).

FIGURE 42. Bell Plain hooded bottle.

displaying a "nose" like appendage similar to a duck bill. Unfortunately the sherd is too fragmentary to determine vessel form or effigy type. The second fragment is a human leg that strongly resembles the leg adornos of human rim-rider vessels (Allen 2008:82, Figure 6) or reclining human (Smith 1992:117, Figure 27f) effigy bowls (Figures 45 and 46).

Matthews Incised (*n*=58)

Two varieties of Matthews Incised were defined for the 40DV392

FIGURE 43. Bell Plain human effigy bottle, Burial 144 (*Photo: Tennessee Division of Archaeology*).

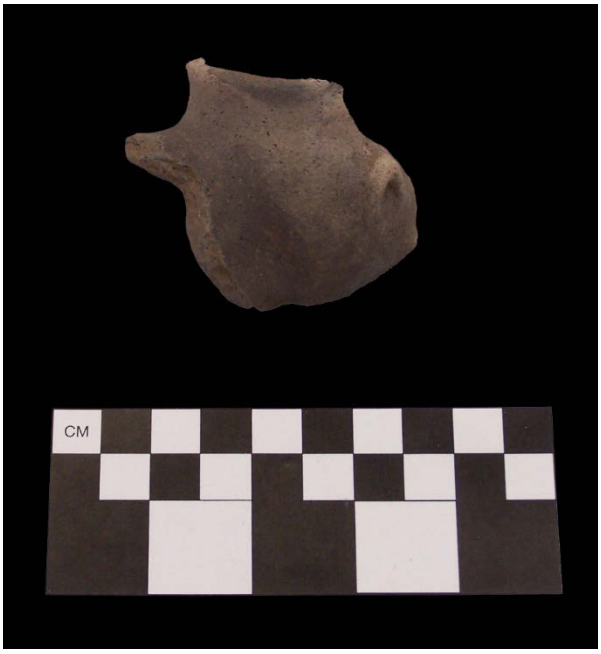

FIGURE 44. Bell Plain human effigy bottle, Feature 21.

FIGURE 45. Bell Plain human effigy "rim rider" leg.

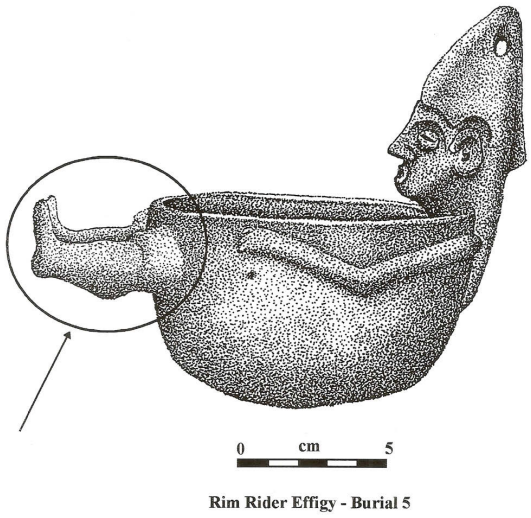

FIGURE 46. Human effigy rim rider vessel from the Travellers Rest site (40DV11).

assemblage: var. *Beckwith* and var. *Matthews*. This category is represented by 57 sherds and one intact vessel.

Matthews Incised var. *Beckwith* comprised 93.1% of this type with 54 sherds (Figures 47 and 48). This particular variety has been separated into the type Beckwith Incised by Kevin Smith and Michael Moore in their more recent Middle Cumberland River research (e.g. Moore 2005; Moore and Smith 2001, 2009; Smith and Moore 2012). Vessel forms of the var. *Beckwith* type included strap handle jars (MNV=4) and indeterminate handle jars (MNV=7).

Matthews Incised var. *Matthews* represented the remaining 6.9% with three sherds and an intact vessel (Figure 49). A minimum of 13 vessels were represented, including two loop handle jars (one intact).

FIGURE 47. Matthews Incised, variety *Beckwith* sherds (possible frog effigy).

FIGURE 48. Matthews Incised, variety *Beckwith* sherds.

FIGURE 49. Matthews Incised, variety *Matthews* jar, burial 130 (*Photo: Tennessee Division of Archaeology*).

Kimmswick Plain and Kimmswick Fabric Impressed (*n*=77)

The Kimmswick Plain and Kimmswick Fabric-Impressed subvarieties accounted for a total of 77 sherds commonly referred to as salt pans (Figures 50 and 51). Kimmswick Plain accounted for the vast majority (*n*=72, 93.5%) with Kimmswick Fabric-Impressed totaling five specimens (6.5%). Rim sherds accounted for 22.2% (*n*=16) of the Kimmswick Plain subassemblage with Kimmswick Fabric-Impressed represented by only one rim.

Nashville Negative Painted (*n*=1)

A single sherd (possibly from a plate) was recovered from Feature 1250 (Figure 52). The geographic and chronological occurrences of Nashville Negative Painted plates have been previously discussed by Beahm and Smith (2013). This type is most commonly associated with midden contexts in the Middle Cumberland region (Beahm and Smith 2013). Negative painted plate sherds have been recovered from Middle Cumberland Mississippian sites 40DV6, 40DV11, 40SU13, 40WI1, and 40WM342 (Beahm and Smith 2013).

Negative painted sherds are best known from the Angel Negative Painted type from the Ohio River Valley (Hilgeman 2000), although the relationship between the Ohio River Valley and Middle Cumberland remains obscure (Beahm and Smith 2013). In contrast to the Middle Cumberland Region, Nashville Negative Painted ceramics appear to have a greater distribution in the Lower Tennessee-Kentucky region and adjoining Mississippi Valley area (i.e. Cairo Lowlands-Sikeston Ridge region of southeast Missouri [Smith 1992:79]), especially from non-mortuary contexts.

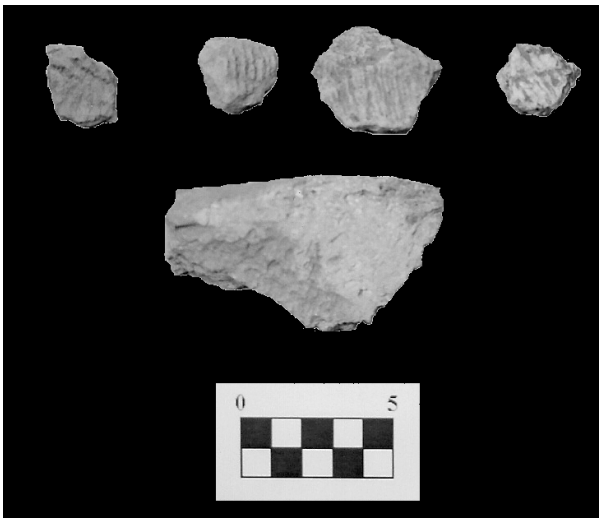

FIGURE 50. Kimmswick Fabric Impressed (top row) and Plain (bottom row) sherds.

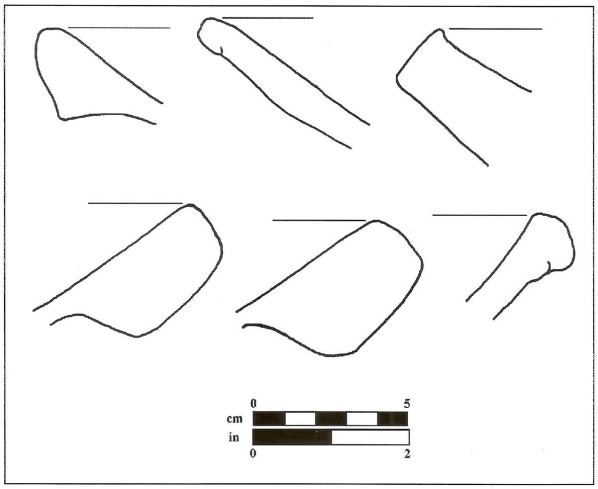

FIGURE 51. Kimmswick Fabric Impressed rimsherd profiles.

Negative painted ceramics have been reported in domestic contexts by Garland (1992:70-71), Pollack and Railey (1987:87), Lewis and Mackin (1984), and Clay (1963:276) within the Lower Tennessee-Cumberland and Sikeston areas.

O'Byam Incised, var.Stewart (*n*=1)

This sherd has a fine paste similar to the Bell Plain sherds, and represents a bowl or deep plate form (Figure 53). The

FIGURE 52. Nashville Negative Painted sherd, feature 1250.

FIGURE 53. O'Byam Incised, var. *Stewart* rim sherd.

incised design is composed of two rectilinear motifs described as "hanging triangles" (Hilgeman 2000).

The larger motif consists of a series of horizontal incisions parallel to the rim and a series of diagonal incisions crossing the horizontal lines. A single incision

perpendicular to the rim provides a border from which both of these series of lines originate. The second motif is similar to the first but less is visible of the design. The rim is flattened with a filleted appliqué strip similar to the Bell Plain filleted rim bowls. The chronological placement of this ceramic type has been recently discussed by Smith et al. (2004). Five additional Mississippian sites in the Middle Cumberland region have produced O'Byam Incised sherds (40DV4, 40DV8, 40DV9, 40DV12, and 40WM1).

Cordmarked, Micaceous Sand Tempered (*n*=8)

Small amounts of micaceous sand particles comprise the temper in these relatively fine paste sherds (Figure 54). Wide cordmarks (4.9 to 5.8 mm) characterize the exterior surface treatment. These eight sherds represent 0.44% of the total analyzed ceramic assemblage. Feature 703 produced seven sherds while a single sherd was found in Village Area 4 (general context).

Two vessels are represented in this sample. A direct rim sherd with rounded lip supports one vessel form as a jar. A previously defined type name is not offered for this ware. These sherds most likely have a non-local origin and may represent trade wares from east Tennessee or northern Georgia.

FIGURE 54. Sand tempered sherds/jar.

Untyped Mixed Temper (*n*=3)

Two untyped mixed temper ceramic wares were noted in the ceramic assemblage. Two body sherds of mixed shell and limestone temper were recovered from Feature 1413. A single body sherd of mixed shell and sand temper was recovered from Feature 760.

Ear Plugs (*n*=7)

Seven ceramic ear plugs were recovered from mortuary contexts at 40DV392 (Figure 55). Ear plugs are generally described as oval or ovoid in shape with a groove around the center and a hole through the long axis with a paste resembling Bell Plain (Trubitt 1998). Six of the seven present in the 40DV392 assemblage conform to this description. Burial 117 produced a more cylindrical shaped object with a coarser paste.

Five burials (44, 101, 117, 123, and

FIGURE 55. Ear plugs. Top row: Burial 44, Burial 101, Burial 117, Burial 123; Bottom row: Burial 137 (*n*=2), Burial 141B (*Photo: Tennessee Division of Archaeology*).

141) each contained a single example while Burial 137 yielded two specimens. These artifacts produced a mean length of 24.19 mm (range of 21-30.8 mm) and a mean weight of 6.24 g (range of 4.2-11 g).

Pottery Trowels (*n*=4)

Pottery trowels are considered to be finishing tools for coiled pots or other grinding and polishing functions (Smith 1992:210; Trubitt 1998:110). The four trowels found at 40DV392 are of the "mushroom" variety (Figure 56). These artifacts were recovered from mortuary (Burials 50 and 139) as well as domestic (Village Area 3, *n*=2) contexts.

A medium to coarse paste similar to Mississippi Plain was used to manufacture these items. The highly eroded trowel from Burial 50 has been hard to accurately measure. The Burial 139 specimen is 7.5 cm in height and has a body diameter of 7.44 cm. A complete trowel from Village Area 3 measured 6.16 cm high and 9.68 cm in disc diameter. The other village specimen yielded a disc diameter of 7.86 cm.

The Kelley's Battery Site Ceramic Assemblage in Middle Cumberland Context

The ceramic assemblage from Kelley's Battery is comparable to numerous other Middle Cumberland Mississippian assemblages associated with nucleated villages (Beahm 2013; Trubitt 1998). The ceramic assemblage most resembles the Regional Period IV (AD 1325-1425) described as a period of regional decentralization following the proliferation of chiefdoms (Moore and Smith 2009). Significant quantities of filleted appliqué strip have been noted as a horizon marker for this period (Moore and Smith 2009:211) along with Matthews Incised ceramics also become prevalent during this period (Moore and Smith 2009:213). Minority types such as interior incised plates and bowls (Smith et al. 2004) and negative painted ceramics (Beahm and Smith 2013) have been documented to a much greater degree in recent history. Interior incised plates and bowls in the Middle Cumberland region are dated as present from AD 1300-1420 (Smith et al. 2004:53). Negative painted ceramics are placed between AD 1250-1350 (Beahm and Smith 2013:97).

FIGURE 56. Pottery trowel, Burial 139 (*Photo: Tennessee Division of Archaeology*).

Ceramic composition and percentages have been compared between the Kelley's Battery site and other Middle Cumberland Mississippian assemblages (Moore and Smith 2001). Kelley's Battery favorably compares with Rutherford-Kizer (40SU15), Gordontown (40DV6), and Old Town (40WM2) in ceramic assemblage composition. Significant differences exist with other sites however. These differences may lie in recovery techniques characteristic of salvage projects versus federal compliance and research projects.

Faunal Analysis

The relatively small faunal assemblage recovered from the 40DV392

investigations yielded vertebrate (*n*=401) and invertebrate (*n*=952) remains (Tables 6 and 7).

Mammalian Remains

Mammalian remains comprised the largest class in the assemblage (*n*=288; 71.82%). Thirteen species were identified, although unidentifiable mammal remains (*n*=117; 40.61%) represent the largest single component (Table 6). Cottontail rabbit was the most numerous identified species (*n*=97; 33.68%), with two fragments recovered from feature context and the remainder retrieved from burial context. White-tailed deer was the second most numerous species (*n*=37), followed by gray squirrel (*n*=7), domestic pig (*n*=5), opossum (*n*=5), eastern mole (*n*=4), dog (*n*=3), rice rat (*n*=3), and woodchuck (*n*=3). Single specimens of eastern chipmunk, fox squirrel, squirrel spp., muskrat, and vole spp. were also present.

Some mention of the distribution of remains should be made. The eastern chipmunk and vole specimens were recovered from burial context along with woodchuck and rice rat. White-tailed deer (*n*=9) were also recovered from burial context although at least two items may represent grave goods. The rodent and rabbit specimens from burial contexts likely represent intrusive elements and are not considered food sources. The domestic pig remains are obviously associated with the historic component.

Avian Remains

Avian remains constitute 7.23% (*n*=29) of the faunal assemblage. The three identified species comprise wild turkey (*n*=6; 20.69%), teal-size water fowl (*n*=2; 6.90%), and Canada goose (*n*=2; 6.90%). All avian remains were recovered from feature context with the exception of four long bone beads (Burial 14) made from an unidentified species.

Table 6. Vertebrate Remains.

Taxa	Count	MNI	Burned	Cut	Modified
Totals	401	42	27	7	14
Mammals	*288*	*25*	*23*	*7*	*8*
Odocoileus virginianus, White-tailed deer	37	2	2	5	6
Sus scrofa, domestic pig	5	1			
Canis familiaris, dog	3	3			
Tamias striatus, Eastern Chipmunk	1	1			
Sciurus niger, Fox squirrel	1	1			
Sciurus carolinesis, Gray squirrel	7	2	1		
Sciurus spp., Squirrel sp.	1				
Marmota monax, Woodchuck	3	2			1
Ondatra zibethica, Muskrat	1	1			
Oryzomys plaustris, Rice Rat,	3	1			
Microtus sp., Vole sp.	1	1			
Sylvilagus floridanus, Cottontail rabbit	97	7		2	
Scalopus aquiaticus, Eastern mole	4	1			
Didelphis marsupialis, Opussum	5	2			
Large mammal fragments	91		20		1
Medium mammal fragments	2				
Small mammal fragments	8				
Small rodent	3				
Mammal fragments	13				
Birds	*29*	*3*	*4*		*6*
Meleagris gallopavo, Wild turkey	6	1	1		1
Anas sp., Teal size	2	1	1		
Branta canadensis, Canada goose	2	1			
Bird fragments	19		2		5
Reptiles	*20*	*6*			
Trionyx/Chelydra sp., Softshell/snapping turtle	2	1			
Terrapene carolina, Eastern box turtle	12	3			
Turtle fragments	3				
Colubridae, Nonpoisonous snake family	2	1			
Viperidae, Poisonus snake family	1	1			
Fishes	*62*	*8*			
Lepisosteus sp., garfish sp.	2	1			
Moxostoma sp., Redhorse sp.	18	3			
Ictalurus punctatus, Channel catfish	2	1			
Aplodinotus grunniuns, Freshwater drum	3	3			
Fish fragments	37				
Other	*2*				
Undifferentiated fragments	2				

Reptile Remains

Reptiles (*n*=20, 4.99%) included two identified turtle species (Softshell/ Snapping and Eastern Box) (*n*=12; 60%) along with several unidentified turtle and snake (Colubridae and Viperidae) fragments. Burial 130 yielded a colubrid vertebrae and Burial 135 had a turtle carapace fragment. All remaining reptile remains were recovered from feature or general recovery contexts.

Fish Remains

Fish represent the second most numerous vertebrate group (*n*=62; 15.46%). Four species were defined, including redhorse (*n*=18; 29.03%), freshwater drum (*n*=3; 4.84), channel catfish (*n*=2; 3.23%), and gar (*n*=2; 3.23%), %). All fish remains were recovered from feature context.

Modified Bone

Fourteen specimens of modified bone were identified from white-tailed deer (*n*=6), woodchuck (*n*=1), large mammal (*n*=1), turkey (*n*=1), and bird fragments (*n*=5). The white-tailed deer modified bone comprised a proximal ulna awl (*n*=1; Figure 57), astragalus (*n*=2; Figure 58), and possible antler flakers (*n*=3).

Possible polish is present on a woodchuck ramus. The unidentified large mammal element exhibited blunting and polish. A turkey bone awl and an unidentified bird bone awl were also present. The remaining unidentified bird bone specimens were four beads manufactured from a radius shaft (possibly turkey).

Six additional modified faunal elements were recovered after the removal project had concluded (not tabulated in Table 6). These comprise a bone fishhook and five pins associated with Burial 90. Two of the pins were recovered from the burial fill while three were found together as to form a composite fishhook or gig. These items were immediately adjacent to the fishhook (Figures 59 and 60).

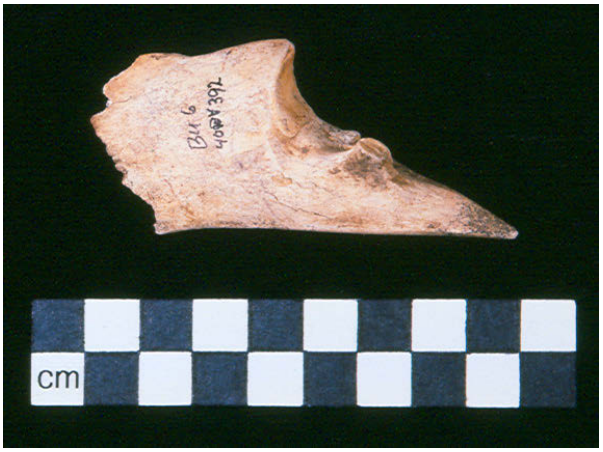

FIGURE 57. Deer ulna awl, Burial 14 (*Photo: Tennessee Division of Archaeology*).

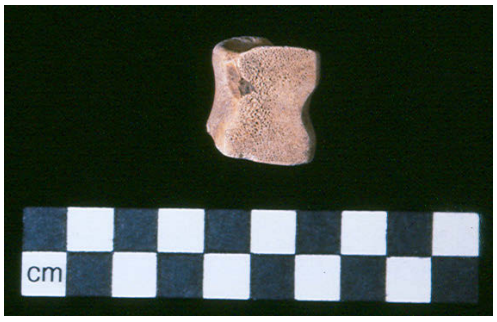

FIGURE 58. Deer astragulus, Feature 1387 (*Photo: Tennessee Division of Archaeology*).

FIGURE 59. Bone pins and fishhook, Burial 90 (*Photo: Tennessee Division of Archaeology*).

FIGURE 60. Composite “gig” and fishhook in situ, Burial 90.

Table 7. Freshwater Invertebrate Remains.

Species	F 1242 NISP/MNI	F 1247 NISP/MNI	F 1387 NISP/MNI	F 1414 NISP/MNI	Total NISP/MNI
Indeterminate bivalve	16/1	50/1	25/1	107/1	198/4
Actinonaias ligamentina	1				1
left	1				
right					
Cylconaias tuberculata	2			1	3
left	1				
right	1			1	
Dromus dromas	1			4	5
left				4	
right	1				
Ellipsaria lineolata	1				1
left					
right	1				
Elliptio dilatata	7/5	1		1	9/7
left	4				
right	3	1		1	
Epioblasma brevidens	2	1			3
left	1	1			
right	1				
Epioblasma flexuosa	1				1
left	1				
right					
Epioblasma haysiana	10/6				10/6
left	6				
right	4				
Epioblasma obliquata	2				2
left					
right	2				
Epioblasma triquetra	2				2
left	1				
right	1				
Lampsilis altilis		1			1
left					
right		1			
Obovaria retusa	4		1	5/4	10/9
left	4		1	3	
right				2	
Pleurobema clava	5			1	6
left	5				
right				1	
Pleurobema plenum	4/3				4/3
left	2				
right	2				
Quadrula cylindrical	2				2
left	1				
right	1				
Indeterminate gastropod		2/1	5/1	250/1	257/3
1		17			17
2	10	6	1	33	50
3	9			20	29
4	61	18		207	286
5				55	55
total	184/118	99/36	33/4	696/338	952/496

Invertebrate Remains

Table 7 summarizes the freshwater invertebrate remains recovered from 40DV392. These remains include 15 identified species of bivalve and five species of gastropod.

A MNI of 56 bivalves and 440 gastropods are represented in the assemblage. Parmalee and Bogan (1998) indicate that many of the bivalve species present in the assemblage are extinct or rare in the Cumberland River today. The assemblage species occupied riffles and shoals in generally three feet or less of water, as sandy to gravelly river beds provided the substrate. The Cumberland River environment is very different now due to inundation. A few species such as *Cylconaias tuberculata*, *Elliptio dilatata*, and *Epioblasma obliquata* can occur in the greater depths seen today.

The eight marine shell artifacts in the

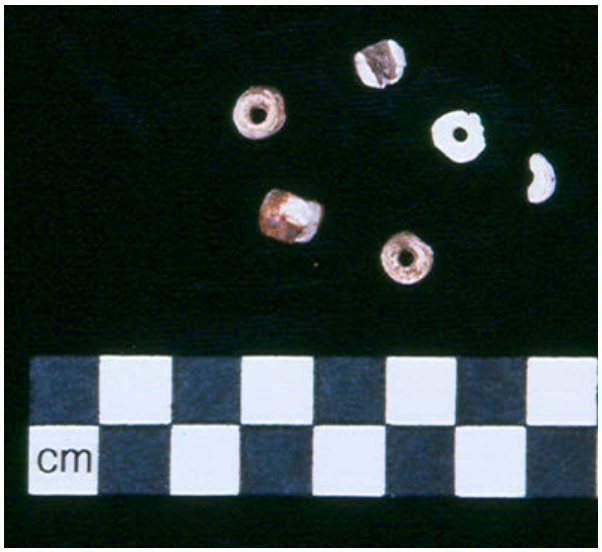

FIGURE 61. Shell beads, Burial 12 (*Photo: Tennessee Division of Archaeology*).

assemblage consist of six marine shell beads from Burial 12 (Figure 61), and two Nashville style or scalloped triskele gorgets from Burials 81 and 112 (Figures 62 and 63).

The two shell gorgets recovered from 40DV392 approach the Nashville I Style as described by Brain and Phillips (1996) but do not entirely conform to their description. This style is described as:

> *exceptionally well made. The overall design is regularly laid out and balanced, and the engraving, pitting, and excising are clearly executed. The central element consists of a pitted circle from which radiate the curved volutes of the triskele or whorl. The volutes overwhelmingly rotate in a counterclockwise direction and generally are deeply engraved or even fenestrated. The ophidian band is made up of six or more pitted circles, often concentric, and panels of numerous pits usually aligned in neat rows. The outer scalloped border consists of a ring of full ellipsoidal scallops that are separated by excised spandrels. The suspension holes are almost always carefully placed in two adjacent spandrels* (Brain and Phillips 1996:113).

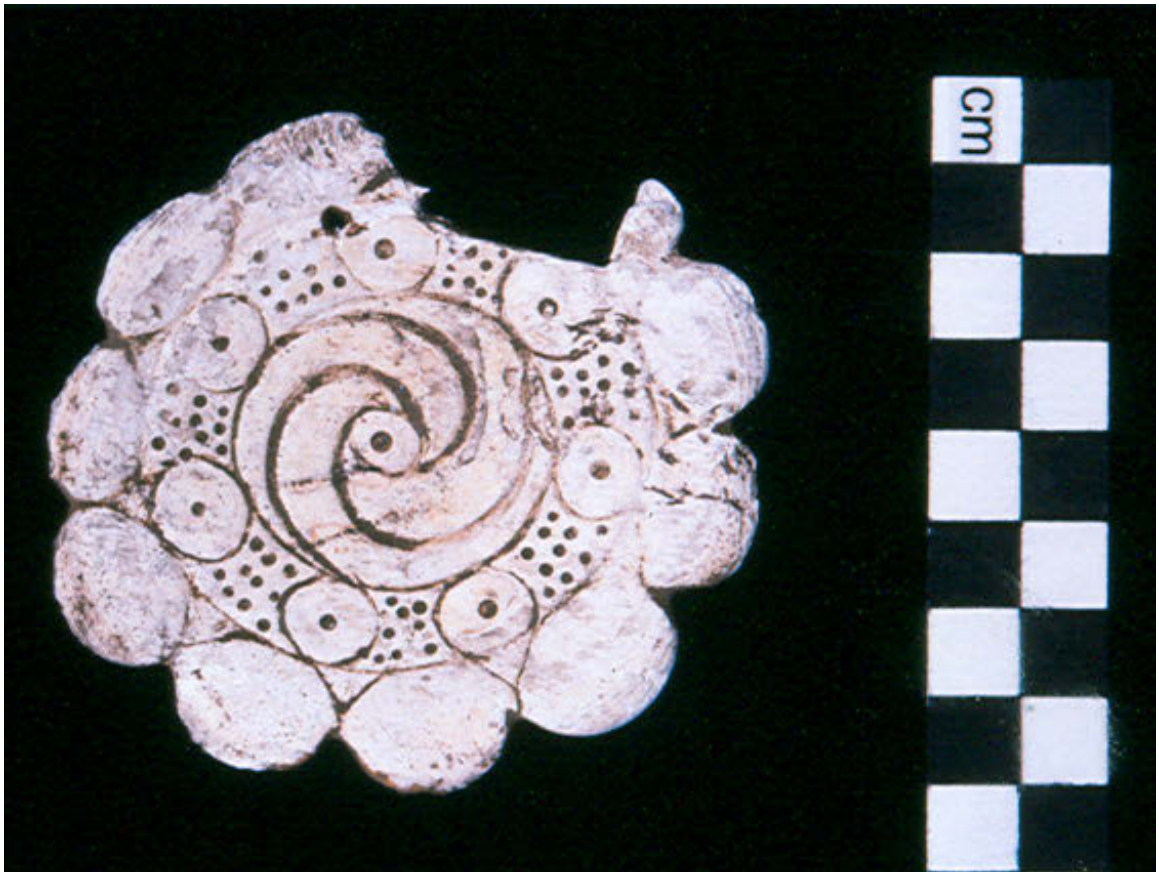

FIGURE 62. Marine shell Nashville style gorget, Burial 81 (*Photo: Tennessee Division of Archaeology*).

The Nashville I style is distinguished from the Nashville II style on the basis of a number of qualitative differences. Nashville II style gorgets (1) tend to be cruder in layout and execution, (2) triskeles are more open with shorter volutes which often rotate clockwise, (3) no plain band surrounding the triskele, (4) the ophidian band has as few as four circles, (5) the pits between the bands are more irregularly spaced, (6) the scalloped border is composed of rough ovoids or trapezoids, and (7) the suspension holes are randomly placed (Brain and Phillips 1996:117).

The Burial 81 specimen (Figure 62) is intermediate between the two Nashville style gorgets described above. Eleven ellipses are present on the scalloped border, which is considerably fewer than

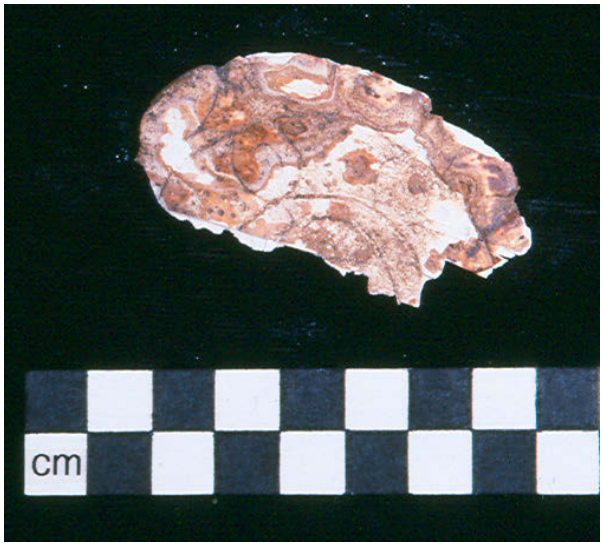

FIGURE 63. Marine shell Nashville style gorget, Burial 112 (*Photo: Tennessee Division of Archaeology*).

the Nashville I style gorgets described by Brain and Phillips (1996:113-117). The fewest number of ellipses present on the Nashville I style described by Brain and Phillips (1996) is twelve with other examples exhibiting up to sixteen ellipses. These approach a more rough ovoid shape as suggested for the Nashville II style. Seven circles are present in the ophidian band with the current specimen while six is the most common number in Brain and Phillip's (1996) sample of Nashville I style gorgets although some variability is allowed in this category. No plain band is present surrounding the triskele unlike Nashville I style gorgets. Fewer pits are present on this specimen than the illustrated examples from Brain and Phillips (1996). In a manner similar to Nashville I style, the volutes are more deeply engraved than the other design elements and the suspension holes are placed in adjacent spandrels. The characteristics of the example described here have a greater affinity with the Nashville II style than the "classic" Nashville I style. However, it is well executed and approaches the Nashville I style to a greater extent than many of the Nashville II style gorgets illustrated by Brain and Phillips (1996). The Burial 112 item (Figure 63) is much more deteriorated than the specimen from Burial 81. Characteristics such as the ellipses suggest this specimen more closely resembles the Nashville II style.

Paleobotanical Remains

A sample of 667.2 grams of floral remains was submitted for analysis. After residual botanical remains and samples weighing less than 0.1 g were removed, the revised total for analysis was 538.2 g. This rather small botanical sample, while recovered from feature contexts, should not be considered representative of the site. In light of this assertion, the paleobotanical assemblage has been presented in Table 8, but with no comparisons to other Middle Cumberland assemblages.

Nutshell

A total of 512 fragments and seven whole nutshell remains weighing a minimum of 79.2 g were recovered. By far the largest represented species was hickory nut (*Carya* sp.) with 468 fragments and 7 whole shells that weighed over 78.4 g. Acorn (*Quercus* sp.) and black walnut (*Juglans* sp.) were also present but in very small amounts.

Wood Charcoal

Wood charcoal represented the largest botanical category with 442.8+ g recovered. Oak (*Quercus* sp.) was the largest group represented with 231 fragments, followed by ash (*Fraxinus* sp.), hickory (*Carya* sp), cane (*Arundinaria* sp), honey locust (*Gleditsia triacanthos*), black locust (*Robinia pseudocacia*), elm (*Ulmus* sp), maple (*Acer* sp), cherry (*Prunus serotin*), sycamore (*Platanus serotina*), yellow poplar (*Liriodendron tulipifera*), hornbeam (*Ostrya virginiana*), redbud (*Cercis canadensis*), hackberry or sugarberry (*Celtis* sp), walnut (*Juglans* sp), beech (*Fagus grandifolia*), and grape vine (*Vitis* sp).

Domesticates and Fruits

This category is represented by moderate amount of maize (*Zea mays*) kernals and cobs/cupules, a single specimen of domesticated bean (*Phaseolus vulgaris*), and five persimmon (*Diospyros virginiana*) fragments.

Table 8. Paleobotanical Remains.

Provenience:	F 69		F 89		F 100		F 283		F 304		F 318		F 334		F 693		F 760		F 766		F 795		F 828		F 840		F 848		F 925	
Sample wt.(g)1:	3.9		<.1		9		45.3		4.2		2.1		42		8.9		11		3.2		2		6.2		26		0.1		<.1	
Residual wt. (g)2:	3.2														5.4		5		2.2		1.2		2.6		9					
	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.
NUTSHELL (wt., grams):																														
Carya sp. (Hickory) nutzhell	71F	0.5	1F	<.1							9F						100+F	5.6	2F	<.1	80F	0.8	15F	0.2	6F	<.1				
Juglans nigra (black walnut)																														
Quercus sp. (acorn)	11F	<.1																							12F	<.1				
WOOD CHARCOAL																														
Total wt./No. of Fragments:	10	0.2	1	<.1	30	9	30	45.3	30	4.2	14	2	30	42	30	3.5	10	0.5	30	1	4	<.1	30	1.4	30	1.1	8	0.1	6	<.1
Arundinaria sp. (Cane)											3				2						1						5			
Acer sp. (maple)																														
Carya sp. (Hickory)															2		5								20					
Celtis sp. (hackberry/sugarberry)																														
Cercis canadensis (redbud)																														
Fagus grandifolia (beech)																														
Fraxinus sp. (Ash)									30		3		30						11						8				3	
Gleditzia triacanthos (Honey locust)							30																							
Juglans sp. (Walnut/Butternut)											1																			
Liriodendron tulipfera (yellow poplar)																														
Ostrya virginiana (hornbeam)																														
Platanus occidentalis (Sycamore)											3																			
Prunus serotina (Black Cherry)																														
Quercus sp. (Oak)	10		1		30						2				26		5		11		3		30				3			
Robinia pseudocacia (Black locust)											1								1						2				3	
Ulmus sp. (Elm)											1								7											
Vitis sp. (grape vine)																														
SEEDS AND FRUITS No. of specimens:																														
Diospyros virginiana (persimmon)																	4F	.<1												
Zea mays (total)																														
Zea mays (maize kernel)																														
Zea mays (cupules)																														
Zea mays (cob)																														
Phaseolus vulgaris (Bean)																														

1 Total wt. of extracted charcoal (grams)

2 Residual wt., 1.00 mm and 0.25 mm screens

W=Whole F=Fragment

Provenience:	F 926		F 992		F 1242		F 1243		F 1246		F 1247		F 1250		F 1280		F 1383		F 1387		F 1412		F 1413		F 1414	
Sample wt.(g)1:	16		23.7		11.5		1.7		3.8		54.1		21.7		20.9		65.4		2.3		233.2		34.8		15	
Residual wt. (g)2:					6						14		1		9.2		3.8				40.4				7.7	
	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.	#	wt.
NUTSHELL (wt., grams):																										
Carya sp. (Hickory) nutzhell					6F	<.1					6F	0.4	2F	<.1			32F	5.3	15F	0.5	'W;100+	65			23F	0.1
Juglans nigra (black walnut)					6F	<.1					9F	0.2					2F	0.6							1F	<.1
Quercus sp. (acorn)																			3F	<.1						
WOOD CHARCOAL																										
Total wt./No. of Fragments:	30	16	30	23.7	30	5.4	15	1.7	30	3.8	30	39.5	30	20.7	15	0.3	30	51.2	20	1.3	30	127.3	30	34.8	30	7.2
Arundinaria sp. (Cane)			10		15		10				7		3				1								4	
Acer sp. (maple)																					13					
Carya sp. (Hickory)					7						4		5		13		1		4						3	
Celtis sp. (hackberry/sugarberry)			2																							
Cercis canadensis (redbud)							3																			
Fagus grandifolia (beech)																	1									
Fraxinus sp. (Ash)	30										5		8				3				12				6	
Gleditzia triacanthos (Honey locust)					4				6								3									
Juglans sp. (Walnut/Butternut)													1													
Liriodendron tulipfera (yellow poplar)									2																3	
Ostrya virginiana (hornbeam)																									5	
Platanus occidentalis (Sycamore)																	1								3	
Prunus serotina (Black Cherry)									5		3		1												1	
Quercus sp. (Oak)			1		3		2		12		7		12		2		20		12		5		30		4	
Robinia pseudocacia (Black locust)			14						5																1	
Ulmus sp. (Elm)			3								2								4							
Vitis sp. (grape vine)					1																					
SEEDS AND FRUITS No. of specimens:																										
Diospyros virginiana (persimmon)																									1F	<.1
Zea mays (total)					14F	0.1					12F	<.1			100+	11.4	18	4.5	37F	0.5	2W; 8F	0.5			6F	<.1
Zea mays (maize kernel)					5F						2F						3		29F		2W; 8F				5F	
Zea mays (cupules)					9F						10F						8		8F						1F	
Zea mays (cob)																	7									
Phaseolus vulgaris (Bean)																					1F	<.1				

1 Total wt. of extracted charcoal (grams)

2 Residual wt., 1.00 mm and 0.25 mm screens

Table 9. Summary of Burial Descriptions from 40DV392 (measurements in cm)

Burial	Type	Position	Bone Condition	Percent Complete	Disturbed	Azimuth (°E of N)	Head facing	Grave Goods	Burial Floor	Box length	Box width	Box depth
1	stone box	unknown	-	-	yes	-	-	no	earth	104	70	30
2	stone box	extended	poor	<40%	yes	-	-	no	earth	225	45	27
3	stone box	unknown	poor	<1%	yes	-	-	no	earth	150	47	22
4	Stone box	extended	fair	40%	yes	-	-	no	earth	178	47	37
5	Stone box	extended	good	90%	no	29	northeast	no	earth	174	45	31
6A	Stone box	extended	good	90%	no	90	east	yes	earth	182	42	28
6B	Stone box	Bundle?	poor	-	no	90	-	yes	earth	182	42	28
7A	Stone box	unknown	fair	50%	yes	-	-	no	stone	91	36	47
7B	Stone box	unknown	fair	50%	yes	-	-	no	stone	91	36	47
9	Stone box	extended	good	<75%	no	295	northwest	no	stone	111	44	28
11	Stone box	unknown	-	-	yes	-	-	no	stone	123	55	5
12	Stone box	extended	poor	<20%	yes	286		yes	stone	180	50	25
14	Stone box	extended	good	90%+	no	298	northwest	yes	stone	161	49	39
15	Stone box	extended	good	95%	no	237	southwest	no	stone	202	49	39.5
17	Stone box	extended	good	90%	slightly	294	northwest	no	stone	156	46	28
18	Stone box	extended	good	90%+	no	243	southwest	no	stone	188	43	23
19	Stone box	unknown	poor	<25%	yes		-	no	earth	150	70	-
20	Stone box	extended	fair	40-50%	yes	297	northwest	no	stone	205	40	20
21	Stone box	extended	good	95%	yes	270	west	no	stone	176	41	22.5
22	Stone box	extended	fair	70%	slightly	293	west	no	stone	180	51	18
23	Stone box	extended	fair	60%	slightly	270	west	no	earth	94	42	28
24	Stone box	unknown	poor	<5%	yes		-	yes	stone	-	36	-
25	Stone box	extended	fair	60%	yes	0	north	yes	earth	180	41	32
26	Stone box	unknown	poor	10%	yes	340	north	yes	earth	100	43	21
27A	Stone box	unknown	poor	35%	yes	281	west	no	stone	170	48	27
27B	Stone box	unknown	poor	35%	yes	281	west	no	stone	170	48	27
28	Stone box	unknown	poor	10%	yes	269	west	no	stone	86	44	22
29	Stone box	unknown	poor	10%	yes	287	west	no	stone	181	50	40
30	Stone box	extended	fair	75%	slightly	281	west	no	stone	83	30	12
31	Stone box	extended	poor	<35%	yes	270	west	no	earth	195	53	27
32	Stone box	extended	good	90%	slightly	299	northwest	no	stone	177	38	22
33	Stone box	extended	poor	15-20%	yes	278	west	no	stone	145	35	-
36A	Stone box	unknown	poor	<15%	yes	-	west	no	stone	176	35	-
36B	Stone box	unknown	poor	<15%	yes	-	west	no	stone	176	35	-
38	Stone box	extended	good	85%+	slightly	283	west	no	stone	190	55	21
40	Stone box	extended	good	90%	no	286	west	no	earth	181	44	38
41	Stone box	unknown	poor	<30%	yes	288	west	yes	earth	183	31	25
42	Stone box	extended	good	90%	no	293	west	no	earth	178	36	24
43	Stone box	unknown	poor	<20%	yes	285	west	no	earth	124	36	26
44	Stone box	extended	good	85%	slightly	282	west	yes	earth	196	50	40
45A	Stone box	extended	poor	10%	yes	291	west	no	stone	126	37	22
45B	Stone box	unknown	poor	10%	yes	291	west	no	stone	126	37	22
46	Stone box	extended	good	90%	no	284	west	no	stone	154	38	26
47	Stone box	extended	poor	10%	yes	284	west	no	stone	120	42	23
48A	Stone box	extended	good	90%+	slight	288	west	yes	stone	185	43	25
48B	Stone box	extended	good	90%+	slight	288	west	yes	stone	185	43	25
49	-	extended	poor	30%	yes	297	west	no	earth	171	37	10
50	Stone box	extended	good	90%+	no	258	west	yes	earth	167	57.5	-
51	Stone box	extended	good	90%	no	248	southwest	no	stone	199	67	16
52	Stone box	extended	fair	65-70%	slight	250	west	yes	stone	160	37	25
53	Stone box	extended	good	85%	no	264	west	yes	earth	180	43	35
54	Stone box	extended	poor	15%	yes	265	west	no	earth	65	40	34
55	Stone box	unknown	poor	<10%	yes	-	-	no	stone	72	20	7.5
56	Stone box	bundle?	poor	15-20%	yes	-	-	no	earth	-	-	-
57	Stone box	unknown	poor	<10%	yes	-	-	no	earth	-	-	-
58	Indet.	unknown	poor	5%	yes	-	-	no	earth	-	-	-
60	Stone box	extended	poor	25%	yes	308	northwest	no	stone	92	31	14
61	Stone box	extended	poor	30%	yes	308	northwest	no	stone	-	-	-
62	Stone box	extended	good	90%	no	307	northwest	no	stone	130	37	-
63	Stone box	extended	good	90%	no	270	west	no	earth	200	53	30
64	Stone box	bundle	good	90%	no	0	north	no	stone	29	26	22
65A	Stone box	unknown	poor	<1%	yes		-	no	stone	120	46	26
65B	Stone box	unknown	poor	<1%	yes		-	no	stone	120	46	26
66	Stone box	extended	fair	50%	yes	11	north	no	stone	140	33	-
67	Stone box	unknown	poor	<5%	yes		-	no	earth	108	53	-
68	Stone box	extended	fair	30-35%	yes	79	east	no	stone	210	78	31
69	Stone box	extended	good	80%	slightly	223	southwest	no	stone	164	62	34
70	Stone box	extended	fair	60%	yes	293	west	no	stone	195	67	37
71	Stone box	extended	good	85%	slightly	71	east	no	stone	196	38	12
72A	Stone box	extended	fair	60%	yes	286	west	no	stone	210	60	34
72B	Stone box	unknown	-	-	yes	286	west	no	stone	210	60	34
73	Stone box	extended	poor	30%	yes		northwest	no	stone	165	30	17
74	Stone box	extended	fair	30-40%	yes	-	northwest	no	ceramic	79	29	20
75	Pit?	extended	good	90%+	no	275	west	no	earth	175	32	-
76A	Stone box	Indet.	fair	-	yes	-	-	no	stone	-	-	-
76B	Stone box	extended	good	-	yes	-	-	no	stone	-	-	-
77	Stone box	extended	poor	<20%	yes	270	west	no	stone	160	20	5
78	Stone box	extended	good	90%	slightly		north	no	stone	180	53	21
79A	Stone box	flexed	good	75-80%	slightly	331	northwest	no	stone	110	52	28
79B	Stone box	bundle?	fair	25-30%	yes	331	-	no	stone	110	52	28
80	surface	-	poor	<10%	yes	-	-	no	earth	-	-	-
81A	Stone box	extended	poor	<20%	yes	356	north	yes	stone	107	41	23
81B	Stone box	extended	poor	<20%	yes	356	north	yes	stone	107	41	23
83	Stone box	Indet.	poor	<1%	yes		-	no	earth	129	49	30
84	Stone box	Indet.	poor	<1%	yes		-	no	stone	100	25	28
86A	Stone box	extended	fair	75%	slightly	274	west	yes	stone	200	66	31
86B	Stone box	Indet.	poor	<20%	yes	274	west	yes	stone	200	66	31
88	Stone box	extended?	fair	50%	slightly	19	northeast	no	earth	90	40	14
89A	Stone box	extended	good	85%	slightly	202	south	no	stone	180	61	37
89B	Stone box	Indet.	poor	<10%	yes	202	-	no	stone	180	61	37
90A	Stone box	extended	good	90%	slightly	25	northeast	yes	stone	213	46	17
90B	Stone box	extended?	poor	<10%	yes	25	northeast	yes	stone	213	46	17
91A	Stone box	extended	fair	40-50%	slightly	42	northeast	no	earth	70	32	19
91B	Stone box	bundle	good	90%	slightly	42	-	no	earth	70	32	19
92	Stone box	extended	good	90%	no	230	southwest	no	earth	71	20	12
93A	Stone box	extended	good	85-90%	slightly	105	east	no	stone	205	43	28
93B	Stone box	bundle?	poor	<10%	yes	105	-	no	stone	205	43	28
94	Stone box	extended	good	90%	no	278	west	no	stone	179	40	15
95	Stone box	extended	fair	75%	yes	26	northeast	no	stone	181	36	-
96A	Stone box	redeposit	fair	60%	yes	270	west	no	stone/earth	220	87	41
96B	Stone box	extended	good	75%	no	270	west	no	stone/earth	220	87	41
96C	Stone box	extended	good	85%	no	270	west	no	stone/earth	220	87	41
97	Stone box	extended	fair	75%	slightly	255	west	no	stone	69	29	34
98	Stone box	Indet.	poor	<10%	yes	-	-	no	stone	86	23	20
99	Pit?	extended	good	90%	slightly	340	north	yes	earth	84	20	6
100	Pit	flexed	poor	25%	no		southeast	no	earth	120	110	15
101A	Stone box	extended	good	95%	no	292	west	yes	earth	190	43	42
101B	Stone box	Indet.	poor	-	yes	292	-	yes	earth	190	43	42
102	Stone box	extended	good	80%	no	285	west	yes	stone	117	29	13
103	Stone box	extended	fair	70%	yes	189	south	no	earth	94	41	-
105	Stone box	extended	good	95%	no	285	west	yes	earth	190	60	20
106A	Stone box	extended	good	80%	slightly	265	west	yes	earth	157	36	-
106B	Stone box	Indet.	poor	<10%	yes	265	-	yes	earth	157	36	-
107	Pit	flexed	poor	70%	no		south	no	earth	77	70	13
108A	Pit?	extended	poor	40%	yes	215	southwest	no	earth	-	-	-
108B	Pit?	extended	poor	<1%	yes	215	southwest	no	earth	-	-	-

Continued…

Table 9. Summary of Burial Descriptions from 40DV392 (*continued*)

Burial	Type	Position	Bone Condition	Percent Complete	Disturbed	Azimuth (°E of N)	Head facing	Grave Goods	Burial Floor	Box length	Box width	Box depth
109	Pit	flexed	poor	75%	no		southeast	no	earth	90	70	-
110	Stone box	Indet.	poor	50%	yes		-	no	earth	70	20	15
111A	Stone box	Indet.	poor	50%	yes	316	northwest	no	earth	170	42	25
111B	Stone box	extended	good	85%	no	316	northwest	no	earth	170	42	25
112A	Stone box	extended	good	90%	slightly	28	northeast	yes	stone	94	35	21
112B	Stone box	Indet.	poor	<5%	yes	28	-	yes	stone	94	35	21
113	Stone box	extended	fair	70%	slightly	310	northwest	no	ceramic	57	23	19
114	Stone box	extended	fair	60%	slightly	39	northeast	yes	earth	100	42	23
115	Stone box	extended	poor	25%	yes	39	northeast	no	earth/stone	196	42	30
117	Stone box	Indet.	poor	<10%	yes		-	yes	stone	111	47	26
118	Stone box	extended	fair	80%	slightly	213	southwest	no	stone	205	64	15
119A	Stone box	extended	poor	25%	yes	20	north	yes	stone	210	69	23
119B	Stone box	bundle?	poor	Indet.	yes	20	-	yes	stone	210	69	23
119C	Stone box	Indet.	poor	<1%	yes	20	-	yes	stone	210	69	23
120	Stone box	extended	good	95%	no	30	northeast	yes	stone	188	49	-
121	Stone box	extended	good	90%	no	229	southwest	no	earth	178	40	28
122	Stone box	extended	fair	60%	yes	275	west	yes	earth	110	37	-
123	Stone box	extended	poor	<10%	yes	127	southeast	yes	stone	102	32	18
124	Stone box	extended	good	85-90%	no	313	northwest	no	earth	73	40	18
125A	Stone box	extended	good	95%	no	192	south	no	earth	184	44	40
125B	Stone box	Indet.	poor	<10%	yes	192	-	no	earth	184	44	40
126	Stone box	extended	good	90%	slightly	15	north	no	stone	195	67	33
127	Stone box	extended	fair	40-50%	yes	207	southwest	no	stone	203	67	31
129	Stone box	extended	fair	80%	no	208	southwest	yes	earth	84	32	15
130	Stone box	extended	good	90%	no	200	south	yes	stone	89	41	25
131	Stone box	extended	poor	<25%	yes	-	-	no	earth	78	28	21
132	Stone box	extended	poor	<5%	yes	-	-	no	earth	-	-	-
133	surface	extended	poor	<35%	yes	-	north	no	earth	-	-	-
134A	Stone box	Indet.	poor	<1%	yes	-	-	no	earth/stone	134	32	30
134B	Stone box	Indet.	poor	<1%	yes	-	-	no	earth/stone	134	32	30
135A	Stone box	Indet.	poor	<10%	yes	10	north	no	earth	148	50	30
135B	Stone box	extended	good	90%	no	10	north	no	earth	148	50	30
137A	Stone box	extended	good	90%	slightly		northwest	yes	earth	177	40	22
137B	Stone box	Indet.	-	-	yes		-	yes	earth	177	40	22
138	Stone box	Indet.	poor	<5%	yes	-	-	no	earth	-	-	-
139A	Stone box	extended	good	75%	slightly	269	west	yes	earth	187	42	24
139B	Stone box	Indet.	poor	<25%	yes	269	-	yes	earth	187	42	24
140	Stone box	Indet.	poor	<10%	yes	-	-	no	earth	26	23	7
141A	Stone box	extended	good	90%+	no	183	south	yes	earth	182	53	20
141B	Stone box	extended	good	90%+	no	183	south	yes	earth	182	53	20
142	Stone box	extended	fair	75%	slightly	259	west	no	stone	170	40	25
143A	Stone box	flexed	fair	70%	yes	270	west	no	earth	100	55	30
143B	Stone box	Indet.	poor	<25%	yes	270	-	no	earth	100	55	30
144	Stone box	extended	good	85%	no	23	northeast	yes	earth	68	45	12
145	Stone box	Indet.	poor	<10%	yes	-	-	no	stone	182	52	26
146	Stone box	extended	good	85%	yes	-	northeast	no	-	-	55	-
147	Stone box	Indet.	poor	<5%	yes	-	-	no	stone	-	-	-
150*	Stone box	extended	fair		slightly	-	west	yes	earth	-	-	-
151*	Stone box	bundle?	poor		yes	-		no	earth	-	-	-
152A	Stone box	extended	fair	85%	no	350	north	no	stone	200	45	21
152B	Stone box	Indet.	poor	<10%	no	350	-	no	stone	200	45	21
153	Stone box	Indet.	poor	<10%	yes	-	-	no	earth	90	44	19
154	Stone box	Indet.	poor	<10%	yes	-	-	no	earth/stone	62	24	10
155A	Pit?	extended	fair	75%	yes	270	west	no	earth	170	-	-
155B	Pit?	Indet.	poor	<10%	yes	270	-	no	earth	170	-	-

Mortuary Analysis

A total of 141 burials (containing 173 individuals) was excavated at 40DV392 in three areas: (a) Cemetery Area 1, 57 burials with 62 individuals; (b) Cemetery Area 2, 67 burials with 90 individuals; and, (c) village areas, 17 burials with 21 individuals (Table 9). The vast majority of burials (*n*=126) were typical stone-box interments (e.g. Brown 1981; Dowd 2008; Moore and Breitburg 1998). Also present were three Archaic period flexed pit burials, and seven burials (9 individuals) in an extended position without a stone-box.

Cemetery and Burial Patterns

While most of the stone-box burials were “typical” in that their size was proportional to the interred body in an extended position, a few burials were unusual. For example, Burial 64 was a very small essentially square stone-box (29x26 cm) with the (apparently bundled) remains of a small child. A similar small stone-box was excavated at the West site (40DV12; Dowd 1972). An additional bundle burial (Burial 91) was identified, along with other burials that may represent either bundled or redeposited individuals (Burials 6B, 56, 79B, 93B, 119B, and 151). At least one stone-box burial (143A) appeared to be a flexed interment. In addition, several burials containing multiple interments were identified. Twenty-nine stone-box burials held the remains of two individuals, and two stone-boxes yielded the remains of three individuals. Fifteen different arrangements of multiple interments were recorded. The most common variation was an indeterminate adult and small child (*n*=6); with adult male and female burials (*n*=5); and adult females (*n*=3) and adult female with infant (*n*=3) also prevalent. Occurrences of adult male and

Table 10. Distribution of Grave Goods by Burial and Type.

Burial	Area	Grave Goods
6	1	Deer ulna awl
12	1	Marine shell beads (*n*=6)
14	1	Double lug jar, strap handle jar, deer ulna awl
24	1	Duck effigy bowl
25	1	Strap handle jar
26	1	Carafe neck bottle, mussel shell effigy bowl
41	1	Partial shell temper vessel
44	1	Ceramic ear plug
48	1	Strap handle jar, shell spoon (?)
50	1	Ceramic trowel
52	1	Matthews Incised jar
53	1	Hafted knife
81	2	Marine shell gorget
86	2	Mano
90	2	Bone pins (composite gig, *n*=5), fish hook, Madison pp/k
99	2	Fish effigy bowl
101	2	Strap handle jar, ceramic ear plug
102	2	Shell tempered vessel
105	2	Fish effigy vessel
106	2	Notched rim bowl
112	Village	Marine shell gorget, notched rim bowl
114	Village	Matthews Incised jar
117	2	Ceramic ear plug
119	2	Matthews Incised jar (frog effigy)
120	2	Hafted knife
122	2	Notched rim bowl, strap handle jar
123	2	Ceramic ear plug
129	Village	Constricted rim bowl
130	Village	Matthews Incised jar, strap handle jar (partial)
137	2	Ceramic ear plugs (*n*=2)
139	2	Ceramic trowel
141	2	Ceramic ear plug
144	2	Hooded human effigy water bottle, fish effigy bowl, conch/gourd effigy bowl, notched rim bowls (*n*=2), deer astragalus cube
150	2	Fish effigy bowl

child; two adult males; adult female and child; two children; two infants; two indeterminate adults; single male and indeterminate adult; an adult female and adolescent; and a small child with an infant were documented. The two triple burials consisted of three adult males, and two adult males with a child.

Three primary variations of floors were identified in the stone-box cemeteries. Stone-lined floors (*n*=67) and earthen floors (*n*=63) were the most common. Several stone-box floors were only partially lined with limestone slabs (*n*=4). The least common variation was floors lined with ceramic sherds (*n*=2).

In Cemetery Area 1, 41.51% of the stone-box burials floors were earthen (*n*=22) and 58.49% were lined with limestone slabs (*n*=31). In Cemetery Area 2, 33.33% (*n*=20) of the stone boxes exhibit earthen floors while 53.33% of the stone boxes (*n*=32) were lined with limestone slabs. An additional 6.67% (*n*=4) were only partially lined with limestone slabs. Stone-box burial floors in the village area consisted of earth (*n*=9, 64.29%), limestone slab (*n*=3, 21.43%), and ceramic (*n*=2, 14.29%). A preference for limestone slab floors was evident but Areas 1 and 2 exhibited similarities in stone-box floor preference. It was interesting to note that both of the ceramic floors occurred in the village area.

A total of 34 burials produced grave goods (Table 10). Ceramic vessels were the most common with 28 vessels recovered from 20 burials. Ceramic ear plugs (*n*=7) were found in six burials, and ceramic trowels (*n*=2) were recovered from two burials. Grave goods manufactured from faunal remains included bone awls (*n*=2), bone pins of a composite gig (*n*=5), a fish hook (*n*=1), and an astragalus cube (*n*=1). Invertebrate remains consisted of marine shell gorgets (*n*=2), marine shell beads from a single burial (*n*=6), and a possible shell spoon. Stone artifacts from four burials included two hafted knives, a projectile point, and a mano.

Some differences in the distribution of burials with grave goods were evident as Cemetery Area 1 had 12, Cemetery Area 2 produced 18, and the village area contained four (Table 10). Fish effigy bowls and filleted rim bowls were restricted to Cemetery Area 2 and the village area. The duck effigy and mussel shell effigy bowls recovered from burial context were from Cemetery Area 1. The two remaining effigy vessels (conch/gourd shell and human hooded bottle) were from Cemetery Area 2. Strap handle jars were fairly evenly divided between the cemetery areas. The carafe-neck bottle and lug handle jar were from Cemetery Area 1.

Non-ceramic vessel artifacts were fairly evenly divided with the exception of earplugs, where just one Cemetery Area 1 burial had an earplug with the remaining

earplugs from Cemetery Area 2 burials. Marine shell artifacts, hafted knives, and ceramic trowels were recovered from each cemetery area.

Two burials in Cemetery Area 1 produced multiple grave goods. However, the presence of more unique burial objects was evident in Cemetery Area 2. Burial 81 yielded a Nashville style gorget. Burial 90 produced a bone composite gig, bone fishhook, and Madison point. Burial 144 was a particularly rich burial with five ceramic vessels and an astragalus cube. Cemetery Area 2 yielded specific types of ceramic vessels (fish effigy and filleted rim bowls), a Nashville style gorget, ear plugs, and a higher percentage of burials producing grave goods. These observations suggest the Cemetery Area 2 burial population was somehow segregated and/or differentiated from Cemetery Area 1. The spatial separation was obvious, but additional segregating factors associated with sociopolitical processes were likely in operation (see Jones 2002).

There are obvious differences between the structure and orientation of the two cemetery areas. Figure 64 presents radial graphs that illustrate the burial orientation of each cemetery in five-degree increments. Cemetery Area 1 exhibits a considerably consistent orientation of burials. Of the total number of burials in which azimuth could be determined, 56.1% (*n*=23) are oriented between 276º and 300º. Furthermore, if the degree range is increased from 256º to 310º, the number of burials increases to 33 (80.49%). This data contrasts significantly with Cemetery Area 2 where much less conformity in burial orientation is evident. Sixteen burials (34.04%) in Cemetery Area 2 are oriented within the 251º-295º range, with an additional 12 (25.53%) within the 356º-30º range. Nevertheless, the majority of burials in Cemetery Area 2 occur outside of these degree ranges. These results clearly illustrate the variation in the structure and relationship of burials to each other within the two cemetery areas.

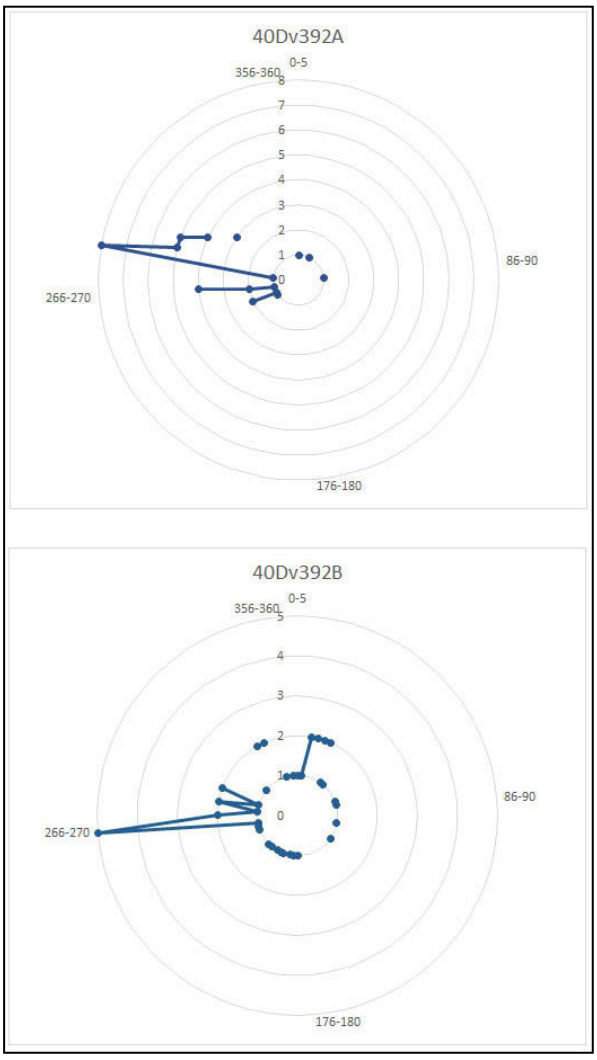

FIGURE 64. Comparison of burial orientations, Cemetery Areas 1 and 2.

Health and Demography

The total Mississippian skeletal population consists of 170 individuals (Figure 65). The health and demography of the skeletal population is presented in Table 11. Children under the age of 16 constitute the largest percentage of the sample (*n*=60; 35.29%). Males occur in greater numbers (*n*=48; 28.23%) than females (*n*=40; 23.53%). Indeterminate adults account for the remainder (*n*=22; 12.94%). In comparison to data presented by Breitburg et al. (1998) and provided by Breitburg and Moore (2005), the percentage of subadults is less than other Middle Cumberland Mississippian sites but most closely resembles the Moss-Wright (40SU20) population. Adults occur in greatest frequency in the 41-45 age range (*n*=23).

Some notable differences do occur between the cemetery and village areas. The differences in demographic composition of the two cemetery areas are illustrated in Figures 66 and 67. Subadults comprise the largest, or are equal to, adults in each area. While the number of subadults in Cemetery Areas 1 and 2 are considerably different, the percentages are nearly equal (29.51% and 32.55%, respectively). Cemetery Area 1 had a lower frequency of sub-adults than Cemetery Area 2, as well as a significantly higher mortality among young adults (11.6%) than Cemetery Area 2 (3.8%). However, subadults occur in the greatest percentage in the village area (72.22%).

Males are the minority in Cemetery Area 1 but are the distinct majority in Cemetery Area 2. While females only slightly outnumber males in Cemetery Area 1, the difference in number of males to females is significantly greater in Cemetery Area 2. The number of adults (*n*=12) that could not be identified to gender in Cemetery Area 2 may bias the difference in adult gender composition of the two cemetery areas. Cemetery Area 2 had a slightly lower relative frequency of older adults. There was a slightly higher mortality for middle age adults (35-45 years) in Cemetery Area 2 (25%) than Cemetery Area 1 (23%). Only four adults identifiable to gender occur in the village.

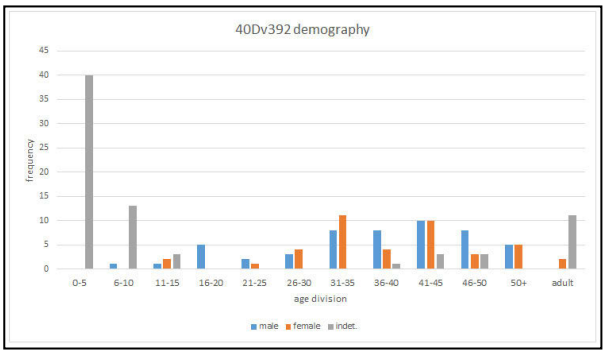

FIGURE 65. Demographic composition.

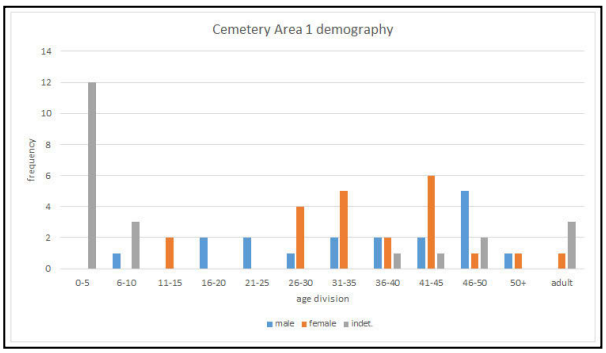

FIGURE 66. Demographic composition of Cemetery Area 1.

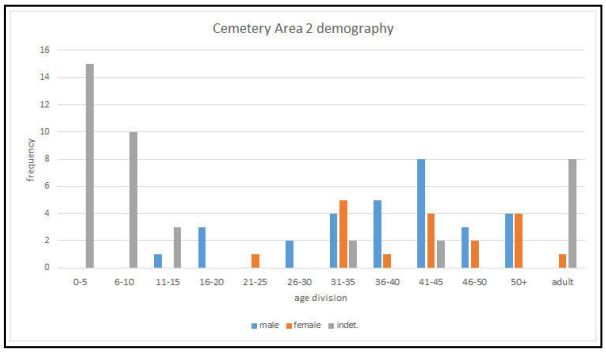

FIGURE 67. Demographic composition of Cemetery Area 2.

Table 11. Summary of Sex, Age, and Pathology.

Burial	Sex	Age	Pathologies/comments
1	Indet.	Indet.	-
2	male	25-35 years	ulna shows healed periostitis
3	Indet.	Adult	-
4	female	25-35 years	slight arthritic lipping along left ulna articular rim
5	male	50± years	lumbar vertebrae, scapular rims exhibit severe arthritis; hyperostosis of alveolar margins; calculus buildup on buccal side of maxillary teeth and lingual side of mandibular teeth; teeth heavily worn exposing dentum on all molars; exostosis of both ears resulting in completely sealed auditory meatus
6A	female	30-40 years	moderate arthritis on articular facets of vertebrae, ulna, sacrum, radii; left wing of sacrum exhibits slight resorption at anterior left side; left maxilla molar exhibits calculus buildup; canine root shows hypercementosis
6B	Indet.	1 yr ± 3 months	-
7A	Indet.	1 yr ± 3 months	One of the two individuals exhibits active internal inflammation in the occipital region; cribra orbitalia on one orbit
7B	Indet.	18 mths ± 3 mths	One of the two individuals exhibits active internal inflammation in the occipital region; cribra orbitalia on one orbit
8	Indet.	Adult	-
9	Indet.	7 years ± 9 mths	slight active inflammation of superior orbital areas
12	female	35 years ± 5 yrs	proximal ulna articular surface exhibits moderate arthritic lipping
14	male	45-50 years	possible cyst on the occipital bone; extensive arthritic development on all vertebrae and especially severe on lumbar vertebrae with extensive lipping on anterior margins; arthritic spurs on anterior of tibia attachment for patella; arthritic development in phalanges; teeth heavily worn; hyperostosis present
15	male	25 ± 5 years	hyperostosis along alveolar sides of mandible and lateral alveolar side of maxilla; active infection and periostosis on interior frontal bone; possible healed fracture of right tibia; calculus buildup of lingual mandibular incisors
17	female	30 ± 5 years	calculus buildup of anterior and posterior mandibular incisors; some hyperostosis of anterior incisor alveolar; M^2 and M^3 of the buccal to lingual maxilla exhibit caries; slight arthritic development of phalanges; porotic area on either side of sagittal suture posterior; clavicle exhibits bone reaction to possible infection at sternum articulation
18	male	22 ± 2 years	-
19	Indet.	50 years	lumbar vertebrae severely compressed and exhibit advanced osteophytosis
20	male	50 years	arthritic development on left and right patella and proximal tibia; osteophytosis on lumbar vertebrae
21	female	ca. 50 years	severe periodontal disease; hyperostosis on right and left lingual side of jaw; arthritic development of tarsals and phalanges; teeth exhibit calculus buildup
22	female	30 ± 5 years	hypoplasia on canine; highly porous cranial bones
23	Indet.	4 years ± 9 mths	cribra orbitalia on right orbit
24	male	6 years ± 9 mths	hypoplasia on maxillary root and crown
25	male	45-50 years	all teeth heavily worn; healed cribra orbitalia on both orbits; exhibits occipital flattening; arthritic development in phalanges, patella, and elbows; caries on maxillary molars; 1st premolar abscessed; burial exhibits occipital flattening
26	Indet.	5 years ± 9 mths	-
27A	male	17 yrs ± 6 mths	upper lateral incisors fractured, possibly a result of a blow to the face; a broken and healed fibula is present but difficult to determine for which individual; carie on one molar; calculus on mandibular lingual molar; individual possibly died as a result of blow to the face
27B	male	30-35 years	-
28	Indet.	2 yrs ± 6 mths	-
29	female	40 ± 5 years	slight arthritic development on pelvis
30	Indet.	1 yr ± 6 mths	Carie on lingual side of maxillary incisor
31	male	45-50 years	arthritis on 1st and 2nd cervical vertebrae and clavicle articular rim
32	female	50± years	hypercementosis in mandibular and maxillary molar roots and P1 and P2; 2nd and 3rd mandibular molars exhibit heavy caries; osteoporotic bone shafts; severe arthritic development on lumbar vertebrae and some development on pelvic socket; most articular surfaces exhibit some arthritic development
33	Indet.	10 yrs ± 9 mths	-
34	Indet.	45-50 years	some calculus buildup on left mandibular P_3
36A	male	35 ± 5 years	osteomyelitis on healed tibia; possible healed break on tibia
36B	female	Adult	-
38	female	30-35 years	abscess below right canine and first premolar on mandible; large carie on cervical maxillary premolar; slight arthritis on vertebrae and around scapular rim
40	female	45 ± 5 years	right distal of humerus fractured and healed; tibia exhibits healed appearance; scapula, vertebrae, and sacroiliac exhibit arthritic development
41	female	30 ± 5 years	some articular arthritic development
42	female	45 ± 5 years	extensive caries around cervical necks of teeth; arthritis on 2nd cervical vertebrae and lumbar vertebrae
43	Indet.	4 yrs ± 9 mths	-
44	female	45 ± 5 years	arthritic development of lumbar vertebrae, articular surfaces of tibia, rim of scapula, phalanges, and patella
45A	Indet.	35-40 years	severe arthritis in phalanges
45B	Indet.	2 yrs ± 6 mths	-
46	female	15 yrs ± 6 mths	porous areas in occipital region
47	Indet.	7 yrs ± 9 mths	-
48A	female	45 ± 5 years	arthritic development in vertebrae and rim of sacral articulation of pelvis
48B	female	30-35 years	-
49	male	45 ± 5 years	-
50	female	45 ± 5 years	extensive arthritis on 1st sacral vertebrae; broken long bone
51	male	30-35 years	deeply depressed porous interior of cranium
52	female	45 ± 5 years	arthritic vertebrae
53	male	40 ± 5 years	some arthritic lipping on articular surface of ulna
54	female	40 ± 5 years	arthritic development on articular rim of ulna and phalanges
55	female	14-15 years	-
56	male	40 ± 5 years	-
57	male	35 ± 5 years	osteoporotic long bones
58	Indet.	45 ± 5 years	highly arthritic proximal radius around head
60	Indet.	3 yrs ± 6 mths	-
61	female	35 ± 5 years	arthritic development in phalanges, ribs
62	Indet.	4 yrs ± 9 mths	carie on 1st right deciduous maxillary molar
63	male	45 ± 5 years	periodontal hypostosis along lingual mandibular teeth; calculus on lateral maxillary lingual and buccal surfaces; extensive arthritic development on lumbar vertebrae, proximal tibia, patella; Schmorl's node on lumbar vertebrae
64	Indet.	3 yrs ± 6 mths	cribra orbitalia on eye orbits
65A	Indet.	Adult	-
65B	Indet.	3 yrs ± 1 yr	-
66	male	45 ± 5 years	arthritic development on long bone rims, thoracic vertebrae; Schmorl's node on one vertebrae; maxillary canine with calculus
67	Indet.	Adult	-
68	male	30 ± 5 years	impacted 3rd maxillary molars; some calculus build up
69	male	39-44 years	arthritic development on carpus, tarsus, articular facets of ribs
70	male	30 ± 5 years	slight arthritic development in vertebrae and ulna
71	male	ca. 50 yrs	extensive arthritic development in phalanges, lumbar vertebrae, sternum, and articular aspects of long bones; Schmorl's node developing
72	male	ca. 50 yrs	arthritic development on thoracic and lumbar vertebrae, distal portion of femur; possible healed break on tibia; left 3rd molar impacted
73	Indet.	8 yrs ± 9 mths	-
74	Indet.	1 yr ± 3 mths	-
75	female	40 ± 5 years	slight arthritis on thoracic and lumbar vertebrae; porosity on parietal bones
76A	male	ca. 50 yrs	arthritic development on lumbar vertebrae and pelvis
76B	male	18-21 years	-
77	male	ca. 40 years	-
78	female	45 ± 5 years	extensive arthritis on lumbar vertebrae and on femur due to healed breakage; healed porosity in cranial area; some calculus buildup
79A	female	45 ± 5 years	arthritic development on vertebrae, sternum attachments, and articular facets of ulna; calculus present on maxillary teeth; left 1st molar and 2nd molar abscessed
79B	Indet.	1 yr ± 3 mths	-
80	Indet.	adult	-
81A	Indet.	10 yrs ± 9 mths	-
81B	Indet.	2 yrs ± 6 mths	-
83	Indet.	Adult	-
84	Indet.	8-9 years	-
86A	Indet.	45 ± 5 years	arthritic development on vertebrae, humerus condyle, articular facets of ribs; Schmorl's node on lumbar vertebrae; heavily worn teeth; right maxillary premolar exhibits crown carie; calculus on teeth
86B	Indet.	45 ± 5 years	-
88	Indet.	1 yr ± 3 mths	slight healed cribra orbitalia
89A	female	35 ± 5 years	some arthritic development
89B	Indet.	child	-
90A	male	40 ± 5 years	arthritic development in phalanges; calculus present
90B	Indet.	adult	-
91A	Indet.	3 yrs ± 6 mths	-
91B	Indet.	4-5 years	-

Continued…

Table 11. Summary of Sex, Age, and Pathology (continued).

Burial	Sex	Age	Pathologies/comments
92	Indet.	18 mths ± 3 mths	cribra orbitalia on orbits
93A	male	40-45 years	extensive arthritic development in lumber vertebrae, ribs, tibia ligament attachments, scapula, and radius head
93B	male	45 ± 5 years	-
94	male	35 ± 5 years	arthritic development on left ulna rim, cervical vertebrae, and phalanges; buccal side anterior teeth exhibit calculus
95	male	15 yrs ± 6 mths	-
96A	male	50+ years	arthritic development on lumbar vertebra, carpals, and tarsals
96B	male	50+ years	heavily arthritic pelvis; caries and calculus buildup
96C	male	50+ years	arthritic development on vertebrae, sternum, patella, and in joints; osteomyelitis in left and right tibias, posterior maxillary teeth from M^2 decayed to root
97	Indet.	6 mths ± 2 mths	one incisor exhibits carie
98	Indet.	6 mths ± 2 mths	-
99	Indet.	11 yrs ± 9 mths	porosity in cranial bones; hypoplasia on canine and incisors; cribra orbitalia
100	male	50+ years	-
101A	female	45 ± 5 years	periostitis of left tibia; arthritic development of metatarsals and metacarpals; left maxillary canine carie
101B	female	adult	-
102	Indet.	8 yrs ± 9 mths	porous parietal bone; hypoplasia on maxillary crown of canine
103	Indet.	2 yrs ± 6 mths	cribra orbitalia around orbits; porosity around left proximal humerus
105	female	35 ± 5 years	caries identified on mandibular M_1, canine, premolar; lipping on thoracic and lumbar vertebrae
106A	Indet.	7 yrs ± 6 mths	-
106B	Indet.	Adult	-
107	female	ca. 50 years	extensive arthritis on patella; some caries on heavily worn teeth
108A	Indet.	2 yrs ± 6 mths	-
108B	Indet.	Adult	-
109	female	50+ yrs	extensive arthritic development in cervical, thoracic, lumbar vertebrae, patella, scapula
110	Indet.	NB-6 months	cribra orbitalia
111A	female	ca. 50 years	extensive arthritic development on lumbar vertebrae, proximal ulna articular surfaces, proximal tibia, metatarsals, and pelvis
111B	male	35 ± 5 years	hypoplasia on right maxillary incisor; left tibia exhibits swelling; arthritic lumbar vertebrae, patella, tarsals, and carpals; tibia and radius exhibit heavy bone growth; periodontal disease on mandible; sternum heavily porous, periostitis
112A	Indet.	3 yrs ± 6 mths	caries on right and left maxillary incisors
112B	Indet.	NB	cribra orbitalia
113	Indet.	Fetal – 6 mths	cribra orbitalia; sphenoid infection; systemic infection on jaw
114	Indet.	9 mths ± 2 mths	-
115	male	40 ± 5 years	arthritic development in phalanges and pelvis
116	Indet.	adolescent	-
117	female	40 ± 5 years	arthritic development in cervical vertebrae, phalanges, femur
118	male	45 ± 5 years	extensive arthritis on proximal ulna, articular surfaces of radius, phalanges; right M_3 impacted; carie on anterior portion of M_3
119A	male	35 ± 5 years	-
119B	male	45 ± 5 years	some arthritic development
119C	Indet.	2 yrs ± 6 mths	-
120	male	45 ± 5 years	severe arthritic development in vertebrae, phalanges, ulna, metatarsals; infection in lumbar vertebrae; left M_3 abscess; calculus on maxillary teeth
121	female	50+ yrs	extensive arthritic development in lumbar vertebrae, left radius, carpals, tarsals, and pelvis; infection in lumbar vertebrae; extensive periodontal disease
122	Indet.	6 yrs ± 9 mths	caries on left and right mandible M_2, hypoplasia on left M_1
123	Indet.	3 yrs ± 6 mths	-
124	Indet.	9 mths ± 2 mths	slight systemic infection of frontal cranial bone; infection around orbits
125A	female	16 ± 1 years	possible infection on talus; lesions on neck of femur heads; extensive calculus on right mandibular teeth
125B	Indet.	infant	-
126	female	50+ years	some hypoplasia on right canine; hypercementosis on right side lingual; deep pitting interior of cranium; extensive arthritis on pelvis, patella, ribs, thoracic and cervical vertebrae, tarsus and carpus, ulna, and sternum
127	male	50+ years	extensive arthritic development in ribs, vertebrae, right ulna, carpus, tarsus, radius, patella, sternum; pitting in interior of cranium; calculus on teeth; hypostosis on lingual side maxilla and mandibular teeth; caries on M_1; M_3 hypercementosis
128			-
129	Indet.	18 mths ± 6 mths	-
130	Indet.	18 mths ± 3 mths	-
131	Indet.	6 mths ± 2 mths	infection on left orbit
132	Indet.	ca. mid 30's	Hypercementosis
133	male	ca. 50 yrs	extensive arthritic development in cervical, lumbar, axis vertebrae, talus, tibia, femur, tarsus; minimal arthritis on pelvis; cranial bones somewhat porous
134A	Indet.	6 yrs ± 9 mths	-
134B	Indet.	adult	-
135A	female	35 ± 5 years	-
135B	female	50+ years	calculus buildup; arthritic development on clavicle, sternum, femur distal
137A	male	35 ± 5 years	calculus buildup of M_1, P_2; arthritis on articular ends of long bones
137B	female	mid 30's	calculus buildup of M_1, P_2; arthritis on articular ends of long bones
138	Indet.	35 ± 5 years	arthritis in tarsus
139A	female	45 ± 5 years	caries on lower molars and incisors; pitted parietal bones; lipping on lumbar vertebrae; arthritis in thoracic vertebrae, phalanges
139B	Indet.	15 yrs ± 6 mths	-
140	female	35 ± 5 years	arthritic development in femur, scapula, ulna, radius head, patella
141A	male	40 ± 5 years	calculus on buccal side of molars; hypercementosis of maxillary teeth buccal side; hypostosis of 1st right molar; articular ends of tibia arthritic and septic; extensive arthritic development of lumbar and cervical vertebrae, tarsus, pelvis; lesions on pelvis; exatosis on sternum
141B	female	45-50 years	carie on anterior portion of P_1 and left M_2; hypercementosis on maxilla; osteophytosis on left humerus head and femur; arthritic development on femur, ulna
143A	female	ca. 50 years	femur head, tarsus very porous; tarsus arthritic
143B	Indet.	4 yrs ± 9 mths	-
144	Indet.	4 yrs ± 9 mths	healed cribra orbitalia
145	female	20 ± 5 years	-
146	male	35-39 years	both mandibular M_2 carie abscessed; carie on right mandibular M3; arthritic development in lumbar and thoracic vertebrae and phalanges
147	Indet.	child	-
148A	Indet.	4 yrs ± 6 mths	-
148B	Indet.	adult	-
149	male	40 ± 5 years	arthritic development in thoracic vertebrae, ulna, tarsus, carpus, and talus
150	female	50+ years	extensive arthritis in lumbar vertebrae, right humerus; abscessed teeth
151	female	20 ± 5 years	-
152A	male	45 ± 5 years	extensive arthritic development in cervical vertebrae, distal clavicle, distal humerus
152B	Indet.	3 yrs ± 3 mths	caries on both M_2 mandible
153	female	20-25 years	-
154	Indet.	9 mths ± 2 mths	-
155A	male	35 ± 5 years	slight arthritic development in vertebrae
155B	Indet.	8 yrs ± 9 mths	-

Additional insights into the skeletal population may be derived from life tables compiled for the total sample population, Cemetery Areas 1 and 2, village, and for males and females. The 40DV392 population was a typical prehistoric cemetery sample with an average age at death of 31-35 years with ages ranging from 0 to 55 years (Figure 68). The life expectancy at birth for the population was quite high at 26 years of age (Figure 69). The population was composed of 61 (35%) sub-adults less than 19 years of age and 113 (65%) adults greater than 19 years of age. The adult population was divided equally between the sexes with 51 (53%) males and 46 (47%) females. Both male and female adults had an average age at death of approximately 41 years. The presence of a high mortality for adult females in the third decade and a lower life expectancy than men until 35 years of age suggests an etiology of child-birth stresses.

Pathologies were noted to provide evidence of environmental stress, whether

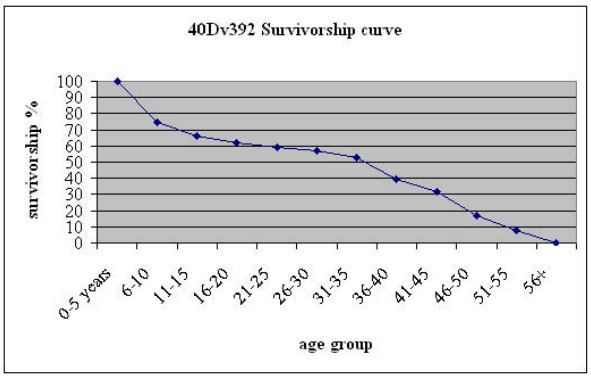

FIGURE 68. 40DV392 survivorship.

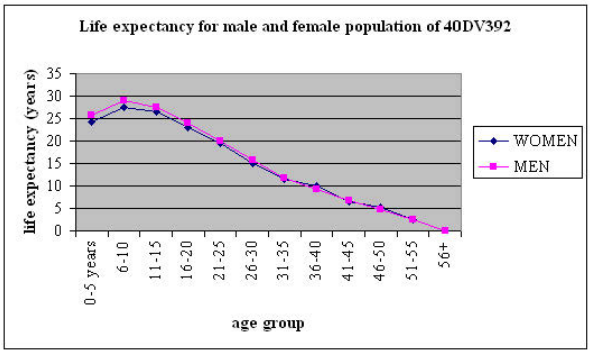

FIGURE 69. 40DV392 life expectancy.

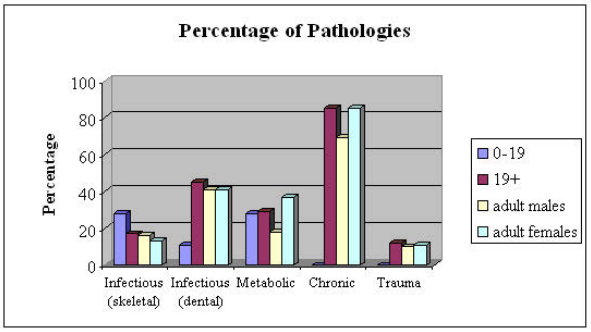

FIGURE 70. Percentage of pathologies.

chronic or acute in nature. Evidence for developmental and metabolic disturbances was sought in abnormalities of bone growth and maintenance. Skeletal and dental indications of infectious disorders was noted in bone and jaw inflammation (the result of reaction to auto-immune disturbances and the attack of organisms or secondary to systemic upsets).

Evidence for pathology was limited by the preservation of skeletal elements. The relative frequencies (%) of various pathologies and categories of pathology (environmental, metabolic, and infectious disorder) were calculated for sub-adults (less than 19 years age at death) and adults (greater than 19 years age at death), and for adult females and males (Table 11; Figure 70). The calculations permitted the interpretation of differences of disease frequency within the population.

Chronic metabolic disorder was present in the form of disrupted dental and bone growth secondary to malnutrition and specific hiatus in the metabolism of iron, vitamin C, vitamin D, and calcium. This disorder, observed within 25% of the population, affected adults and sub-adults equally and occurred twice as often on adult females (37%) versus males (18%).

Two metabolic disorders resulting in the under-production of dense bone, osteoporosis (calcium deficiency) and rickets (vitamin D deficiency), were observed in 2% of the adult population. Porotic hyperostosis and cribra orbitalia (iron deficiency), scurvy (vitamin C deficiency), hyperostosis frontalis interna (HFI-hormonal upset), and hypercementosis (starvation stress) were observed metabolic disorders that resulted in the diffuse over-production of disorganized bone or cementum. Iron deficiency was the most common disorder, affecting sub-adults as cribra orbitalia (25%) and adult females (33%) as porotic hyperostosis (Figure 71).

Acute and chronic environmental stresses were seen in the form of trauma and degenerative joint and vertebral disease. Trauma exclusively affected adults (12%) and were mostly well healed. Females displayed trauma to the elbow, hand, and shin (11%). Males exhibited

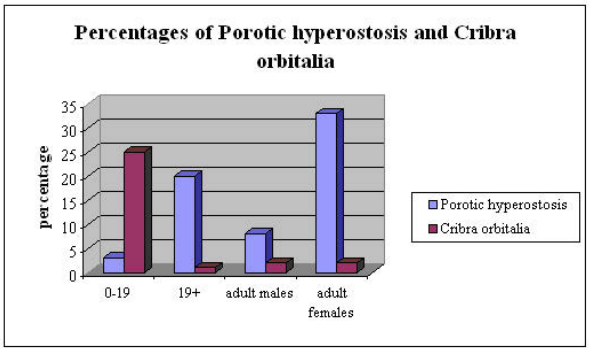

FIGURE 71. Percentages of porotic hyperostosis and cribra orbitalia.

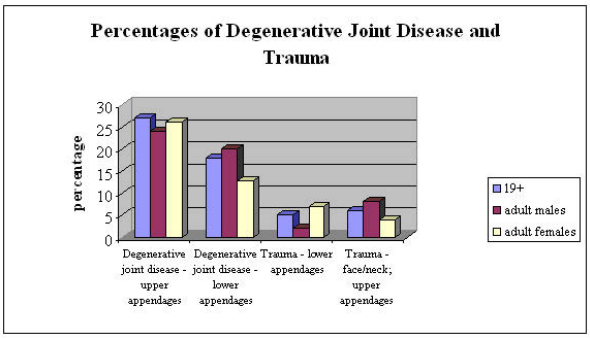

FIGURE 72. Percentages of degenerative joint disease and trauma.

FIGURE 73. Examples of trauma and degenerative bone disease (*Photo: Tennessee Division of Archaeology*).

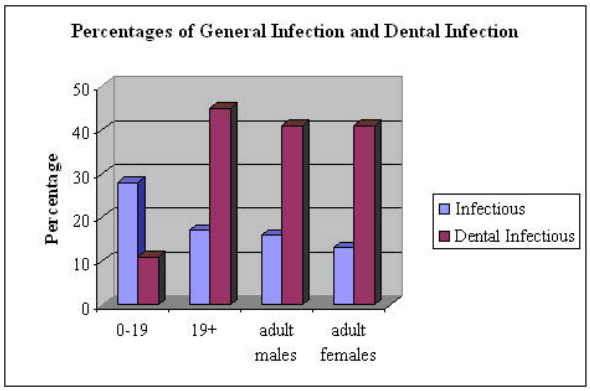

FIGURE 74. Percentages of general infection and dental infection.

severe trauma to the face, neck and lower legs (10%). Facial trauma to a young adult male (Burial 27A) likely resulted from interpersonal violence.

Degenerative joint disease through chronic arthritis of the vertebrae (VJD), appendages (DJD), mandibles (TMJ), and dentition (attrition) was observed on nearly all of adults (85%; Figures 72 and 73). Arthritis was observed as bone spurs (osteophyte) along joint margins and the deterioration (porosity) of joint surfaces. These forms of arthritis result from aging, strenuous occupations and trauma. Vertebral joint disease primarily affected either the entire column (21%) or the lumbar region (21%). No variation in VJD frequency was observed between the sexes. Females and males displayed similar frequencies of dental attrition (35-46%) and appendicular arthritis (71-76%). Arthritis of the appendages among males impacted upper, lower and all limbs equally. The upper appendages (26%) of males were affected twice as often as the lower appendages (13%) among females.

Additional important indicators of acute and chronic environmental stress were detected. Evidence for childbirth called marks of patrition (bone growth within the pelvis) was observed on 9% of adult females. Two adult males displayed auditory exostoses suggesting possible chronic exposure to cold water (Roberts and Manchester 1995:113). An example of cosmetic cranio-deformation was noted on the calavarium of Burial 25.

Chronic infection was evident through periosteal bone formation, osteomyelitis, meningitis, and otitis (Figure 74). Skeletal

infection observed in 19% of the population primarily affected sub-adults (28%). Sub-adults were solely affected by meningitis (5%) and otitis (3%). Frequencies did not vary significantly between the sexes, although males had a higher level of cranial and vertebral infection than females (8% versus 2%). This variety of infection may represent skeletal tuberculosis, syphilis or other more serious chronic infections. Notably, the appendicular infections among adults were often attributed to healing fractures.

Skeletal or dental pathology was very common (63%) among the 174 individuals within the population (Figure 74). Adults (88%) were affected twice as often as sub-adults (44%). The presence of dental calculus, cavities, periodontitis, dental abscess, and antemortem dentition loss (predominately among adults) indicates a pattern of chronic dental disease related to poor oral hygiene, general illness, and age. Some form of dental infection was observed within 28% of the population. Adults were affected four times more often than sub-adults (45% versus 11%), but no significant frequency differences were observed between the sexes.

Summary and Conclusions

Kelley's Battery (40DV392) represents an important addition to the extensive list of significant archaeological sites destroyed by development in the Nashville area. The exploration minimally met existing standards for archaeological investigations outside of state or federal oversight. Nonetheless, an extensive amount of information was recovered that provides insights into the prehistoric occupation of the Nashville Basin.

The investigations revealed the presence of an extensive prehistoric occupation with intact Late Archaic and Mississippian deposits. The emphasis of investigation was upon the Mississippian component. While these deposits exhibited superb integrity, the nature of the salvage operations precluded extensive, systematic excavation. Nevertheless, significant information amenable to reconstruction of the social and political systems during the Mississippian occupation was obtained. The results of the various analyses in the current study are evaluated within the context of Mississippian studies in the Middle Cumberland Region of Tennessee.

The Mississippian component embodies a nucleated village with associated stone-box cemeteries. Such villages are characteristic of the Regional IV decentralization period, A.D. 1325-1425, recently defined by Moore and Smith (2009:202-210). The ceramic assemblage compares favorably with assemblages from other contemporary sites. The occurrence of filleted appliqué bowls with negative painted and interior incised sherds are attributed to this period. The hafted knives recovered from Burials 53 and 120, and the discoidal, are considered characteristic of Middle Cumberland Mississippian lithic assemblages. Unfortunately the faunal and botanical assemblages are too small to be considered representative of the population subsistence patterns. However, the astragalus cubes, shell beads, and shell gorgets within the faunal assemblage are distinctly Mississippian. Maize and domesticated beans are clear indicators of late prehistoric settlements.

Burial patterns identified at 40DV392 demonstrate the greatest potential for identification and evaluation of social and cultural variation in Middle Cumberland Mississippian sociopolitical patterns. Forthcoming research will address the 40DV392 component in an evaluation of

hypotheses concerning social and political evolution in the Middle Cumberland region. Distinct patterns and variation in the stone-box clusters may be key in an assessment of the social and political changes purported to have occurred in the late prehistoric period in the Middle Cumberland region.

Numerous questions remain concerning the emergence and decentralization of the Middle Cumberland Mississippian chiefdoms. Unfortunately the rate of development and site destruction that has already occurred may hinder, if not prevent, developing a greater understanding of the late prehistoric occupation of the Nashville Basin. Great efforts are immediately required by the professional as well as avocational communities to preserve the cultural legacy of this region.

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NEW TENNESSEE CAVE AND ROCK ART RESEARCH 2015

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In 2015, the University of Tennessee, Knoxville, Cave Archaeology Research Team visited a number of new prehistoric cave art and open air rock art sites and continued documentation work in several others that were discovered in recent years. New findings concern painted pictographs on the southern and northern Cumberland Plateau, and petroglyphs and pictographs in two new cave art sites in Middle Tennessee. We also have new C14 dates from several rock art localities that refine our chronological understandings of prehistoric rock art in Tennessee.

For more than a decade, members of the Cave Archaeology Research Team ("CART") at the University of Tennessee, Knoxville, have made annual reports to archaeologists and interested lay persons at the Current Research in Tennessee Archaeology (CRITA) conference organized in Nashville by Kevin Smith of Middle Tennessee State University and Nick Fielder (early on) and then Mike Moore of the Tennessee Division of Archaeology. In those presentations, we have discussed new discoveries of prehistoric (and occasionally historic) rock art in Tennessee, both art that was placed in the open-air, usually on bluff faces, boulder surfaces, or in shallow rock shelters, and rock art produced deep underground within segments of Tennessee's vast karst systems -- cave art in the true sense of that term. Typically, these presentations have been descriptive, sometimes partly integrative, but they have always been designed to alert the archaeological community to the rich and varied (and still mostly undiscovered) corpus of ancient art that the state contains.

The sites we have reported have sometimes been the subject of more detailed subsequent publications (e.g., Simek and Cressler 2008a; Simek, Douglas and Wallace 2007; Simek et al. 2001; Simek et al. 1997; Simek, Franklin and Sherwood 1998; Simek et al. 2013a), and they have often been incorporated into more general studies or overviews of southeastern rock art or cave art (Simek and Cressler 2001, 2005, 2008b, 2009, 2015; Simek, Cressler and Douglas 2013). The CRITA reports themselves, however, have rarely been published (but see Simek et al. 2006; Simek et al. 2010) and so the encyclopedic sum of these reports, providing as they do presentations on all the sites we have worked on in a given year, remains essentially unavailable. In 2016, in part because the annual CRITA meeting was cancelled due to extreme winter weather in Tennessee and we were unable for the first time to give the report, we talked to Kevin Smith and Mike Moore, co-editors of the journal, about the possibility of publishing these presentations as extensive research reports in *Tennessee Archaeology* each year, so that the basic information about these important and sometimes compelling sites could be available to the archaeological community in a timely manner and on a systematic basis. Kevin and Mike agreed that this would be a useful set of sources, and this paper is the first result. We hope to continue to publish these reports each year into the future, and if there is interest,

FIGURE 1. Black pictograph Glyph 1 from 76th Unnamed Cave, Tennessee.

we might even go back and "retro-publish" past reports so that the full catalog is available to those interested in our work over the years. This first edition will concern work by the UT Cave Archaeology Research Team in calendar year 2015.

CART Activities in 2015

The year 2015 was productive for the Cave Archaeology Research Team. Eight (or maybe nine) new prehistoric rock art sites were discovered, including seven open air localities and one (maybe two) new cave art sites. We will briefly present each of these new sites in this paper. In addition to the new sites, we will report here on new absolute age determinations from 73rd Unnamed Cave that we received since last year's CRITA meeting where we first talked about the site itself.

New Cave Art Sites

In February of 2015, Joe Douglas, Alan Cressler and Jan Simek were taken to 76th Unnamed Cave in southeastern Tennessee by Kristen Bobo, an independent cave conservationist and gate builder *extraordinaire*. Several years

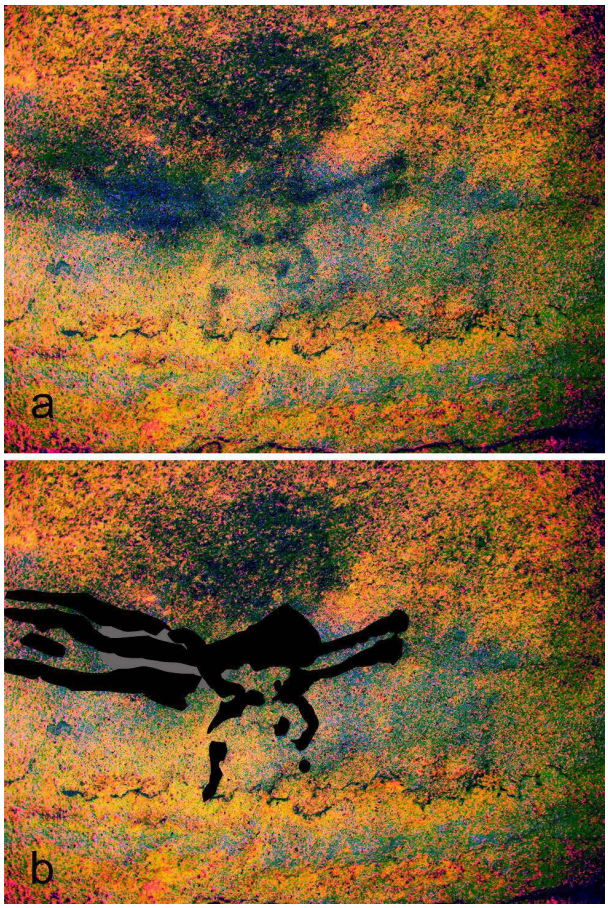

FIGURE 2. DStretch enhanced (a) and illustrated (b) versions of Glyph 1 from 76th Unnamed Cave.

earlier, Kristen had seen what she thought might be a black pictograph of a bird, perhaps a turkey, drawn on the cave wall at the back of a wide chamber some 100 m into the dark zone of the cavern (Figure 1). The pictograph, which we call Glyph 1, is much faded and schematic in any event, but when it's enhanced using Jon Harmon's DStretch plugin for ImageJ (Figure 2a), it seems possible that the figure comprises a spreading tail to the left, a body and two curving legs in the center, and a long neck extended to the right (Figure 2b). There is an area of smeared black above the figure, but the color tone of this area is not exactly the same as for the lines composing the possible avimorph. The smudge may not

FIGURE 3. Black pictograph Glyph 2 from 76th Unnamed Cave, Tennessee.

FIGURE 4. Illustrated version of Glyph 2 from 76th Unnamed Cave.

be related to the pictograph. For us, the condition of this pictograph and its possible subject matter make it conceivable that it is a prehistoric image, although this cannot be determined with certainty at this time -- one reason for the "maybes" we used earlier as qualifiers for the number of new sites in 2015.

Some 20 m or so further into the cave there is another black image painted onto the ceiling of the passage (Figure 3). This pictograph, Glyph 2, was probably applied using liquid black paint as was Glyph 1, but the subject matter is enigmatic (Figure 4). More clearly composed of continuous, coherent curving lines and circles, this pictograph is quite different from Glyph 1. It, too, is faded, suggesting some antiquity. We note that this cave was mined historically for saltpeter, and there are signs that mining was heavy in some places. Mattock marks are common in some exposed remnant sediment profiles and there is reason to believe that over a meter of deposit might have been removed in certain areas. But the cave does *not* display the frequent graffiti and counting lines ("tally marks"), typically scratched and/or smoked onto walls and ceilings that many saltpeter mining sites contain. We also note the presence of a small number of clearly prehistoric artifacts found inside the cave, including a ground mica schist fragment that might have been from a shattered celt, suggesting that the interior was visited, if not decorated, by prehistoric people. The extent of saltpeter sediment removal does indicate that access in prehistoric times was probably much more constricted and difficult than it is today. Given the lack of much context for these two pictographs, we cannot be certain as to their origin and meaning.

We visited 52nd Unnamed Cave, less than a half kilometer from 76th Unnamed Cave in the same geographic context after completing our visit to the latter site. Several years ago, Alan Cressler had seen the feature shown in Figure 5 more than 100 m into the dark zone of this cavern, but we had never had an opportunity to visit this very large cave together before. A number of charcoal lines and smudges converge at various angles on a round hole in the cave wall (Figure 6). The depression itself is natural, and there is no sign of anthropogenic alteration or modification of the hole. The lines, however, are not natural, and they occur in groups of two or three parallel

FIGURE 5. Location of black line feature in 52nd Unnamed Cave, Tennessee.

FIGURE 6. Close up of black line feature in 52nd Unnamed Cave.

segments delimiting the natural void on all sides and at different angles. It is hard to imagine how these lines would have resulted from random markings independent of the hole in the wall. Moreover, the lines do not have the shape or distribution normally seen with torch stoke marks: the parallel lines seem too far apart for them to have been made by burning stick bundles. We acknowledge that the image in question is enigmatic and problematic as to age and meaning; we present it here only as a possible prehistoric feature. It is another of our

FIGURE 7. Location of Ty's Pinnacle 1 pictograph panel.

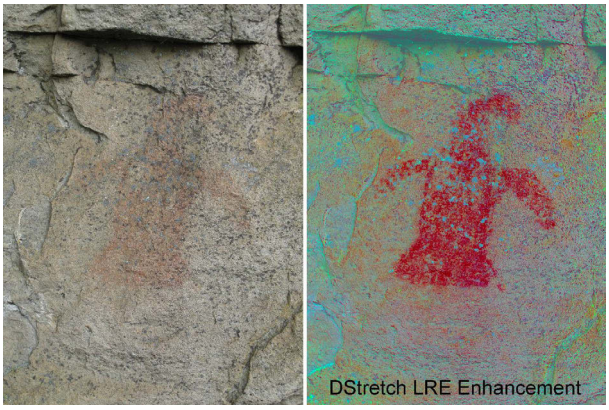

FIGURE 8. Raw photograph and DStretch enhancement of Ty's Pinnacle 1 pictograph.

cautionary "maybes" for this year.

New Open-Air Pictograph Sites

We are more confident in the seven new open-air pictograph sites we visited in 2015. All seven of these sites share certain characteristics of format and/or geography that we have come to recognize as elements of a regional pattern for open air rock art (Simek et al. 2013b; Simek, Cressler and Herrmann 2013): all seven of these sites contain red paintings; they are all located on south- to southeast-facing sandstone bluff walls at the top of the Cumberland Plateau litho-stratigraphic sequence; all sites are high

FIGURE 9. Illustrated version of Ty's Pinnacle 1 pictograph.

on the bluff walls between 457 and 533 meters amsl. We will consider these locations as we visited them over the course of 2015.

In April, Sarah Sherwood of Sewanee took Simek to visit a new rock art site that she had discovered in southeastern Tennessee. As we explored the area around the first site, we located a second area containing pictographs some 60 m northeast from her original discovery. Given their proximity, Sherwood gave the same name to both localities with a number to distinguish between them, thus "Ty's Pinnacle 1 and 2." Ty's Pinnacle 1 is located on a vertical wall inside a large sandstone rockshelter (Figure 7). A single faded red pictograph at this locality illustrates the filled torso, head, and upper limbs of a figure (Figure 8). Given the disposition of the limbs, the length of the neck and shape of the head, and the flaring of the torso at the base (Figure 9), we believe that the figure represents an avimorph or bird shown in a vertical position. As it turns out, this is a relatively common way for avimorphs, or even

FIGURE 10. Bird/Human petroglyph from 11th Unnamed Cave, Tennessee (Simek et al. 2001).

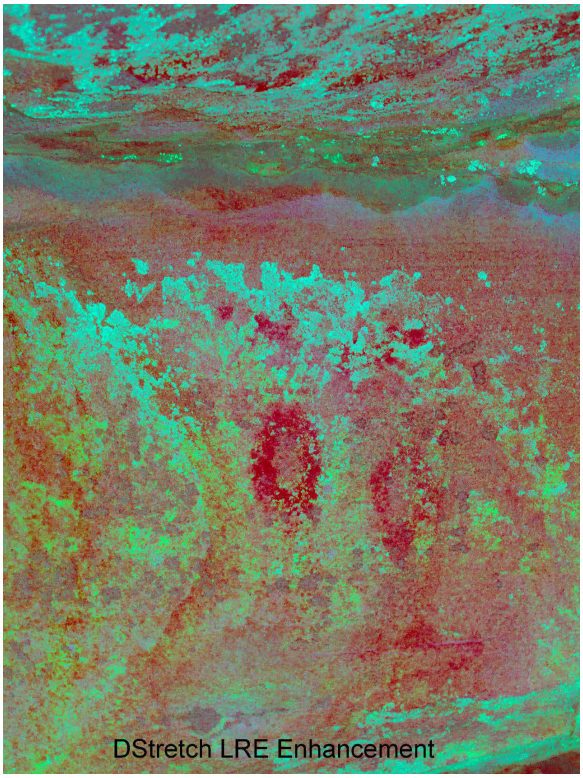

FIGURE 11. DStretch enhanced circle pictographs from Ty's Pinnacle 2, Tennessee.

bird/human transformations, to be depicted in southeastern cave and rock art (Figure 10). There are several other pictographs at Ty's Pinnacle 2, and these are executed in three different pigment colors, a rare thing for open- air rock art on the plateau. The first glyphs at Ty's Pinnacle 2 are two small red ovals, each about 10 cm in length (Figure 11). These are obscured by lichen growth, and while there are other patches of color showing through the lichen, we can distinguish no other intentional shapes. A bit further along the cliff is another set of glyphs. The most evident character here is a black quadruped (Figure 12a); voids in the black lines composing the figure indicate that it was drawn on the wall with a dry black crayon rather than painted with liquid color. The quadruped faces left -- the head raised and the tail curved over the back -- and it is associated with a yellow

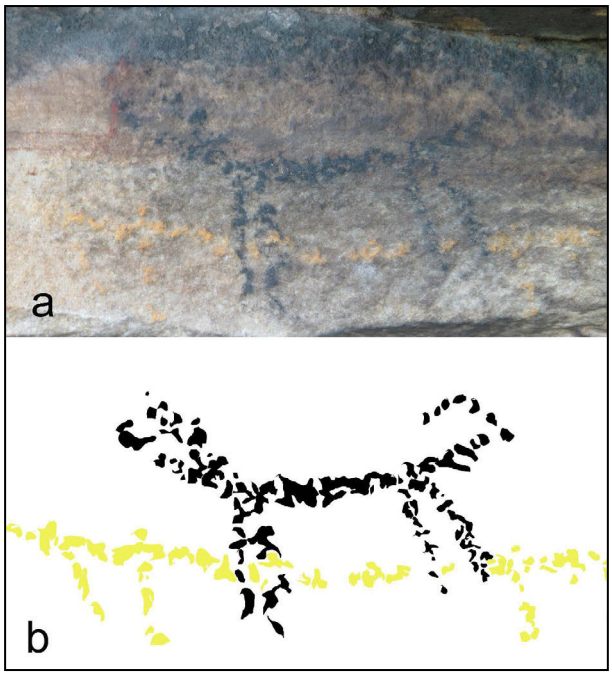

FIGURE 12. Black pictograph of a quadruped with yellow lines below (a) and illustration of same (b) from Ty's Pinnacle 2.

FIGURE 13. Black pictographs of canids from 60th Unnamed Cave, Tennessee.

FIGURE 14. DStretch enhanced photograph showing spatial relationship between black canid and red anthropomorph (arrow) from Ty's Pinnacle 2, Tennessee.

figure, similarly drawn and composed of four short vertical line segments connected by a longer horizontal line (Figure 12b). We suggest that the quadruped is a canine or dog drawn in the same way as we have seen dogs illustrated in a number of rock art contexts (e.g., Figure 13). To the right of this (seen in pink on the wide enhanced view shown in Figure 14) is another red pictograph, composed of a thick central vertical element with two lateral curving lines extending out and up from the central mass (Figure 15). This posture is commonly used in prehistoric rock art in this region to illustrate anthropomorph figures with arms raised; Figure 16 shows an example from Painted Bluff in Alabama some 100 km south of Ty's Pinnacle.

Thus, Ty's Pinnacle 2 contains a small but complex assemblage of pictographs that is unique in this area of the Cumberland Plateau. The use of dry crayons instead of paint is rare. Black figures in the open air are also rare, with black being the usual color for pictographs in caves and red in the open (Simek et al. 2013b); there are, however, a few other exceptions to this "usual" pattern. The use

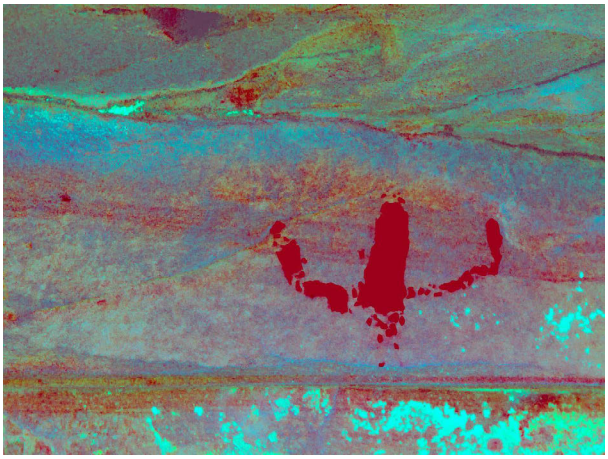

FIGURE 15. Illustrated version of red anthropomorph pictograph from Ty's Pinnacle 2.

of yellow is very rare, but yellow pigment can be produced with limonite (yellow ocher), which is often found with hematite (red ocher) in natural iron deposits. In any event, we intend to undertake *in situ* chemical and mineralogical analysis at Ty's Pinnacle 2 in order to sort out some of these issues. Otherwise, in subject matter and context, these pictographs appear to fall within the corpus of southern Cumberland Plateau prehistoric rock art.

In June of 2015, Bill Lawrence of the Division of Archaeology invited Simek to hike up into the Daddy' Creek area of Cumberland County to look at several possible rock art sites he had discovered while surveying new land additions to the Cumberland Trail. Bill had identified three new sites, one a heavily looted rockshelter that did not exhibit rock art, and two other localities 100-150 m up the canyon that both contain red pictographs that are much faded and difficult to see. The first site, Lawrence Pictographs 1 (Bill refused to name these sites, so Simek did) contains two panels with perhaps as many as eight individual glyphs. Panel 1, the largest, extends for several meters along the back wall of a small rockshelter;

FIGURE 16. DStretch enhanced photograph of an anthropomorph with arms raised above head from Painted Bluff, Alabama.

Figure 17a shows a mosaic photograph of that full panel, and Figure 17b shows that panorama enhanced with DStretch and with seven glyphs/iron spots identified on the panel. With only a few exceptions, the red pictographs on Panel 1 are difficult to discern, even with image processing. There are two glyphs, however, that are relatively clear, our Glyphs 2 and 3 (Figure 18). Glyph 2 is a complex geometric design. It is composed of two equal-sized boxes, one above the other, connected by a vertical line segment that bisects both boxes. This is clearly not a natural feature. Glyph 3, just to the left of #2, is a somewhat faded red circle, and both of these pictographs show the kind of surface induration that occurs when paint was applied as a liquid. We will not venture guesses as to the original form of

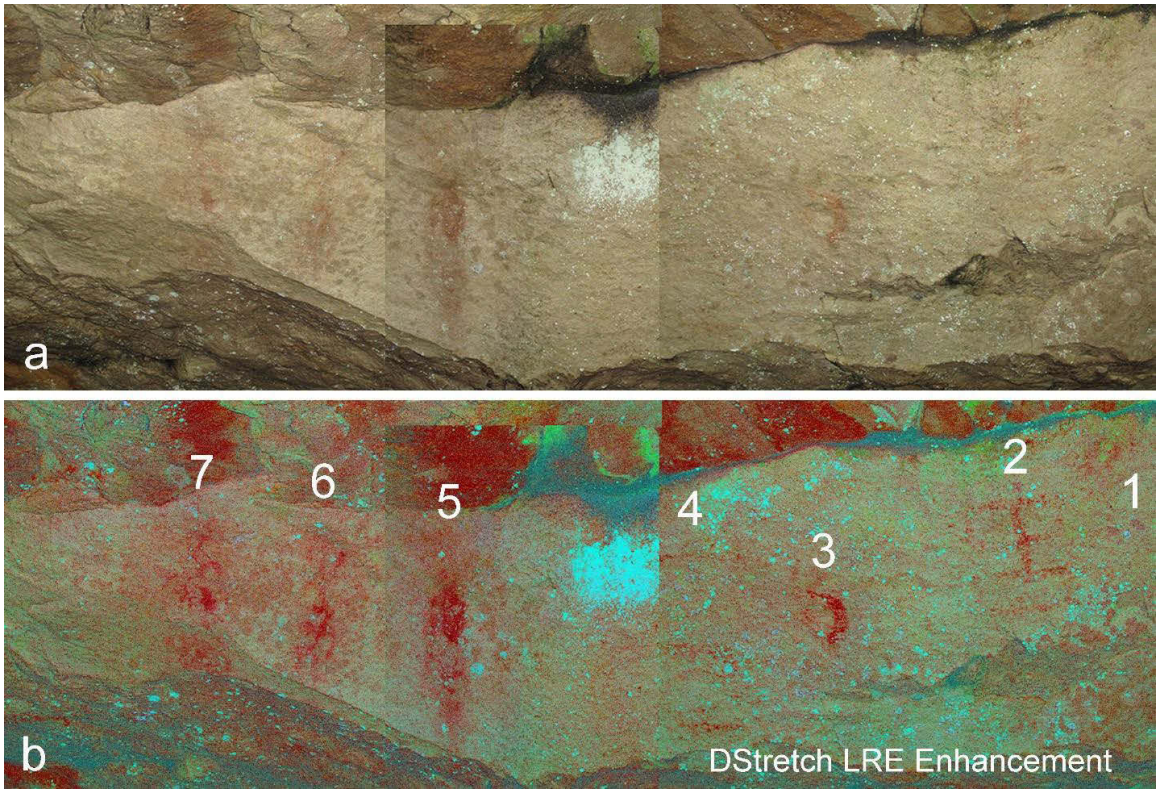

FIGURE 17. Mosaic photograph of Panel 1 from Lawrence Pictographs 1, Tennessee (a) with DStretch enhanced image of that panel (b) with glyph numbers listed.

FIGURE 18. Illustrated version of Glyphs 2 and 3 from Lawrence Pictographs 1.

any other Panel 1 pictographs. Panel 2 (Figure 19) is located several meters to the south of Panel 1 behind a breakdown boulder on the shelter floor.

This panel contains a single pictograph executed in red, another geometric form with two vertical lines connected at the base by a horizontal element forming a rectilinear structure. At the top of the two side bars are angled short line segments, several on each side, radiating from the tops of the vertical segments. This pictograph is not natural and its similarity to the geometric figure Glyph 2 suggests a similar origin.

Sixty-five meters or so up the canyon, Lawrence found another site with traces of red pigment on the wall of a small sandstone overhang mostly covered over with spreading lichens. The density and coverage of the red paint at this locality is not likely natural, but the lichen obscures any definition of pictograph form. We named this site Lawrence Pictographs 2, but we can't say much more about what might have been there. Interestingly, however, we can observe that the red pictographs from Lawrence 1 and 2 are

quite far north for such images in Tennessee. While there are two red pictograph sites we know of in southern Kentucky and three Tennessee pictograph sites (one black) north of the Lawrence sites (two in the Harpeth Valley of Middle Tennessee), all other Tennessee examples are south of the Lawrence Pictographs. We believe this may reflect the presence of a prehistoric boundary somewhere near the modern Kentucky border between two ancient provinces of rock art production (Simek and Cressler 2016).

Alan Cressler was contacted by a member of the caver community in late September 2015 about a possible new red pictograph site, once again at high elevation on the southern Cumberland Plateau. He and Sarah Sherwood visited the site on October 2 and, while exploring the bluff lines around the original site, they found a second rock art site nearby. Cressler, Sherwood and Simek revisited both localities in January 2016. The first site Cressler and Sherwood saw in October was the caver report, and Alan named it the Zellner Pictograph, after the caver who first saw the image. The single pictograph (Figure 20a) is positioned at the base of a high south facing sandstone wall with very little protective overhang. The image consists of an outlined vertical line segment that links into to a horizontally-oriented outlined oval shape at the base; this base oval is open at the right side, although there is some suggestion in the processed photograph that the oval may have been originally closed (Figure 20b). Two-thirds of the way up the vertical line segment are two lateral projections, both linked to the body of the vertical element and both rounded and oriented slightly downward from horizontal. This image resembles a poorly drawn Christian cross, although the oval at the base is not typical for such a depiction. There are, however, numerous

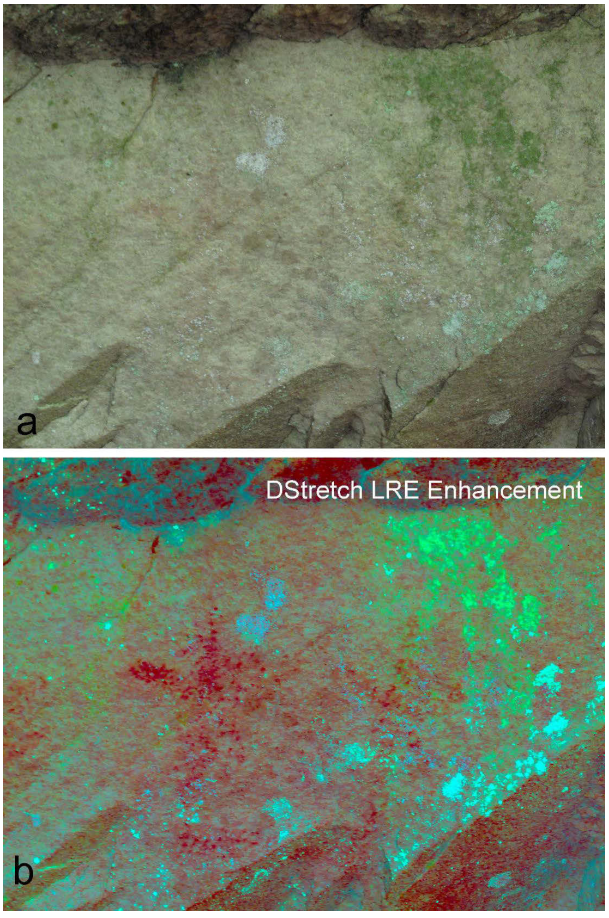

FIGURE 19. Panel 2 from Lawrence Pictographs 1. Tennessee (a) with DStretch enhanced image of the panel (b).

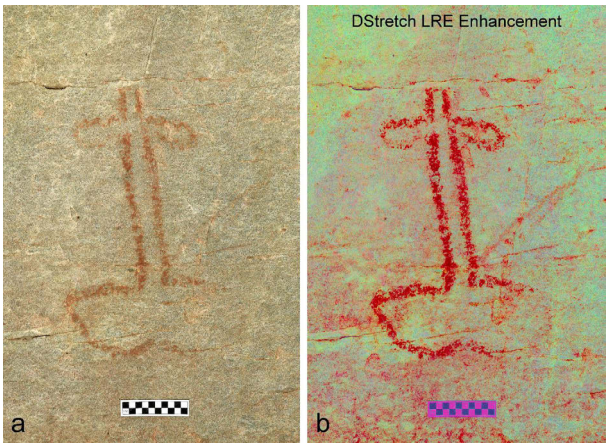

FIGURE 20. Zellner pictograph (a) and DStretch enhanced image (b).

FIGURE 21. Sarah Sherwood seated below the Dry Creek Pictographs in 2015.

FIGURE 22. DStretch enhanced image of Glyph 1 at Dry Creek Pictographs, Tennessee.

FIGURE 23. DStretch enhanced image of Glyph 2 at Dry Creek Pictographs, Tennessee.

other prehistoric cross images known in area rock art and in the Southeast more generally. In its context, condition, and execution, the Zellner Pictograph is in keeping with other prehistoric pictograph sites on the southern Plateau.

The second site in this grouping was discovered by Cressler and Sherwood about 1/3 kilometer from the Zellner Pictograph (Figure 21). Cressler named this site the Dry Creek Pictographs and recorded two complex geometric images just inside a small south-facing shelter. One of these (Figure 22) is a pointed oval shape with a series of interior branching lines that partition the interior of the oval

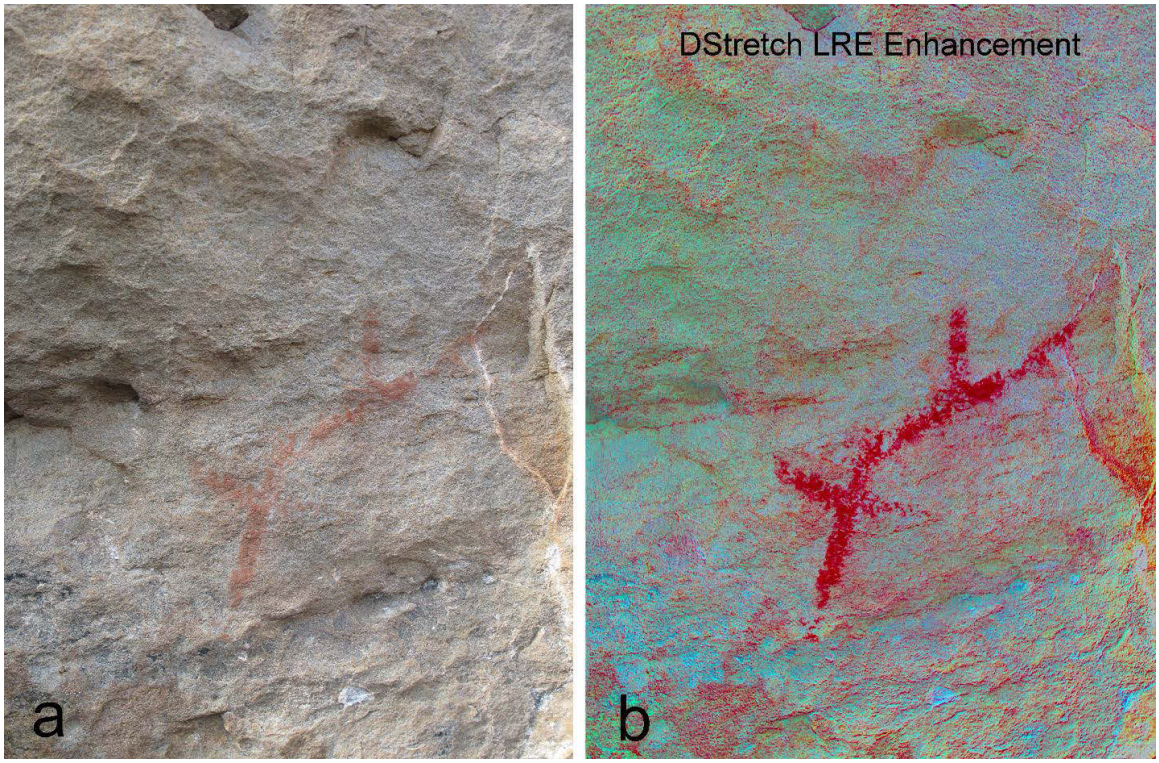

FIGURE 24. Obie Birthday Pictograph (a) and DStretch enhanced image (b).

into varied, seemingly unorganized, and unequal sized spaces. In the upper center of this array is a dark red dot wider than any of the accompanying lines with three line segments spreading away from this unique feature. The second pictograph (Figure 23) is a wide oval that also contains interior partitioning line segments, but in this case the partitioning lines are bilaterally symmetrical inside the outline. Both of these pictographs share subject matter with other Cumberland Plateau rock art, including several geometric and circular images that we have already seen at other sites described above. More investigation at these two new sites, especially with instruments for materials analysis, may yield information concerning how and when they might have been made.

The last open-air pictograph we will discuss here was discovered by South Cumberland State Park ranger Jason Reynolds in February 2015. Simek visited the site with Reynolds, Sierra Bow, and a number of others on December 12, 2015. There is a single red pictograph at this locality, which we call the Obie Birthday Pictograph, consisting of a branching linear pattern drawn on a sheer sandstone wall at about modern eye level (Figure 24). While admittedly not very complex, this image resembles a number of others we have seen in this same area and highlights just how illusive some of these features can be. And as the discovery of seven new sites this year would suggest, these open air pictograph sites are becoming quite numerous on the Cumberland Plateau of Tennessee.

New Radiocarbon Dates

We conclude our presentation with a report on two new radiocarbon ages for a dark zone cave art site that we reported at CRITA in 2014. We first visited 73rd Unnamed Cave with Kristen Bobo and

FIGURE 25. Location of crosshatch petroglyph near waterfall in 73rd Unnamed Cave, Tennessee.

FIGURE 26. Crosshatch petroglyph in 73rd Unnamed Cave, Tennessee.

Joe Douglas in September of 2014, where they had seen a series of very fine line petroglyphs engraved onto the vertical face of cave wall near to a small underground waterfall (Figure 25); these engraved lines were dense and overlapping at right angles forming a rectangular crosshatched petroglyph about 40 cm square (Figure 26). During that visit, another panel of fine petroglyphs, these illustrating what might be plants (Figure 27), perhaps tobacco or corn, were found along a different stream passage more than 70 m from the first. Alan Cressler visited the cave in August

FIGURE 27. Fine line petroglyphs, perhaps images of plants, in 73rd Unnamed Cave, Tennessee.

FIGURE 28. Fine line petroglyph panel on ceiling of 73rd Unnamed Cave, Tennessee.

FIGURE 29. Detail of ceiling panel in 73rd Unnamed Cave, Tennessee.

2015, to photograph the fine-line petroglyphs it contains. During the August visit, another very dense panel of engravings was found on the cave ceiling comprising dense and overlapping figures (Figure 28) but with clearly delineated

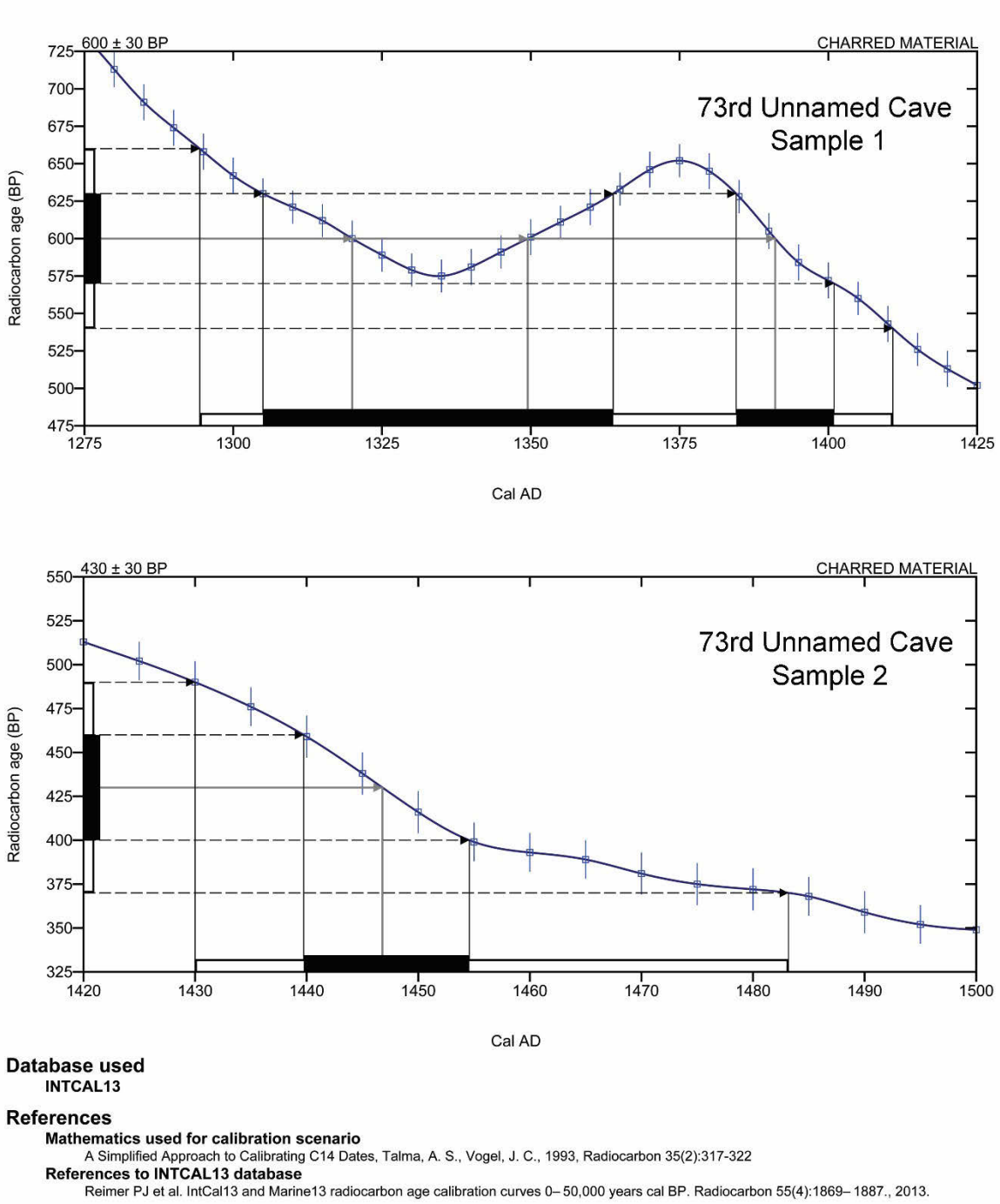

FIGURE 30. Two new radiocarbon age determinations, both on cane charcoal from 73rd Unnamed Cave, Tennessee. Measured ages at upper left of each calibration curve.

individual images within the palimpsest (Figure 29). This panel warrants detailed study, which it will receive in the months to come. Also in August, two fragments of burnt river cane (*Arundinaria* sp.) were recovered in different parts of the cave and submitted to Beta Analytic for age determination.

Two dates were returned, Sample 1 that calibrates to AD 1295 to 1410 at 95% CI and Sample 2 that calibrates a bit later to AD 1430 to 1485 with the same CI

(Figure 30). That both of these age determinations implicate a late 14th/early 15th century Mississippian authorship is encouraging, especially given the possible subject matter of some of the petroglyphs.

Conclusions

For the most part, new Tennessee cave and rock art sites discovered in 2015 conform in their nature and context to general patterns we have seen elsewhere in the State. New open-air pictograph sites are all located along the western escarpment of the Cumberland Plateau or within interior drainages on the plateau surface. All face into the southern quadrant of the compass. All are relatively elevated, above 450 m (c 1500 ft) amsl. All contain red pictographs with surface coverage and induration characteristics typical of applications of liquid paint. And the new open-air sites are located from northern into southern Tennessee along the Plateau. The addition of seven new bluff painting sites brings to 42 the number of open-air pictograph sites now recorded in Tennessee; there are, in addition, 16 recorded open-air petroglyph sites for a total number of 58 open-air rock art sites. The pace of discovery for these sites is evident when one considers that Charles Faulkner listed 18 open-air sites (and six cave art sites) in Tennessee as recently as twenty years ago (Faulkner 1996:111-118); we are finding on average two new sites every year since 1996.

There are a few distinctive elements among this year's open-air rock art discoveries. The multi-colored pictographs at Ty's Pinnacle 2 show that both black and yellow pictographs can occur in the open air, but there are already a few known examples of both colors outside caves. Black pictographs have been found at Baker Mountain Shelter, Skinner Mountain, and at the Dogslaughter Pictograph site in southern Kentucky. Yellow pictographs, indeed polychrome red and yellow images, have been recorded at Painted Bluff in Alabama (Henson and Martz 1979; Simek, Cressler and Herrmann 2013). The complex geometric forms from Lawrence 1 are rare in Tennessee, but they are known from Painted Rock on the Tennessee/North Carolina border (Loubser 2007) and other sites in that area. Thus, while there are some less common aspects to the 2015 Tennessee open-air rock art discoveries, they still fall well within the wider corpus of regional rock art variation.

The two new cave art sites recorded in 2015, while perhaps problematic as prehistoric cave art sites, also conform to what we know of such sites in the region. Both are along the western margin of the Cumberland Plateau, and both sites are relatively low down on the escarpment, below 335 m (1100 ft) amsl. Cave mouths are oriented in the SW compass quadrant. Both are quite extensive cave systems, and pictographs inside the caves were produced using black pigment, and as for open-air red pictographs they were likely applied in liquid form. In our experience, this makes an historic period origin unlikely, as 19th century saltpeter miners typically "smoked" graffiti onto cave walls and ceilings with tallow candles or oil lamps. The addition of these two sites to the catalog brings to 55 the total number of cave art sites in the State, a far cry from the 6 caves Faulkner listed in 1996. Cave art sites have been discovered at the rate of almost 2.5 per year for the past two decades, and the Tennessee catalog for cave art sites now approaches the number of entries for the open-air rock art sites. There are now over 100 rock art sites total known in Tennessee.

Lastly, two new ^{14}C age determinations from 73rd Unnamed Cave indicate activity in that cave during the late 14th/early 15th centuries, a time period that we have identified as the "apogee" of prehistoric cave art in Tennessee (Simek, Cressler and Douglas 2013). The association of the cave art in this site with water and with images of curving meander lines and, perhaps, plants is consistent with what we have seen in contemporary caves.

We will continue to survey the caves of Tennessee and surrounding states for new examples of this compelling prehistoric site type. We are certain that there are many sites still out there to be discovered. With an increasingly large sample of sites, we can now also undertake comparative studies among Tennessee's rock art sites and with rock art complexes from surrounding states. We believe that we are approaching a detailed understanding of the variation that existed among these sites in the past, an understanding that will allow us to better determine when this art came to be and how it changed in content and meaning over time. The prospects are truly exciting.

Acknowledgements. We are especially grateful to the owners of these Tennessee rock art sites, who have welcomed us and our work and have sought so diligently to protect the heritage resources on their properties. Jon Harmon authored the wonderful DStretch plugin for Image J. We acknowledge the support of Tennessee State Parks (TDEC), The University of Tennessee, the UT College of Arts and Sciences, and the UT Office of Research. Mike Moore and the Tennessee Division of Archaeology have facilitated our work on state properties. We gratefully acknowledge funding support to the senior author from The Wenner-Gren Foundation and The Noyes Family Foundation.

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NANCY LEWIS LADD (1926-2015): IN MEMORIAM

Marlin F. Hawley and David H. Dye

Nancy Lewis Ladd, the only child of Tennessee Valley archaeologist Thomas M.N. Lewis and Leone C. Lewis, passed away on Friday, February 27, 2015 at St. Clara's Manor in Lincoln, Illinois. She had moved there from Jacksonville, Illinois with her husband, Frank Ladd, after he had been incapacitated by a stroke shortly before Christmas 2012. The couple had called Jacksonville, Illinois home for more than two decades. The move put them closer to one of their two sons.

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Nancy Ladd was born in Watertown, Wisconsin, in 1926, and accompanied her parents to Knoxville, Tennessee in early 1934, when her father, an avocational archaeologist and businessman, accepted an offer by William Webb to head up archaeological investigations in the Norris Basin in the spring of 1934. In leaving Watertown, her father effectively turned his back on the family business, the G.B. Lewis Company. Tom's father had groomed him to take over the company, which Tom was not inclined to do. For that matter, in heading south, Tom gave up a regular income, one which had provided enough leisure time to pursue his interest in the collection of Native American artifacts. In any case, through Webb's influence, Tom Lewis was later appointed to the faculty of the University of Tennessee (UT), where he remained for the duration of his storied career as a TVA archaeologist.

In trying to piece together a picture of Tom Lewis's life before his involvement in the TVA, we managed to track down Nancy (i.e., Dye 2013; Dye and Hawley 2014; Hawley and Dye 2015, 2016). Then living in Jacksonville, she and Frank graciously allowed one of us (Hawley) to invade the couple's apartment, where he was permitted to scan the small cache of images she had of her father (all of which post-dated ca. 1950, and ran into the late 1960s). While they had once had others, over the years many had been lost and some of persons unknown to them had been culled.

In many ways Nancy was a less than an ideal source of information about her father. The reason for this is that her parent's divorced in 1939, when she was 13 years old. Although she could not say for sure what precipitated the couple's break up, she did point out that Tom's mother never warmed to Leone, whom she regarded, as "a spoiled Southern belle" (quoted in Hawley and Dye 2015:148). Nancy was less aware of other factors, but in the year or two leading up the divorce, the stresses of administering the UT TVA archaeology program mounted. Add to this the bitter feud in which Tom was then engaged with his former boss, William Webb, and it is not hard to imagine the strains on him and, as result, on the couple's marriage. A troubled marriage to begin with perhaps, it

FIGURE 1. Nancy L. Ladd, one of her sons, and Tom Lewis, early 1960s.

never stood a chance.

Even before the divorce, apparently, Nancy was dispatched north to Tom's parents where she finished her education. She then enrolled in Vassar College, where she matriculated with a Bachelor of the Arts degree. Vassar College was not her choice; Tom's mother said to her one day, "Tom went to Princeton, so you'll go to Vassar." That was that. Nancy went on to obtain a Master's degree in journalism from the University of Wisconsin in Madison and also took classes at the Art Institute of Chicago. She worked as the Decorating Editor for Institutions Magazine and as the public relations director at MacMurray College (New Herald News 2015), but her lifelong passion was painting. She married Frank Ladd in 1956. Unfortunately, for the historian of archaeology trying to flesh out aspects of Tom's career, Nancy had little direct information. She was a young girl when her parent's divorced and she had been shielded from the emotional strains that beset them. Much of her knowledge of her father's career, and that of Madeline's, too, for that matter derived from the flyleaf to *Tribes that Slumber*. Her copy was inscribed, "To Nancy, from Pappy."

While Nancy was unable to provide specific details that might add a personal dimension to, for instance, her father's feud with Webb, she was still his daughter and naturally she had internalized a great deal of personal knowledge about him. She commented at one point in our interview, for instance, that her father was a deeply reticent man. Direct confrontation was simply not part of who he was; it was an unfortunate personality characteristic to have in facing many of the problems that that beset him in the late 1930s. Madeline was Tom's opposite in many ways. As Nancy put it, Madeline complemented her father. Where Tom often held back, Madeline did not. Sullivan's comment (1999:73) that Madeline was no "shrinking violet" was an

FIGURE 2. Madeline and Tom Lewis at Princeton University, probably 1969, the date of his 50th class reunion.

FIGURE 3. Tom Lewis' Christmas card, late 1930s.

assessment that Nancy accepted with a nod. Probably in no small measure, it was Madeline's presence and support—along with that of his mentor, W.C. McKern—that got Lewis through this period—the feud, the mounting problems with the TVA, his failed marriage and divorce, and his father's sudden death (in Dec. 1938), all packed into the span of a few years.

As the years passed, Nancy was a frequent visitor in Knoxville. She related a story involving Madeline's paintings and drawings for *Tribes that Slumber*. That Madeline used Tom as an occasional model for her depictions of native life in the Tennessee River valley has been known since Lynne Sullivan's (1999:78) biography of Madeline, in which Madeline acknowledged that she used Tom's hands to stand in for those of a native flintknapper (Lewis and Kneberg 1958:22-23). But Tom was the inspiration for other images, as well. Scanning one of Madeline's in-progress productions one day, Nancy commented to her that "Dallas Man" (Lewis and Kneberg 1958:114) bore a striking likeness to her father. Madeline, she said, responded with a smile and resumed drawing. She and Frank wondered if the inclusions of aspects of Tom's person into her art were an "in joke" between the pair or whether it was unconscious on Madeline's part. In all likelihood it stemmed from Madeline's deep affection for and familiarity with Tom.

Nancy herself was reticent throughout Hawley's interview, something for which she apologized. She seemed bemused in our interest and at times a little discomfited by our knowledge of him. Who wouldn't be if the tables were turned? And, since the first visit in April 2012, Nancy occasionally provided other bits of lore, mostly in response to information that we sent to her. From time to time, she would turn up images that she sent, including the one of her father holding one of the spectacular Duck River Cache "swords" that recently graced the cover of *Tennessee Archaeology*. Through Nancy, too, we were able to obtain a family portrait and two other Lewis images from her cousin. Nancy embraced our research as it opened a vista onto her shared past with her father and Madeline, too, for that matter, which was otherwise hazy. The last direct link to Tom Lewis, her quiet encouragement will be greatly missed.

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