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Margaret Robinson

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ILLUMINATING HOPEWELL LEGACY DATA: A CASE STUDY OF MOUND 23

AT HOPEWELL MOUND GROUP

By

Margaret Robinson

A THESIS

Presented to the Faculty of

The Graduate College at the University of Nebraska

For the Degree of Master of Arts

Major: Anthropology

Under the Supervision of Professor Carolyn Heitman

Lincoln, Nebraska

December, 2016

ILLUMINATING HOPEWELL LEGACY DATA: A CASE STUDY OF MOUND 23
AT HOPEWELL MOUND GROUP

Margaret Robinson, M.A.

University of Nebraska, 2016

Advisor: Carolyn Heitman

Digital archives present new opportunities for transparency, context and accessibility by digitizing and publishing limitedly accessible collections of archival documents and artifacts. Due to the destructive nature of archaeological inquiry these datasets are the only remaining materials from which archaeologists can make interpretations about past human behavior. The objective of this thesis was to be a case study for the usability of legacy data from Hopewell Mound Group by examining newly accessible data sources through the Ohio Hopewell digital archive (hopewell.unl.edu). The resulting databases for the burial data and artifacts of Hopewell Mound Group's Mound 23 are a combination of the Field Museum of Natural History artifact catalog, archival field notes, published manuscripts, unpublished manuscripts, excavation reports, and plan maps. In addition, contemporary data sources such as Case and Carr's (2005: Appendix 6.1) HOPEBIOARCH database and geophysical data from Hopewell Culture National Historic Park were also used in this study. Through the examination of the archival data in conjunction with museum artifact catalogs and contemporary data I was able to glean new details and interpretations of Mound 23 at Hopewell Mound Group. Details regarding burial numbering, burial preparation, and artifact associations which were previously unintelligible from the published data are presented for future study. The databases were also situated within a GIS environment to provide a new level of analysis for comparing burial deposits within Mound 23. Lastly, the materials recovered and

compiled through this investigation of Mound 23 were compared to previous mortuary analyses of Hopewell Mound Group's Mound 25 by Greber and Ruhl (1989) and Case and Carr (2005). Overall, based upon a set of measures outlined by Case and Carr (2005), Mound 23 possessed few individuals of potentially high social status and based upon Case and Carr's (2005) suite of features demonstrated ceremonial society membership or achieved status. Future analyses should examine the ethnographic record in relation to patterns of mortuary deposits at Hopewell Mound Group. Moreover, more reliable dating of the deposits of mounds 23 and 25 should be undertaken to better elucidate their relationship to one another and expand the analytical capabilities of future research.

ACKNOWLEDGEMENTS

I would like to thank Dr. Carolyn Heitman for her immense support throughout my graduate school education and for talking me through my moments of panic, frustration, and discouragement. You lifted me up through dark times and provided a calming voice during this transitional period of my life. Thank you for telling me it will all be okay. I would also like to thank Dr. Heather Richards-Rissetto for her mentorship and the digital skills and techniques I learned under her tutelage continue to be some of the most important lessons I learned to propel me into the professional world. I enjoyed learning from the best. Lastly, thank you Dr. Timothy Schilling for introduction me to my first professional archaeological project for the National Park Service and giving me the space to learn and apply new technologies. I appreciated your encouragement and most of all for saying “hey, it’s just a thesis.”

Thank you to the Field Museum of Natural History for their contributions to the Ohio Hopewell digital archive (hopewell.unl.edu) especially Kree Britt (University of Illinois-Chicago), Dr. William Parkinson (University of Illinois-Chicago and Field Museum of Natural History), and Dr. James Brown (Northwestern University, Field Museum of Natural History). In addition, thank you Dr. Christopher Carr for allowing me access to the HOPEBIOARCH database and Dr. Bret Ruby of the Hopewell Culture National Historic Park for access to the geophysical data of Hopewell Mound Group.

My friends have become part of my family in Lincoln, Nebraska. Without them I am sure I would have given up long ago. Finally, I grateful for my mother who always offers soothing words and weird bitmojis when I need them...just do it babe.

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Hopewell Mound Group Study Area

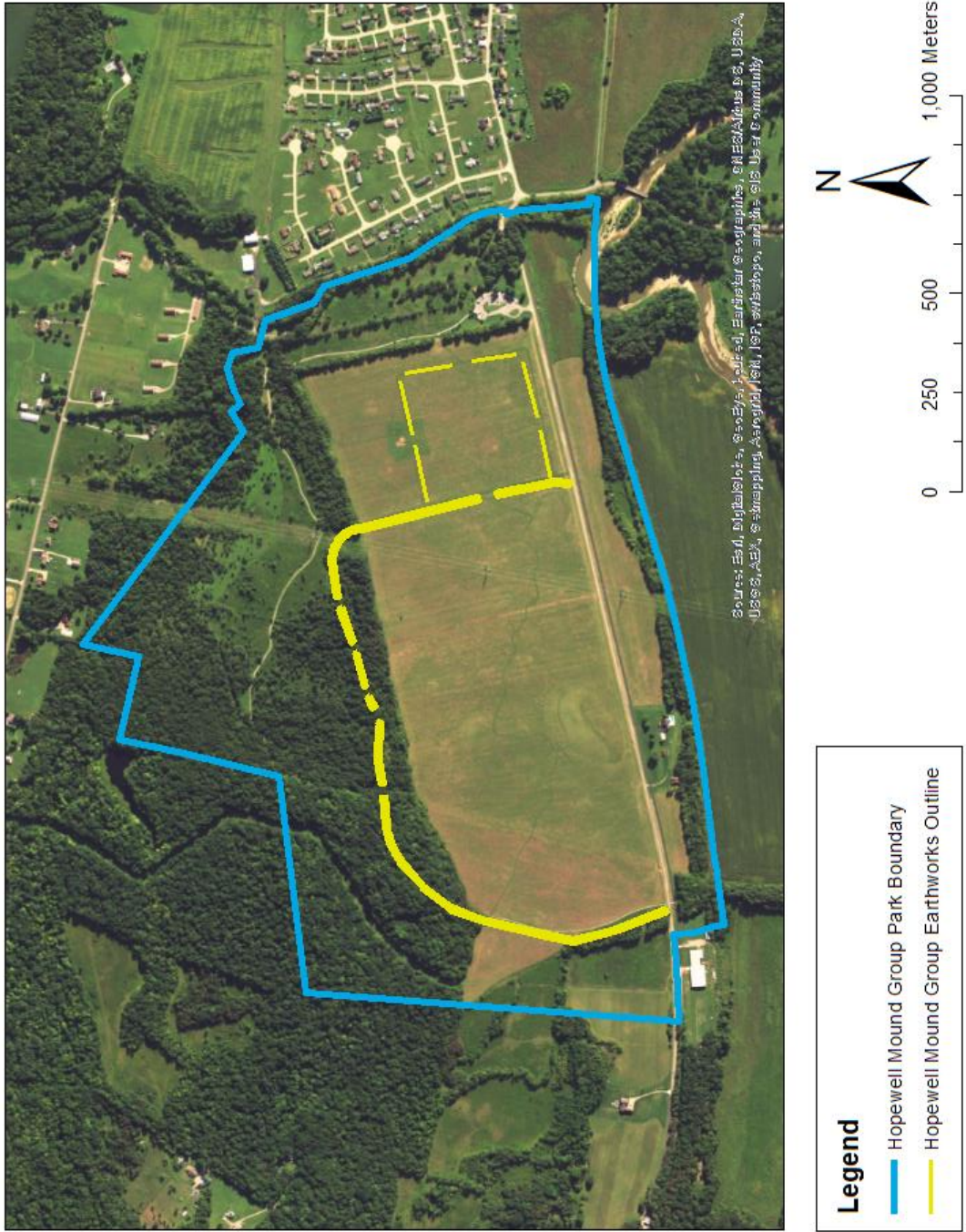


Figure 1: Hopewell Mound Group is a 300-acre site within the Hopewell Culture National Historic Park. The archeological site is composed of a large parallelogram which contains a circular enclosure and D-shaped enclosure, a square enclosure, and over 30 mounds.

CHAPTER 1

Introduction

Archaeological legacy datasets which are comprised of historical excavation documentation present a challenge to archaeological researchers who wish to develop new interpretations of the past social behaviors. When reconciling legacy datasets researchers can expect to encounter data inconsistencies, lack of provenience, and data loss. However, wading the intrepid waters of data integration is well worth the effort, especially in the case of archaeological inquiry as these datasets from historic excavations are the only remaining documentation of archaeological sites due to the destructive nature of archaeology. This problem is particularly poignant for mound sites in the Ohio and Scioto River valleys where deterioration from agricultural and residential development has considerably diminished the sample of Hopewell mounds and earthworks available for investigation. Therefore, it is imperative that more work be done to understand the possible analyses with the available legacy datasets.

Previous investigations which have attempted to reconcile legacy archaeological collections from Hopewell Mound Group and other Hopewell earthworks sites have been inhibited by the inconsistencies of archaeological data, lack of comparability across datasets, and limited access to primary data (Greber and Ruhl 1989; Greber 2006; Case and Carr 2005, 2008). The Ohio Hopewell digital archive (hopewell.unl.edu) has recently digitized a series of historic maps, field notes, unpublished manuscripts, artifact catalogs, photographs, and correspondence concerning Warren K. Moorehead's archaeological investigations of earthworks sites in the Ohio River Valley between 1891 and 1892, specifically Hopewell Mound Group in Ross County, Ohio housed in the Archives and

Collections of the Field Museum of Natural History in Chicago, Illinois. With the digitization of the materials via the Ohio Hopewell digital archive researchers now have unfettered access to the historic materials for future analyses and can embark upon the task of reconciling these data sources into comprehensive digital databases for comparative analyses.

When bringing legacy data into close juxtaposition with contemporary data sources many challenges arise. First, numerous hours are spent reconciling missing geographic coordinate information, which inhibits the georeferencing capabilities of researchers. Rudimentary mapping technology used during historic excavations leads to inconsistencies in feature locations over time. Second, researchers must decipher multiple seemingly irreconcilable data sources from archival and museum datasets. The goal of this study was to provide a case study in the integration of legacy data from the Moorehead excavations of Mound 23 at Hopewell Mound Group with contemporary data sources into two comprehensive digital databases, one for skeletal/burial data and another for artifacts (Figure 1). The objectives are two-fold: (1) to evaluate the types of data sources and the level of detail of data researchers can gain by re-examining the legacy datasets from the original excavations housed at the Field Museum of Natural History, (2) to provide a case study in incorporating legacy data into contemporary mapping software to create spatial environment for additional analyses, specifically creating a comparative dataset to examine the differentiation in burials deposits between Mound 23 and Mound 25 at the Hopewell Mound Group. In doing so the following questions are addressed:

1. What new data sources are available for the interpretation of Mound 23 at Hopewell Mound Group?

2. Are there differences between previous interpretations and now based on recovered materials? Did we gain any detail from the re-examination of the legacy data?
3. What new observations can we make about the individuals interred in Mound 23?

Background and Study Area Description

The Hopewell people occupied the Scioto River Valley and the surrounding tributaries from 100 BCE to 400 CE, building monumental earthworks and enclosure aligned to astronomical features (Hively and Horn 2010). The activities at the Hopewell earthworks throughout the Ohio River valley included feasting and mortuary ritual which required the collection of exotic materials for burial deposition (Artursson et al. 2016: 15). The Hopewell people who engineered expansive ceremonial landscapes of earthwork sites lived in small dispersed hamlets and subsisted as low-density hunter-gatherers (Artursson et al. 2016). The construction of monumental earthworks on the landscape drew Hopewell people to the region and each building event added to a “progressively monumentalized landscape that bound the living groups to the burial places of their ancestors” (Artursson et al. 2016: 3).

Mills’ (1914) atlas of Ross County, Ohio (Figure 2), demonstrates the distribution of earthworks sites throughout this region. The earthworks in Ross County, Ohio, was the largest distribution of earthworks sites in the Hopewell cultural sphere thus signifying its position as the social and ritual center of Hopewell activity (Figure 3). At the heart of this cultural florescence, the Hopewell Mound Group in Ross County, Ohio emerged as one of the most elaborate examples of monumental earthwork construction and ceremonial practice (see Figure 1). The cultural deposits excavated from the site are indicative of a

complex of inter-regional trade network that brought materials to Ohio from the furthest reaches of the North American continent. The artifacts recovered include mica from North Carolina, shell from the Gulf Coast, obsidian and Knife River flint from Wyoming and Idaho, and precious metals from the Great Lakes. The inclusion of exotic materials in the ritual deposits found at Hopewell sites has been identified as a major indicator of Hopewell cultural influence and termed the Hopewell Interaction Sphere (Caldwell 1964; see Figure 3).

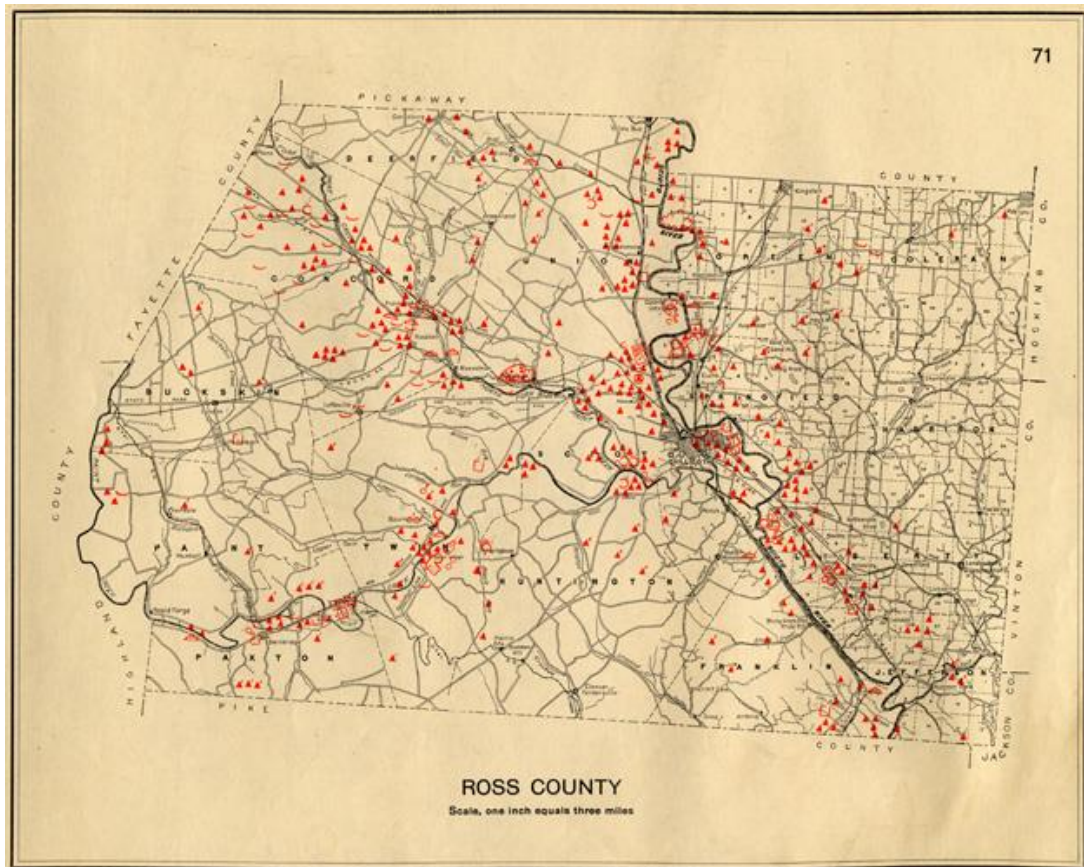


Figure 2: Ross County, Ohio, and the Scioto River Valley was the center of Hopewell cultural life. It contained the highest density of Hopewell earthworks sites in the Hopewell cultural sphere. Mills (1914) documented the distribution of earthworks sites in Ross County, Ohio.



Figure 3: The Hopewell Culture was part of a complex inter-regional trade network which brought exotic cultural materials from the far reaches of the North American continent to be buried at the earthworks sites in the Ohio River Valley. Hopewell researchers have termed this trade network phenomenon the Hopewell Interaction Sphere. The figure above is courtesy of the National Park Service, Hopewell Culture National Historic Park and was created by Tom Engberg. The figure displays the boundary of the Ohio Hopewell culture and the extent of the Hopewell Interaction Sphere as well as the source locations for the exotic materials excavated in from earthworks in the Ohio River Valley (<https://www.nps.gov/hocu/learn/historyculture/places.htm>).

Hopewell Mound Group

Hopewell Mound Group (33RO27) is located within the Scioto region of Ross County, Ohio. Ross County boasts the largest clustering of major Hopewellian sites including six which are now a part of the Hopewell Culture National Historic Park: the Hopewell Mound Group, Seip Earthworks, Hopeton Earthworks, Mound City Group, Spruce Hill Earthworks, and High Bank Works (Figure 4). Hopewell Mound Group is comprised of two large enclosures, a parallelogram (the Great Enclosure) and a square, in addition to a variety of mounds (see Figure 1). The total site encompasses nearly 300 acres (Greber and Ruhl 1989: 11). As a consequence of agricultural activity and the migration of settlers in post-contact United States, it is difficult to estimate the original number of original mounds within the Hopewell Mound Group site. Early excavation notes document roughly 40 individual mounds within and around the upper and lower terrace of the site (Squier and Davis 1845). Greber and Ruhl (1989: 12) estimated an average loss of “30 cm of height was lost every 25 years.” The enclosure walls were constructed from the adjacent soils and in 1845 and were an estimated ten meters wide at the base and two meters high. Through more recent archaeological investigations the outer ditch was revealed to be filled with water diverted from a natural spring (Lynott 2015: 180).

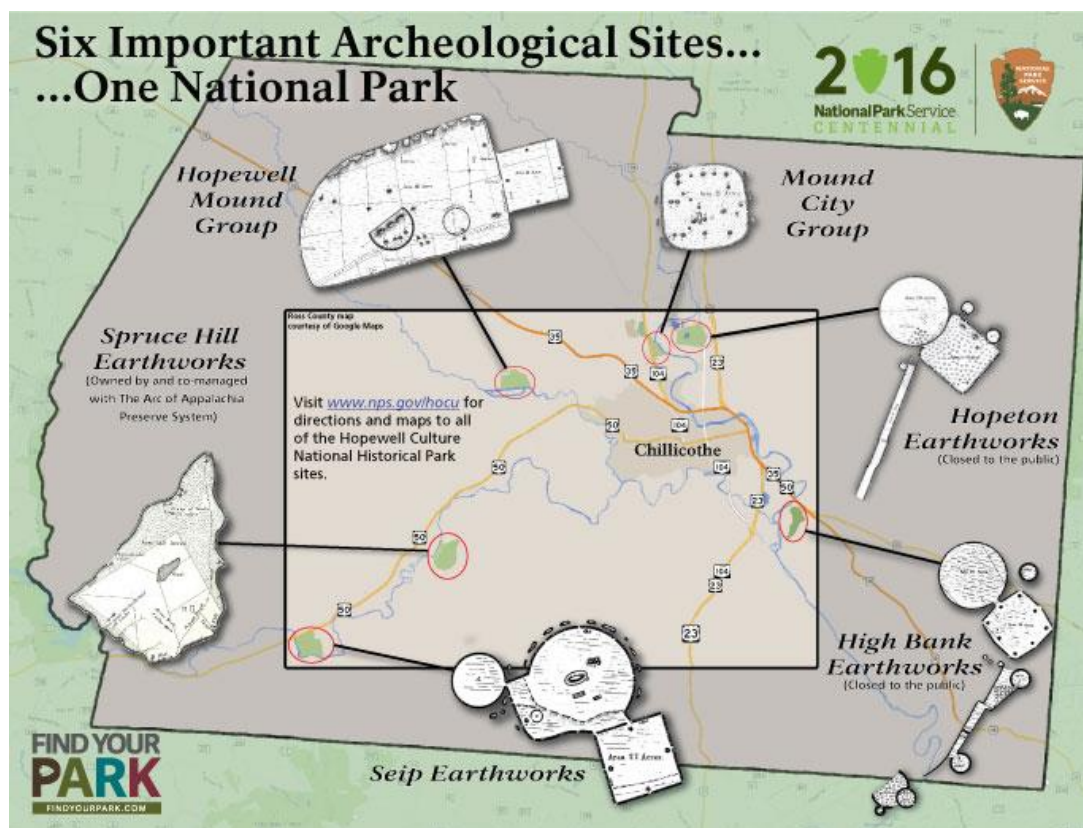


Figure 4: Hopewell Mound Group is one of six Hopewell earthworks sites within the Hopewell Culture National Historic Park. The image above details the locations of each earthwork within the park in Ross County, Ohio. Photo courtesy of the National Park Service (<https://www.nps.gov/hocu/learn/historyculture/places.htm>).

Mound 25, the largest Hopewell mound, originally consisted of three connected mounds within the D-shaped embankment of the Great Enclosure (Figure 5; mound k). The burials uncovered from the excavations of this mound are the most elaborate expression of Hopewell ceremonialism excavated to date. Many burials contained vast ceremonial deposits of copper and mica, large caches of blades and knives, and copper headdresses. The second largest mound, Mound 23 was documented as two connected mounds (Atwater 1820; Figure 5) and contained significantly less elaborate burials and

deposits than Mound 25 (Figure 6; mound m). Mound 25 has been studied more extensively in the academic literature; however, little work has been done to examine the deposits within Mound 23 and the relationship of Mound 23 to Mound 25 as the two largest burial mounds at Hopewell Mound Group (Case and Carr 2005).

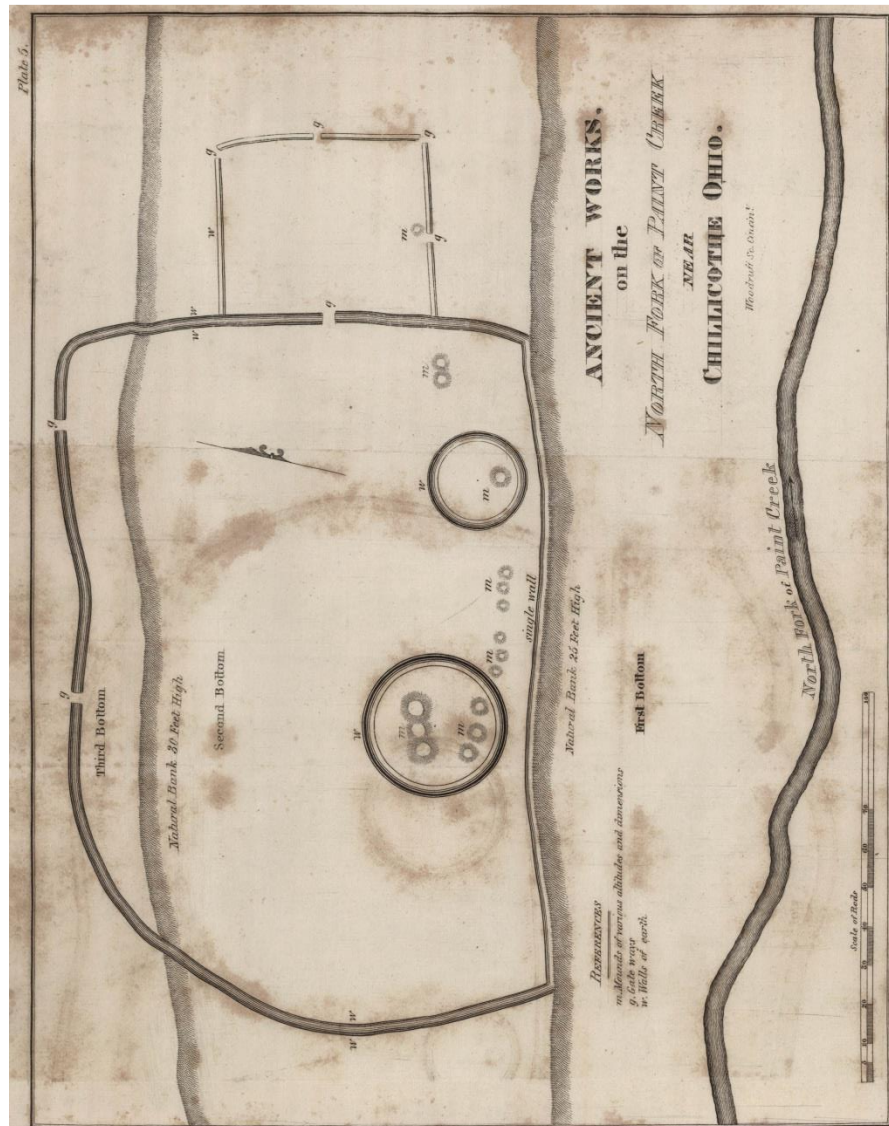


Figure 5: Atwater's 1820 map of Hopewell Mound Group. On this map mounds are labeled as "m." This is the only map which shows Mound 23 in the original two mounds form (southeast corner of the Great Enclosure).

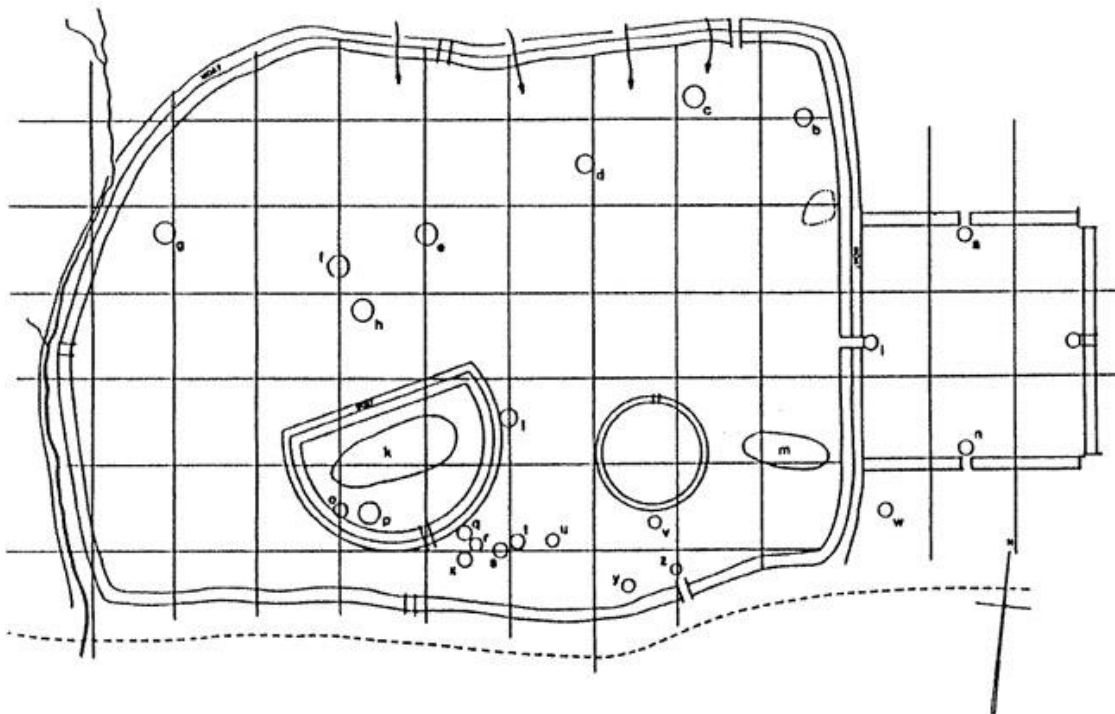


Figure 6: Greber (1999) drawing based on Clinton Cowen’s 1892 map of Hopewell Mound Group. C. Cowen surveyed what was then called the North Fork Works and provided a more precise shape of the Great Enclosure and the mounds within the enclosure (Greber 1999). Mound “m” indicates Mound 23 and Mound “k” within the D-shaped enclosure is Mound 25.

The Hopewell Mound Group was one of the first earthwork sites to capture the imagination of the early Euro-American archaeologists. Named for the landowner Mordecai C. Hopewell, the wealth of exotic artifacts excavated from the elaborate burial mounds awed researchers. The site has undergone three major periods of archaeological investigation: Squier and Davis in 1845, Warren K. Moorehead between 1891 and 1892, and finally Henry Shetrone and William Mills between 1922 and 1925. These archaeological collections are currently housed between four institutions: the Field

Museum of Natural History, the Ohio History Connection, the British Museum, and the Peabody Museum of Natural History.

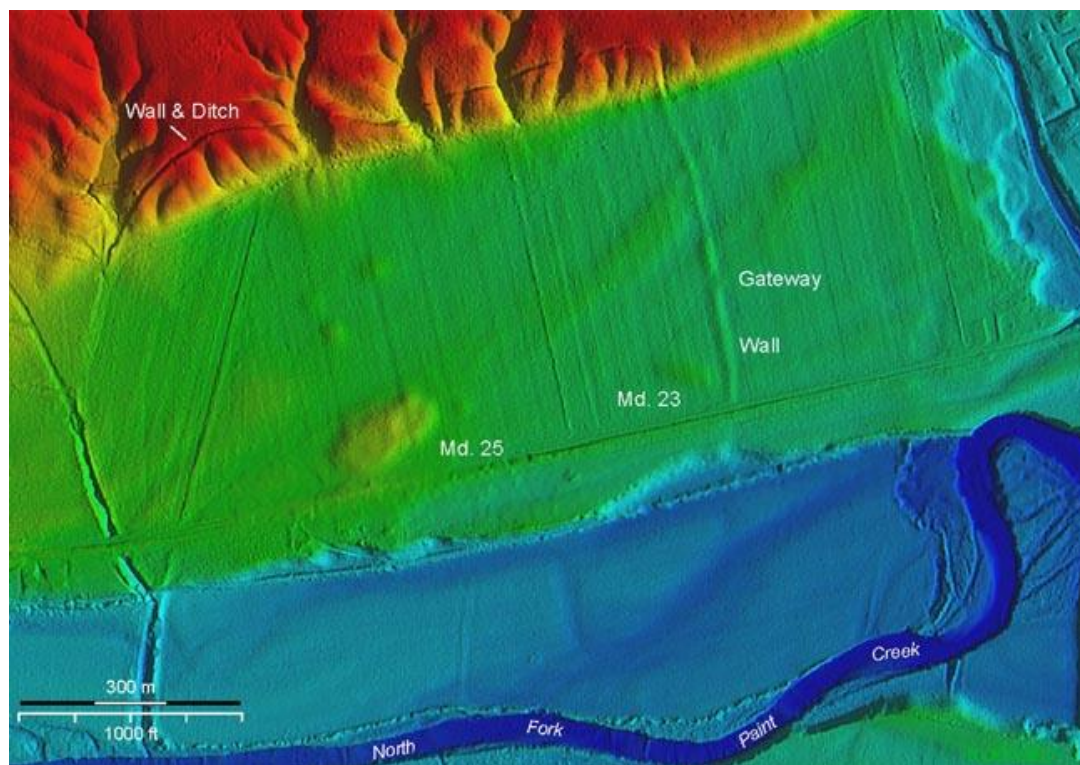
The “type site” for the Hopewell culture, a striking number of high quality materials were uncovered during the Warren K. Moorehead investigation at Hopewell Mound Group (then Clark’s Works). As the center piece of the 1893 World’s Columbian Exposition, the materials uncovered by Warren K. Moorehead in the field season of 1891-1892 inspired years of archaeological inquiry into the mound sites of the Ohio River Valley. After the Exposition, the materials became incorporated into the Field Museum of Natural History in Chicago, Illinois. Historic archaeological excavations at Hopewell Mound Group generated large datasets and numerous published and unpublished archival documents. The challenge of working with legacy collections such as those examined in this thesis are inhibited by early archaeological methods. Recording standards for excavations and sites were rudimentary and often lacked standardization (Greber 1999). However, due to the destructive nature of archaeological inquiry these datasets are the only remaining materials from which archaeologists can make interpretations about past human behavior. Therefore, as stated previously, efforts have begun to make these materials more available to academic researchers for digitization, spatial mapping, and re-analysis in order to facilitate further investigations of social behavior (Allison 2008: 24).

The Ohio Hopewell digital archive and the historic data relevant to Mound 23 used this study presented an opportunity to combat data accessibility and data integration challenges. However, making this data usable for archaeological comparison was a challenge. Excavation notes and materials from the Moorehead excavations are plagued

by inconsistencies, inaccurate measurements, and limited documentation. Despite these challenges, the Moorehead Collection and archival materials are the only remaining data available for the interpretation of Hopewell Mound Group's Mound 23 mortuary deposits.

Mound 23 is unique in the completeness of the archaeological record despite the time period of excavation. The excavations by Warren K. Moorehead's team of Mound 23 were well-documented by Dr. H.P. Cresson in his field notes over the three weeks of investigations. To integrate various archival and archaeological data sources each document was combed for descriptions of Mound 23 features including burials, artifacts, and soil deposits. Discrepancies in the published and unpublished data were scrutinized and decisions made based on the apparent accuracy of the information with preference given to the original field notes. After initial investigations, the data including artifact and burial descriptions and distributions were compiled into two digital databases. During my investigation each burial, feature, and artifacts was documented along with information such as burial orientation, associated artifacts and placement, soil changes, and depths (to the nearest inch) into the databases. The day-to-day field notes of the excavations by Dr. H.P. Cresson were compared to hand written reports by Warren K. Moorehead and unpublished manuscripts by other researchers such as the 1898 curator of Peabody Museum, George Dorsey. In addition, two plan maps by Dr. H.P. Cresson marking burial orientations, soil patterns (distances to the center stake), altars, and indirect artifact distributions included in the Moorehead Collection archival materials were incorporated into the resulting databases.

Fine-grained maps and reconstructions were created using measurements collected from the original field texts. Two site maps of Mound 23 from the Moorehead excavations were georeferenced using contemporary magnetometry data from investigations at Hopewell Mound Group (Burks 2013; Figure 7 and 8). Each feature on the maps was digitized into shapefiles for burials, feature, and artifacts. Georeferencing maps that lack geographic coordinate systems presents a unique set of problems for scientific integration of data into GIS. GIS, or Geographic Information Systems and more broadly Geographic Information Science, are a range of spatial software programs which act as a database management system “designed for the acquisition, manipulation, visualization, management and display of spatially reference (or geographic) data” (Aldenderfer 1996: 4, *In* Chapman 2006:14). In archaeology, GIS emerged in 1985 as a potential resource for archaeological research and data management tool (Chapman 2006: 17). The utility of GIS expanded beyond the computerization of spatial data with the development of new methods for predictive modeling of archaeological sites, 2.5D modelling of digital terrains, and spatial statistics. The GIS software used in this study was ESRI ArcMap 10.4.1. I georeferenced the plan maps of Mound 23 to provide preliminary locations of burials and distributions of artifacts.



Figures 7 & 8: Figure 7 shows Hopewell Mound Group and Jarrod Burks's 2013 magnetometry data. Figure 8 is an image showing the outline and label of Mound 23 in addition to other features such as Mound 25 from the 2013 LiDAR data. The outline of Mound 23 is visible in the lower southeastern corner of the parallelogram enclosure. The locations were used to georeference the Mound 23 site maps into *ArcMap 10.4.1*. Magnetometry and LiDAR data were given to the researcher in June 2016 courtesy for NPS Hopewell Culture National Historic Park, Chief Archeologist Dr. Bret Ruby.

Limitations due to the lack of geographic coordinate system utilized on the original maps prevented precise use of control points within ArcGIS 10.4.1. However, a hybridized method of control points, scale, and shift transformations was utilized in this process to approximate the map positions on the landscape. Using a hypothesized location on the map still allowed for the contextualization of the spatial data within a

consistent framework and scale. This created a GIS environment which allowed for intramound comparisons of Mound 23 burials and deposits. Mound 23 was examined at in spatial isolation of Hopewell Mound Group, therefore, the location of the mound within the larger enclosure via GIS was unnecessary.

Several lines of evidence such as the HOPEBIOARCH database and artifact catalogs from the Field Museum were combined into a queryable database for future analysis. The HOPEBIOARCH database created by Dr. Troy Case and Dr. Chris Carr is the result of 13 years of Hopewell research and two books *Gathering Hopewell* and *Scioto Hopewell and their Neighbors*. The HOPEBIOARCH database is divided into three categories: (1) Demographic, Tomb, Shamanic, (2) Other Ceremony, Symbolic, Clan, and (3) Personal and Raw Material. Each category is subdivided into more classifications and variables that are detailed in Carr and Case (2008: 431-463). The size and complexity of the HOPEBIOARCH database presents a unique opportunity to compare previously disparate datasets of Hopewell burial deposits. However, I contend that the comparison capabilities are hampered by the classification scheme employed by Carr and Case. The database compiled skeletal data such as age and sex information from three studies of Hopewell Mound Group skeletal remains: Johnson (2002), Mills (2003), and Pickering (1987). I incorporated this updated skeletal information into my database for Mound 23 skeletal/burial data. Overall, in order to make the database usable for the analyses between Mound 23 and 25, I removed values that did not pertain to the artifacts found in the mounds and annotated the HOPEBIOARCH database with variable identifiers gathered from the index of Carr and Case (2005: 431-463).

Lastly, in order to examine the applications of the newly created Mound 23 databases in the larger conversation of Hopewell academic inquiry, the Mound 23 deposits were compared to previous investigations of Mound 25 by Greber and Ruhl (1989) and Case and Carr (2005, 2008). They discuss the distribution of socially significant items such as headdresses and breastplates as correlates for social status. Comparisons were drawn between Greber and Ruhl's (1989) reconstruction and mortuary analysis of Mound 25 at Hopewell Mound Group as well as Case and Carr's 2005 and 2008 investigations into social status between Hopewell Mound 25, Ater mound, Seip-Pricer Mound, and Edwin Harness Mound with Mound 23. Burial items which require more energy to produce are considered indicators of social status in the context of Case and Carr's (2005, 2008) investigations of Hopewell mortuary deposits.

Scope of Thesis

Now that the stage has been set in chapter one, which presented the purpose, goals, and objectives of my thesis, chapter two presents the historic context for understanding the range and diversity of artifacts recovered from Hopewell Mound Group and Mound 23. This includes a critical discussion of the prevalent Hopewell research trends within settlement, subsistence and ritual organization of the Ohio Hopewell culture as well as the position of Hopewell Mound Group and Mound 23 within the Hopewell cultural complex. Chapter three examines the new data sources presented by the Ohio Hopewell digital archive and the methodology of interpreting the Moorehead Collection associated with Mound 23 at Hopewell Mound Group. It outlines the various challenges to integrating the extant museum collections with contemporary data and mapping applications. Chapter four is an analysis of the Mound 23 data and new

detail gleaned from the legacy sources. Moreover, chapter four compares the burial depositions of the two oblong mounds at Hopewell Mound Group, Mounds 23 and 25, to understand the social behavior implicit in the burial ritual. Finally, chapter 5 considers the implications of this research on previous archaeological interpretations of social organization at Hopewell Mound Group and the future applications of this case study on archaeological investigation. By creating detailed databases of the material and burial remains and contextualizing it within a GIS environment for analysis, this thesis produced a finer-grained, personalized reconstruction of Mound 23 with the intention of examining local societies and for understanding intraregional similarities in Hopewellian ritual organization.

CHAPTER 2

“At first settlement of this territory by the whites, mounds were to be seen everywhere. They existed on the same level lands in almost as great numbers as do the farmhouses at the present day. Scores, even hundreds, have been opened, and at present very few are intact” (Moorehead 1892: 145).

Chapter two contextualizes the Hopewell cultural florescence within the natural setting of the Ohio River Valley and Scioto-Paint Creek region (Figure 9) by identifying the environmental factors that contribute to its richness of resources. In addition, this chapter offers a brief discussion about the Ohio Hopewell culture including academic dialogue concerning settlement patterns and subsistence strategies as well as current research trends in Ohio Hopewell archaeology. The Ohio Hopewell culture history provides a broad context for the discussion of the Hopewell Mound Group and materials recovered during the major historic excavation episodes at the site. Each archaeological collection is described as well as relevant published works and archival documents currently housed in various museum institutions.

The southern Ohio landscape was created by the Illinoian and Wisconsinan glaciations which covered much of the northern Great Lakes region during the last glacial period (Case and Carr 2008: 47; Lynott 2015). As the glaciers retreated at the end of the Ice Age, the melting ice flooded the southern Ohio terrain depositing tremendous amounts of sand and till into the resulting rivers and valleys. These glacial episodes in the southern Ohio region created two distinct ecological zones, the Allegheny Plateau to the east and the Till Plains to the West. The Allegheny Plateau abuts the western portion of the Appalachian Mountains and is surrounded by bluffs and mountains along with dense forests atop rolling hills. Distinctly different from its eastern counterpart, the Till Plains are a landscape of flat lands with thin forest of Oak-Hickory or Oak-Maple and patches

of scrub and prairie grasses (Case and Carr 2008: 47-49). The soils of the Ohio River valley are fertile and the diversity of terrestrial resources in the area is high.

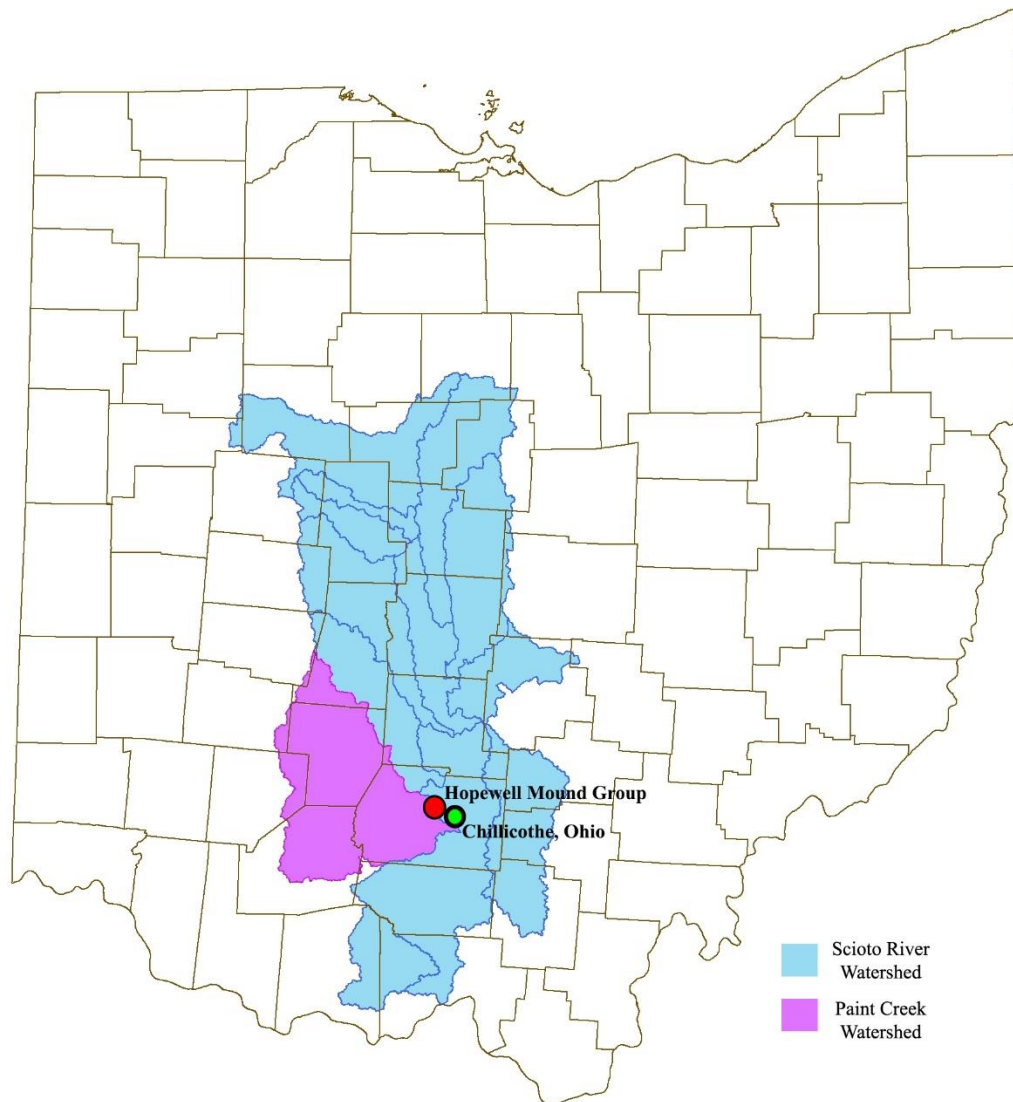


Figure 9: Adapted from Ohio Environmental Protection Agency of the Scioto River and Paint Creek Watershed, this map shows Hopewell Mound Group and the Chillicothe, Ohio and there position within the Scioto and Paint Creek Watersheds

(<http://www.epa.state.oh.us/dsw/tmdl/SciotoRiver.aspx#122433383-paint-creek>).

Contributing to the complexity of the southern Ohio environment is the Ohio River. The Ohio River is the largest tributary of the Mississippi River extending approximately 981 miles long and flowing southwest from the highlands of western Pennsylvania and terminating in Cairo, Illinois (Case and Carr 2008: 47). A tributary of the Ohio River, the Scioto River is a moderately sized stream that draws much of the drainage from central Ohio. The river extends 180 miles from its source in Hardin County, Ohio in the Till Plains ecological zone and runs through south-central Ohio emptying into the Ohio River near Portsmouth, Ohio (Lynott 2015: 156).

Overall, the Ohio and Scioto River valleys lie at the convergence of both ecological zones discussed above. This position at the intersection of two ecozones promoted the development of diverse biological communities and transformed the region into an area of the increasingly varied microenvironments (Lynott 2015: 141; Case and Carr 2008: 47-48; Maslowski and Seeman 1992:11). In this rich environment the Scioto-Paint Creek valley confluence became the epicenter of prehistoric life, specifically during the Woodland period (800 B.C. to A.D. 1200).

The cultural landscape of the Ohio and Scioto River Valleys has sparked curiosity and interest among the academic and avocational communities for over 150 years. At the time of European expansion into the Ohio region, hundreds of mounds and earthworks sites dotted the Central and Southern Ohio landscape. Early accounts remark on the size, volume, and complexity of the earthworks spread throughout the southern Ohio landscape (Atwater 1820; Squier and Davis 1848). In their observations explorers and settlers drew similarities between the sites and modern military formations. This led many to assume that these mounds were defensive in nature (Squier and Davis 1848).

Squier and Davis's (1848) *Ancient Monuments of the Mississippi River* surveyed over 100 mounds and enclosures throughout southern Ohio and the South presenting a preliminary classification of the earthworks as either sacred ceremonial centers or defensive earthworks. Baffled by the complex designs and precision in the construction of earthworks, Early Euro-Americans could not believe Native Americans capable of such technological skill and, therefore, attributed earthwork construction to a lost race of Americans descendant from European populations. This belief was termed the mound builder hypothesis (Thomas 1894). Popular publications suggested that the mound builders were remnants of the lost Israelite tribe, descendants of the Phoenicians, or even the Egyptians (Lynott 2015: 13). The disenfranchisement of Native Americans and their ancestry was reflected the historic attitudes towards the communities which in turn altered interpretations of archaeological materials in the past.

Belief in the mound builder hypothesis persisted into the 19th century until Cyrus Thomas' 1894 publication *Report on the Mound Explorations of the Bureau of Ethnology and Archaeology from 1890-1891*. Thomas (1894) successfully refuted the mound builder hypothesis making the connections between Native Americans and the mounds culminating in a single, definitive statement: "the links connecting the Indians and mound builders are so numerous and well established that archaeologists are justified in accepting the theory that they are one and the same people" (Thomas 1894: 17).

Chronology of Ohio Cultural Periods

Mills (1914) conducted the first systematic examination of cultural materials to identify the temporal order of observable groups in the Ohio River Valley. Mills (1914) identified several cultural groups which lived within the Ohio region: the Glacial Kame,

Red Ochre, Adena, Hopewell, and Fort Ancient (Lynott 2015: 23). Lynott (2015) presents a synthesis of fourteen radiocarbon dates which places each of these cultural periods in temporal context:

Culture Name	Years (BP)	Years (BCE/CE)
Late Archaic (Glacial Kame and Red Ochre)	5000-2800	3050-850 BCE
Adena	2800-1900	850-50 BCE
Hopewell	1900-1400	50BCE – 550 CE
Fort Ancient	1000-300	950 – 1650 CE

Table 2.1: Cultural chronology based on Lynott (2015) synthesis of fourteen radiocarbon dates.

The Glacial Kame culture was characterized by flexed burials in natural locations as well as funerary objects such as gorgets, marine shells, and beads (Lepper 2005). Similar to the Glacial Kame cultural period, the Red Ochre culture occupying the northern Midwest from the end of Late Archaic period to the Early Woodland, also practiced flexed burials within natural locations; however, in contrast these burials were capped with powdered red ochre and were accompanied by items such as turkey tail projectile points, chert caches, galena crystals, copper and ground stone artifacts, and marine shell necklaces (Converse 1970).

Two hundred years prior to the Hopewell cultural florescence in the Ohio River Valley, there was a dramatic increase in land modification practices and construction by the Adena culture (Dragoo 1963: 197-198; Berle Clay 1998). The Adena, named after the Adena estate where the first mound was excavated by Mills (1902), refers to the Early Woodland burial mound culture spanning southern Ohio, northern Kentucky, and southeastern Indiana and western West Virginia (Milner 2004: 54). During the Adena

period there was an increase in social complexity and social status though the construction of conical burial mounds which varied greatly in size. Built over previous wooden structures, the Adena mounds contained funerary objects similar to their Late Archaic counterparts, but less exotic than the preceding Hopewell culture. The mounds contained many burials accumulated over time (Berle Clay 1998; Greber 1991).

Adena mounds were highly variable in scale and form which early theorists hypothesized was due to the status differentiation of interred individuals. However, recent theory presents a more likely hypothesis that the observed variation in mound traits are not a reflection of social status, but a consequence of mortuary ritual between equals social groups resulting in unpredictable mortuary structures (Mainfort 1989: 173; Berle Clay 1998: 4). Berle Clay (1998: 4) hypothesized that the mound structures were not as important as monument of the dead, but rather engineered landscapes which facilitated social interaction between groups. Built in a series of stages, the initial internal mound structure was constructed for the burial of an individual or a limited few. Berle Clay (1998:4) argued that increasing the size of the mound was not the impetus for mound constructions, but a response to burial needs and “no one had any idea when a mound was started how big it would ultimately become.” The size of the mound may actually be an indicator of the intensity and continuity of ritual participation by Adena groups (Berle Clay 1998:4).

The most common Adena burial form was the sealed burial graves, a low cost mortuary system (Berle Clay 1998:5). Log crypts were present at sites such as Wright (Mainfort 1989) and represent an intentional investment in reusable burial vaults. Though less common in the Adena archaeological record, log crypts contained unidentified

skeletal remains along with the final internments. This could indicate earlier internment episodes (Berle Clay 1998: 5). Though the status of the deceased and the living family members were important in the construction of mounds for burial; however, the social rank of individuals were not the only impetus for burial differentiation. In addition, settlement structures were relatively dispersed and of consistent size eliminating interpretations of status differentiation. The habitation sites suggest an egalitarian, low-level hunter gatherers and horticulturalists who lived in small social groups (Berle Clay 1998: 13). Mound sites could not have been constructed by a single family unit and, therefore, were sites of social interaction rooted in the “mortuary process, preparation of the dead, grave side feasting, and the construction of graves” in mounds (Berle Clay 1998: 14).

The Hopewell Culture represents an intensification of the ritualism and social interaction from the Adena culture. The Hopewell culture earthwork construction and associated ritualism reflected in the complexity of earthwork design and inclusion of increasingly exotic materials within burial deposits. Between the Adena and Hopewell, the scale of mound construction was similar; however, Hopewell earthwork construction was clustered around two centers less than two miles apart: Mound City and Hopewell Mound Group. Within the Scioto-Paint Creek portion of the Scioto drainage, Adena and Hopewell mounds occurred in relatively equal frequency, but they were situated in different natural zones. Adena were placed at higher elevation while Hopewell mounds and earthworks were constructed on main terraces near waterways (Berle Clay 1998).

The Ohio Hopewell Culture

During the Middle Woodland period, approximately 100 BCE to 400 CE, a group of small scale communities constructed massive and elaborate earthwork complexes. Scattered throughout the southern Ohio landscape, these groups built impressive geometric earthworks, embankments, mounds, ditches, and ponds that varied in number, size, and form. The expansive cultural landscape created by the Hopewell peoples makes the concentration of earthworks in southern Ohio one of the most impressive ceremonial centers in North America (Lynott 2015: 1).

Hopewell culture is an archaeological construct describing a pattern of exchange and ritual organization in the Midwest (Griffin 1978). Described as an ideological and religious movement, the Hopewell people participated in an elaborate exchange network of exotic artifacts such as silver ornaments, carved pipes, copper axes, and shark teeth. These artifacts were being transported by individuals into the heart of the Ohio Hopewell cultural region and ideologies and religious practices were being spread from southern Ohio. Caldwell (1964) termed this unique network of long-distance trade of exotic goods the Hopewell Interaction Sphere. Communities interacted with each other to share mortuary-ceremonial or religious rituals (Caldwell 1964: 138). Therefore, the Hopewell culture is characterized in the academic literature as a network of interactions founded on a common ideology or worldview.

Two themes have pervaded in the academic dialogue concerning the Ohio Hopewell since the initial excavations of Hopewell earthworks sites in the mid-19th century. Early archaeological inquiry of the Hopewell concerned the cultural history of the Hopewell through the examination of mortuary artifacts. However, since the

evolution of archaeological techniques, processual archaeological theory, and landscape archaeology inquiry has continued to emphasize the understanding of broad patterns of Hopewell subsistence and settlements. This is also due, in part, to the increasing deterioration of mound sites, the unavailability of historic excavation documentation, and difficulties examining historic mortuary collections. The following sections will outline the current research on Hopewell social organization and subsistence.

Subsistence, Economy, and Ritual

Hunter gatherers are defined as relying exclusively "on wild species of plants and animals, whereas agricultural societies derive at least 30 to 50 percent of their annual caloric intake from domesticates" (Smith 2006: 501; Smith 2001). Smith (2001) argued against the dichotomy of hunter gatherers and agriculturalists in the archaeological record. Ohio Hopewell culture subsistence, as observed in the archaeological record, does not conclusively fit into these differential definitions of subsistence as agriculturalists or hunter gatherers.

Early observations of the Ohio Hopewell assumed a subsistence on maize agriculture (Morgan 1952); however, a series of biological and subsistence studies has since disproven this assumption (Wymer 1993, 1996, 1997; Yerkes 2006). The Ohio Hopewell were described as practicing a mixed subsistence strategy of foraging and horticulture relying on collected nuts, hunted deer and other mammals, mollusks, and cultivated crops in the Eastern Agricultural Complex (maygrass, knotweed, and goosefoot) (Smith 1992). Wymer (1992, 1996, 1997) argues that the Ohio Hopewell populations cut small garden plots to cultivate domesticated plants such as chenopodium, marsh elder, maygrass, erect knotweed, sunflower, and squash (Pacheco and Dancey

2006: 5). Wymer (1997) described this cultivation of local domesticates as farming. However, the Ohio Hopewell were not farmers in the traditional sense of sedentary agriculturalists. The three most common plants found at Ohio Hopewell settlement sites, such as the Murphy and McGraw sites, are the starchy and oily weeds: erect knotweed, goosefoot, and maygrass (Yerkes 2006: 57; Wymer 1993, 1997). The lack of extensive storage pits and agricultural tools at known habitation sites are not indicative of an agricultural subsistence system (Yerkes 2006: 61). Whereas archaeological evidence suggests that the "toolkit of the Ohio Hopewell is a hunting-and-gathering toolkit" (Cowan 2006: 48-49; Yerkes 2006: 61). Based on the archaeological evidence it is probable that the Ohio Hopewell supplemented a regular diet of wild nuts, plants, fish and game with starchy, oily weeds (Smith 2001: 36).

The Hopewell may have practiced a form of cultivation harvesting species of wild and/or domesticated plants, but these starchy, oily weeds as agricultural plants likely did not depend on humans for their reproduction, therefore, they are not true domesticates (Yerkes 2006: 57). In addition, Gremillion (2003) posited that there is little evidence for intensive harvesting of goosefoot, knotweed, and maygrass and Middle Woodland groups maintained a broad-based hunter gatherer subsistence. Sciulli (1997) examined the dental wares and caries of skeletal remains of the Ohio River Valley determined that Ohio Valley Hopewell population did not exhibit the dental patterns consistent with agricultural society and a high carbohydrate diet.

In the traditional view of subsistence as related to social complexity, agriculture is indicative of increased social complexity and hunter gathering as low social complexity. However, this dichotomy does not fit the Hopewell culture, who demonstrated an

increased level of social complexity through the orchestration and construction of monumental earthworks. Therefore, as low-level food producers the Hopewell typify the “middle ground” ground who are qualitatively different from hunter gatherers and agriculturalists a separate general class of extremely variable and successful long-term socioeconomic solutions which were then adapted to local cultural and environmental contexts (Smith 2001:36).

Settlement

Habitation studies which referenced materials from outside earthworks were not published until 1965. Olaf Prufer (1965) conducted a comprehensive analysis of the Scioto River settlement sites and compiling evidence from "approximately twenty concentrations of Hopewell debris outside and away from the earthworks and burial mounds" (Yerkes 2006: 378). Prufer (1964) proposed that Hopewellian communities consisted of small, dispersed sedentary households, usually of one family unit or extended family, sharing community space such as earthworks which provided social interaction. Prior to Prufer's hypotheses researchers assumed Ohio Hopewell peoples lived in village sites around earthwork complexes; however, archaeologists continue to find no evidence of long term occupied villages around mound sites.

Dancey and Pacheco tested Prufer's hypotheses by looking for evidence of occupation sites outside of earthworks center. According to Dancey and Pacheco (1997) households are "reproductive and economic units, typically consisting of a single, possibly extended family" (Pacheco and Dancey 2006: 6). These small, dispersed hamlets were clustered around vacant ceremonial centers, termed the Prufer-Pacheco-Dancey hamlet hypothesis (Pacheco 1993; Prufer 1964; Figure 10). Though the ceremonial

centers lack permanent residences, the earthworks were visited in "culturally determined annual cycles by the local community and on occasion by representatives from neighboring communities and regional polities" (Pacheco and Dancey 2006: 25). Examples of known Ohio Hopewell communities are the Murphy, McGraw (Prufer 1964), and Jennison Guard (Kozarek 1997) sites. These sites are located within easy walking distance to the nearest earthwork complex (Cowan 2006: 48). At the Murphy and McGraw sites showed no evidence of significant domestic structures, thick middens, or other evidence for long-term occupation were found (Lepper and Yerkes 1997; Yerkes 2006; Pederson-Weinberger 2007).

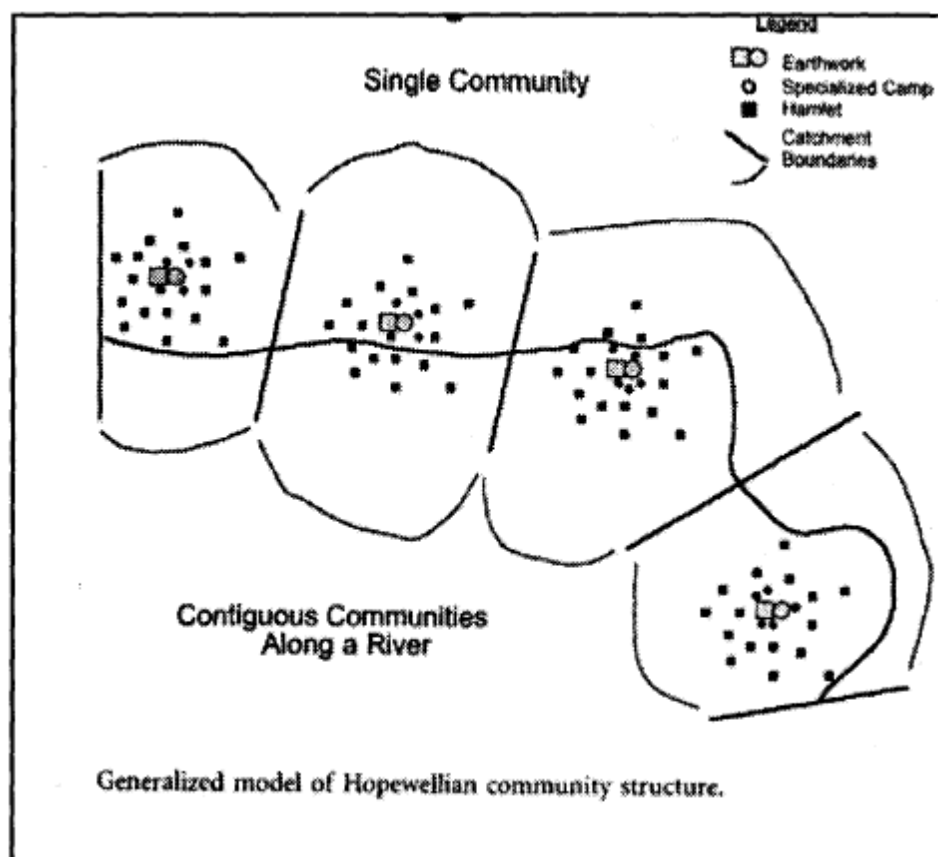


Figure 10: Prufer's Vacant Ceremonial Center Model (Dancey and Pacheco 1997: 21).

An elaboration on the dispersed sedentary hamlet model presented by Dancey and Pacheco (2006), Ruby (2005) proposed that Ohio Hopewell peoples lived in small, sedentary residential groups (Ruby 2005; Lynott 2015). Essential to Ruby's hypothesis is the belief that the Ohio Hopewell participated in local symbolic communities. These symbolic communities operated as political, economic, and social alliances possessing a shared interest and common goals. Ruby (2005) terms these "local" due to cluster of earthworks in the Ohio Hopewell region. The close proximity of mound centers in Ross County, Ohio provides additional evidence for Ruby's hypothesis. The mound centers in this region are too close together to assume they serve one community, therefore, it is likely the earthworks served multiple local symbolic communities as common cemeteries (Ruby 2005: 116; Lynott 2015: 74). However, this is complicated by the lack of earthwork chronology. Future research to date earthworks sites and create a chronology of Hopewell mounds construction may elucidate further the ritual significance of earthwork forms.

Based on evidence of habitation sites, Yerkes (2002) hypothesizes that the Ohio Hopewell were a mobile, egalitarian, decentralized society who continued to utilize the settlement and shelter of their ancestors (Mills 2003: 15). The Ohio Hopewell would have achieved cultural complexity evident by the construction of monumental earthworks, while still maintaining a mobile tribal society (Lynott 2015: 74-75). Yerkes (2002) cited that lack of food surpluses, specialized production, or permanent residences as evidence for the hypothesis (Lynott 2015: 75).

Cowan (2006, 1999) challenged the Prufer-Pacheco-Dancey hypothesis by investigating Hopewell lithic technology. Cowan posited that the Ohio Hopewell sites

discussed previously were "gathering places for much more widespread and, probably, much more mobile communities than is suggested by the Prufer-Pacheco-Dancey sedentary hamlet model" (Cowan 2006: 48). By examining the stone tool assemblages recovered from Ohio Hopewell settlement sites and the relationship between sites and earthworks in relation to community gathering Cowan revealed trends in lithic technology that represents short term occupation habits. Cowan's 2006 study of lithic materials from Hopewell sites found that the artifact assemblages for the Hopewell were comprised mostly of bladelet technology. Bladelets are "small, thin, and rarely retouched" and "were likely costly to produce" (Cowan 2006; Landon 2010). They showed no evidence of hafting and little use wear, therefore, it is assumed they were used for a short time and then discarded (Cowan 2006; Landon 2010). Sedentary communities relied on less costly tools due to the availability of resources and minimal technological constraints (Cowan 1999).

The Hopewell people were mobilized by local leaders to create monumental ceremonial landscapes (Artursson et al. 2016). Artursson et al. (2016) postulated that the political economy and roles of local leaders were institutionalized via religious investment in the engineered landscape. The building of religious monuments drew people to the immediate vicinity, and leaders exercised rights to mobilize labor and amass food for feasting and mortuary ritual, which were central tenets of the Hopewell cultural life (Artursson et al. 2016: 15; Earle and Spriggs 2015; Spielmann 2002). Because of the investment in the ceremonial landscape generated through construction and mortuary ritual, the movement of Hopewell groups was regularized in the region to ensure repeated visitation and investment (Artursson et al. 2016).

In a study of nonmound debris in the immediate vicinity of earthworks Burks and Pederson (2006) observed less dense habitation debris spread over a smaller area. Burks and Pederson (2006) hypothesized that the debris clusters are small camps inhabited for short periods of time by visitors to the earthworks. In the field seasons of 2004 and 2006 MWAC archaeologists investigated the Riverbank site (33RO1059) a habitation site south of Hopewell Mound Group. Based on limited habitation debris, ceramics, and a four features, Landon (2010) suggested that the Riverbank site represented a short term occupation for temporary visitors to the site. This coincides with Bernardini (2004) hypothesis that earthworks were built and used by individuals on a regional scale versus local and pilgrims to the site would establish short term camps alongside the earthworks.

Overall, the archaeological evidence concerning Ohio Hopewell subsistence and settlement suggests that they were low-level food producers who practiced a “middle range” subsistence strategy. They demonstrated a higher level of social complexity than traditional hunter gatherers as evidenced by the production of monumental ceremonial landscapes. In addition, their mobility resulted in short term occupational sites in the archaeological record with few discovered in or around earthworks sites to date.

Earthwork Construction

Though designated the “type site” of the Hopewell culture, Hopewell Mound Group does not reflect the standard of Hopewell earthwork construction. There is a tremendous amount of variability in Hopewell earthwork construction from geometric enclosures like Newark Earthworks to complex burial sites such as Hopeton Earthworks, Mound City, and Hopewell Mound Group. Over two centuries of European occupation in the Ohio River Valley have left most earthwork sites barely visible to the naked eye

(Lynott 2004). As urban centers continue to grow and agricultural development intensifies, earthwork are decreasing at a rapid rate (Lynott 2004: 7). Despite this, numerous excavations have been conducted on earthwork sites and continue elucidate new details concerning earthwork construction and meaning.

Earthworks were constructed using massive amounts of soils quarried by hand and carried in baskets from the surrounding areas of the site (Lynott 2004: 6). Wall excavations at Hopeton Earthworks by Lynott (2004) revealed several patterns of wall construction. The excavations hypothesize that the Hopewell people first removed the topsoil to expose the subsoil before construction (Lynott 2004). In addition, soils were carefully placed with red soil on the side of the wall to be viewed from outside the enclosure and yellow soils on the wall that would be viewed from inside the enclosure (Lynott 2004: 6). A similar pattern of soil deposition of red and yellow soil was uncovered at The Great Circle of the Newark Earthworks (Charles 2012; Lepper 1996; Greber 2006). According to Charles (2012) the contrasting soils in the interior and exterior walls would have been deposited to alter the experience of the structure depending upon the person's position inside or outside the enclosure (Charles 2012: 345). Moreover, the detection of small soil features with charred materials indicate that "the builders performed rituals that involved burning" (Lynott 2004: 4). This placement of soils and the associated activities indicates a ritual significance to the construction. The evidence of ritualistic burnings occurred throughout construction of Hopeton Earthworks and suggests that "the enclosure was either used for some sort of ceremonial purpose or possibly that the construction was ceremonial in and of itself" (Dempsey 2006: 97; Lynott 2005).

Hopewell mounds were built in stages of soil deposition and covered previous wooden structures, such as charnel houses (or sub-mound structures), upon prepared floors (Brown 2013: 32). The initial layer of vegetation and surface soil was scraped or burned in layers of red and yellow soil as well as a capping gravel layer (Charles 2012: 346). Intensive burned deposits excavated from mounds of earthworks sites indicate burning of the buildings before earthwork construction (Figure 11). Throughout Hopewell sites burials occur both alone and within groups ranging from cremations to extended burials (Charles 2012). In addition to intensity of materials uncovered from Hopewell burial contexts varies tremendously between earthwork sites. Therefore, earthworks can longer be seen as a single episode of design, but a reflection of “many hands over a long period in an effort to enhance the perceived sacral aspect of the landscape” (Brown 2013: 357).

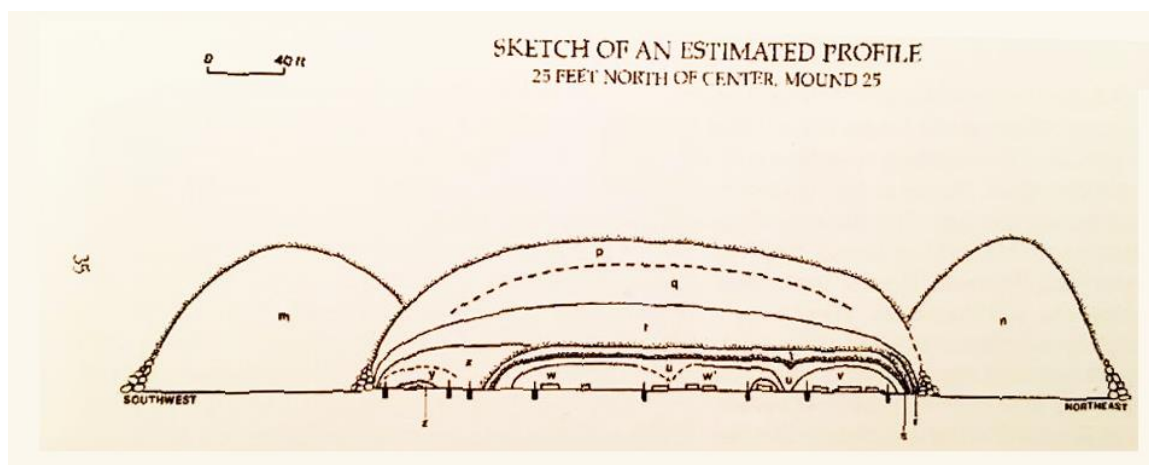


Figure 11: Mound 25 at Hopewell Mound Group displaying the various construction stages. Mounds were repeatedly used covering several wooden buildings and features (Greber and Ruhl 1989: Figure 2.14).

Charles (2012) hypothesized the potential ritual meaning of soil deposition patterns from an examination of the ethnographic record. Charles (2012: 347) hypothesis is described as a manifestation of the cosmos:

“The surface soil was removed to expose what was known as the Lower World, reddish or brownish in color. A disc of light-colored gray or yellow silt or sand was laid out representing that was termed the This World. An *axis mundi* of life and death was created through the central crypt, surrounded by a ring of sod...reflecting the Earth Diver creation myth...providing a place for animals and people to live.”

According to this myth, earthwork construction recreates “the structure of the universe (*imago mundi*) and re-enacts the creation of the lived-in world” (Charles 2012: 347).

Overall, the subsoil reflects the Lower World, the lighter colored soil This World, and finally, the sky is the Upper World (Charles 2012: 347). In contrast to Charles (2012), Carr (2005) hypothesizes a multiple realm alternative in which the construction emphasizes the Above and Below with corresponding patterns of Cardinal and Lunar directions. The center of the ceremony reflecting ritual of the cosmos shifted in focus based upon burial episode (Carr 2005; Charles 2012; 348).

This emphasis of ritualism is also reflected in the placement of gateways at Hopeton and other Hopewell earthwork sites where enclosures were planned to view solar and lunar events (Lynott 2004: 6; Romain 2000). The orientation of earthen structures suggests a phenomenological knowledge of solstices and celestial events (Romain 2000). Therefore, earthworks may have acted as observatories of astronomical events and potentially seasonal use according to these events (Romain 2000; Dempsey

2006; Hively and Horn 2010). These hypotheses continue to be evaluated by large scale geophysical surveys (Lynott 2004: 6).

Not all mounds contain the same patterns of soil deposition nor the same amount of ceremonial use. Similarly to the variability of earthwork construction, the variability in mound structures could indicate differences in ritual participation. In addition, there may be temporal changes over time; however, more reliable radiocarbon dates need to be conducted in order to verify the temporal relationship between intrasite mounds and earthwork sites.

Hopewell Mound Group

Designated as the "type site" for the Hopewell culture, the Hopewell Mound Group was accepted to the National Register of Historic Places (1974). Hopewell Mound Group is recognized as an important part of the economic, political and ritual landscape of Hopewell culture. Hopewell Mound Group is the best representation of the Hopewell ability to construct monumental earthworks. Moreover, the wealth of ceremonial deposits excavated from the site are indicative of the extent of inter-regional trade networks which brought materials to Ohio from the far reaches of the North American continent. Currently the majority of earthworks at the site are difficult to discern due to years of agricultural impact and erosion.

It is located on the North Fork of Paint Creek, approximately eight kilometers West of Chillicothe, Ohio. The known features of the site include embankments, ditches, mounds, the remains of submound structures, borrow pits, nonmound artifact debris, and subsurface features (Burks and Pederson 2006: 378). The main embankment is a large,

irregular wall (parallelogram) that runs across the second terrace and the top of the ridge at the north end of the site (Burks and Pederson 2006: 378). The Great Enclosure is approximately 2800 feet in length from east to west, and 1800 feet long north to south (Burks 2013). The embankment is broken by a series of gateways with borrow pits surrounding the outside of the enclosure on the east, west and north sides. The square enclosure is attached to the east side of the main enclosure and is accessed by a series of gateways. The square enclosure is 850 feet by 850 feet and each gateway is blocked by a mound, including the one to the main enclosure. In addition to the two large enclosures, a D-shaped enclosure and a circular enclosure (370 feet in diameter) are located with the large embankment. The D-shaped enclosure is approximately 574 feet (175) meters across, originally 3.2 feet (one meter) high, and surrounds the largest mound, Mound 25. The circular enclosure is approximately 492 feet (150 meters) east of the D-shaped enclosure, adjacent from the second largest mound, Mound 23. Hopewell Mound Group originally contained as many as 43 mounds in and around the site's embankments. The mounds ranged in size from less than two feet to more than 30 feet in height. Mound 25, the largest mound at Hopewell Mound Group, is also the largest mound constructed by the Hopewell culture.

Squier and Davis (1845)

Initial descriptions of the site by Caleb Atwater (1820) estimated that the large enclosure encompassed 110 acres with wall 12 feet (3.7 meters) high and surrounded by a ditch 20 feet wide (6.2 meters) with no ditch on the side abutting the river (Atwater 1820: 183). Hopewell Mound Group has undergone three major episodes of excavation: Squier and Davis (1848), William K. Moorehead (1891), and Shetrone and Mills (1922).

Ephraim G. Squier and Edwin H. Davis conducted the first survey of earthworks in the Mississippi River Valley. This survey would become the first publication of the newly minted Smithsonian Institute, *Ancient Monuments of the Mississippi Valley* (1848). The Squier and Davis (1848) map of Hopewell Mound Group, is still referenced today in archaeological publications and investigations because of the quality of Squier and Davis' mapping as well as the destruction of the monument since 1848 (Figure 12).

Between 1846 to 1847 Ephraim Squier and Edwin Davis conducted extensive surveys and excavations of the earthworks sites around the Scioto River valley. Hopewell Mound Group was named "Clark's Works" in honor of the property owner, W.C. Clark, and classified in their publication as a "Work of Defence". Squier and Davis' published map of the Hopewell site document fifteen numbered mounds: 1-12 and 14-16 (Greber and Ruhl 1989: 13; Squier and Davis 1848: Plate 10). The main enclosure was described as a parallelogram "2800 by 1800 feet (840 by 540 meters) with one rounded corner" (Lynott 2015: 177). The wall along the river, which lacked an exterior ditch, was approximately four feet (1.2 meters) high and the walls of the main enclosure were six feet (1.8 meters) high and 35 feet (10.5 meters) wide (Squier and Davis citation in Lynott 2015: 177).

Squier and Davis excavated at the site at four mounds and produced some of the first evidence of the exotic and well-crafted artifacts that would be revealed in subsequent excavations. The materials from these excavation were sold by Edwin Davis to Lord Blackwell who built a museum in Salisbury, England. The collection is now housed at the British Museum with many artifacts not currently on display.

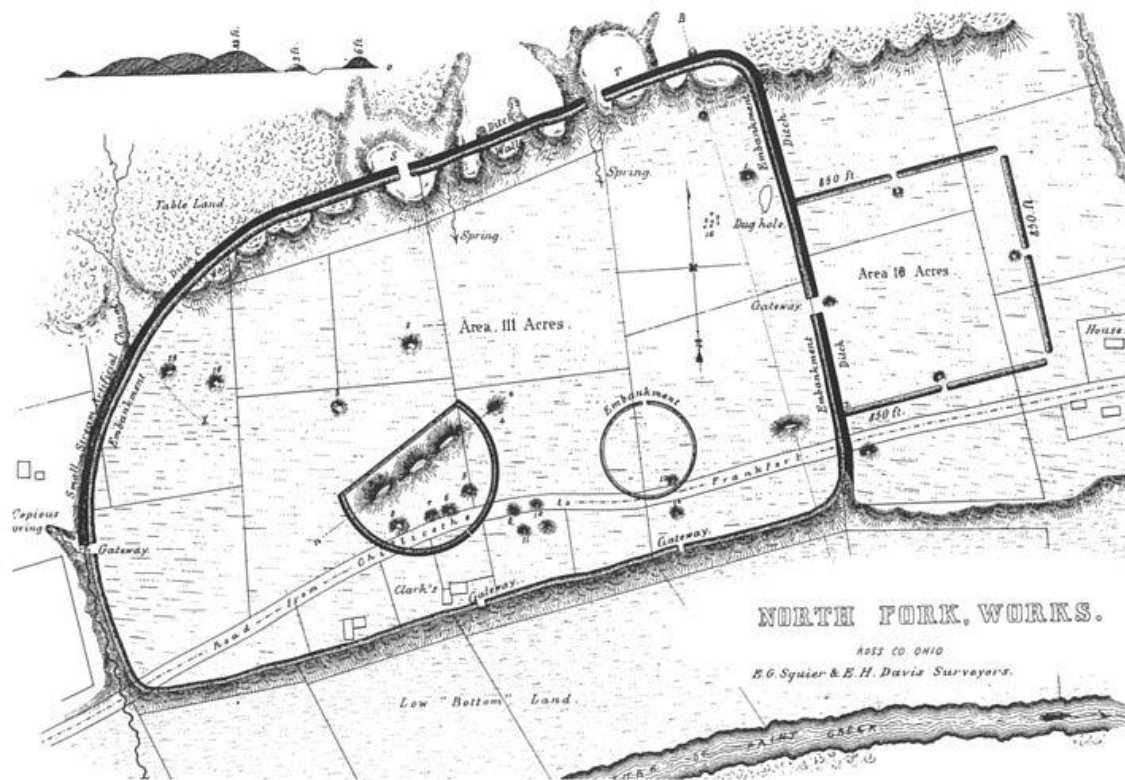


Figure 12: Squier and Davis' 1848 map of Hopewell Mound Group, then called the North Fork Works.

Warren K. Moorehead (1891-1892) and the World's Columbian Exposition, 1893

Warren K. Moorehead conducted extensive archeological excavations at the Hopewell site in addition to other sites such as Fort Ancient and Hiram Taylor's Mound during the field seasons of 1891-1892 for the purpose of gathering artifacts of the World's Columbian Exposition in Chicago, Illinois (Moorehead 1891-1892, A Report Done on the Work in Southern Ohio). Moorehead was hired by Frederick W. Putnam, the director of the Department of Ethnology and Archaeology, as known as the Department M. The collections from the World's Columbian Exposition in Chicago would eventually become the Field Museum of Natural History in order to house the artifacts brought to Chicago for the exposition.

Moorehead and his team excavated four sites during this field season including Fort Ancient, Oregonia, Anderson, and Hopewell Mound Group generating thousands of archaeological materials in the process (Moorehead, Field Notes 1891). Moorehead's collection has been at the Field Museum since its founding in 1893, and includes several types of records such as site maps, correspondence notes, manuscripts, field notes, and images all associated with the nine months of excavations by Moorehead's team.

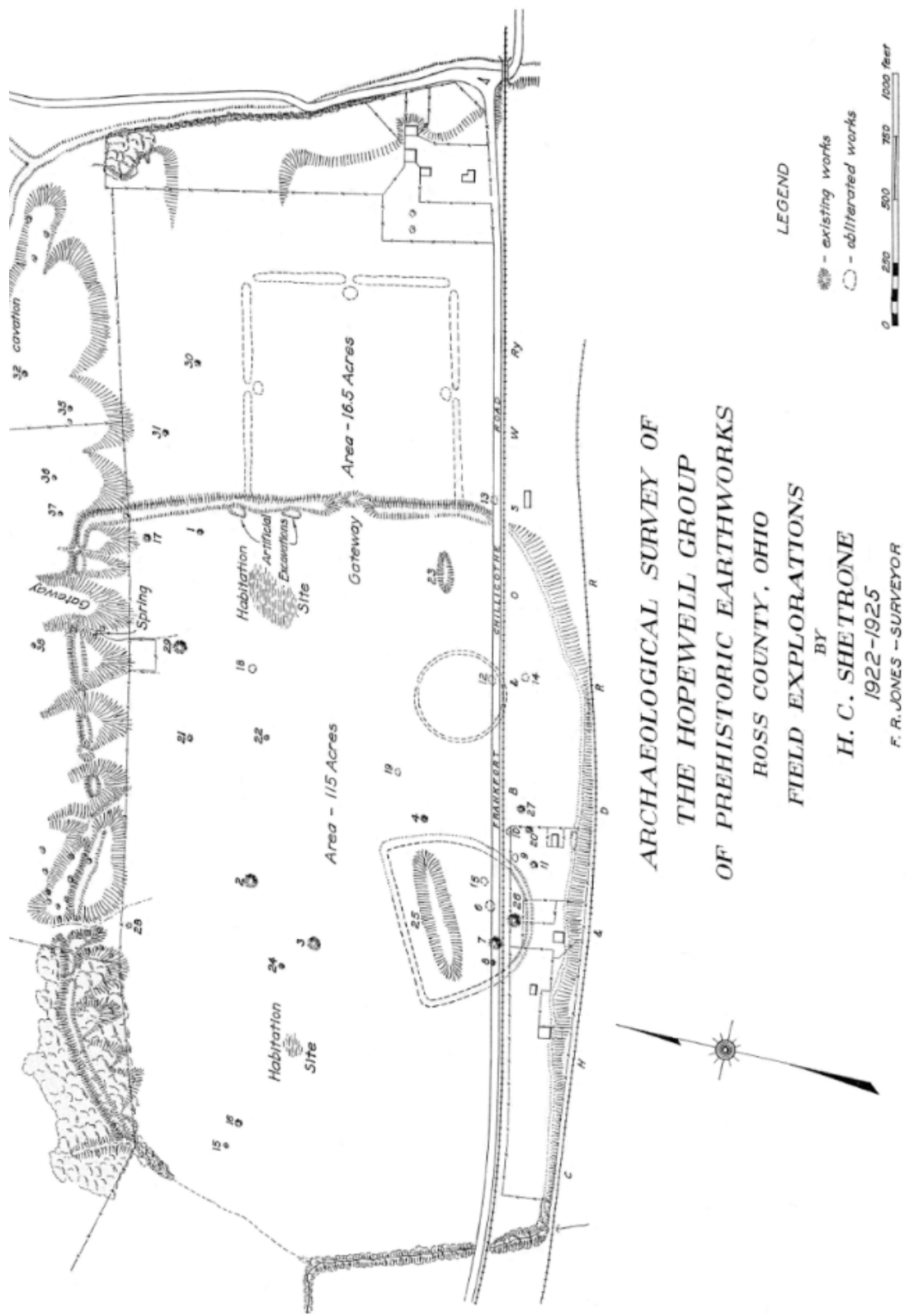
The field seasons focused on mound excavations and the collection of artifacts include several photographs and maps of the excavated mounds and burials. Moorehead used the Squier and Davis maps as a field guide and intended to continue their numbering scheme naming the first mound "17" continuing to "25". Moorehead did not complete the report on the Hopewell Mound Group until 1922; however, several small publications (Moorehead 1896) reveal some of the exotic and finely crafted artifacts discovered in the mounds. Moorehead's report were plagued with inconsistencies and lack of detail. Despite this Moorehead garnered much acclaim for his excavations. The Hopewell Mound Group artifacts and records were housed at the Field Museum of Natural History in October 1893. Charles Willoughby, director of the Peabody Museum of Harvard from 1915 to 1928, compiled a manuscript of the 1891-1892 excavations and was used as a source for Moorehead's 1922 final publication on the Hopewell Mound Group. The manuscript was not published until Greber and Ruhl's 1989 *The Hopewell Site* which used the manuscript to identify intraspatial patterns of artifacts and reconstruction of Mound 25.

Shetrone and Mills (1922-1925)

The final phase of excavation at Hopewell Mound Group was conducted by Henry C. Shetrone and William C. Mills between 1922 and 1925 under the authority of the Ohio Historical Society (now the Ohio History Connection). Shetrone and Mills continued Moorehead's previous investigations and excavated the remainder of the visible mounds utilizing a new numbering system that extended as high as "38" (Figure 13). The collections from this final major excavation are currently housed at the Ohio History Connection. Shetrone and Mills excavated the remaining one third of Mound 23 to reveal a prepared floor and ceremonial space to the west (Shetrone 1926; Greber 1989). The locations of burials 01 and 02 were estimated by R. Zinser based upon Shetrone's (1926) text descriptions (Case and Carr 2005: Appendix 7.2). Both burials contain cremated remains.

Site	Mound	Provenience	Primary Source
Hopewell	23	Burial 01	Shetrone 1926:54
Hopewell	23	Burial 02	Shetrone 1926:54-55

Table 2.2: Excerpt from Case and Carr (2005, 2008) HOPEBIOARCH database regarding the burials recovered from the Shetrone and Mills (1922-1925) excavation of Hopewell Mound Group under the Ohio Historical Society. The materials recovered from this excavation episode are currently housed at the Ohio History Connection (formerly Ohio Historical Society). Burial 02 uncovered with two flint blades and one bone needle (Shetrone 1926:54-55; Case and Carr 2005: Appendix 6.1).



ARCHAEOLOGICAL SURVEY OF
 THE HOPEWELL GROUP
 OF PREHISTORIC EARTHWORKS
 ROSS COUNTY, OHIO
 BY
 H. C. SHETRONE
 1922-1925
 F. R. JONES - SURVEYOR

Figure 13: Shetrone and Mills (Shetrone 1926) plan map of Hopewell Mound Group.

Mortuary Analysis

Since the beginning of archaeological inquiry over the exotic deposits recovered from Hopewell burials, researchers have struggled to derive meaning from the mortuary artifacts to understanding social organization of the Ohio Hopewell (Greber, 1996; Greber, 1983; Pickard, 1996; Wymer, 1996). Burials and mortuary remains are some of the richest sources of information concerning past societies and are a reflection of a society's cultural ideals ritual practices (Tainter, 1975; Tainter, 1978; Trinkaus, 1984; Carr, 1995; Brown, 1995; Binford, 1971). Since the beginning of archaeological inquiry over the exotic deposits recovered from Hopewell burials, researchers have struggled to derive meaning from the mortuary artifacts to understanding social organization of the Ohio Hopewell (Greber, 1996; Greber, 1983; Pickard, 1996; Wymer, 1996). Previous research in mortuary studies believed that mortuary rites and patterns perpetuate a society's belief system and honor the life of the deceased representing the ideals of the community which are reflected in the deposition of symbolic artifacts and ritualism (Tainter, 1975; Carr, 1995). Particularly, through the analysis of burials researchers were able to glean information about an individual's social status, role, religious ideologies, and the institutionalized belief systems of their culture (Carr, 1995; Saxe, 1970).

Traditional examinations of the mortuary record have focused on associated ritualism with burial preparation and formation along with mortuary material deposits (Charles and Buikstra, 2002). Burial deposits represent an intentional separation of individual internments (Binford, 1971; Carr, 1995). Theoretical contributions of Saxe (1970), Binford (1971), Carr (1995), Brown (1995), Charles and Buikstra (2002), and Case and Carr (2005, 2008) expanded mortuary analysis beyond examinations of burial

materials to include physical location and orientation of burials as culturally determined and reflection of social importance (Binford, 1971; Charles and Buikstra, 2002).

However, theoretical contributions by archeological researchers in recent decades have increasingly moved away from examinations of burial deposits as indicators of social status to burial episodes as representation of social and ritual dramas (Parker Pearson 1999; Brown 2003; Emerson et al. 2016). In addition, advancement in bioarchaeological techniques have broadened the capabilities of researchers to address questions of health, status, gender, and identity (Arnold and Jeske 2014).

A systematic study of mortuary deposits and social organization was initiated by Saxe (1970) who outlined hypotheses regarding social dynamics of past societies reflected in the mortuary record. Prehistoric corporate groups, or local communities, were in competition with one another for limited resources and, therefore, maintained a bounded disposal area for their deceased in order to legitimize their rights to those resources (Brown, 1995:13-15; Parker Pearson, 1999:29-30; Saxe, 1970:119).

Lewis Binford (1971) elaborated on Saxe (1970) by postulating that the complexity of behaviors observed in the mortuary context correspond to the complexity of the society. The higher status an individual, the more investment in their burial by the community (Binford 1971). Moreover, Binford (1971) argued that the combination of social personae, or social roles, in the mortuary record are defined on an individual and societal level (Binford 1971:17-21; Parker Pearson, 1999:29-30; Tarlow, 1999:10-11). These hypotheses became known as the Saxe-Binford Hypothesis and it brought attention to the analytical possibilities of the mortuary record. By looking at individual burial

patterns in comparison to archaeological patterns across societies one can identify burial behaviors and discern patterns of social complexity.

Later research assumed a pyramidal rank structure of community organization, and postulated that those occupying positions of higher status would be identified through increased presences of social persona and would be less common in mortuary contexts. In examining these differences and burial attributes the social hierarchy could be reconstructed (Brown, 1995:9-12; Gamble et al., 2001:2; Peebles and Kus, 1977:431; Tainter, 1975:2). Further elaborating on Saxe-Binford hypothesis, Tainter (1978) suggested that higher levels of effort exerted in the deposition of burial materials are correlated to high social status. In addition, the unique expression of materials and practices correspond to the people occupying positions of limited availability and reflect an elite status (Goldstein, 1981:54-55; Parker Pearson, 1999:74-75; Peebles and Kus, 1977:431).

As processual archaeological theory expanded the analytical dimensions of mortuary theory, the post-processual movement seeks to recontextualize mortuary remains into the individual by looking at aspects of social behavior such as agency, identity, gender, and symbology (Parker Pearson 1982:112; Tarlow 1999; Trinkaus 1995:54-55). Recent archaeological contributions towards mortuary analysis incorporate social archaeology into the assessment of mortuary deposits. Archaeologists increasingly look to the ethnographic record to discern ritualism explicit in the patterns of mortuary deposits (Emerson et al. 2016; Brown 2003; Parker Pearson 1999). In Brown's analysis of Cahokia's Mound 72, a ridge top mound in the Grand Plaza, elaborate burials such as the beaded burial in Mound 72 were reflections of Cahokian cosmology. In this particular

example Brown (2003) argued that the individuals interred in Mound 72 (72Sub1) were characters in a cosmogram, a representation of cosmology. The bodies were hypothesized to be representing players in a ball-game ritually enacting episodes of the Red/Horn Morning Star narrative a derivative of Siouan mythology (Brown 2003; Emerson et al. 2016: 418). In addition, Brown (2003) asserted that the beaded burial of Mound 72 (specifically Burial 13) in which several males are buried on a “falconoid beaded cape” exemplified an early application of the bird man mythology which would become integral to the ritualism of the Southeast Ceremonial Complex (Emerson et al. 2016: 418). This interpretation of the beaded burial has been complicated by the recent examinations of the structured deposits at Mound 72 by Emerson et al. (2016). According to their research, Emerson et al. (2016) argue that the mass of shells indicating the falconoid cape likely represent a structured deposit, similar to a cache of points, rather than a cape or blanket. Despite this, the application of ritual performance to mortuary remains such as at Mound 72 is an alternative to hypotheses which correlate burial preparation with hierarchical social organization or as denoting status or social roles (Brown 2003; Emerson et al. 2016: 412).

Social Status in the Material Record

Societies may differentiate between individuals on the basis of kin group membership, club association, sex, gender, and age among others (Ames 2006: 489). These differentiations change based upon the social complexity of the culture from egalitarian to ranked societies and chiefdoms. Those in egalitarian societies achieved status as a result of awarded prestige, whereas ranked societies positions of status individuals can either achieved or ascribed. In particular high rank is ascribed and based

upon the position of their kin groups. Leaders organized individuals based upon social power as individuals who can control the movement of people rather than modes of production (Ames 2006: 489; Earle 1997). This is pertinent to the discussion of Hopewell culture who seem to have individuals of higher status as a result of their ability to mobilize labor for ceremonial construction. Anthropologists have hypothesized the emergence of differential status as reflection of certain events such as increased populations, specialization and regional interaction, feasting, surplus production, and sedentism (Ames 2006: 493; Box 28.1).

Rank and status are identified in the archaeological record by differential access to prestige goods which are non-utilitarian and beyond basic survival and reproduction (Ames 2006: 496; Hayden 1998). According to Peeble and Kus (1977) one potential measure of social status is the investment in mortuary ritual associated with an individual (i.e. greater burial elaboration and artifact depositions). This has been challenged in later literature, and though it is valuable as proposed method of measure it does not address the possible ritual significance of mortuary ritual in determining burial deposits (Brown 1995; Carr 1995). Ames (2006: 495, Box 28.2, adapted from Wason 1994 and Schulting 1995) outlined a series of analytical dimensions for mortuary programs (Figure 14).

Box 28.2. Analytical Dimensions for Mortuary Programs	
<ol style="list-style-type: none"> 1. Preparation and treatment of the body <ol style="list-style-type: none"> a. Degree of skeletal articulation (i.e., primary vs. secondary burials) b. Disposition of the burial (placed in grave, exposed on a platform, flexed, extended, etc.) c. Number of individuals per burial d. Orientation of long axis of the skeleton(s) e. Postmortem modifications 2. Mortuary facility <ol style="list-style-type: none"> a. Type of burial (inhumation, cremation, platform, etc.) b. Form of the facility (simple excavated grave, tomb, chamber, tumulus, box, canoe, etc.) c. Shape and dimensions d. Depth e. Construction and raw materials used f. Orientation of the facility and the body within the facility (orientation toward cardinal directions, landscape feature, etc.) g. Location relative to the community (burial within community, burials away from community) h. Location within disposal area itself (is burial part of cemetery, where is it in the cemetery, is it part of a clear subsection of cemetery?) 	<ol style="list-style-type: none"> i. Form of disposal area (are there cemeteries, are cemeteries spatially organized?) 3. Burial context within grave <ol style="list-style-type: none"> a. Arrangement of bones within the grave and relation to furniture, and facility (furniture can include grave goods as well as other features of interment, e.g., coffin, ledges, ramps, etc.) b. Form of the grave (what holds the body itself?) c. Quantity and nature of inclusions (can include objects as well as people, animals, vehicles, etc.) <ol style="list-style-type: none"> i. Type ii. Quantity iii. Source, raw materials used 4. Biological dimensions <ol style="list-style-type: none"> a. Age b. Sex c. Evidence for disease, pathologies (e.g., dental caries), injuries, stress (patterns of arthritis), and circumstances of death d. Nutritional evidence e. Cultural/behavioral modification of the skeleton f. Genetic relationships
<small>Source: Adapted from Wason 1994; Schulting 1995.</small>	

Figure 14: Ames (2006: 495) potential measures for examining social status in mortuary contexts.

Greber (1976, 1979) attempted to confront these questions of social status in the Hopewell culture through the analysis of mortuary data from Seip Mound, Ater Mound, and Turner Mound. Greber (1976) counted the amounts of nonperishable artifacts associated with burials as well as type of burial treatment and burial location to calculate rank (Greber 1976; Johnston 2002). Greber and Ruhl (1989) assessed rank in Ohio Hopewell mortuary contexts by examining the artifact deposits from Hopewell Mound 25. The nonperishable artifacts included in this examination of rank are: pearls, beads, misc. other, misc. copper, copper earspools, plaques, marine objects, bone/flint tools, large canines, and cut mica (Greber and Ruhl, 1989: 53, Table 2.2). These materials were

meant to reflect greater investment in burial ritual as an indicator of greater social status. In addition to material despoils, grave preparation was also used as a measure of mortuary investment. Greber and Ruhl (1989) investigated the distribution of burial clusters within Mound 25 and identified six unique burial clusters (Figure 15). Of these six clusters three are identified as major clusters which contain “primary extended burials and redeposited cremations” (Greber and Ruhl 1989: 52). Within Mound 25 the most common form of grave is a log chamber around a prepared floor supporting a bark or timber roof. Similar to other observed mound structures, though physically separate from one another, the burials of Mound 25 occupy the same prepared floor. The three main groups identified by Greber and Ruhl (1989: 56) were C, D, and E respectively and consisted of 82 individuals sharing similar treatment of log-lined tombs and depositional time frame (see Figure 15). Greber and Ruhl (1989) acknowledged a potential bias in their results based on a limited presentation of the population which may include all individuals of increased wealth. In their words “there was a great deal of social and materials of wealth shared by all groups” in their sample (Greber and Ruhl, 1989: 57). However, they did not identify appreciable material differences and, therefore, suggested that there was no differential status among the groups (Greber and Ruhl, 1989: 57).

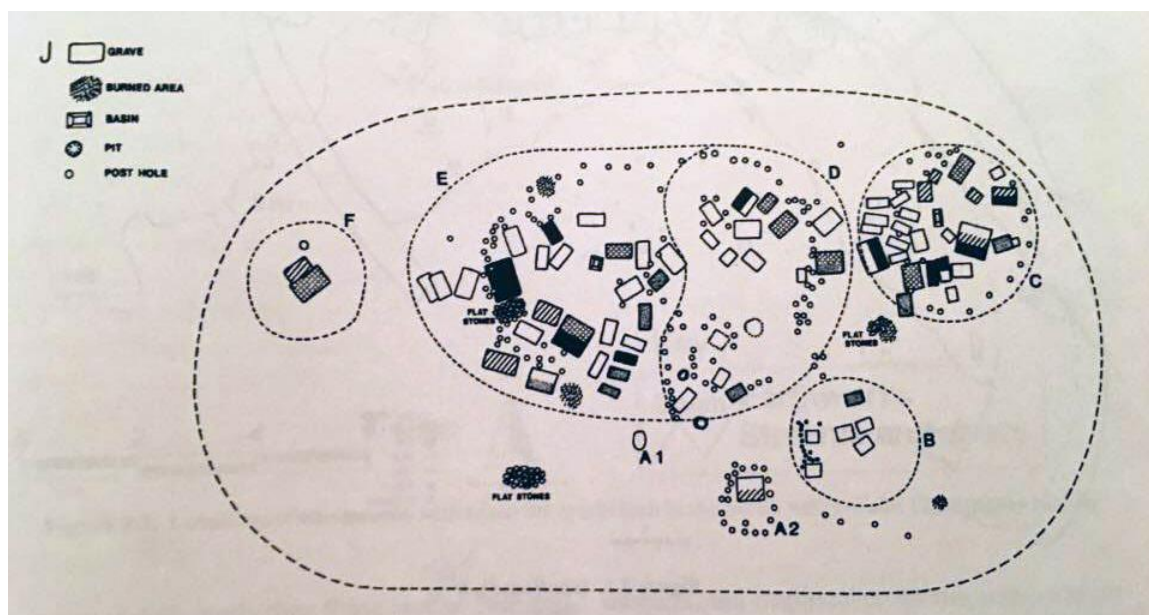


Figure 15: Greber and Ruhl (1989: 57) identified clusters of burials in Hopewell Mound 25 based upon a series of statistical analyses.

Greber and Ruhl observed that copper earspools were more common in the burials represented a social role distinct from those rarer items such as copper breastplates and copper covered panpipes (Greber and Ruhl, 1989: 58). Greber and Ruhl (1989) also did not observe any statistical differences in the patterning of artifact distribution among the burial clusters identified in Mound 25. The following artifacts were found to be the most common (in order): no artifacts (most common), pearls, beads, misc. artifacts (rare or idiosyncratic artifacts), large bear canines (16 times more frequent in Mound 25 than Seip Mound), bone/flint tools, copper earspools, and copper plaques (Greber and Ruhl 1989: 61-62). Lastly, Greber makes preliminary observations about the distribution of burials within Mound 25, stating that the burials present a central pattern and as such that mound floor is “crowded” in the center with less area per burial (Gerber and Ruhl 1989: 63).

Case and Carr (2005, 2008) present a much more ambitious study of the deposits in several Hopewell mounds. Their two tomes *Gathering Hopewell* (2005) and *The Scioto Hopewell* (2008) are deep investigations into the hypotheses concerning the political, economic, social, and ritual lives of the Hopewell. Of particular interest in this study are their ideas about social ranking and artifact analyses from mortuary data at Hopewell Mound Group. Ascribing to the paradigm of “thick description” Case and Carr (2005, 2008) attempted to discern the social roles of individual through the intense investigation of mortuary deposits, orientation, location, and grave type. Case and Carr (2005: 242-243, Table 6.1) presented a table for which to “determine archaeologically whether a past society was organized by principles of rank.”

Case and Carr (2005: 239) defined social rank as the “differential allocation of prestige (respect, evaluations of importance) to individuals of a society on the basis of criteria other than age, sex, or personal attributes.” They present a table for which to determine the presence of social rank in the archaeological record and was a result of comparison of ethnological generalizations concerning the presence and emergence of social rank in cultures (Case and Carr 2005: 242-243). Overall, Case and Carr (2005: 244) postulated that mortuary artifacts that indicate ranking can be determined by their material nature. Lynott (2015: 92) respected the rigor in which Case and Carr (2005) collected their data, he warns against making generalization based upon his conclusions. Case and Carr (2005) should be treated as a hypothesis which should continue to be tested against other mortuary collections.

Through their analyses of burial deposits of Seip Earthworks, Liberty Works, Ater Mounds, and Hopewell Mound Group Mound 25 Case and Carr (2005) identified four

artifact classes that are potentially indicative of prestige: headplates, celts, breastplates, and earspools. The prestigious nature of the artifacts is based upon their frequencies in the archaeological deposits as well as distributions across sites. Based upon frequency Case and Carr (2005) inferred the greatest prestige lie with individuals interred with headdresses, celts, breastplates, and finally earspools. Each artifact was typically buried with one example with the exception of earspools which were typically buried in pairs. Case and Carr (2005) postulated that headplates reflect individuals who held positions of leadership based upon frequency and difficulty of production. In addition, celts occupy a similar yet distinct social leadership role in this context of Case and Carr (2005). Lastly, Case and Carr (2005) suggested that earspools and breastplates reflected ceremonial societal membership based upon the increased frequency in Hopewell ceremonial deposits. The table and prestige artifact highlighted by Case and Carr (2005) will be tested against the deposits outlined in chapter three regarding Mound 23 of the Hopewell Mound Group to investigate the presence of status in individual internments.

CHAPTER 3

Materials from the Moorehead Collection at the Field Museum of Natural History have been made available by the Ohio Hopewell digital archive (hopewell.unl.edu). These data sources include Warren K. Moorehead's original field notes, Field Museum of Natural History artifact catalog, photographs, manuscripts, and reports from the archival collections at the Field Museum of Natural History. The integration of this archival and archaeological data into a series of databases for analysis allows for a comprehensive description of the day-to-day uncovering of burials, excavation techniques, and artifacts from field notes and manuscripts within the archival collection at the Field Museum of Natural History. This chapter will examine the new data sources presented by the Ohio Hopewell digital archive and the methodology for combining these records into a geodatabase for analysis of Mound 23 at the Hopewell Mound Group.

Legacy Data Integration

In archaeology researchers are faced with the problem of managing legacy datasets which are defined as any information that was generated in the past and then passed to subsequent generations (Plaza 2013). These datasets are often “old, unused, obsolete, and/or disparate” (Plaza 2013: 3) and challenging to work with due to the lack of metadata or associated documentation. The expense of maintaining datasets has resulted in many being in a “state of disrepair” rendering them “underutilized, and difficult to properly archive or integrate into the current archaeological dialogue” (Plaza 2013: 1). Moreover, museums and institutions are also challenged to preserve and provide access to these legacy collections for current and future research. Digital archives bring legacy datasets into the sun. Though timely and challenging to build they provide

unprecedented access to collections that would otherwise remain unseen and unused in the annals of archaeological collection institutions. Legacy collections are windows into past excavations, archaeological practices, and archaeological interpretations (Plaza, 2013; Macfarland, 2006), therefore, they hold precious data that cannot be replicated or regenerated. The nature of archaeological investigations renders the resulting extant museum collections and archival materials the only remaining documentation and hope for interpretation for sites excavated before more precise archaeological methods, specifically excavations in the 19th and early 20th century.

Moorehead's initial documentation is limited and contains many inconsistencies with actual materials in the collection (Almazan 2005). Patricia Essenpreis and Davis Jessup (1986) and Field Museum Collections staff headed by Tristan Almazan (2005) attempted to rectify the available data and organize the collection for research. Essenpreis' 1986 project was meant to produce a publication with chapters by contributing authors such as Dr. James Brown of Northwestern University and Dr. N'omi Greber of the Cleveland Museum of Natural History; however, the project did not come to fruition and some of the remaining materials were compiled into a CD-ROM *The Hopewell Mound Group: Its People and Their Legacy*. The team members of the 2005 project produced a helpful finding aid for the Hopewell site materials detailing associated accession numbers and number of items catalogued for each mound at Hopewell Mound Group. Accession 31 and catalogue numbers 1893.31.56001-56612, 56701-56867 house the materials from the Hopewell site and 27 catalogue numbers are associated with Mound 23.

The Field Museum Archives, contains several documents related to the Hopewell Site Collection. The World's Columbian Exposition Expedition to Southern Ohio (1891, 1892) archives contain Moorehead's field notes, maps, and manuscripts; an unfinished manuscript by George Dorsey on the excavation's archaeological collections; and lists of objects (not from the Hopewell Site) collected by Harlan Smith (Field Museum Finding Aid, 2005). In addition to the archival collections at the Field Museum of Natural History, from 1892 to 1894 Charles Willoughby conducted a comprehensive study of the Moorehead materials producing notes and drawings of the artifacts and burials. The notes are currently in the Peabody Museum archives, but were edited and published by N'omi Greber and Katherine Ruhl (1989).

The following data sources relevant to Mound 23 were located in the Ohio Hopewell digital archive from the Moorehead Collection materials and incorporated into this study:

Title	Provenience	Description	Pages relevant to Mound 23
<i>A Report on the Work Done in Southern Ohio (1892)</i>	FMNH Moorehead Collection Folder 7, Box 1	Moorehead's first report to Frederick Putnam. Sent from WKM, the Department of Ethnology – World's Columbian Exposition, Chicago, Illinois on December 30 th , 1892 to Professor Frederick W. Putnam, Chief Department M., Ethnology World's Columbian Exposition, Chicago, Illinois.	52 -123; (pg.70 – Mound 23)
<i>Manuscript Account</i>	FMNH Moorehead	Moorehead's	24-38

<i>of Explorations at Hopewell Mound Group, Ohio (1891)</i>	Collection Folder 5, Box 1	typewritten report for the Department of Ethnology, World's Columbian Exposition, 1891. Refined day-to-day field notes detailing each day of excavation of Moorehead's team (September 1 – December 10 th , 1891).	
George A. Dorsey. <i>The Hopewell Works: Mounds 1-24 ("Clark's Work on the Hopewell Group, Ross County, Ohio")</i> . <i>An illustrated catalog of the Moorehead Collection (1891-92)</i> .	A-17. FMNH Moorehead Collection Folder 1, Box 1	Field Columbian Museum Publication. <i>Anthropological Series</i> (Vol. II, No. II). This is an illustrated catalogue of the archaeological collections made by WK Moorehead for the World's Columbian Exposition in 1891-1892. Dorsey created this catalog the materials in August of 1898. The document cuts and pastes (manually) parts of Moorehead's initial publications for context and then inserts personal observations about the artifacts and burials via typewriter and handwritten. Chronologically goes through mounds and excavated materials.	124-146
<i>Site Maps, 1891</i> n.d.	FMNH Moorehead Collection Folder 4, Box 1	All plan maps created during Moorehead's excavation of Hopewell Mound Group between 1891 and 1892. Most maps were created by Dr.	56-60

		HP Cresson, Moorehead's assistant, and each of his maps include date of recording, depths, and north arrows.	
<i>Record of Warren K. Moorehead Explorations, Little Miami Valley, Ohio, April 1891-January 1892.</i>	FMNH Moorehead Collection Folder 3, Box 1	Mostly hand written field notes from the entire excavation season of 1891-1892. Moorehead's original notes with the assistance of George Little and John C. Munger (Fort Ancient), Dr. HP Cresson (Anderson), and Clinton Cowen (surveyor at Anderson). Includes handwritten corrections and insertions of catalog numbers from the FMNH collection.	88-100

Table 3.1: Archival documents related to Hopewell Mound Group's Mound 23 used in this study.

Mound 23

Mound 23 lies in the southeastern corner of the great enclosure of the main terrace at Hopewell Mound Group. The mound was described by Moorehead in the original field notes as approximately fourteen feet high, one hundred and forty feet in width, and something over two hundred feet in length.¹ Overall, the mound was rivaled only by Mound 25, also called the Effigy Mound, the largest mound in the Hopewell culture.

¹ This approximation of dimension changed between publications and descriptions of the deposits from the original field notes at 100 feet wide and 155 feet long to the Moorehead (1922) indicate dimensions of 100 feet wide and 150 feet long. The dimensions used in study 150 feet long and 100 feet wide for georeferencing.

During the three weeks of excavation, Moorehead and his team recovered 47 skeletons, most of which were accompanied by singular specimens (Moorehead Field Notes, 1891). Moorehead excavated using teams and scrapers until reaching between four or five feet from the baseline at which point the team switched to hand excavation. Baseline in the context of this study refers to the “ground floor” approximately 10 feet below the mound surface. The excavation trench extended nearly as wide as the base line of the mound through the structure from east to west. Moorehead employed a vertical excavation method in which deposits were removed in vertical segments and then backfilled upon the previous exposed surface. This ensured the soils only moved approximately ten feet from the original locations and only portions of the surface were uncovered at a time (surface never fully revealed) (McKee 2005).

Though Mound 23 was documented on both Caleb Atwater’s and Squier and Davis’ maps of the Hopewell Mound Group (see Figure 4), neither conducted preliminary excavations of the mound, unlike Mound 25. Willoughby’s unfinished manuscript on the 1891-1892 excavations and on his “studies and replication of artifacts recovered during those excavations” (Greber and Ruhl 1989: 5) were used as a source for Moorehead’s 1922 publication on the Hopewell site (Greber and Ruhl 1989: 5). Contrasting Moorehead’s notes, Willoughby carefully examined Dr. H.P. Cresson’s, an archaeological technician in the original Moorehead team, original plan maps, which documented the height in the center of the mound as ten feet, width of one hundred feet and a total length of one hundred and fifty feet.

Mound 23 is unique and particularly of interest in this investigation of legacy data integration because, though it boasts an extensive deposit of materials, it has been less

extensively investigated than its larger counterpart Mound 25 of the Hopewell Mound Group. Subject to only two periods of excavation, the initial investigation by Moorehead and his team in 1891 was by far the most substantial excavation and the materials are all now housed at the Field Museum of Natural History with the exception of the two burials excavated by Shetrone and Mills in 1926, which are stored at the Ohio History Connection. Moreover, it offers a point of contrast to the deposits of Mound 25 which will be investigated further in chapter four.

Deposition Overview from the Archival Documents

Moorehead's investigation documented two clusters of burials in the vertical stratigraphy one at 3 feet 3 inches (3.25 feet) below the surface (Figure 16) and the other at the baseline of the mound between 9 and 11 feet below the surface, respectively (Figure 16). Moorehead's initial observations of the burial distributions include intrusive burials 182-190, and observed skeleton groups 197 to 200 and 203 to 209. Skeletons 197, 203 and 206 were observed to be charred by fire. In addition to the burials, Moorehead discovered two altars equidistant from the center of the mound. These altars contained no presence of artifacts. This is in contrast to other mounds at sites such as Mound City (Brown 2013) and Hopewell Mound 25 (Moorehead field notes 1891) which contained large amounts of artifacts and evidence of charred remains. Though the mound was documented by Squier and Davis (1848), Moorehead did not note any obstructions caused by the Squier and Davis investigations.

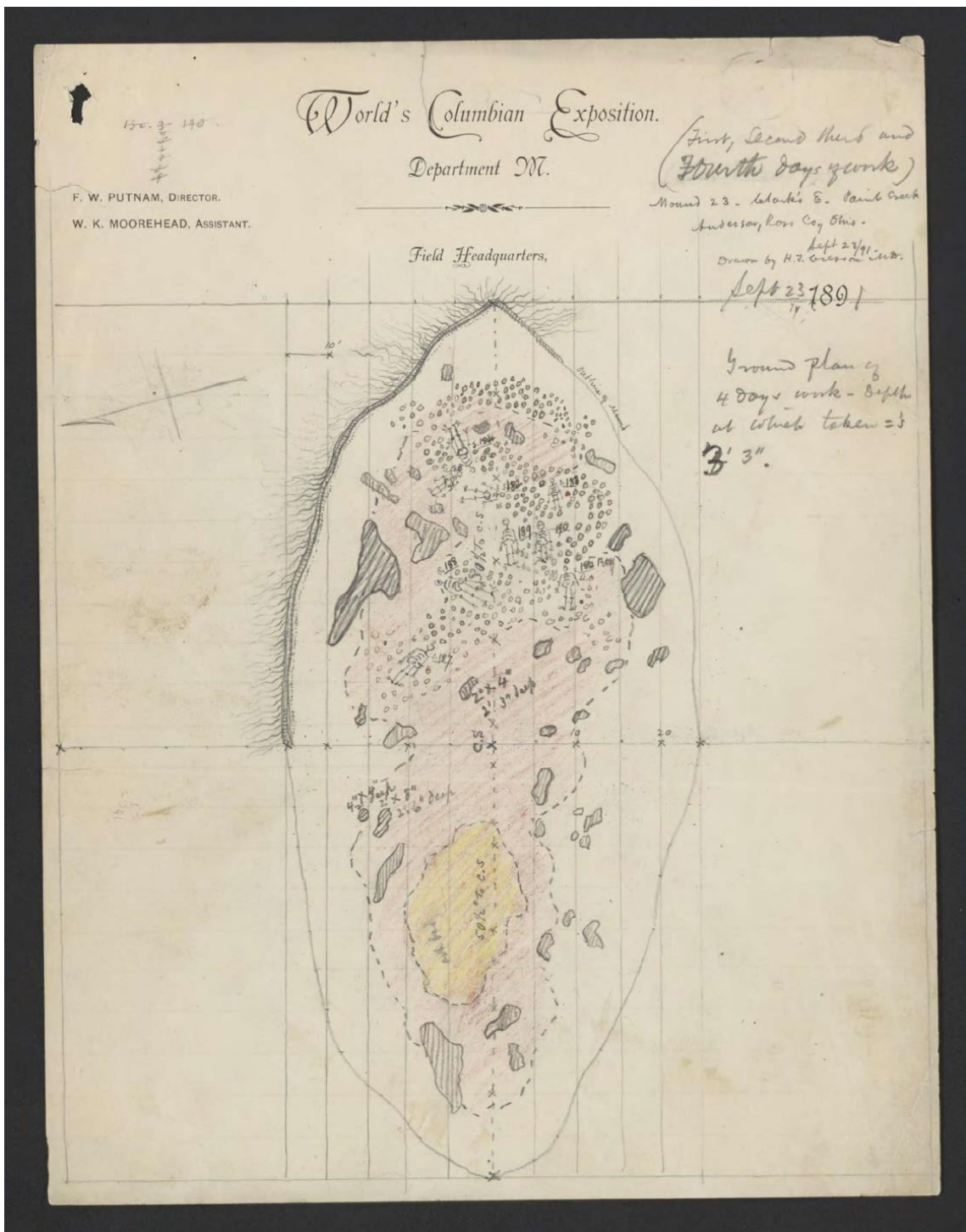


Figure 16: The initial plan map of Mound 23 from a depth of 3.25 feet.

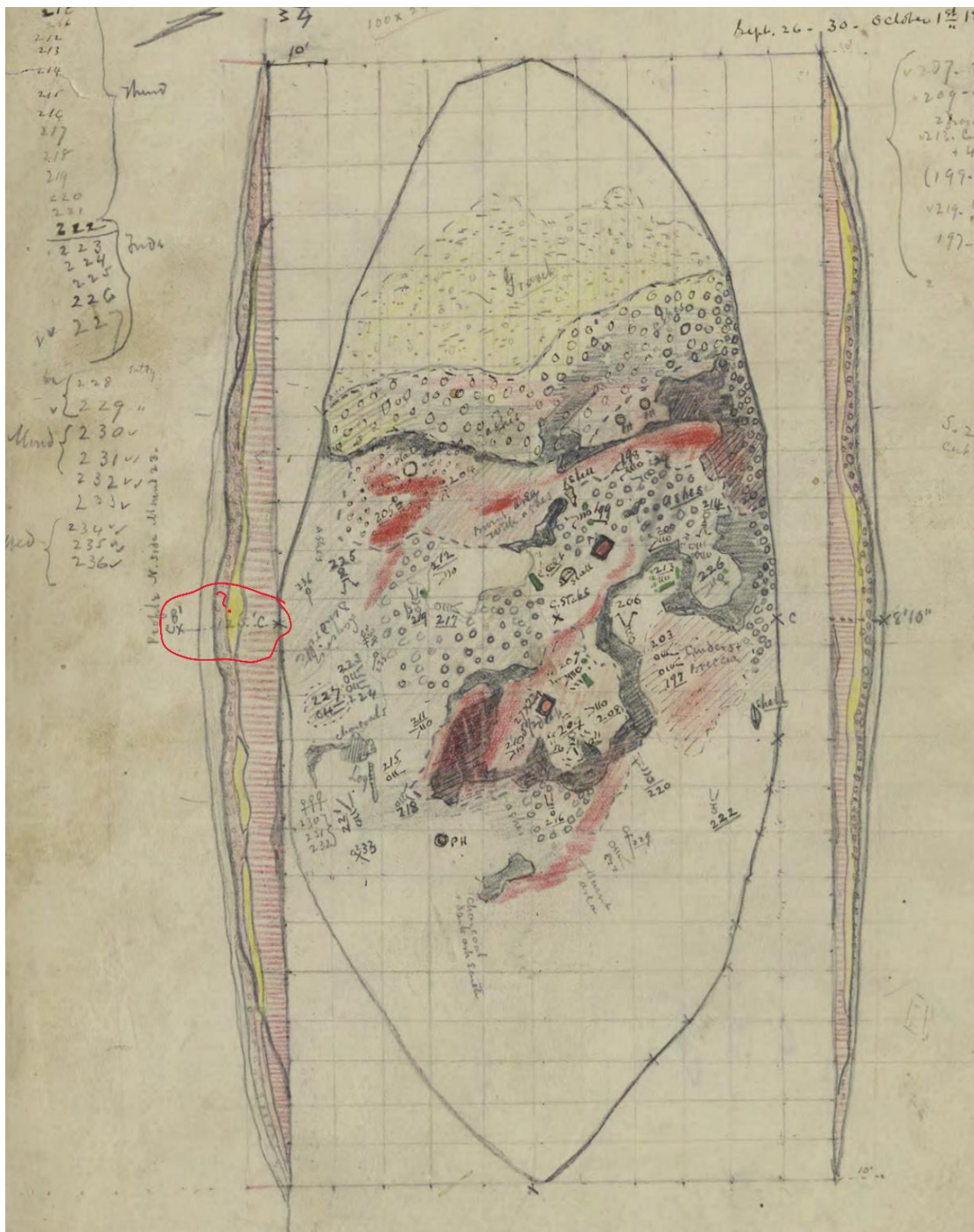


Figure 17: The Ground Plan Map from Moorehead's original site maps, 1891.

Drawn by Dr. H.P. Cresson.

On September 22nd, 1891 Moorehead's team began their investigations on Mound 23 upon completion of investigations at Mound 22. Two skeletons were uncovered, skeleton 182 and skeleton 183, crushed by the weight of the earth and not saved by Moorehead's team. No materials were found with these skeletons. Seven skeletons were uncovered the second day of investigations, Skeletons 184 through 190. Skeletons 182 through 190 were recovered from a depth of 3 feet 3 inches and contained little to no artifacts with the exception of burials 186 and 187. Skeleton 186 is that of an adolescent boy (determined by Johnson 2002) and buried with five stone celts², stone and bone points³, and several cut jaws of mammals (fox and lynx). The Field Museum artifact catalog details approximately 25 artifacts accompanying skeleton 186. In contrast to skeleton 186, skeleton 187 was that of an old man⁴ with his head to the southeast and one artifact, a bone awl with the skeleton (Willoughby Sketch, Greber and Ruhl 1989: 24, figure 2.5). Skeleton 188 was buried with the head in the east northeasterly direction and the left humerus was noted to be perforated. Lastly, Skeletons 189 and 190 were both buried with their heads to the southeast.

No. 184. Head west, no ornaments. Bones could not be saved.	
No. 185 (Cat. No. 40170). Female, head S. S. E. ←	Current FMNH Accession 359 and Catalog Number
No. 186. Boy. Bones crushed by weight of earth. With this skeleton were five stone celts, an arrowhead, cut jaws of the fox and lynx, and some bone points.	Current FMNH Accession 359 and Catalog Number
No. 187. Old man, head southeast. No ornaments; one bone awl.	
No. 188 (Cat. No. 40171). Brachycephalic head. Head E. N. E., left humerus perforated. ←	
No. 189 (Cat. No. 40166). Head S. E. ←	Current FMNH Accession N/A and Catalog Number N/A – fragmentary skeleton
No. 190 (Cat. No. 40172). Head S. E. ←	Current FMNH Accession 359 and Catalog Number

² Only four celts recorded in FMNH catalog.

³ Despite mentioning bone points these are not in the FMNH artifact catalog; unknown number or position.

⁴ Johnson (2002) determined the age to be approximately 50+ years old.

Figure 18: Moorehead (1922) details of skeletons 182-190.

No skeletons were uncovered on September 24th, 1891; however, field notes by Dr. H.P. Cresson note changes in soil color and composition as excavations proceeded downward. Moorehead believed that the subtle difference in soil and patchiness of the depositions indicated that soil was being dumped in small patches (Moorehead 1922). The field notes described the prevalence of ashes in the west end of the mound and the position of skeletons on the gravel bed of the east end of the mound especially to the south.

Excavation continued on Mound 23 while Moorehead began the investigation on Mound 24 September 25th, 1891. Skeletons 191-196 represent those skeletons recovered from Mound 24 during this season. Large pits and/or post holes were uncovered on the north side of the west end of Mound 23 and one indicated in the center of the east end of the mound. Dr. H.P. Cresson noted the soil deposition patterns in the cross section of the mound, which showed the sod line, a layer of fine gravel, ashes, and burnt clay. On September 30th, 1891 Moorehead's team recovered eleven skeletons between 9 and 11 feet below the surface including 197, 199, 200, 204, 205, 206, 207, 208, 209, 198, and 203 (Table 3.2).

FMNH Catalog Number	Skeleton Numbers
40190	197, 199, 200, 204, 205, 206, 207, 208,209
40181	198
40191	203

Table 3.2: Skeletons uncovered 9-11 feet below the surface and the associated FMNH catalog numbers.

Near Skeleton 199 a large shell was unearthed along with two copper plates (Willoughby sketch Greber and Ruhl 1989: 25, figure 4.3). Upon the plate were impressions of leather fastened to the plate with vegetable fibers (Greber and Ruhl 1989: 25; Willoughby manuscript). Skeleton 207 had a large quantity of pierced wolf teeth around the head and copper ornaments lain on either side of the arms. Skeleton 209 was accompanied by a copper plate, two pipes (Greber and Ruhl 1989: 26, figure 6.33b and 6.35b; Willoughby illustrations), pearl beads, bear canines, bear canine ornaments with pearl insets (two) and bear teeth without pearl insets (insets empty).

Skeletons 197, 203, and 206 were shown to be significantly charred.⁵ Dorsey (1898) and Moorehead (1891, 1892) remark that charring of the remains is indicative of laying bodies upon stone hearths, directly on fires, or upon baked clay surfaces. In addition, to the eleven skeletons recovered on September 30th, two altars were found about 10 feet below the surface and each laying in the northwesterly direction. Altar 1 was located south of the center stake and measured approximately 27 inches by 22 inches and was 5.5 inches deep. Altar 2 was located 15 feet southeast of the center stake and measured 24 inches by 30 inches and was 4.5 inches deep. Northeast of the center stake a large copper celt was found and weighed nearly seventeen pounds. In addition, a large gulf shell was uncovered west of the east stake.

⁵ Dorsey (1898) and Moorehead (1892) state that the charring continued around skeleton 209.

Cat. No.	Field No.	Depth below Surface Feet
40190	197	10
	198	8.9
40187	199	10
	200	10
	203	10.9
	204	10
40185	205	10
40186	206	9.9
	207	9.9
	208	10
	209	11

Skeleton #	Field No.	Depth below surface.
197		10 Feet
"	198	8 3/4 "
"	199	10 "
"	200	10 "
"	204	10 "
"	205	10 "
"	208	10 "
"	206	9 3/4 "
"	207	9 3/4 "
"	203	10 3/4 "
"	209	11 "

Figure 19: Moorehead 1922 published data (makes the change from $\frac{3}{4}$ in the Dr. H.P. Cresson field notes to 0.9 in the published data).

Thirteen skeletons were found upon the ground floor of Mound 23 (skeletons 210-222). Skeleton 213 was found upon the south side of the baseline with several objects near it including one bone bead, pearl beads, copper ear buttons with one in each ear and in each hand; textile still attached to one (Willoughby manuscript, Greber and Ruhl 1989: 26, figure 5.16d), two bear teeth (uncut), one bear tooth cut, one bear tooth cut into several pieces, bear fragment (end), and one copper plate (Greber and Ruhl 1989: 26).

Hair impressions were noted on the opposite side of the copper plate.⁶ At the head of this skeleton was located a set of teeth from the cut upper jaw of a human. A necklace of pearl beads 1/16 inches were found still laced upon a string of vegetable fiber.

Moorehead's notes indicate that Skeleton 213 was covered in approximately 8 feet 8 inches of clay and gravel and, therefore, removed from the ground floor in fragments. A shell cup was recovered approximately at a depth of 8.75 feet and 4 feet 6 inches east of the center stake.

On October 2nd, 1891 five skeletons were discovered in fragmentary condition and charred. Near skeleton 219 Moorehead's team uncovered a pipe⁷ and one ear bob near the right hand. Skeleton 224 was accompanied by a fragment of a pipe. Artifacts were recovered with skeleton 226 particularly two copper ear ornaments and one button covered with copper (broken). Prior to damage by a series of rainy days Moorehead's team uncovered two skeletons (228 and 229) from the baseline. During the final days of excavation the remaining seven skeletons were uncovered on the ground floor. Four (230-233) were recovered on October 8th, 1891. A shell cup was recovered on the east side of skeleton 231 and was destroyed by a cave in of the trench walls; however, the fragments were saved. Skeleton 233 was noted to have two perforated humeri. On October 9th, 1891 three skeletons (233-236) were recovered in the portion of Mound 23.

Mound 23 Plan Maps

Maps contain information retained by no other written sources. Data utilized in this study are recently revived plan maps from the original Moorehead 1891-92

⁶⁶ Willoughby's manuscript suggests this to be buffalo hair, but Greber and Ruhl (1989) believe it more likely to be bear (Greber and Ruhl 1989: 27, note 18).

⁷ This pipe is noted to have been given to Mr. and Mrs. Hopewell in Dorsey (1898) manuscript.

excavations. Moorehead's excavations were the most extensive excavations of Mound 23 and provide a good case study for the integration of historic maps into GIS. Previous publications have contained versions of these Moorehead maps (Case and Carr 2005; Greber and Ruhl 1989; Moorehead 1922); however, they are derivatives of the original maps and, to my knowledge, have not previously been digitized and georeferenced into mapping software. GIS breathes new life into historical maps by freeing them from the static confines of their original print form. Allowing researchers to manipulate coloring of layers and shapefiles as well as query specific data, GIS can provide new interpretation to old data simply by visualizing it in a new way. Information that was difficult to perceive in the map is now available for investigation such as elevation data, distance, area, orientation, and these data can be integrated with other data sources to acquire additional knowledge.

Maps of the excavations by Moorehead remained unpublished for more than 20 years. In addition, there are substantial differences between the original maps/notes and Moorehead's publication from corrections to previous numbering errors to errors in excavation dates. There are two maps used in this investigation. First, the initial plan map documents the artifacts and burials discovered approximately 3 feet 3 inches below the surface. During the excavations of September 22, 1891 to September 23, 1891, Moorehead recovered seven skeletons numbered 182 to 190. This map, drawn by Dr. H.P. Cresson, notes changing soil colors and types and information such as burial position and head direction. This map also includes soil patterns, various depths, and distances to the center stake utilized in the initial investigation. Many of the skeletons recovered from this layer were not saved and contained few artifacts. Dr. H.P. Cresson's

map exceeds expectations of the period by including information concerning soil types, depths, and burial positions. Moorehead (1922) did not include this map in his subsequent publications.

The second map used in this study has been represented more extensively in the academic literature. This map reflects a depth of 10 feet below the mound surface (6.75 feet between deposits in map one and map two) and details burials numbered 197 through 236, burial positions, artifacts, soil patterns, and soil types. Initial observations of the map reveal patterns similarly observed in Mound 25, a strong central burial distribution and vacant ceremonial plazas on either side. In the intervening decades the map has not changed since the Moorehead (1922) publication in which burials numbers are miss labeled and several burial features ignored (Figure 20).

Methods for integrating data from multiple sources

In 2013 Dr. Jarrod Burks conducted magnetometry⁸ on the main terrace of the Hopewell Mound Group at the request of the National Park Service. This data is currently owned by the National Park Service and was made available by the Midwest Archeological Center (MWAC). This data revealed the location of Mound 23 including other pertinent features such as a portion of the D-shaped enclosure and circular feature in the southern portion of the large enclosure. This data was used to georeference the Mound 23 plan maps and provide a foundation for later data integration. It was from these maps that mound features, burials, and artifacts were digitized and joined with the artifact catalogs.

⁸ Magnetometry data acquired from NPS Hopewell Culture National Historic Park staff in June 2016.

Archival Data and Data Integration

Data were gathered from a variety of sources made available by the Ohio Hopewell digital archive. “Site maps” regarding Mound 23 were downloaded from the archive and converted into a .tif format. These maps were then imported into *ArcMap 10.4.1* for georeferencing. One limitation revealed in the process of georeferencing was the lack of coordinate system and recognizable features in the data aside from a hypothesized outline of the mound. When using control points estimated from the outline of the mound in the magnetometry data, the map warped thus rendering the measurements indicated on the map obsolete. Because of the lack of coordinate information, control points were found to be inapplicable in the traditional context of direct georeferencing. Therefore, an adapted method of control points and scale and shift transformations was employed to estimate the location of mound without warping the original map. The maps were observed to correspond with the length identified mound, but the drawn width of 100 feet did not correspond to the identified mound. The location of the mound is ultimately a hypothesis; however, the subsequent observations based on the hypothesized location are still relevant and valid.

Next, each feature of the two maps was digitized including soil types, artifact distributions and burials. First using only the maps, each burial and feature was labelled and then compared to the field notes, artifact log, and publication data. The burials were digitized as rectangular features. A shapefile was created to mark the location of the artifacts within burials. When exact position could not be acquired then the centroid method was employed. Artifact data was compiled into an *Excel* database classified into the following categories: mound, burial, depth, description, count, artifact class, type,

material, weight, length, height, accession number, excavation date, excavator, current location, photo number, and references. This .csv file was joined to the artifact and burial data allowing for visual analysis of artifact distribution (the joined shapefile was exported in order to save the changes to data before analysis).

Discrepancies in skeletal numbering

In Moorehead's (1922: 99) published report he mentions corrections to the Mound 23 plan map (Map 2); specifically, "numbers 231 and 232 on the south side should be 201 and 202; 229 on the west side should be 219, and 226 on the north should be 226A." Case and Carr (2005) stated that the map does not have a skeleton labeled Burial 236 despite mention of such in Moorehead (1922:99) and in his field notes (October 9, 1891: 19) and subsequently labeled a previously "unlabeled" skeleton to be 236. However, after closer examination of the original field maps it has become apparent that these "corrections" are, in part, incorrect. On the ground plan map skeleton 236 is labeled clearly on the north side of the mound near 225, 234, and 235 (Figure 20). According to Moorehead (1922) this burial is labeled 226 and then relabeled 226/A (Case and Carr 2005; Moorehead 1922; Moorehead 1891:208; Figure 21). Case and Carr (2005: Appendix 7.2) also noted this possibility. Skeleton 236 was not located in the FMNH records (Johnston 2002:184; Case and Carr 2005: Appendix 7.2).

In the original plan map of deposits 10 feet below the mound surface (Figure 17) skeletal numbers 231 and 232 in the southern portion of the mound were changed to 201 and 202. According to Moorehead (1922) these were mislabeled in the original maps and correspond to the only two cremated inhumations recovered from Mound 23, skeletons 201 and 202. This is a valid change for two reasons: First, three skeletons are found in

close proximity to one another in the northern portion of the mound and are labeled 230-232. Second, skeletons 201 and 202 are described in a pair within the field notes and, therefore, this new positioning readily supports that interpretation.

The last correction indicated by Moorehead (1922:99) in which he attempts to correct skeletal numbering errors on the plan maps of Mound 23 are in relation to skeleton 219. Skeleton 219 was recovered with an associated platform pipe. In the original map (Figure 17) the pipe is drawn in next to the skeleton labeled as 219 (Figure 22). However, Moorehead suggested that this burial was meant to be 229 (not recovered with evidence of a platform pipe). Due to the presence of the platform pipe in the plan map, I chose to disregard Moorehead's correction as it did not correspond with the available evidence.

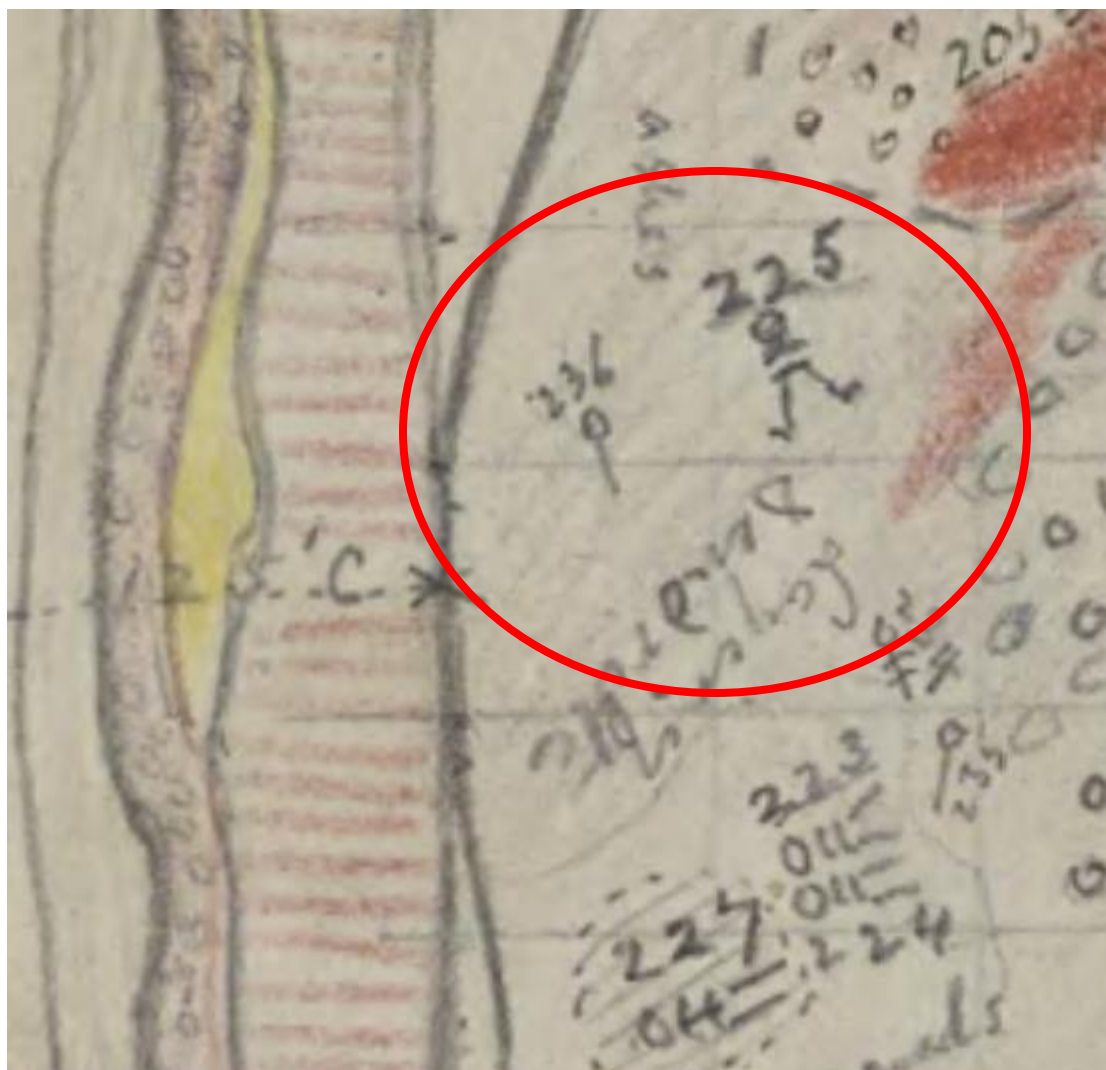
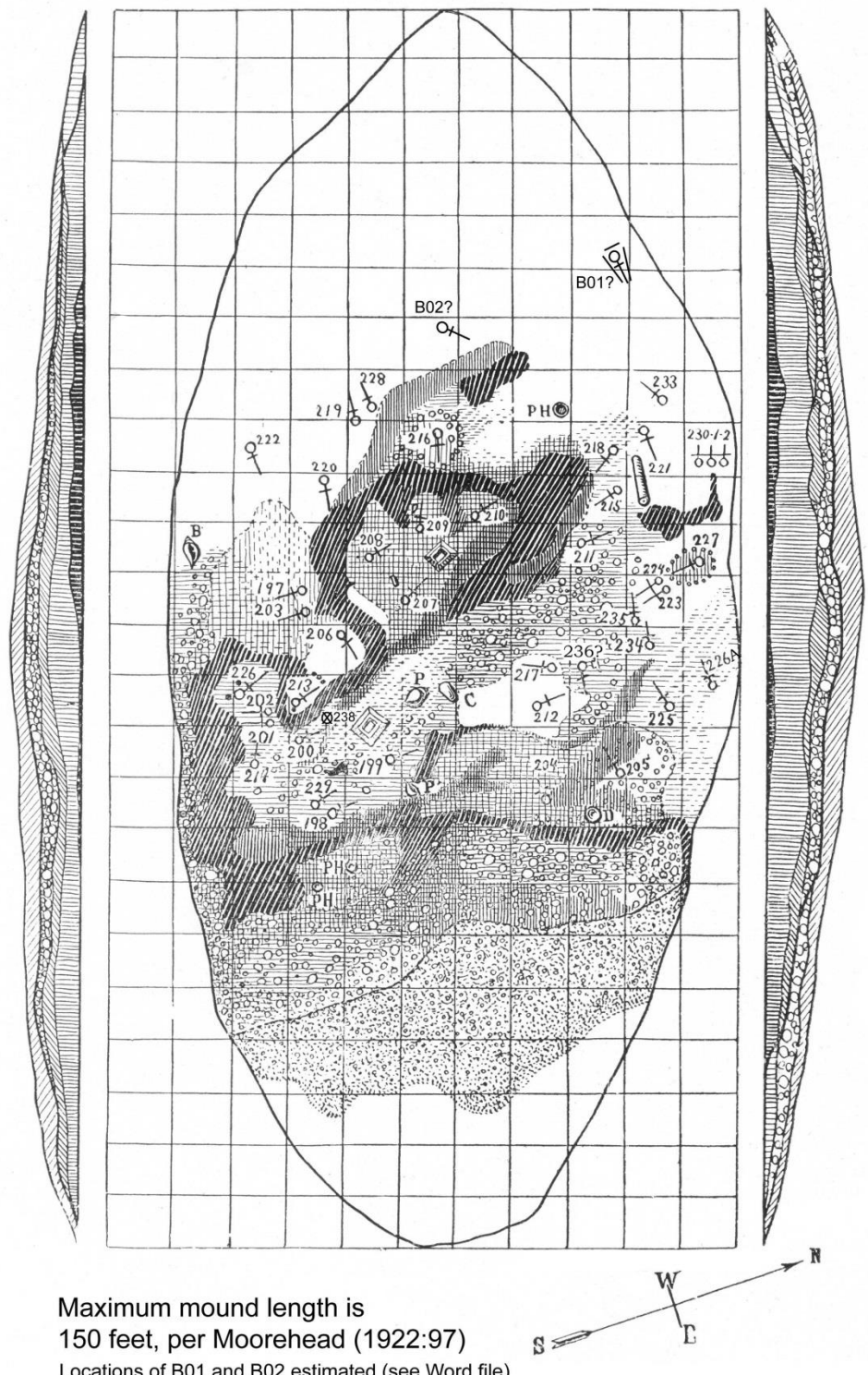


Figure 20: Dr. H.P. Cresson's plan map of Mound 23 approximately 10 feet below the surface clearly shows skeleton 236 in the northern portion of the mound.

Hopewell Mound 23



Maximum mound length is
150 feet, per Moorehead (1922:97)
Locations of B01 and B02 estimated (see Word file)

Figure 21: Case and Carr's (2005) publication of Mound 23 based on the Moorehead (1922) published map. Case and Carr (2005) made corrections to the original map based

upon Moorehead's corrections in his 1922 publication. This included changes to the numbering scheme such as skeleton 236 to 226A and changing numbering between cremations 201 and 202. In addition, they included the location of two burials uncovered by Shetrone and Mills (1926) as recorded by R. Zinser (1926).



Figure 22: Skeleton 219 on the ground plan map of Mound 23.

Spatial Analysis

The original intention of this study was to perform a cluster analysis to understand the spatial distribution of artifact classes and determine burial clusters. However, through the process of integrating and georeferencing it became apparent that traditional spatial cluster analysis would not be applicable. Without precise locations of materials within the site and a larger dataset, cluster analyses would not provide reliable statistical results. Point density analyses can still provide a deeper spatial understanding of artifact distribution. Despite the limitations of analyses some preliminary statistics can still be carried out.

Georeferenced Mound 23 Map 1 at 3.25 feet Below the Mound Surface

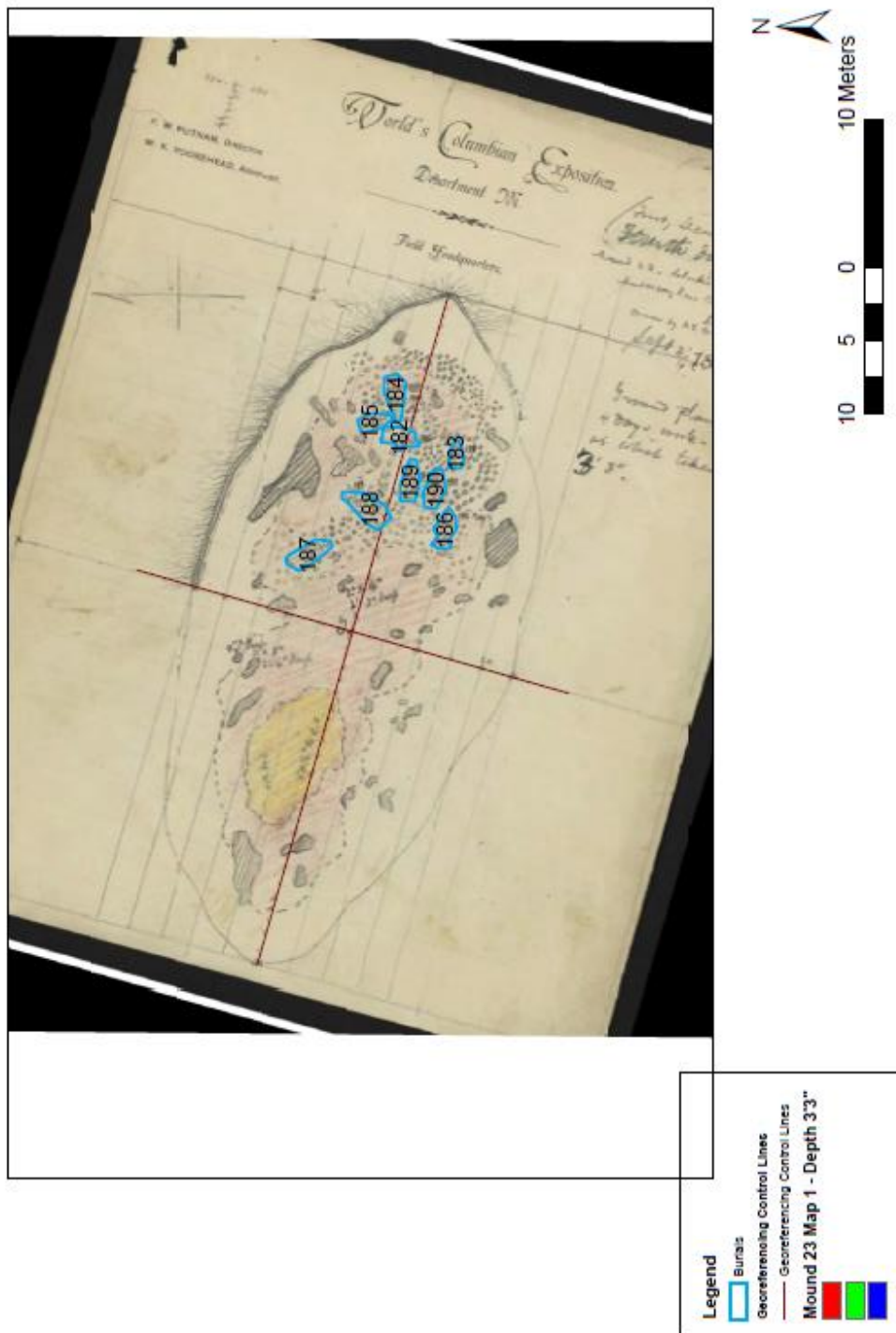


Figure 23: Georeferenced plan map one, approximately 3.25 feet below the mound surface of Hopewell Mound Group’s Mound 23.

Georeferenced Map of All Mound 23 Burials and Artifacts

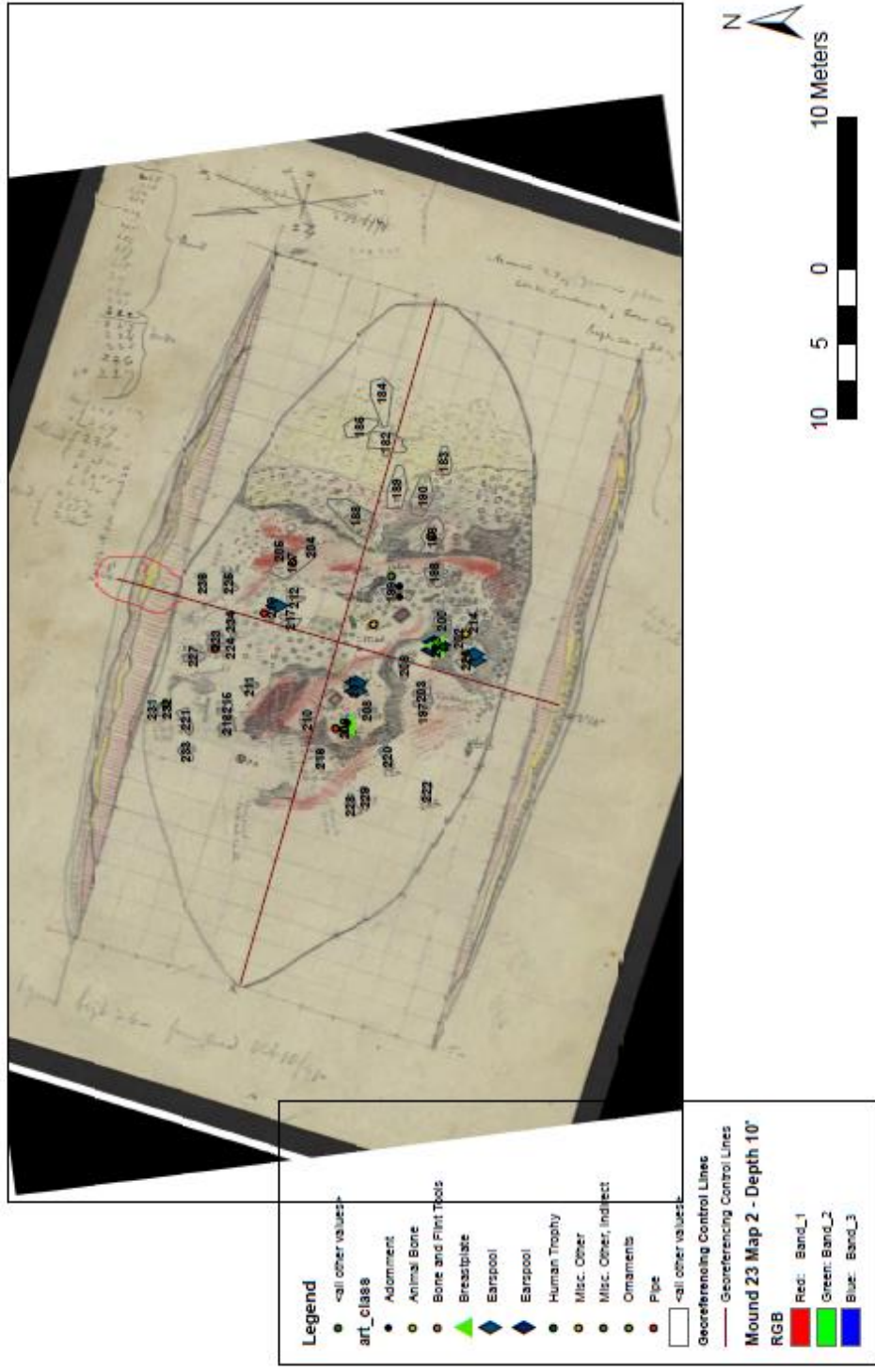


Figure 24: Georeferenced plan map two, approximately 10 feet below the mound surface of Hopewell Mound Group’s Mound 23.

CHAPTER 4

The mortuary contexts of Mound 23 have not been subjected to systematic examination of the material artifacts and burials in order to identify intramound burial patterns. Investigations by Greber (1976, 1979), Greber and Ruhl (1989) and Carr and Case (2005, 2008) of the Hopewell site as a mortuary complex have explored the similarities and differences between the large deposits of Hopewell Mound Group Mound 25 to other large mound sites such as Ater Mounds and Turner Mounds in order to discern regional ceremonial and social patterning evident in the archaeological record. Due to the emphasis on examining intersite patterns of burials and artifact distributions by the study of the largest mound deposits, little work has been done to understand the relationship of smaller burial mounds and their populations.

This thesis attempts to fill this gap in knowledge by re-examining the Mound 23 deposits at a microscale particularly between the burial deposits within Mound 23 investigating differences in burial preparation as well as associated goods. This will include a discussion of the major burial deposits in Mound 23, patterns of distribution, the distributions of known sexes and ages within the burials, and potential burial clusters based on the visual analysis of the legacy maps georeferenced into *ArcMap 10.4.1*. In order to assess the utility of the Mound 23 data created in this thesis in relation to the contemporary mortuary research at Hopewell Mound Group, the artifacts and burial distributions of mounds 23 and 25 will also be compared to identify the presence of prestige materials outlined as indicators of social status by Carr and Case (2005). Further, Carr and Case (2005: 242-243, Table 6.1) provide a framework that can be applied to discuss the social rank of individuals interred in Mound 23 mortuary contexts. These

criteria will be systematically applied to the Mound 23 databases created in this thesis. They will then be compared to the prior interpretations by Carr and Case (2005) and Greber and Ruhl (1989) for Mound 25.

Mound 23 Results

Of the 49 burials excavated from Mound 23 by Moorehead and his team, 38 were identified as extended burials and the remaining two as cremations (skeletons 201 and 202) paired in the far south eastern portion of the mound (Figure 23). Despite the large population of burials within the mound only 10 burials contained associated artifacts and, of those, five contained more than one artifact and possessed artifacts from which determinations of social status could be made.

40% (n=10) of the burials with associated artifact have sex and age determinations and of those sexed burials approximately 75% buried with artifacts are male. Determinations of sex and age were compiled from the HOPEBIARCH database (Case and Carr 2005: Appendix 6.1) which integrated data from previous studies conducted by Johnston (2002), Mills (2003), and Pickering (1987). These were then incorporated with the pre-existing legacy data in which Moorehead and his crew made preliminary determinations of sex (Dorsey 1892). Three designations were made concerning age which include AA (assumed adult), adult, and a specific date range such as 13-20 or 30-59 based upon the Carr and Case's (2005) HOPEBIOARCH database. Determinations of age were estimated for 37 burials are as follows:

Burial	Age (yrs.)
205	21-35
236	30-59
234	40-50
226	50+

187	50+
227	50+
186	13-20
228	20-30

- **AA:** 211, 210, 219, 217, 212, 216, 229, 209, 208, 207, 220, 213, 222, 214, 223, 224, 218, 221, 215, 230, 231, 232
- **Adult:** 233, 235, 225, 206, 197, 203, 199

Table 4.1: Age estimates of the burial population in Mound 23 of Hopewell Mound Group compiled from the HOPEBIOARCH database (Carr and Case 2005: Appendix 6.1).

The burials in Mound 23 reflect a large age distribution, which could be indicative of a ranked society or hereditary status as individuals such as skeleton 186 would have been unlikely to gain ascribed status as a young man (Carr and Case 2005: 241-247). However, the population is heavily skewed towards adult burials with one potential adolescent male, skeleton 186, represented in the first burial deposit and no known adolescents represented in the ground plan burials. A visual analysis of the plan maps (Figures 16 and 17) shows a concentration of burials in the later deposits approximately 3.25 feet below the mound surface in the eastern portion of the mound for later deposits of skeletons 182 through 190 (nine total skeletons at a depth of 3.25 feet).

The second map showing burial deposits approximately 10 feet below the mound surface (Figure 17) reveal a denser population of 40 individuals laid upon the proposed ground floor of the mound. The largest concentration of burials was in the southern portion of the mound, with the most artefactual rich deposits being associated with skeletons 209 and 213. Each burial lies in close proximity to altars one and two (Figure

17). Both burials contain breastplates which may indicate similar levels of status in addition to their placement in the mound near altars.

Overall, Mound 23 contains significantly fewer artifacts and burial deposits than Mound 25 (Carr and Case 2005). Of the 49 recovered burials 10 include associated burial deposits. Of these 10 only 5 contain deposits of more than one artifact.

Burial	Sex	Age	Number of Artifacts	Depth (ft.)
186	M	13-20	25	3.25
187	M	50+	1	3.25
199	F	Adult	3	10
201	NA (Cremation)	(Cremation)	1	10
207	NA	Assumed Adult*	526	9.75
209	NA	Assumed Adult	570	11
213	NA	Assumed Adult	206	10
226	Male	50+	2	10
219	NA	Assumed Adult	2	10
224	NA	Assumed Adult	1	10

Table 4.2: Descriptive traits of burials that contain burial deposits in Mound 23.

Skeleton 186 contained the only deposit of bone and flint tools with stone celts, bone points, flint projectile points, bladelets, and animal bones (cut jaws of lynx and fox) totaling to 25 items. Though not a large deposit, skeleton 199 was recovered with two breastplates and an associated worked large ocean shell. A pair of copper earspools and a large necklace of wolf and fox canines were found in association with skeleton 207. Skeleton 207 is outlined in the plan map with double hash marks which could indicate funerary furniture in a circular outline. This is not addressed in the field notes from the excavation and excluded in the published plan map of the mound by Moorehead (1922) and Case and Carr (2005). This is also the case for skeleton 209, which also shows a double hash marks outline of the burial in the ground plan map. Skeleton 209 was

uncovered with two platform pipes, a pearl necklace, large bear canine ornaments (some pearl inset), and one copper breastplate. Lastly, skeleton 213 is the largest deposit of Mound 23 containing two pairs of earspools, two breastplates, human trophy jaw, a pearl necklace, and beads.

The ground plan map of Mound 23 revealed several features that were not readily visible on previously published maps nor indicated in the field notes by Warren K. Moorehead. Five potential instances of funerary furniture preparation were identified with the following burials (see Figures 24-27):

- 213, 209, 207, 216, 227



Figures 24 and 25: Potential evidence for funerary furniture in deposits around skeletons 213, 207, and 209 pictured here in the plan map approximately 10 feet below the surface.



Figures 27 and 28: Potential evidence for funerary furniture in deposits around skeletons 227 and 216 pictured here in the plan map approximately 10 feet below the surface.

Skeleton 213 deposits are readily observed in the field notes, archival manuscripts, publications and artifacts catalog. However, when examining Moorehead's 1922 published map⁹ details of the grave construction are lost. The plan maps indicate a log lined tomb within close proximity of altar one. In addition, 207 and 209 could be assumed to have circular deposits outlining their tombs. Dr. H.P. Cresson's map indicates the potential tomb outline with hashed marks around each skeleton; however, this is not noted in the field notes or subsequent publications. Therefore, by re-examining the plan map we gain level of clarity about burial preparation. Both burials are extremely close to one another and were recovered at approximately the same depth. This observation is consistent with previous studies which have recorded the presence of funerary furniture in Hopewell burials, specifically log-lined crypts and gravel lined tombs (Lynott 2015; Berle Clay 1998: 5).

Sex differences in Mound 23 burial population

14 burials within the overall cemetery population of Mound 23 were sexed using the HOPEBIOARCH database and, of these, the male to female ratio is 1:1. The HOPEBIOARCH determinations of sex are of varying precision were compiled from several skeletal studies (Johnston 2002; Mills 2003; Pickering 1987). Therefore, the sex distributions are subject to change as archaeological investigations utilize more precise measures of sex such as DNA analyses.

⁹ This is the map Carr and Case (2005) use in their preliminary examination of Mound 23 (Figure 21).

The equal distribution of males to females in this small sample is in contrast to the other Ohio Hopewell burial populations observed in previous studies including Mound 25. Mound 25 presents a burial population with a male to female ratio of 12:8 (20 known, 82 unknown) (Carr and Case 2005). This could be indicative of differential prestige and status between the burial populations in Mound 25 and Mound 23 and will be further examined later in this chapter. However, the ability to make generalizations based upon this sample of burials is hindered because we do not have the representativeness of the burial population as a sample of Hopewell culture. The following skeletons were identified as female in the Mound 23 population: 229, 203, 236, 234, 205, 199, and 185. Skeletons 233, 187, 197, 186, 227, 198, and 226 were identified as male.

Females buried in Mound 25 possess no artifacts with the exception of burial 199. Skeleton 199 contained two breastplates and a large ocean shell was discovered near the skeleton. However, the sex of this burial is questionable as it is based upon Moorehead's initial field notes. Future DNA analyses should investigate the sex and age of this burial. If female, it would represent a unique burial of a female with breastplates which Case and Carr (2005) argue represent ceremonial membership.

Comparisons to previous research

Mound 25 is described as the largest Hopewell mound and the materials recovered from the excavations of the most exotic and elaborate ceremonial items in the Hopewell interaction sphere. By examining deposits from Mound 23 and 25 researchers get a more complete picture of the Hopewell population. One challenge to the interpretation of the deposits of mounds 23 and 25 is the lack of dating data that could be used to assess the relationship of the mounds through time and space. This next section

places the mortuary data compiled for Mound 23 by this thesis in the context of Hopewell mortuary investigations by discussing two previous assessments of social status in Mound 25 of Hopewell Mound Group and applying the criteria to Mound 23.

The burial populations of Mound 25 represent a potentially greater investment in human burials which would be evident in the archaeological record through increased elaboration and deposition of associated artifacts. The double Burial 260-61 in Mound 25 was accompanied by 92 breastplates and 63 celts. In addition, Burial 7 of Mound 25 was interred with 60 accompanying ear spoils. The abundance of materials portrayed with individuals from Mound 25 could indicate higher status. Future should research the ethnographic record for the potential correlates to social ritual and drama which could explain the high presence of ritual materials. Hypotheses which emphasize the importance of ritual performance versus social status in determining burial deposits in the Hopewell culture have been explored by Brown (2013) and Emerson et al. (2016).

Previous studies of Mound 25 by Greber (1976, 1979) and Greber and Ruhl (1989) were limited in their interpretations of rank and prestige due their investigation of one burial population at Hopewell Mound Group, Mound 25. Greber and Ruhl (1989) assumed that one society is represented in the mounds, specifically Mound 25 (Greber and Ruhl 1989: 56). Therefore, any interpretations are skewed towards investigating those who occupy a small section of the communities and who possessed higher status than other mounds. Greber and Ruhl (1989) are challenged by Carr and Case (2005) who posited that individuals from one local symbolic community were interred in disparate mound locations (Ruby 2005). By examining multiple mounds from Hopewell Mound

Group, a challenge begun in this thesis by comparing Mounds 25 and 23, a more complete picture of the Hopewell social system can be interpreted.

For this analysis the HOPEBIOARCH database was used to identify patterns of artifact deposits and tomb construction for Mound 25 in order to compare to Mound 23's identified features. Carr and Case (2006, 2008) created the HOPEBIOARCH database with the intention of developing the most complete record of Ohio Hopewell burial contexts. The database is the result of 13 years of archaeological and archival research. Similar to the aims of this study, Carr and Case (2005, 2008) sought to integrate the archaeological record with details from archival data sources. Carr and Case (2005, 2008) chose to organize their datasets into determinations of social roles, which they believed were reflected in the archaeological record based upon ethnographic correlates.

The database was only used for gathering Mound 25 artifact data in conjunction with descriptions from previous mortuary analyses by Greber (1976, 1979) and Greber and Ruhl (1989). The data for Mound 23 in the HOPEBIOARCH database is largely based upon the Moorehead (1922) published results. However, as indicated previously in this thesis, the publication contained errors and removed significant details from the mortuary record of Mound 23, which have since been rectified in the two databases created for this thesis. The comparison of mounds 23 and 25 are presented within the framework of assessing relative rank within burials. Carr and Case (2005) established a methodology for assessing social differentiation in a population based upon ethnographic analyses as well as materials correlates of rank to the mortuary databases of Mound 23 and Mound 25. Case and Carr (2005: 242-246) identified the following items as representative of the social differentiation in the Hopewell archaeological record:

breastplates, headplates, earspools, and celts. This was achieved by examining the frequency of which the materials appear in the archaeological record and hypothesized that headplates and celts represented leadership whereas breastplates and earspools represented ceremonial membership based upon such frequency and ethnographic research.

In contrast Greber and Ruhl (1989) identified six potential burial clusters within Mound 25 deposits based on differential burial location and treatments. In the three major deposits that contained 80% of Mound 25 burials Greber did not find evidence of social differentiation. Greber assessed this based on the presence and number of artifacts of the following categories: no artifacts, pearls, beads, misc. other, misc. copper, copper earspools, copper plaques, marine objects, bone/flint tools, large canines, and cut mica (Greber and Ruhl 1989: 53, Table 2.2). Case and Carr (2005) identified several problems with Greber's analysis of the burial populations at Mound 25. Greber's use of Mound 25 as a representative sample of the Hopewell society is problematic. Mound 25's unusual deposits of elaborate mortuary materials, rare artifacts indicating leadership such as headdresses, and dominance of male internments in the mortuary record, both indicate Mound 25 as a burial location for high status Hopewell individuals (Carr and Case 2005: 275). Additionally, Greber and Ruhl (1989) incorporate individualistic burial associated artifacts (termed by Carr and Case as "ordinary") in their analysis of rank within Mound 25 that could be considered irrelevant to the analysis (Carr and Case 2005: 275). For artifacts to be considered relevant to the assessment of ranking they must be non-utilitarian and "represent energy investments in the distant sources of their raw materials,

and are qualitative distinctions that could have symbolized a prestigious social position” (Carr and Case 2005: 275; Tainter 1975, 1978).

Differences between Mound 23 and Mound 25 are readily observable both in the plan maps and through the examinations of the burial deposits. The burials in Mound 25 are rich in grave offerings and tomb constructions with about 33% of the population containing associated burial artifacts. In addition the burial populations are shown to be disproportionately adult males. Mound 23 provides a unique counterpoint to the Mound 25 deposits because of the overall poorer grave deposits and tomb construction (Carr and Case 2005: 272). The burial population Mound 23 is less differentiated by sex. As stated in the previous paragraphs, Mound 23 contained 50% females based on a sexed sample of 14 burials.

Of the Mound 25 burial populations 75.5% (77 of 102) of the individuals are extended burials. In contrast, 95.9% (47 of 49) of the individuals in Mound 23 were inhumed with only two cremations evident in the burial population. 40.3% (31 of 77) of the inhumations in Mound 25 had a cooper headplate, breastplate, celt, or earspool while only 28% of those cremated (7 of 25) had one or more of these items (Carr and Case 2005: 279). Mound 25 presents a burial population with a male to female ratio of 12:8 (20 known, 82 unknown) and all women were found associated artifacts. For example, Burial 07 was a female uncovered by Shetrone and Mills in 1925 with 60 earspools, pearl beads, 60 copper buttons, four copper bracelets, and two hair pins (Shetrone 1926: 65-66; Carr and Case 2005: Appendix 6.1). In contrast to the vast deposits presented in Mound 25, of the 49 internments of Mound 23 only 7 skeletons contained associated artifacts available for analysis. Three skeletons (199, 209, 213) with breastplates on or near the

chest and a total of 9 earspools were uncovered from the burial deposits of skeletons 207 (2), 219 (1), 226 (2), and 213 (4). Large amounts of pearl beads (191 and 506) were found in association with skeletons 209 and 213 (the two largest deposits).

APPENDIX 7.1										
AGE AND SEX DISTRIBUTION OF BURIALS UNDER THREE SCIOTO HOPEWELL MOUNDS										
Site and Mound	Child (0-12)	Adolescent (13-20)	Young Adult (21-35)	Middle Adult (36-49)	Old Adult (50+)	Adult Unknown	Assumed Adult ^a	Male or Male?	Female or Female?	Expectable Age or Sex Distribution*
Hopewell Mound 25	2	0	4	12	3	24	41	15	8	

^aSkeleton is assumed to be an adult because the field report or publications do not indicate that the skeleton is a child. Children and very old adults received extra attention and description in the field, generally, while the common adult did not.

Table 4.3: Age and sex distributions of Hopewell Mound Group Mound 25. Excerpt from Carr and Case (2005) *Appendix 7.2*.

Carr and Case (2005: Table 5.5) postulated that headplates and celts represent non-shaman-like and shaman-like public ceremonial leadership. No headplates were found in association with the individuals buried in Mound 23 whereas 10 (10 of 106 in HOPEBIOARCH) individuals were uncovered with headplates in the Mound 25 deposits. The most significant deposit of breastplates was found in Burial 260-61 by Moorehead and contained 92 breastplates with 63 celts and 60 copper earspools. According to Carr and Case (2005: 280-281) headplates symbolize vertical social differentiation based on the energy required to accumulate raw copper materials and craft the plaques. Copper breastplates represent a social role within the Hopewell society particularly leadership based on the rarity of the item in the Hopewell archaeological record. Therefore, the lack of headplates could be indicative of individuals, though likely of increased social status based upon burial in mounds, did not possess roles of leadership in the community. Headplates in Mound 25 occur in 2.6% of the burial population, consistent with the

expected range of leaders in a community burial population (Carr and Case 2005: 282). Mound 25's increased number of headplates within the burial is consistent with the assumption that the mound was the preferred burial place of elites. Headplates were exclusively found with older adult males (Carr and Case 2005: 282; Greber and Ruhl 1989).

Stone celts were recovered from burial, skeleton 186, approximately 3.25 feet from the Mound 23 surface. This group of burials, nine skeletal remains in total, are spatially distinct from the other burial population with 6.75 feet in between the burial episodes. The presence of celts with this skeleton is intriguing because, though recovered with stone celts, it is unlikely he achieved this status potentially associated with the celts as an adolescent.¹⁰ This could be indicative of a shift in achieved status to ascribed status in the archaeological record; however this interpretation is limited by the lack of chronology in between the Mound 23 deposits beyond "earlier and later." The burial also includes distributions of other bone and flint tools. This may be indicative of personal skill in hunting or tool gathering rather than a social role indicating ceremonial leadership. Copper celts were more indicative of social leadership in Mound 25 and were not directly comparable to the stone celts conclusion made above; therefore, they were excluded from this analysis.

Breastplates were discovered with three burials in Mound 23 including two of the largest deposits 209 and 213 that were determined to be males interred in prepared tombs with large quantities of personal adornment items such as pearl necklaces. Skeleton 199, a female burial, was discovered with two breastplates. Two female burials in Mound 25,

¹⁰ It is estimated he was between 13 and 20 years old by Johnson (2002).

burials 07 and 12, were also found in association with breastplates. Though overall, the presence of breastplates in mortuary deposits is strongly skewed towards men in both burials with 96% (123 of 128) found with males. Carr and Case (2005) determined that breastplates may reflect sodality membership particularly membership of ceremonial societies (Carr and Case 2005: 284). Similarly earspools reflect similar membership and achievement in ceremonial societies. Earspools, however, are much more common in the archaeological record of both sites, which may indicate earspools being used as signals of achievement within and across sodalities (Carr and Case 2005: 285). Mound 25 contained 124 individual earspools almost exclusively with adults and in association with other burial artifacts. Mound 23 contained significantly fewer earspools in association with skeletons 207, 213, 219, and 226.

Conclusions

Based upon the type and distribution of artifacts indicated above it is unlikely that Mound 23 and 25 represent instances of social differentiation. Carr and Case (2005: 242-243, Table 6.1) outline the process for assessing of the potential for social ranking represented in the mortuary contexts. First, the sample of burials should be a representative cross-section of the community. It is apparent that Mounds 23 and 25 are skewed towards deposits of higher status individuals based on the quality and quantity of artifacts recovered with burials; however, by positioning these deposits against one another they represent a larger burial sample, which could also represent different segments of society. Second, a suite of mortuary traits were selected which indicate vertical differential and then further distinguish among those that indicate achieved prestige, ranking, leadership, or personal rank. For traits to represent ranking they should

be represented in burials of persons of all ages and sexes. The materials chosen for this analysis were contained in both burial populations. Despite consistency between the presences of traits within the mounds, with the available demographic information, it is uncertain whether the traits are evenly distributed between ages and sexes.

Further DNA and skeletal analyses should be conducted to provide more clarity to the burial sample both in age and sex determination as well as examining indicators of health that could elucidate details about the roles of individuals in the Hopewell community. Overall, Mound 25 represents a distinctive increase in ritual than Mound 23 based upon the frequency and quantity of ceremonial artifacts recovered in the burials. This could indicate different social roles implicit in the mortuary deposits which assume contemporaneity of the mounds. The evidence that I examined suggests that the burial populations of Mound 23 and 25 may represent complimentary groups of leaders. This interpretation is consistent with previous hypotheses by Carr and Case (2005) and Greber and Ruhl (1989) concerning the relatedness of Mound 23 and 25 burial populations. However, the burials represented in Mound 25, by the quantity and quality of artifacts recovered from the burial deposits, could indicate increased leadership prestige and status. Mound 23 individuals, though high status members of their ceremonial communities, reflected by the presence of prestige artifacts such as breastplates and earspools, represent a socially distinct group from Mound 25. Or it is possible that the mounds convey two ritually exclusive episodes in which social and ritual dramas were enacted as hypothesized by Brown (2013) and Emerson et al. (2016). As stated previously, more ethnographic research needs to be done in order to assess this possibility.

This analysis assumes concurrent use of Mound 23 and 25. The most recent radiocarbon dates of wood from Burial 260 on the floor of Mound 25 by Greber (2003: 102-103) calibrate to the date range of 40BC to AD 70 and another from altar 1 of Mound 25 calibrate to AD 245 to AD 398 (Carr and Case 2005: 306). These radiocarbon dates suggest that Mound 25 of Hopewell Mound Group was contemporaneous with other Hopewell sites such as Seip-Pricer and Edwin Harness and perhaps construction on the mound begun even before Seip-Pricer, Edwin Harness, and Seip-Conjoined mounds (Greber 2003; Carr and Case 2005: 306-307). Future study should collect radiocarbon samples from Mound 23 deposits, if possible, to compare to the dates represented by the samples from the floor of Mound 25. If Mound 23 proved to not be contemporaneous with Mound 25, explanations of the relationship between Mound 23 and 25 reflected in the artifact deposits could be further theorized to reflect the overall progression of mortuary ritual in the Scioto Hopewell region.

CHAPTER 5

The research presented here is an attempt to better understand the history of data in the field of archaeology and the ways that technology is changing archaeological practice. The creation of large digital databases from legacy collections is time consuming and poses problems for researchers looking to carry out comparative analyses to discern broad patterns across sites. Archaeological sites, such as Hopewell earthworks, have undergone several phases of historic excavations that generated numerous archival and artifact datasets. This thesis posed a framework for approaching such integration efforts and provided a commentary on the various challenges such as georeferencing historical maps, reconciling unpublished manuscripts with publications, and comparing museum artifact catalog records with field notes of the original excavations. In many cases artifacts from historic excavations are not saved, misplaced, or miscataloged in their museum lives. By examining the original field notes, many gaps that would otherwise be left out of the archaeological record can be filled. In the case of this thesis, several unsaved burials, indirectly associated artifacts, and grave descriptions could be resituated into their relative archaeological proveniences.

The Ohio Hopewell episode was characterized by the systematic construction of earthworks, both burial and geometric, within the Central Ohio Valley between 100 BCE and 400 CE (Byers 2004: 2; Lynott 2015). The research on the Hopewell Mound Group has been hindered by lack of visibility of relevant archival materials housed in museum institutions and the lack of synthesis and cohesion between multiple phases of archaeological investigation conducted at the site during three major investigations. Publications such as Greber (1976, 1979), Greber and Ruhl (1989), and Carr and Case

(2005, 2008) have attempted to reconcile these disparate datasets to answer their own research questions regarding interregional Hopewell social, political, and economic structure implicit in mortuary contexts. Despite their goals to create a synthetic database for the analysis of mortuary remains at Hopewell sites, these databases are largely influenced by the goals of interregional investigation and emphasize the deposits and investigations into the largest Hopewell ceremonial deposits such as Ater Mound, Turner Mound, Seip Mound, Edwin Harness Mound, and Hopewell Mound 25 (Greber 1976, 1979; Carr and Case 200, 2008).

Comparisons within the Hopewell Mound Group contribute to the academic conversation within mortuary analysis and Hopewell social theory. All referenced comparative studies, particularly Greber and Ruhl (1989) and Carr and Case (2005, 2008) identified the need for comparative studies of mortuary materials between mounds of earthworks sites, specifically between Mound 23 and 25. These mounds provide a natural point of comparison due to their similarities in size, as large loaf-shaped mounds. The databases expanded upon Carr and Case's (2005) HOPEBIOARCH database by using the original plan maps and manuscripts as the starting point of the investigation and comparing inconsistencies between the Moorehead (1922) publications of the site.

Examining the history of excavation and the resulting documents and publications presents an opportunity to understand intrasite social dynamics implicit in mortuary deposits such as those within Hopewell Mound Group. This analysis was facilitated by the *Ohio Hopewell* digital archive and presents a pilot study in the aggregation and integration of legacy datasets into a GIS for analysis. The integration of this data, which included two plan maps that recorded burial deposits and features at different elevations

(3.25 and 10 feet respectively) revealed new details concerning the numbering of burials and revealed patterns of deposition. The database exposed inconsistencies in the number and distribution of artifacts between the publications by Moorehead (1922) and the original field notes. The two databases for artifacts and burials detail all materials and features recorded during Moorehead's 1891 investigations and the associated artifacts, which included artifact class, count, depth, dimensions, accession numbers, and source materials. Each burial deposit was reconstructed to provide an accurate comparative sample for all the Mound 23 materials. Overall, the deposits of mound are artifact poor with only 10 of 49 burials containing artifacts. The analysis of these materials revealed two larger burials – 213 and 209 – which included breastplates, earspools, and necklaces. The plan maps revealed previously unseen grave preparation around each burial. This could indicate higher levels of social status implicit in their burial treatment.

Aggregation of the smaller Hopewell mounds has not been achieved on this fine scale level in previous research (Greber and Ruhl 1989; Carr and Case 2005). Until the construction of this database there was no comparative analysis conducted between the large Mound 25 and any of the smaller mounds of Hopewell Mound Group, including Mound 23. Using these databases as a foundation, this study intended to gain a better understanding of the social roles of individual Hopewell people buried in the two mortuary contexts within the same site.

Carr and Case (2005) propose a methodology and list of traits from which to assess the social roles of Hopewell individuals based on ethnographic and quantitative studies of intersite Hopewell burials. This provided a point of comparison for assessing the burial deposits between Mound 25 and Mound 23. The analysis revealed a potential

increase in the prevalence of high status individuals within the Mound 25 burials. Within Mound 23, two individuals, 209 and 213, demonstrated potential sodality membership and achieved status within those sodalities by the presence of earspools. Another noticeable difference between the Mound 23 and 25 deposits are the gender ratios in the burials deposits. Of the sexed burials in Mound 23, the male to female ratios are equal whereas Mound 25 reveals a male dominated burial population. This indicates that the burial populations of Mound 25 along with an increase in the quality and quantity of burial deposits that the individuals buried within Mound 25 occupy positions of higher prestige or status typically held by males than those in Mound 23. This study presented limited population sample of individuals of high social status and/prestige and the incomplete skeletal data were unable to identify burial traits that would indicate social further assessments of social status.

Although an effective case study, generating two digital databases of materials from Mound 23, this study was hampered in its exploratory power by the lack of temporal clarity both within Mound 23 and between Mound 25. Future analyses should try to improve the dating of Hopewell Mound Group features to construct a chronology of construction. In addition, artifact analyses of copper and the application of seriations such as Ruhl (1983) copper earspool study could further contextualize Mound 23 within the larger Hopewell ceremonial center construction. In addition, artifact analyses of the materials at the Field Museum Natural History on the deposits related to the identified sodality member burials, 209 and 213 as well as the other skeletons containing artifacts may also reveal more details regarding the composition and energy expenditure necessary for burial construction.

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