CULTURALLY MODIFIED HUMAN REMAINS
FROM THE HOPEWELL MOUND GROUP

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
The Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

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ABSTRACT

Culturally modified human remains from Hopewell contexts, often referred to as “trophy skulls,” include skulls, crania, jaws and other skeletal elements that have been drilled, ground, incised or shaped and deposited as funerary objects. Researchers seeking an understanding of the role of these culturally modified human remains in Hopewell ideology focused on the ages and sexes of those individuals from whom the modified bones were derived. Recent debates regarding the accuracy with which age and sex can be estimated from human skeletal remains have led to a better understanding of the limitations of commonly used methods and suggestions for improving accuracy.

All available skeletons recovered from the Hopewell Mound Group (33RO27) were examined and described. Eleven methods were used to produce age estimates from which a best estimate was calculated using principal components analysis. Sex estimates were based on seven pelvic and three cranial indicators of sex as well as seriation of cranial robusticity, diameters of humeral and femoral heads, and discriminant functions calculated using dental metrics.

Three hypotheses regarding the role of culturally modified human remains in Hopewell culture were tested using age and sex data: trophies of war, revered ancestors, and memento mori/objects for ritual use. The hypotheses that Hopewellian culturally modified human remains represent trophies of war or memento mori/objects for ritual use
are tentatively rejected. Regardless of the purpose culturally modified human remains served in Hopewellian mortuary behavior, adults of either sex were used as donors of raw material or as posthumous recipients of culturally modified human remains. Future researchers should consider the possibility that multiple stimuli led to the production, use, and deposition of Hopewellian culturally modified human remains.
Dedicated to my family

and to the memory of

Dr. Richard O. Pfau
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Literally hundreds of people have contributed to this work, some of them while alive, some after death. It is with great emotion that I thank them all.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td>iv</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>v</td>
</tr>
<tr>
<td>Vita</td>
<td>viii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>xii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>xvi</td>
</tr>
<tr>
<td><strong>Chapters:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.1 The “Trophy Taking” or “Victory Token” Hypothesis</td>
<td>9</td>
</tr>
<tr>
<td>1.2 The “Revered Ancestor” Hypothesis</td>
<td>9</td>
</tr>
<tr>
<td>1.3 The “Memento Mori” and “Ritual Objects” Hypotheses</td>
<td>10</td>
</tr>
<tr>
<td>2. Background</td>
<td>11</td>
</tr>
<tr>
<td>2.1 Ohio Hopewell</td>
<td>11</td>
</tr>
<tr>
<td>2.2 Subsistence</td>
<td>12</td>
</tr>
<tr>
<td>2.3 Biological Relatedness to Other Groups</td>
<td>15</td>
</tr>
<tr>
<td>2.4 Settlement Pattern</td>
<td>21</td>
</tr>
<tr>
<td>2.5 Hopewell Mortuary Material Culture</td>
<td>23</td>
</tr>
<tr>
<td>2.6 Previous Studies of Culturally Modified Human Remains</td>
<td>26</td>
</tr>
<tr>
<td>3. Age and Sex Estimation</td>
<td>32</td>
</tr>
<tr>
<td>3.1 Age Estimation Techniques</td>
<td>33</td>
</tr>
<tr>
<td>3.2 Sex Estimation Techniques</td>
<td>43</td>
</tr>
<tr>
<td>3.3 Paleodemography</td>
<td>46</td>
</tr>
<tr>
<td>4. Methods</td>
<td>55</td>
</tr>
<tr>
<td>4.1 The Sample</td>
<td>55</td>
</tr>
</tbody>
</table>
Appendix J: Sex Assignment Results of Individuals Interred with Culturally Modified Human Remains from the Hopewell Mound Group ..........326

Bibliography ...............................................................................................................................330
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>116</td>
</tr>
<tr>
<td>2</td>
<td>119</td>
</tr>
<tr>
<td>3</td>
<td>123</td>
</tr>
<tr>
<td>4</td>
<td>123</td>
</tr>
<tr>
<td>5</td>
<td>124</td>
</tr>
<tr>
<td>6</td>
<td>124</td>
</tr>
<tr>
<td>7</td>
<td>125</td>
</tr>
<tr>
<td>8</td>
<td>125</td>
</tr>
<tr>
<td>9</td>
<td>126</td>
</tr>
<tr>
<td>10</td>
<td>126</td>
</tr>
<tr>
<td>11</td>
<td>127</td>
</tr>
<tr>
<td>12</td>
<td>127</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>13</td>
<td>Linear discriminant functions of sex based on dental metrics of 56034-4 of Mound 18, Hopewell Mound Group</td>
</tr>
<tr>
<td>14</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of 56034-4 of Mound 18, Hopewell Mound Group</td>
</tr>
<tr>
<td>15</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 213 of Mound 23, Hopewell Mound Group</td>
</tr>
<tr>
<td>16</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 213 of Mound 23, Hopewell Mound Group</td>
</tr>
<tr>
<td>17</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 213 of Mound 23, Hopewell Mound Group</td>
</tr>
<tr>
<td>18</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 213 of Mound 23, Hopewell Mound Group</td>
</tr>
<tr>
<td>19</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 12 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>20</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 12 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>21</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 12 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>22</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 12 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>23</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 23N of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>24</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 23N of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>25</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 23N of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>26</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 23N of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>27</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>28</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>29</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>30</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>31</td>
<td>Summary statistics for discriminant function analysis of dental metrics from culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>32</td>
<td>Results of Box's M test for equivalency of group covariance matrices for culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>33</td>
<td>Linear discriminant functions of sex based on dental metrics of culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>34</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>35</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 41-1 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>36</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 41-1 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>37</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 41-1 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>38</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 41-1 of Mound 25, Hopewell Mound Group</td>
</tr>
<tr>
<td>39</td>
<td>Summary statistics for discriminant function analysis of dental metrics from Burial 1 of Mound 27, Hopewell Mound Group</td>
</tr>
<tr>
<td>40</td>
<td>Results of Box's M test for equivalency of group covariance matrices for Burial 1 of Mound 27, Hopewell Mound Group</td>
</tr>
<tr>
<td>41</td>
<td>Linear discriminant functions of sex based on dental metrics of Burial 1 of Mound 27, Hopewell Mound Group</td>
</tr>
<tr>
<td>42</td>
<td>Frequencies of classification error of linear discriminant function of dental metrics of Burial 1 of Mound 27, Hopewell Mound Group</td>
</tr>
<tr>
<td>44</td>
<td>Age estimates of culturally modified human remains from Hopewell Mound Group</td>
</tr>
<tr>
<td>45</td>
<td>Sex assignment of culturally modified human remains from the Hopewell Mound Group</td>
</tr>
<tr>
<td>46</td>
<td>Age estimates of individuals interred with culturally modified human remains from the Hopewell Mound Group</td>
</tr>
<tr>
<td>47</td>
<td>Sex assignment of individuals interred with culturally modified human remains from the Hopewell Mound Group</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Culturally Modified Mandible of Burial 181 Mound 18 Hopewell Mound Group (Field Museum Catalogue Number 56033)</td>
<td>152</td>
</tr>
<tr>
<td>2</td>
<td>Culturally Modified Mandible (Field Museum Catalogue Number 56034-2) of Mound 18 Hopewell Mound Group</td>
<td>157</td>
</tr>
<tr>
<td>3</td>
<td>Culturally Modified Maxilla of Mound 18 Hopewell Mound Group (Field Museum Catalogue Number 56034-3)</td>
<td>159</td>
</tr>
<tr>
<td>4</td>
<td>Culturally Modified Maxilla of Mound 18 Hopewell Mound Group (Field Museum Catalogue Number 56034-4)</td>
<td>161</td>
</tr>
<tr>
<td>5</td>
<td>Culturally modified maxillae of Burial 34 Mound 25 Hopewell Mound Group (150120)</td>
<td>280</td>
</tr>
<tr>
<td>6</td>
<td>Culturally modified cranium of Burial 41 Mound 25 Hopewell Mound Group (150056)</td>
<td>289</td>
</tr>
<tr>
<td>7</td>
<td>Culturally modified mandible of Burial 41 Mound 25 Hopewell Mound Group (150172)</td>
<td>293</td>
</tr>
<tr>
<td>8</td>
<td>Culturally modified maxillae of Burial 41 Mound 25 Hopewell Mound Group (150172)</td>
<td>294</td>
</tr>
<tr>
<td>9</td>
<td>Age distribution of culturally modified human remains from the Hopewell Mound Group</td>
<td>317</td>
</tr>
<tr>
<td>10</td>
<td>Sex distribution of culturally modified human remains from the Hopewell Mound Group</td>
<td>321</td>
</tr>
</tbody>
</table>
11 Age distribution of individuals interred with culturally modified human remains from the Hopewell Mound Group ................................................................. 325

12 Sex distribution of individuals interred with culturally modified human remains from the Hopewell Mound Group ................................................................. 329
CHAPTER 1

INTRODUCTION

Between approximately 200 B.C. and 400 A.D (Greber & Ruhl 1989) a cultural phenomenon we call Hopewell thrived in parts of what is now the eastern half of the United States. Hopewell is known for an elaborate material culture and the construction of numerous mounds and earthworks; it is strongly and richly expressed in south central Ohio and is named for the type site (33Ro27), which is located in Ross County, Ohio, on land that once belonged to Mordecai Cloud Hopewell.

It is not clear whether the people responsible for the material remains associated with Hopewell were all part of a single culture (Greber 1991). What is clear from the archaeological record is that the material culture of contemporaneous people living between 200 B.C. and 400 A.D. in parts of the eastern portion of the United States shared aspects of style, mortuary behavior, and certain raw materials and therefore perhaps also elements of symbolism and ideology.

Many facets of human existence during the Middle Woodland period, when Hopewell flourished, have received scholarly attention. Extended discussion regarding the mode of subsistence, living arrangements, ideology, social organization, political
structure, and art fills the literature. Researchers have invested many hours describing Hopewell artifacts fashioned from a plethora of raw materials, including chert, copper, hematite, obsidian, pipestone, quartz crystals, cannel coal, mica, silver, meteoric iron, shell, ceramics, teeth, and bone. Of these categories of raw materials perhaps the least amount of attention has been focused on bone, especially in cases where human bone has been fashioned into an object or modified by human hands.

In addition, the number of physical anthropological studies of Ohio Hopewell human remains has been relatively small compared to work that has been done on collections of human skeletal material from Illinois Hopewell sites. Buikstra speculates that this is due to a paucity of specimens from Ohio and poorly documented context for the curated specimens that do exist (Buikstra 1979). Collections of human skeletal material from Ohio Hopewell sites do have their shortcomings relative to collections of materials from Illinois Hopewell sites; nevertheless it is possible to frame hypotheses that are testable with data collected from the Ohio material. These collections still have much to teach us.

The foci of this work are the collections of skeletons from the type site of Hopewell, Hopewell Mound Group, with special focus on culturally modified human remains. The Hopewell Mound Group is located in Ross County Ohio in the area of south-central Ohio known as the Hopewell heartland which encompasses several of the “classic” Ohio Hopewell sites (Greber, 1976). Culturally modified human remains, often referred to as “trophy skulls,” include skulls, crania, and jaws that have been drilled, ground, incised or shaped in a variety of ways and often, but not always, deposited with interred skeletons or cremations seemingly as a sort of a funerary object.
Previous interpretations of culturally modified human remains have focused on the role in life of the person from whom the culturally modified human remains were derived (Seeman 1988; Webb & Snow 1945; Moorehead, 1922; Shetrone, 1926; Mills 1909). Whether culturally modified human remains represent trophies of war or revered ancestors has been debated in the literature. Konigsberg and Frankenberg (1993) suggest two additional scenarios that might have lead to the production and disposition of culturally modified human remains. The possibility that culturally modified human remains represent memento mori or “tokens of remembrance” is suggested as well as the idea that culturally modified human remains are simply “heads collected for a particular ritual.” The ritual use scenario holds that culturally modified human remains may have been significant to those who manipulated them because of what they are as opposed to whom they represent.

Konigsberg and Frankenberg (1993) suggest that to understand the significance of these culturally modified human remains, we must examine the background of unmodified human remains from the same contexts. To do this is to take a step backward from the strategy used in previous attempts to explain culturally modified human remains. Past researchers sought an understanding of the role of culturally modified human remains in Hopewell ideology by focusing on the ages and sexes of those individuals from whom the modified bones were derived. Following the suggestion of Konigsberg and Frankenberg, this study focuses on age estimation and sex assignment of the individuals from whom the culturally modified human remains were derived as well as the individuals with whom they were interred. If an age or sex pattern can be
established, trophy taking or ancestor worship might be supported. If the ages and sexes are patterned after the mortality profile, the hypotheses of Konigsberg and Frankenberg must be considered.

Hopewell mortuary evidence is derived almost exclusively from mound contexts and indicates a varied array of treatments for human remains. For this reason it is difficult to formulate a single definition of cultural modification with regard to Hopewell human remains. Defined broadly, culturally modified human remains include any human skeletal element that has been deliberately changed in any way by humans from the state the material was in at the time of death, time of interment, or time of final disposition of the remains. This would include cremated remains, bundle burials, and re-interments as well as carved long bone shafts, drilled crania, and cut and ground mandibles and maxillae. Excluded are modifications caused by events that occurred during the life of the decedent such as cranial shape alteration caused by cradleboards or bindings.

A more narrow definition, the one that encompasses the sample for this study, includes only those remains that been treated or deposited in the same manner an artifact would be treated or deposited. Human remains that have been incised, drilled, ground, or cut (i.e. worked) or intentionally arranged are thus included. Cremated remains, bundle burials, and re-interments are excluded from the sample defined for this study since these modifications are part of mortuary practices having to do with preparing or interring the body.

Culturally modified human remains have been recovered from a number of mortuary locations and express a wide range of formal, depositional, and contextual
variation. Culturally modified human remains are not alone as variably expressed facets of Hopewellian mortuary ceremonialism. As Brose (1985: p. 65) states:

“Given the incredible variety of mound and mortuary treatment, very few valid generalizations about Ohio Hopewell funerary ceremonialism can be made. In fact, it is only the nature and use of deliberately included offerings that tie Ohio Hopewell sites together.”

It is from this seemingly chaotic array of mortuary behaviors that hidden patterns may be made apparent.

Ultimately, the goal of a bioarchaeological study such as this one is to discover something about the breadth and nature of past human variation with the hope that we will learn something about ourselves. First, however, we must try to tease out variables that can be used in the reconstruction of past human behavior. From such reconstruction we may glean knowledge of organizing principles that governed social behavior. The theoretical program of mortuary analysis set forth by Binford (1971) and Saxe (1970) predicts that this can be accomplished. The Saxe-Binford program holds that the manner in which people treat and dispose of their dead is conditioned by social organization. Hence, logical arguments can be constructed that relate mortuary behavior to sociological variables.

Mortuary studies yield two broad types of information. First, the behavior of the living who make decisions regarding how the body will be processed and disposed of may be reconstructed and, if so, can shed light on social organization, cultural practices, and ideology. Secondly, the remains of the dead themselves provide evidence from which aspects of their lives can be reconstructed. Human remains hold clues to how long
an individual’s life lasted, which sex the person was, how tall and robust he or she grew
to be, and what sort of ancestry the person had. Skeletons may also reveal whether
certain illnesses or injuries were suffered and in what stage of life these afflictions
occurred, whether there were behaviors that were repeated enough to have a physical
effect on the body, what sort of diet was used, whether some form of purposeful body
alteration was practiced, and whether a woman had ever given birth.

In order to address questions about social organization, cultural practices, and
ideology using mortuary evidence variable aspects of the dead and their treatment by the
living must be identified (Saxe, 1971). It is well known that considerable mortuary
variation is present among Ohio Hopewell. Not only do aspects of grave construction
vary within and between Ohio Hopewell sites, so do the materials, types, and placement
of artifacts within the grave and treatment of the corpse. The age, sex, and genetic or
social relationship of individuals interred in Hopewell contexts vary as well, but these
types of variation are less well understood. Because the number of mortuary variables is
great, and there are gaps in our understanding of them, it is important to treat them
individually before an attempt is made to look for potential patterns, relationships, and
meaning.

Culturally modified human remains are unique among grave inclusions in that
they have the potential to express stylistic variation as artifacts, as well biological
variation as anatomical elements. Their manufacture and deposition in a grave are
unusual, and presumably culturally meaningful, facts. Perhaps equally meaningful are
the ages and sexes of the individuals from whom bone was taken for modification and the
ages and sexes of the individuals with whom the modified bone is placed.
Short, somewhat anecdotal, descriptions of culturally modified human remains from the Hopewell Mound Group were written by W. K. Moorehead and later by H. C. Shetrone as they were encountered during investigations at the site. Studies have been carried out of culturally modified human remains from combined Hopewell contexts (Seeman, 1988) and from Mount Vernon Mound in Posey County Indiana (Nawrocki, 1997), but no focused examinations of the attributes and variation of culturally modified human remains or the individuals with whom they were interred from the classic Ohio Hopewell sites or the type site have been published.

The immediate goal of this research is to identify and describe the variation, especially the biological variation, present among culturally modified human remains and those with whom they were deposited at the Hopewell Mound Group. The long term goal of future, related, studies will be to do the same for culturally modified human remains from other prehistoric contexts. The implicit assumption made by Seeman (1988) is that all culturally modified human remains from Hopewell contexts were created and deposited for the same reason. A casual inspection of the variation in degree of modification alone suggests that it may be more informative to consider examples with similar attributes together. The attributes must be identified first. This dissertation’s contribution to Hopewellian studies is to provide a body of data from which future investigations of cultural modification can begin and to suggest a framework for such investigations.

In the case of the Hopewell Mound Group human skeletal material, collections in museums comprise most of the available sample. Political and legal constraints as well as the nature of the archaeological record render new, large scale, controlled excavations
of human remains unlikely for the foreseeable future. The sample used in this study is derived from the collections of the Ohio Historical Society, the Field Museum of Natural History, and the Milwaukee Public Museum.

A sample derived from a museum collection, by its nature, has limitations. One of the goals of this study is to survey the material from the Hopewell Mound Group available for study in order to determine the integrity of the sample and what sorts of research it will support. Detailed descriptions of each individual who is identifiable in terms of skeleton or burial number and mound of origin are provided in Appendices D and E. Included in the descriptions is information addressing issues of questionable provenience and steps that were taken to resolve these issues. No comprehensive set of descriptive information about the skeletons recovered from Hopewell Mound Group has been produced or published before.

We must seek a few very basic pieces of information about human skeletal remains recovered from Hopewellian contexts in order to ascertain what questions can be addressed. In order to compare culturally modified human remains to non-culturally modified human remains, we must first start by determining the ages and sexes of all of the available specimens. These two sets of data are essential if the nature of the population represented by the museum sample is to be revealed.

There are a number of approaches from which to investigate culturally modified human remains and many questions to be answered. The goals of this work are to address the following:
1) Evaluate the age and sex of the individuals represented in museum collections from the Hopewell Mound Group.

2) Describe individual specimens from the Hopewell Mound Group.

3) Describe the variation present among culturally modified human remains, the individuals with whom they were interred, and the manner in which they were deposited.

4) Test the following hypotheses:

The “Trophy Taking” or “Victory Token” Hypothesis:

$H_0$: Culturally modified human remains represent trophies taken in conflict or tokens of victory if the individuals from whom they were taken were young adult males and if the individuals they are interred with were male (after Seeman, 1988).

$H_1$: Culturally modified human remains do not represent trophies taken in conflict or tokens of victory if the individuals from whom they were taken were not young adult males and if the individuals they are interred with were not male (after Seeman, 1988).

The “Revered Ancestor” Hypothesis:

$H_0$: Culturally modified human remains represent revered ancestors if the individuals from whom they were taken were adult individuals, predominantly of one sex (Konigsberg and Frankenberg, 1993), and if the age distribution of the individuals they were interred with is patterned after the mortality profile of the burial population.
H₁: Culturally modified human remains do not represent revered ancestors if the individuals from whom they were taken were not adult individuals, if the sex ratio approaches unity, and if the age distribution of the individuals they were interred with is not patterned after the mortality profile of the burial population.

The “Memento Mori” and “Ritual Objects” Hypotheses:

H₀: Culturally modified human remains represent memento mori (tokens of remembrance) or “ritual objects” in which factors other than the age and sex of the decedent determined their use if the age and sex distributions of the individuals from whom they were taken and with whom they were interred are patterned after the mortality profile of the burial population (Konigsberg and Frankenberg, 1993).

H₁: Culturally modified human remains do not represent memento mori (tokens of remembrance) or “ritual objects” in which factors other than the age and sex of the decedent determined their use if the age and sex distributions of the individuals from whom they were taken and with whom they were interred are not patterned after the mortality profile of the burial population (Konigsberg and Frankenberg, 1993).
CHAPTER 2

BACKGROUND

Ohio Hopewell:

Archaeological evidence of “Hopewell” is present in numerous regions throughout the Eastern half of the United States. These regional variants share cultural attributes observable in the archaeological record as commonalities in material culture and subsistence strategy. It is difficult to name more than a few things all the regional variants seem to have held in common but mound or earthwork construction, elaborate mortuary behavior, and the ability to procure and create beautifully wrought, stylistically pleasing objects made from a great variety of raw materials seem to be obvious candidates. Most sites were clustered along a river drainage and are perhaps better organized for purposes of study by drainage than by modern political unit.

In what is now Ohio, evidence of Hopewell has been most frequently reported in the Scioto, Muskingum, and Little Miami drainages. These drainages contain many large, complex earthworks. This is especially the case in the lower Scioto drainage which contains the Hopewell Mound Group, the Liberty works, Seip, Tremper, Raymond Ater and Mound City among others. What follows is a synopsis of what is known about Hopewell subsistence, biological relatedness to other groups, settlement pattern, and material culture.
Subsistence:

At one time it was assumed that the people participating in Hopewell relied on maize agriculture as their main means of subsistence (Morgan, 1952). This idea has been soundly rejected and it is now clear that maize did not make up an important part of the Hopewell diet (Smith, 1992). However, while most researchers agree that the Hopewell did not practice large scale agriculture focused on the production of maize, there is debate over how intensely native domesticates of the Eastern Agricultural Complex were cultivated (Yerkes, 2000).

The conclusion that Hopewell subsistence practices did not include maize agriculture is supported by stable carbon isotope studies of human bone collagen and by studies of dental wear and pathology (Smith, 1992; Sciulli, 1997). Maize, a tropical domesticate, uses a different photosynthetic pathway than do the species of the Eastern Agricultural Complex. The C4 pathway used by maize results in an increase in $^{13}$C in bone collagen of individuals ingesting maize in their diets. This increase is expressed in the ratio of $^{13}$C/$^{12}$C, which is measurable in bone collagen. The lower the value of the ratio the lower the amount of C4 plants, such as maize, in the individual’s diet. Studies have shown that $^{13}$C/$^{12}$C ratios are too low until after approximately A.D. 1000 for maize to have been a significant component of the diet in the Eastern Woodlands (Smith, 1992; Sciulli, 1997).

Dental evidence that maize agriculture was not used for Hopewell subsistence may be found in a study by Sciulli (1997) in which three “dental cultural ecological environments” are recognized. Dental wear and pathology were observed in a sample of 3613 individuals from 40 Ohio Valley samples spanning a 3000 year period. Sciulli
found that Late Archaic (3100-2500 B.P.) and earlier populations are characterized by high rates of dental wear and low frequencies of caries. Woodland populations (2500-1000 B.P) show evidence of low rates of dental wear and low frequencies of caries while Late Prehistoric (1000-300 B.P.) groups exhibit low rates of wear and high frequencies of caries.

Sciulli concludes that the transition between dental cultural ecological environments is accounted for by two cultural innovations. The first cultural innovation is the adoption of ceramic technology, which marks the beginning of the Woodland period and is evident in the bioarchaeological record as low dental caries frequencies and especially low rates of wear. The use of ceramics allowed cooking and food processing methods that softened the diet and introduced less grit, thus lowering dental wear rates. Caries frequency was low in the Woodland period as it had been in the Late Archaic due to low amounts of simple carbohydrates in the diet. The initiation of maize agriculture corresponds with the transition from the second dental cultural ecological environment (low frequencies of caries and low wear) to the third (high frequencies of caries and low wear). A diet high in simple carbohydrates, such as that provided by a subsistence system heavily reliant on maize would likely cause dental caries frequencies to increase.

Paleoethnobotanical evidence supports the idea that Hopewell people may have been cultivating plants but were not maize agriculturalists. The archaeological record of Hopewell sites in the Licking River Valley lacks evidence of maize but includes seed assemblages with high percentages of domesticated species of the Eastern Agricultural Complex including maygrass (*Phalaris caroliniana*), erect knotweed (*Polygonum erectum*), and goosefoot (*Chenopodium* spp.) (Wymer, 1997).
Evidence of land clearing consistent with agricultural activities includes a relatively high proportion of charcoal from various second-growth taxa. Wymer (1996, 1997) suggests that Ohio Hopewell people were not only farming, but that the products of this activity were major components of their diet. Non-agricultural products such as gathered nuts, fruits and berries are present in the record, but in lesser proportions than cultivated plant foods.

Yerkes (2000) questions the idea that Hopewell subsistence relied on any kind of true agricultural or farming practices. Eastern Agricultural Complex plants may have been cultivated by the Hopewell in his view, but there is no evidence that these species relied on human intervention for reproduction, nor is there evidence that they were the main component of the Hopewell diet. In addition, the Hopewell tool kit includes no tool types that would be associated with the activities of agriculturalists and features associated with the production of surplus food such as storage pits are lacking at Hopewell habitation sites. Yerkes notes that the timing of the domestication of the Eastern Agricultural Complex species occurred well before Middle Woodland times and that the timing of archaeologically observable increases in the use of these species did not happen until Late woodland times.

All three lines of evidence, paleobotanical, stable isotope ratios, and dental wear and pathology place the widespread reliance upon maize agriculture for subsistence in Ohio around A.D. 900-1000. In addition, accelerator mass spectrometer dates of maize from deposits older than A.D. 900 in the Eastern Woodlands show most of these to be later contaminants not associated with the cultural horizon from which they were collected (Smith, 1992). Exceptions are maize kernels recovered from the Edwin
Harness Site in Ohio (A.D. 220 ± 105), the Icehouse Bottom Site in Tennessee (A.D. 175 ± 110), and the Holding site near East St. Louis, Illinois (170 B.C.- 60 A.D.) (Riley et al., 1994). These occurrences of maize are thought to represent the earliest evidence of maize in the Eastern Woodlands but fall well before evidence of widespread cultivation and use of maize in the diet is present in the archaeological record (Smith, 1992).

The transition from the use of indigenous cultigens to maize agriculture in Eastern North America seems to be complete by the end of the Late Woodland (Simon, 2000; Smith, 1992; Johannessen, 1984). The mechanisms that produced this change are much less clear than is the fact that it happened. Johannessen (1984) citing Wetterstrom (1978) suggests that the reason is not simply increasing population and the demand for more resources. That maize played a ceremonial role or was a high status crop until after A.D. 800 is an often cited explanation for the fact that it is scarce, but not absent, in archaeological assemblages in Eastern North America until around A.D. 800 (Smith, 1992). Increased sociopolitical complexity may have been the key to the transition (Smith, 1992) but is not consistent with a transition in settlement pattern between early Late Woodland and late Late Woodland times in the Upper Ohio River Valley from large nucleated to smaller, dispersed settlements (Simon, 2000; Seeman and Dancey, 2000). Simon (2000) notes considerable regional variation in Eastern North America in the timing of the adoption of maize agriculture in relation to the timing of changes in social complexity and settlement pattern.

Biological Relatedness to Other Groups:

The cultural distinctiveness of Ohio Hopewell seems somewhat obvious in a general sense and was thus once taken for granted based on the quality and quantity of
elaborate artifacts recovered from Ohio Hopewell sites. The cultural antecedent of Ohio Hopewell was similarly assumed to be the Adena cultural tradition which appeared to be Hopewell writ small. Archaeological evidence of Adena cultural traditions supported this idea to the extent that in many of the same areas that Ohio Hopewell remains are found, there were earlier and sometimes chronologically overlapping traditions that superficially appear to be very similar to, yet not as strongly expressed, as Ohio Hopewell. Similarities include an elaboration of ceremonialism involving the construction of mounds concealing numerous feature types as well as the construction of enclosures, the use of exotic materials, and the production of certain types of artifacts (Greber, 1991).

The concept of Adena and its cultural relationship to Hopewell has been refined in recent years. Detailed studies of regional variants of Ohio Hopewell and Adena grouped according to drainages suggests that the nature and degree of the differences between the two varies from drainage to drainage. Greber (1991) documents four characteristics that separate Hopewell and Adena in the drainage containing the types sites of each, the central Scioto. These characteristics that distinguish Adena and Hopewell are:

“…(1) the basic change from a single group’s use of vertical space [Adena] to a multi-group use of shared horizontal space for interments and probably other ceremonial/ritual activities [Hopewell]; (2) a great increase in the use of the three basic raw materials: copper, mica, and marine objects, both in quantity and the range of artifact forms [Hopewell]; (3) the addition of other exotic and local raw materials to the suite of symbolic goods [Hopewell]; and (4) a significant increase in the complexity and size of the archaeologically recoverable ceremonial/ritual remains [Hopewell].”
Greber concludes the differences between the types sites of Adena and Ohio Hopewell are of sufficient magnitude and nature to support what was once an assumption: that the Adena tradition is culturally ancestral to Hopewell at least in the central Scioto drainage.

Similarly, the biological distinctiveness of Ohio Hopewell populations has long been questioned by physical anthropologists and archaeologists attempting to elucidate the origins of Ohio Hopewell and their Early Woodland predecessors, the Adena, and their relationship to each other as well as to other groups, especially to Illinois Hopewell (Buikstra 1979). Such efforts have their beginnings in the early part of the nineteenth century with a typological approach to cranial morphology. By grouping similar crania and comparing groupings to each other, researchers sought to address questions regarding who was more closely related to whom by first identifying “types” or sets of crania that were similar morphologically. From these “types,” individual crania were chosen that were thought to best represent groups and were then compared with each other in order to trace broad lineages. The basis of this method was the assumption that groups with similar frequencies of each type share a close genetic relationship regardless of other factors such as geographical proximity and population composition. One shortcoming of typological approaches is a neglect of the full range of variation within groups in assessing variation between groups. Once the types were defined they were set and there were usually not any new types added. Some researchers failed to consider obvious environmental causes of cranial shape differences caused by artificial deformation practiced by some human groups when they defined types. In addition, there was a tendency for all differences between groups with regard to cranial shape to be attributed to migration of types. The effects of gene flow, genetic drift, and natural selection were,
in some cases, not considered. Franz Boas’ studies of European-born immigrants and their American-born offspring demonstrating the importance of the environment in determining cranial shape were ignored. Ironically, Boas’ data were recently reevaluated using modern statistics and quantitative genetics and found to be in error (Sparks and Jantz, 2002). Cranial morphology has thus been shown to be highly heritable, but the relationships such data reveal are not based on comparisons of crania representing various “types” but rather on patterns of variation within human populations.

The result of the use of the typological approach for describing and tracing the origins of Hopewell was a tangled web of relationships among those characterized as dolicocephalic (“long headed”) and their brachycephalic (“short headed”) counterparts. Nonetheless, studies of morphological similarity played an important role in attempts to discern the relationship between Hopewell and Adena.

At one time, a Central American origin for Adena was postulated (Webb and Snow, 1945). Charles Snow based this hypothesis on cranial typology. Culturally deformed Adena crania, which he thought would show brachycephaly even if they were not culturally modified, were considered to be a key piece of supporting evidence for a Central American origin of Adena. Additional support of this hypothesis came from the fact that cranial cultural modification has a long history in these southern regions. Thus, Snow thought Adena to have been derived from different stock than the Woodland people native to the Midwest at the time of the arrival of the brachycephalic Adena precursors from Central America. Ohio Hopewell cranial series, which were described as a mixture of long heads and round heads, represented the mingling of native
dolicocephalics with newly arrived brachycephalic stock. However, Snow’s failure to
distinguish a cultural attribute from a biological one in comparing series of crania renders
his ideas suspect.

Contemporaneous with Snow, and also a student of Woodland period human
osteology, was physical anthropologist George Neumann. Neumann’s techniques were
similar to Snow’s with the important exceptions that Neumann recognized the necessity
of distinguishing culturally modified crania when making population comparisons and he
assumed that the answers to the origins of Woodland peoples could be found with the
identification of unhybridized pure stocks. Nevertheless, Neumann did not disagree with
a southern origin for Adena until his later years when he supported a northern origin for
Adena and relied on forces of evolution to explain the in situ differentiation of long and
short heads during the Middle Woodland (Neumann, 1960; Dragoo, 1963).

Prior to the 1960s it was thought that morphological similarity between Ohio and
Illinois Hopewell was great enough that the two groups shared a common ancestral group
(Neumann, 1950 as cited in Buikstra, 1979; Neumann, 1952). Subsequently, the
formation of the idea of exchange networks among Hopewellian groups (Caldwell 1964;
Struever and Hoart 1972), led to exploration of the possible ramifications for biological
exchange between groups. Reichs (1984) addressed this problem by comparing Illinois
Hopewell and Ohio Hopewell cranial metrics and discrete traits. Like her predecessors,
Reichs’ hypothesis relied on the assumption that similar cranial shape and size indicate a
close genetic relationship. She found differences between Ohio and Illinois Hopewell
cranial morphology that are similar in magnitude to the differences observed in Illinois
Woodland populations separated by 800 years.
Johnston and Sciulli (unpublished) used cranial discrete traits to assess mean measure of divergence (MMD) between two Illinois Hopewell samples (Elizabeth and Ray Sites) and an Ohio Hopewell sample (Hopewell Mound Group). MMDs between Ray and Elizabeth, Ray and Hopewell, and Elizabeth and Hopewell were calculated using the equation of De Souza and Houghton (1977). The results indicate less divergence between the Illinois samples than between either Illinois sample and the Hopewell sample. In order to evaluate the significance of this finding, a bootstrapping technique was employed to create a distribution of MMDs using data from between 200 and 250 permutations in which the data were randomized and MMDs were recalculated. The results indicate that the MMDs calculated for the three combinations of samples do not fall within the distribution of MMDs calculated from the randomized data. Hence, a hypothesis of biological distinctiveness between Ohio and Illinois Hopewell was supported.

Another type of evidence that supports a lack of biological relationship between Illinois Hopewell and Ohio Hopewell comes from studies which demonstrate biological continuity through time from Late Archaic through the Woodland phases in Ohio (Sciulli, 1997; Sciulli and Mahaney, 1986) and biocultural continuity between Early and Middle Woodland in Illinois (Jamison, 1971).

Sciulli and Mahaney (1986) compared cranial metrics and cranial discrete trait frequencies of twelve Ohio skeletal samples including eight terminal Late Archaic samples, three Early Woodland samples and one Middle Woodland sample. The results indicate virtual identity in cranial size and shape between the Late Archaic and Hopewell samples in Ohio. Comparisons of cranial metrics were carried out by Jamison (1971)
using Woodland samples from throughout the Midwest as well as a Late Archaic sample from Indian Knoll, Kentucky. Jamison’s results indicate biological continuity among the Illinois Woodland samples. The evidence for regional biological continuity provided by Sciulli and Mahaney (1986) and Jamison (1971), when considered in tandem with the findings of Reichs (1984) and Johnston and Sciulli indicate a lack of close biological relatedness between Ohio and Illinois Hopewell populations and argue for separate genealogies for these two regions in Middle Woodland times. Thus it appears that Ohio and Illinois Hopewell are regionally distinct biological populations which may have shared certain cultural attributes, but were not commonly exchanging genes.

Settlement Pattern:

Prufer (1964) put forth the “Vacant Ceremonial Center-Dispersed Agricultural Hamlet” model based largely on observations made in the Scioto River valley of South Central Ohio through archaeological survey and excavations at the McGraw Site, a Middle Woodland farmstead or “hamlet.” Prior to Prufer’s work it was assumed that Ohio Hopewell populations resided in villages adjacent to, or in, earthworks.

The model was not tested until the mid 1980s when Dancey & Pacheco (1997) began to look for evidence of “hamlets” in other places/drainages. Siteless survey (Dunnell & Dancey, 1983) was used at the Murphy Site, a Licking Drainage location, to demonstrate the existence of small, ephemeral habitation areas that were postulated to be archaeologically observable as concentrations of domestic debris (Pacheco, 1993).
In his dissertation, Pacheco (1993) tested Prufer’s model. Pacheco’s archaeological correlates of hamlets are as follows:

1) Small in size
2) Redundant assemblages of artifacts
3) Structural redundancy
4) Relatively close proximity to a ceremonial center

Hamlets consist of one or several households (possibly an extended family) residing on a year-round basis in a location associated with a small “territory” or “cachement” to be exploited by the resident individuals. In addition to exploiting the naturally occurring flora and fauna hamlet dwellers were engaged, to some extent, in swidden agriculture utilizing domesticates of the Eastern Agricultural Complex (such as maygrass, chenopodium, squash, etc.) (Wymer, 1997). Proximity to a ceremonial center (earthwork or mound) served to tie the dispersed populations together and reduce economic risks via reciprocal connections with others.

Pacheco’s archaeological correlates of hamlets were observed during his work at the Murphy Site (Pacheco, 1993) and have been identified in reports of more than ninety other sites in southern Ohio (Dancey & Pacheco, 1997). The inhabitants of hamlets, according to Dancey and Pacheco (1997), were sedentary to the extent that they stayed in one location perhaps for multiple generations, except to stray occasionally and temporarily in order to acquire resources from other areas (for example, lithic raw material). Although the Hamlet Hypothesis seems well supported by these data, the idea that the Hopewell were as sedentary as the model suggests has been challenged (Yerkes, 1990, 2000, 2002; Lepper and Yerkes, 1997; Cowan, 2002).
Yerkes presents an alternative view of the Hopewell as groups of complex mobile foragers who were integrated via ceremonialism and were not motivated in their interactions with each other by gaining prestige by accumulating wealth, but rather gained prestige by giving as has been suggested by Hall (1997). This view is supported by a lack of evidence at Hopewell domestic sites of substantial domestic dwellings, sufficient storage pits, floral and faunal species representing multiple seasons, and the appropriate artifact assemblage.

Yerkes (1990) reports that microwear analysis of lithic artifacts from the Murphy Site does not support the hypothesis that the site was a sedentary settlement or hamlet. He examined 668 chipped stone artifacts from the Murphy Site for diagnostic polish, striations, and damage scars that are associated with certain uses of the artifact. The use wear analysis showed that 121 of the 668 artifacts had been used. Used artifacts included bifaces, bladelets and flakes and each class of artifact had been used for cutting a variety of materials. Yerkes concludes that the lack of evidence for curation of tools (such as hafting and retooling) and the light traces of wear suggestive of a single use, indicate that the tools were expedient tools which were used perhaps once and then thrown away. Expediently used tools are consistent with short-term occupation of the site that may have occurred seasonally.

Hopewell Mortuary Material Culture:

Material culture refers to the physical objects or the stuff people gather, produce, use, and discard as they live their lives. Material culture is the evidence of past human behavior carried out by an individual or a group from which we reconstruct the
past. In addition to portable objects the material culture of Ohio Hopewell includes the mounds and earthworks themselves as well as various types of tombs, basins, caches, and other deposits.

The terms “elaborate” and “exotic” are often used to describe the portion of Hopewell material culture associated with mortuary or other ritual and ceremonialism. This is perhaps due to the fact that many non-local materials are used to create aesthetically pleasing artifacts of complex design and superior workmanship (for example copper, mica, Indiana hornstone, and obsidian).

Many of these elaborate artifacts are included in graves but there are concentrations of them that have been deposited in altars, caches, or special non-grave deposits that are unique in form, internal arrangement, or content. Ohio Hopewell exotic artifacts are sometimes placed in carefully prepared settings along with specifically arranged colored soils and wood charcoal from numerous and sometimes non-local species (Greber, 1996; Greber, 1983; Pickard, 1996; Wymer, 1996). Caches and special deposits have considerable time depth in Ohio, perhaps more so than particular grave association configurations do, as they have Late Archaic/Early Woodland precedents. Greber & Ruhl (1989) suggest major, perhaps cyclical, cultural events, or the termination of a lineage, idea, or resource as motivators for the creation of the unusual arrangements and contents of deposits of material culture associated with Ohio Hopewell.

The interpretation of exotics as ceremonial objects is partially based on their recovery from contexts in or near large Hopewell Earthworks. This is true to the extent that all of the most elaborate, cached or specially deposited material is from mounds or earthwork associations. In addition, these contexts represent the object being taken out of
circulation, hence perhaps a special meaning is attached to the object. Greber (1997) makes a case for the association of special deposit size and number of participants in its deposition, lending support to the idea that ritual significance and earthwork association are linked.

The time honored scenario of the Hopewell as sedentary agriculturalists who constructed large and elaborate ritual centers in support of chiefdom type social complexity and the acquisition of prestige through wealth supported by an interaction sphere has been countered as all of these cultural attributes have been questioned (Yerkes, 2002, 2000; Clay, 1998; Hall 1997). Ironically, it seems that many of the same lines of evidence that have been used to support the old scenario in the past can be used to support the opposite view of Hopewell: that they were socially complex yet were not organized by rank, were sedentary yet were not agriculturalists, and that their interactions were based on maintaining social ties and prestige through gift giving instead of through economic means associated with the accumulation of wealth.

Greber (1976, 1979) looks at social structure by examining mortuary data from three Ohio Hopewell sites (Seip, Raymond Ater and Turner). She follows the idea of Harary (1959, as cited in Greber, 1976), which is that a given individual’s status may be estimated according to the sum of the products of the number of people ranked below an individual and the weight of each rank. Greber uses counts of nonperishable artifacts associated with interments as well as type of inhumation, spatial location, and a grave descriptor (Seip and Turner only) to calculate rank for individuals interred within the mound. As predicted by Binford (1971) and Saxe (1970), by examining patterns of ranking within and among these three sites Greber is able to demonstrate varying degrees
of social complexity among and between the social group(s) responsible for the mortuary arrangements within the mounds. While high status may be evident by virtue of a low rank sum score in Greber’s scheme, it is not dependent just on inclusion of exotic artifacts with a skeleton or cremation.

Exotics from domestic contexts tend to be sparse and are often in the form of manufacturing debris (for example the mica debris at Jennison Guard (Blosser, 1996) and Indiana hornstone debitage at Murphy (Pacheco, 1997, 1993)). These contexts seem to support a hypothesis that the artifacts were manufactured not by specialized craftspeople but by anyone skilled enough. It also indicates participation in the ceremonial realm of Hopewell life by everyone - not just elites or shamans. Status perhaps was thus assigned by virtue of ascription via personal skills or insights and not necessarily via birthright, a hypothesis supported by the inclusion of relatively few subadults in mounds.

While culturally modified human and nonhuman remains are not necessarily made of non-local raw material they could perhaps be included as an “exotic” artifact by virtue of their interregional distribution (Seeman 1988) and their potential to behave as an artifact class in ways similar to artifacts of non-local materials (pan pipes for example).

Previous Studies of Culturally Modified Human Remains:

There are several good reviews of culturally modified human remains (Nawrocki, 1997; Owsley et al., 1994), however Seeman’s (1988) study is the most complete published survey to date of Hopewell “trophy skulls.” In his report Seeman discusses the history of thought regarding these remains, the modification processes used to create them, their contexts within sites, and ethnographic evidence of their purpose. Seeman discusses two interpretations for these culturally modified human remains. It had long
been postulated that culturally modified human remains were either “revered ancestors” or “trophies” of war (Moorehead, 1922; Mills, 1909; Shetrone, 1926). The “revered ancestors” hypothesis holds that the person represented by the modified bone was important in some way to his or her own living relatives, to the individual who is the main interment, or to the main interment’s living relatives.

Until Seeman’s report the consensus had been that culturally modified human remains fit the “revered ancestor” hypothesis better than they fit the “trophy” hypothesis (Webb & Snow, 1945; Seeman, 1988). It was thought that the age and sex of the individuals from whom these objects were made held the key for their interpretation. If the preponderance of the “donors” were young males, it was assumed they fit the profile of individuals likely to be involved in conflict with other groups though the presence of young female “donors” would not cause the “trophy” hypothesis to be summarily rejected. Advanced age and maleness were attributes that supported the “revered ancestor” hypothesis however, old females could be revered ancestors as well. However, because these hypotheses were not rejectable in this form, there was no scientific basis for choosing one hypothesis over the other.

Based on an assessment of a cache of drilled skulls from Turner (Willoughby & Hooton, 1922) in which Hooton incorrectly identified the individuals as old adults, the idea that culturally modified human remains were revered ancestors seemed better supported by the evidence and was thus the accepted explanation for culturally modified human remains until Seeman (1988) challenged this idea.

Seeman’s effort to re-evaluate culturally modified human remains was stimulated by the introduction of new age estimation techniques and improvements on old methods.
If the key to understanding culturally modified human remains was the age and sex of the “donor” individual, then perhaps a more complete and accurate assessment of age and sex could lend strength to one hypothesis over the other.

Seeman favored a “trophy” hypothesis based largely on ethnographic examples of human trophy taking and display from Plains groups of Native Americans and archaeological representations of trophy taking on Mississippian art objects. Examples of representations of severed human heads in Ohio Middle Woodland art exist. The Wray Figurine from the Newark Earthworks depicts a human dressed in a bear skin (complete with bear head and claws) wearing earspools and holding what appears to be a severed human head (also wearing earspools) in his/her lap. While the depiction of a severed head stimulates thoughts of a potential connection to culturally modified human remains, the ritualistic nature of the Wray figurine does not help us choose between the “trophy” or “revered ancestor” hypotheses. Another depiction of a severed human head noted in Ohio Hopewell art is a pipe from Seip in which a dog holds a human head in its mouth. Similarly, it is hard to make a serious argument that this supports either hypothesis.

With the help of a physical anthropologist (Dr. Robert Mensforth of Cleveland State University), Seeman compiled a list of remains including their present location, presence or absence of several modification variables (including drilling, polishing, cutting, and application of “red paint”), age, and sex. Of the forty or so examples he documents, Seeman reports age and sex estimates for less than half. Young males outnumber old males and females hence Seeman’s conclusion that this re-analysis supports the “trophy” hypothesis. Interestingly, Seeman also reports that there is
sufficient variability in attributes among the specimens he examined to render the formation of a typology of culturally modified human remains non-informative.

Although Seeman’s study seems to lend support to the “trophy” hypothesis, his conclusions that the sex ratio of culturally modified human remains is not 1:1 have been questioned. Konigsberg and Frankenberg (1993) use missing data theory and Ohio Hopewell craniometric data collected by Charles Snow, Georg Neumann, and Earnest Hooton to demonstrate that there is no statistical evidence for a biased sex ratio in a sample of Ohio Hopewell “trophy skulls.” In addition, a recent re-examination of many of the culturally modified human remains included in Seeman’s report plus additional examples from the Mount Vernon Mound (Nawrocki, 1997; Johnston et al., 1997) shows that the sex ratio of “donor” individuals is not significantly different from equality. This result holds for the sexes reported in Seeman’s paper and those in the more recent works. These results and the fact that many of the Hopewell culturally modified human remains have not been sexed, render the “trophy” and “revered ancestor” hypotheses equally well supported (or unsupported) by the sex evidence at this point in time.

Recent thought on the purpose served by culturally modified human remains focuses on the variability represented in these artifacts (Konigsberg and Frankenberg, 1993; Lloyd, 1996; Nawrocki, 1997; Johnston et al., 1997). The idea that there are more than two competing hypotheses to consider figures prominently in the light of recent work (Konigsberg & Frankenberg, 1993; Nawrocki, 1997; Johnston et al., 1997).

An additional consideration has been the nature of the interregional distribution of culturally modified human remains. Seeman (1988) makes note of the fact that culturally modified human remains have an interregional distribution. Examples have been
documented from Illinois (Snyders Mound C, for example), Indiana (Mount Vernon Mound), Iowa, Tennessee, and of course, Ohio (Turner, Hopewell, Seip, Harness, Purdom, Tremper, Mound City, Raymond Ater). Interregional variability in the modification processes has been documented such that the Indiana and Illinois culturally modified human remains resemble the Ohio material from Tremper in degree and type of modification, but do not as closely resemble culturally modified human remains from most of the other Ohio sites (Johnston et al., 1997). For example, most culturally modified human mandibles from Ohio contexts, with the exception of two hemimandibles from Tremper, have undergone minimal modification to include drilling and striations but do not exhibit the type of grinding that results in the removal of relatively large portions of bone or splitting at the symphysis. In contrast, culturally modified mandibles from Tremper in Ohio, Indiana (Mount Vernon Mound) and Illinois (Snyders Mound C) contexts have been split at the symphysis and reduced by grinding to the extent that only small sections of alveolar bone and associated teeth remain. It has also been noted that the Illinois, Indiana, and Tremper examples have been modified in ways more similar to much of the Ohio culturally modified non-human material which is often split at the symphysis and heavily reduced by grinding (Johnston et al., 1997).

There are two factors, which seem not to vary within Hopewellian culturally modified human remains:

1) the complete exclusion of subadults from Ohio Hopewell culturally modified human remains

2) the fact that almost all examples from which age can be estimated are young or middle-aged adults.
Temporal variation is also an interesting problem. Examples of modified bone have been recovered from Late Archaic, Early Woodland, Middle Woodland and Late Prehistoric contexts in Ohio. However, the overwhelming majority of modified bones of human origin are from Middle Woodland times. In addition, it seems clear that the production of such items reached its zenith in the Middle Woodland (Nawrocki, 1997; Johnston et al., 1997). Within Ohio Middle Woodland an examination of the chronological position of each example of culturally modified human remains would be informative, but at this point in time, such information is not available except on a very general scale.

In sum, the nature of culturally modified human remains as they function or existed in Hopewellian culture is unknown. Until recently, only two hypotheses regarding the significance of culturally modified human remains were entertained in the literature - that of “trophies” and that of “revered ancestors.” In 1993 Konigsberg and Frankenberg proposed the “Memento Mori” and “Ritual Object” hypotheses, both of which would be supported by an age and sex distribution of culturally modified human remains that parallels the mortality profile of the burial population they are part of. Perhaps culturally modified human remains from Hopewell contexts were created and deposited to serve all of these purposes or none of them. Further work on this problem will perhaps shed light on how these interesting artifacts fit into the lives of prehistoric Woodland people.
CHAPTER 3

AGE AND SEX ESTIMATION

Physical anthropologists who study human skeletons, regardless of whether their subject matter is modern, historic, or prehistoric, seek to discover several important pieces of information about the decedent. Collectively these pieces of information comprise the biological profile and include the age at death, sex, ancestry, and stature. Also a part of the biological profile are the interpretation of features of the skeleton that indicate trauma, pathology, activity patterns, and in forensic and sometimes in historic contexts, personal identification. Each component of the biological profile is important not only because it describes the decedent, but also it allows the decedent to be assigned to groups of individuals who share some biological indicator or skeletal feature. Information about human populations and how they have changed through time is thus retrievable via the compiled biological statistics of individuals.

Archaeologists are interested in past demographic change due to their attempts to answer questions of site function, human movements, and concentrations of humans in time and space (Ubelaker, 1989; Paine, 1997). Much of this interest is the result of the use of population concentration and decline to explain cultural change (Roth, 1992; Paine, 1997). For example, Buikstra et al. (1986) demonstrate an increase in fertility
over time in west-central Illinois using age at death data from skeletal series and relate this change to changing diet or food preparation techniques.

In studies of prehistoric skeletal series it is ideal to know how many males and females are present and how many individuals fall into each of a series of defined age categories. The study of the vital rates of extinct populations who left no written records is known as paleodemography (Buikstra and Konigsberg, 1985). Paleodemographic analysis starts with the reconstruction of a living population’s age and sex structure from skeletal remains (Ubelaker, 1989). Demographers who study modern living populations often have age and sex data at hand in the form of census data. However, paleodemographers must estimate age and sex indirectly from examination of skeletal remains. These methods assume biological uniformitarianism or that basic biological function is the same in modern populations as it was throughout history and prehistory (Howell, 1976).

**Age Estimation Techniques:**

Maples (1989, p. 323) rendered the following opinion regarding age estimation from human skeletal remains:

“Age determination is ultimately an art, not a precise science. Many areas of scientific data must be evaluated, but the final best estimate results from a subjective weighting of the results of all of the techniques that were employed.”

This may be true, to some degree, of age estimates carried out as part of a forensic analysis. However, in recent years, studies designed to improve methods of aging series of human skeletons seem to, for the most part, share the implicit ultimate goal of making
statements like Maples’ untenable. Several factors concerning the nature and limitations of age estimation techniques should be considered before recent advances in aging methods can be fully appreciated.

An important distinction to consider in a discussion of age estimation from skeletal remains is the difference between skeletal age and chronological age. Chronological age is a measure of the amount of time that passed between the birth and death of an individual. Studies of demography require estimates of chronological age because it is a measure of the length of time an individual was exposed to various factors that lead to death (Lovejoy et al., 1997). However, estimates of age derived from skeletal remains do not directly estimate chronological age. Instead, an estimate is made based upon the degree to which a skeleton has grown, matured or deteriorated at the time of death (Stewart, 1979). An estimate of chronological age is made from the skeletal age by comparing the skeletal age of the unknown to the skeletal age of individuals who are known to have lived to a certain age (Lovejoy et al., 1997).

There are numerous methods available for the estimation of skeletal age at death from human skeletal remains and the subsequent correlation of this estimate to chronological age. These typological approaches are easy to operationalize and provide chronological age at death estimates with a statistically defined margin of error. However, such methods are only as good as the degree to which skeletal and chronological age correlate. The correlation is affected by individual variation in the biological processes that occur in skeletons throughout life and by variation in the skill of the person making the estimate. There is also a tendency for practitioners of these
methods to translate the range of variation reported for a group to an individual. Such translations provide misleadingly narrow ranges for individual estimates.

In order to overcome the error introduced by biological variation in the skeletal aging process Lovejoy et al. (1997) advocate methods that rely upon an understanding of the biology of skeletal growth, maturation and senescence at the individual level. The goal of such methods is to evaluate the skeletal age of the individual via multiple age indicators considered together and in the context of the individual skeleton and population rather than via individual indicators considered separately and correlated with the chronological age of individuals from another population. Others advocate the use of multiple age indicators as well with differences in the way the ages are summarized distinguishing one method from another. Other researchers suggest statistical methods by which individual indicators may be corrected to more accurately predict chronological age (Konigsberg et al., 1997; Aykroyd et al., 1999).

All methods have limitations regardless of whether a single indicator or multiple indicators is (are) used. Realization of these limitations is the key to choosing the appropriate method(s) to use for any given skeleton or skeletal series. Methods that are appropriate for estimating ages of groups of skeletons are often not the best choice when estimating the age of an individual skeleton as in a forensic context. In practice, however, other factors such as financial and time resources available must be considered as well as the logistics of using techniques that require special equipment. An important additional factor to consider is whether or not a method that requires destructive testing of some sort is ethical and permissible.
Age estimation methods can be organized into several broad categories including morphological methods, radiographic methods, histological and chemical methods, and multiple methods. Each category has its own set of benefits, limitations, and practical constraints.

Morphological Methods of Estimating the Age at Death of Adults:

Morphological methods of age estimation from human skeletal remains involve gross examination of various parts of the skeleton, many of them joints. Because these methods require direct observation of various skeletal surfaces and evaluation and description of the condition of those surfaces, a thorough familiarity with skeletal anatomy and variation on the part of the observer is essential. The success of the estimate also depends heavily on the observer’s experience and skill in identifying the various textures, patterns, and signs of osteoclastic and osteoblastic activity, that characterize phases or stages defined by morphological methods.

Most morphological methods are inexpensive, require minimal equipment, are non-destructive and require relatively little time to carry out. They include methods of age estimation from degree and pattern of cranial suture closure, metamorphoses of the auricular surface of the ilium, the pubic symphysis, and the sternal rib ends, atrophy of the scapula, and evaluation of degenerative changes in the vertebral column. These methods are often inaccurate for populations other than the one they were developed for (Masset, 1989) and tend to reflect the age distribution of the populations from which they were derived (Jackes, 1992). In addition, due to the composition of the samples the methods are based upon in terms of age, sex and ancestry, morphological methods are likely to underage old adults and many have not been refined to more accurately age
individuals of both sexes and of various races. For example, one of the widely used standards, that for the pubic symphysis, was developed using a sample of individuals who passed through a medical examiner’s office which was biased against elderly individuals. Use of a small sample of older adults of known age at death to define phases of pubic symphysis senescence renders the phases associated with older age less well described morphologically and statistically than younger phases that are based on larger samples. The oldest individuals of unknown age at death are thus likely to be put in the oldest phase described by the method which may not reflect the oldest ages actually found in human populations.

Radiographic Methods of Estimating the Age at Death of Adults:

Radiographic methods of age estimation involve the observation and evaluation of changes that occur as one ages in the density and thickness of bone as well as trabecular patterns. Such changes were first noticed by clinicians interested in diagnosing osteoporosis. Most techniques concentrate on the proximal end of long bones either singly or combinations of several bones.

Walker and Lovejoy (1985) calibrated standards for radiographic seriation of age changes in the proximal femur, proximal humerus, clavicle and calcaneus using 500 prehistoric Amerindian individuals from the Libben Site. These standards were then tested using 130 individuals of known age at death from the Hamann-Todd collection. Seriation of the Hamann-Todd individuals was carried out both by visual inspection of radiographs and by relative radiolucency derived from measures of optical density. The study demonstrates that different skeletal sites lose bone with age at different rates and to differing degrees. Walker and Lovejoy conclude that visual inspection and seriation
provides better results than seriation of optical densities and that seriation by visual
inspection of the clavicle provides the best estimate of age of the four bones studied.

Radiography provides a non-destructive means of assessing skeletal age and is
useful as part of a multifactorial means of estimating age at death. It requires expensive
specialized equipment and supplies as well as specialized training of its practitioners in
radiographic interpretation. Radiographic methods also suffer from problems
encountered in standardizing filming, inter- and intra-observer error, and, in
archaeological samples, taphonomic effects that affect bone density. Finally, radiographs
of disinterred bone may be difficult to interpret due to soil and mineral deposits in the
medullary canals of long bones.

Histological and Chemical Methods of Estimating the Age at Death of Adults:

Estimating age at death from characteristics not observable by simple visual
inspection may be accomplished through the use of magnification of minute structures or
by chemical assay of various components of bone. Histological methods include osteon
counting, dental cemental annulation, and dental root transparency. Chemical methods
measure changes in the amounts of calcium, phosphate, collagen and carbonate in bone
which are known to decrease (calcium, phosphate, collagen) or increase (carbonate) over
time during the life of an individual. However, chemical methods are not suitable for
archaeological bone since they are very sensitive to diagenesis (Jackes, 1992).

Osteon counting is a histological method based on the changing microstructure of
bone as it goes through the normal processes of remodeling and turnover throughout the
life of higher vertebrates. This method requires that specific bones, usually long bones
of the lower limbs, be sectioned at a specific location. Thin sections are prepared and
specified areas of the section are observed via microscopy. Age is estimated from the amount of remodeling that has occurred which is quantifiable via counts of several different structures involved in bone remodeling (i.e. the number of osteons, the number of fragments of old osteons, the percentage of circumferential lamellar bone, and the number of non-Haversian canals). Like all biological phenomena, bone remodeling is sensitive to the physiological environment in which it occurs and can thus be influenced by many factors besides chronological age including disease, diet, trauma and exercise. Osteon counting requires specialized equipment, rigid standardization of procedural parameters, and a great deal of technical training. It is destructive and the process of sectioning the bone and making the slides is long and complicated. Maples (1989, pp. 323) summarizes histological methods of age determination in this way:

“I seem to use the histological techniques now much less than I once did. In the final analysis, histological techniques give me results that are no more precise than many other techniques, but require considerably more investment of time for preparation.”

Two histological methods of estimating age at death require observation of teeth instead of bone. Cemental annulation and root transparency are methods of age estimation from dental tissues used by Gustafson as a combined method. Cemental annulation is based on the observation, first made by Gustafson (1950), that the thickness of cementum increases with age in increments that are observable under magnification. The method is destructive since teeth must be sectioned for cemental annuli to be counted and it is sensitive to diagenetic effects. Also employed by Gustafson (1950) is the method of determining age at death based on dental root transparency. Root transparency
has been shown to be highly correlated with age and the only one of the six methods of Gustafson that is accurate enough to be used alone. Jackes (1989) reports little evidence of diagenetic effects on root transparency in archaeological tooth samples. Root transparency is observable without sectioning the tooth, but the amount of the root that has become transparent is more reliably measured on thin sections. Preparation of thin sections is destructive and requires special equipment. Root transparency is sensitive to numerous facets of dental health and diet.

Dental Methods of Estimating the Age at Death of Adults:

Dental tissues possess numerous characteristics which change with time or use over the life of an organism. In the developing dentition the degree of growth and maturation reflects age at death in subadult individuals. Once growth and maturation are complete age at death is reflected by the degree of mechanical wear associated with mastication as well as various facets of senescence of hard tissues that leave characteristic signs on preserved teeth and jaws.

The outer protective covering of teeth, the enamel, is the hardest mineralized tissue in the human body and is 96% inorganic material (Bhasker, 1991). This renders enamel, and thus teeth, highly resistant to trauma, fire, and diagenetic processes (Bang, 1989). The potential for teeth to survive in the archaeological record, even in the event that an individual was cremated, is therefore relatively high. Thus, any method that utilizes teeth to estimate age at death has the potential to be extremely useful to the bioarchaeologist.

Perhaps the most used and most written about methods of estimating age using teeth are those that are based on dental attrition. The occlusal surfaces of teeth tend to
wear over the lifespan of an individual at a rate dependent upon the composition of the diet and the hardness of the enamel and dentin of the tooth. Activity patterns can alter the rate of wear as well if the teeth are used for something other than mastication. Use of the teeth as tools is a common source of wear patterns not related to processing food for ingestion. Insterstitial wear produces observable effects on teeth as they move against one another in the dental arch. Both occlusal and interstitial wear have been used to estimate age at death.

Methods Using Multiple Indicators for Estimating the Age at Death of Adults:

Much criticism has been raised against methods of age estimation used singly (Lovejoy et al., 1985a; Mensforth and Lovejoy, 1985; Jackes, 1992). Most summaries of age estimation techniques recommend the use of multiple indicators if enough of the skeleton is present (Ubelaker, 1989; İşcan, 1989; Shipman et al., 1985; Schwartz, 1995). However, very few authorities on the subject of age estimation contribute methodology for compiling the resulting ages into a meaningful estimate of age. An exception is the work of Lovejoy et al. (1985a) who advocate the use of principal components analysis to produce a summary age from ages derived from multiple indicators in a series of skeletons.

Methods for Estimating the Age at Death of Subadults:

Estimation of age based on the skeletal remains of subadults is somewhat less problematic than estimation of age from adult skeletons. Physical anthropologists have both growth and development to guide their estimates of skeletal age in the immature. Numerous changes in size, shape, and degree of mineralization of skeletal elements occur as one progresses through childhood.
Because skeletal and dental development are not absolutely correlated each can be
used to produce an estimate based on multiple indicators. Dental calcification patterns,
dental eruption sequences, and loss of deciduous teeth can be used to estimate the age at
death of subadults, however the loss of deciduous teeth is the least reliable. It is also the
case that bone development and dental calcification are more highly correlated with
chronological age than dental eruption.

Skeletal age estimates in subadults are accompanied by smaller margins of error
than those of adults because the developing skeleton is marked by so many age related
changes which occur in a predictable sequence. In general, the older the individuals, the
more skeletal variability they will express (Krogman and Işcan, 1986). For example, it is
much easier to distinguish a two year old from a twelve year old than it is to distinguish a
thirty year old from a forty year old.

Error is, however, introduced in several ways (Ubelaker, 1989). First, the varying
growth rates of children contribute error to the estimate. In addition, much of the data
used to formulate skeletal age estimation techniques in children from dry bones and teeth
were collected using radiographic observations in living children. Degree of dental
calcification may be underestimated from radiographic observations. Lightly mineralized
bone tends not to show up well on radiographs thus causing a tendency to underage. Dry
bone observations of newly fused epiphyses are more accurate than those from
radiographs because the line of fusion remains observable for a period of time on the dry
bone (but not on a radiograph) after the fusion is complete. Krogman and Işcan (1986)
estimate that this factor causes the age estimate to be off by only about six months. Other
osteological methods were worked out on archaeological populations for which age at

42
death was estimated from dental events and are thus dependent upon the accuracy with which the dental indicators were derived and the applicability of them to populations other than the one they were derived from.

Not all methods work equally well in all stages of immaturity. Epiphyseal union is most useful for aging adolescents because this is the period during which unions are occurring. The pattern of union is very regular and predictable, however the age at which union occurs varies depending on sex and between populations. The range of variation in timing of union is large for a single bone, but if a number of bones are used the range can be narrowed to acceptable levels. A problem with this method is that often the mean age of union is reported without a range of variation. Also, several years elapse between the initiation of union and complete union yet degree of union scores may not reflect this. Not all epiphyses are equally good indicators of age based on degree of union. The best indicators are the proximal humerus, the medial epicondyle of the humerus, the distal radius, the femoral head, the distal femur, the iliac crest, the medial clavicle, and the sacrum.

Diaphyseal length of long bones can be used to estimate the age of fetuses, neonates, children and young adolescents. Once epiphyseal fusion starts diaphysis length is hard to measure. The range of variation is affected by sex, ancestry, and socioeconomic factors. It is best to use multiple bones.

Sex Estimation Techniques:

There are numerous methods, both qualitative and quantitative, by which sex can be assigned or estimated from human skeletal remains. The degree to which males and
females differ from each other for any given trait or measurement varies from population to population. Hence, some means of distinguishing the sexes may perform more with greater accuracy in one human group than in another.

Skeletal sex estimation techniques can be divided into two broad groupings: those that apply to adult skeletons and those that apply to subadults. Estimating the sex of subadults is problematic due to the fact that sexual maturity has not been attained and the morphological characteristics that distinguish the sexes skeletally have not developed. Numerous studies aimed at discovering sexually dimorphic characteristics in subadults have been carried out (for a review see Saunders, 1992), none of which approach the classification accuracy attainable in adults. Currently accepted standards for the collection of skeletal data do not recommend estimating the sex of an immature skeleton except in the case of adolescents (Buikstra and Ubelaker, 1994).

In the case of adolescents, if pelvic indicators of sex are present that are typically female, then sex may be assigned as female. Adolescent pelves that do not exhibit female morphology should not be assigned a sex. Cranial indicators of sex typically associated with males are indicative of the male sex in an adolescent. Adolescent crania that appear gracile should not be assigned a sex. And finally, femoral and humeral head diameters, if sufficiently large to merit the assignment of the male sex to adults, may be used to assign the male sex to adolescents.

There are two broad groupings of sex estimation techniques that apply to adult skeletons: techniques that rely on differences in pelvic dimensions and morphology due to the demands of childbirth on the female pelvis and skeletal differences in size and
robusticity which reflect the fact that human males are usually larger and more heavily muscled than human females (Schwartz, 1995; Ubelaker, 1989; Shipman et al., 1985).

The best indicators of sex involve skeletal differences in the morphology of the pelvis. Some of these indicators of sex are related to the fact that the female pelvic outlet needs to be big enough for a neonate’s head to pass through. In order to allow the passage of a neonate, the female pelvis tends to have a wide inlet, a wide sciatic notch of the ilium, a long pubic bone, a wide subpubic angle, and an elevated auricular surface. Evidence of parturition in the form of sulci or pits on the dorsal aspect of the pubic symphysis or in the preauricular area is also associated with femaleness. In addition, the structure of the female pelvis is characterized by the presence of a ventral arc, a subpubic concavity, and a narrow, ridged medial aspect of the ischiopubic ramus. The Phenice method (Phenice, 1969) involves scoring the pubic bones for the presence of a ventral arc, subpubic concavity and narrow ischiopubic ramus. If all three conditions are present the method can be used to assign the female sex to a skeleton with close to 100% accuracy. The presence of the ventral arc is the most highly correlated with female sex of the three indicators.

Sexual dimorphism in size and robusticity is also a useful basis for assigning sex to skeletal elements. In general, females are smaller in size and more gracile than males. Cranial traits that tend to be observable on male crania include, prominent supraorbital ridges, heavy temporal and nuchal lines, square orbits with dull superior margins, and large mastoid processes. In addition, males tend to have squarer chins than females, a greater degree of gonial eversion, deeper mandibular rami and more rugose muscle attachment points on the mandible. Postcranial size differences between the sexes are
reflected in size differences in joint surfaces. Two commonly used postcranial metrics that distinguish males from females are the diameters of the heads of the humerus and femur. For any skeletal dimension there will be overlap between males and females in the ranges produced when a large number of individuals are measured. This introduces a range of values, which do not discriminate between males and females. To the extent that the distribution of values of a skeletal or dental metric produces a bimodal distribution, males and females can be distinguished via the calculation of a discriminant function. A discriminant function uses the metrics of groups of known males and females as a basis for comparison for the metric data of an unknown. The function will classify the unknown as male or female depending on how similar it is metrically to those of known sex.

Another means by which to separate a group of skeletons by sex is to seriate them. Skeletal elements can be arranged according to a qualitative or quantitative trait in order from most masculine to most feminine. The seriation can be anchored by including elements from individuals of known or securely estimated sex. The goal of seriation is to divide a group of skeletons into three subgroups: those most likely male, those most likely female and those that are indeterminate. Crania are often seriated using traits associated with size and rugosity such as prominence of the supraorbital ridges, nuchal crest, mastoid processes and temporal lines.

**Paleodemography:**

Age and sex data are used to estimate vital statistics such as life expectancy, mean age at death, birth rate, fertility, mortality and survivorship for the population from which the skeletal remains were derived (Buikstra et al., 1986; Roth 1992; Ubelaker, 1989).
Vital statistics can then be used to predict population characteristics based on comparison to known populations (Blakely, 1977; Konigsberg, 1985; Milner et al., 1989; Pennington, 1996) and to conduct paleopathological analyses of disease prevalence (Wood et al., 1992).

In order for paleodemographic vital statistics to be calculated at least three conditions must hold:

1) It must be reasonable to assume that the living population from which the skeletal material is derived was not growing or getting smaller (it was a stationary population).

2) The skeletal remains are always a sample of the original population. You must be reasonably sure that the sample reflects the original population accurately. Each age category in the sample must be a reasonable estimate of the age category in the living population.

3) It must be demonstrable that the living group from which the skeletal remains came was a biological population.

The first condition, an assumption of demographic stationarity, is based on the concept of biological uniformitarianism proposed by Howell (1976). It is known that changes in fertility rates can dramatically change age at death distributions in nonstationary populations (Wood et al., 1992). Mortality rate changes, however, can change radically and have little or no effect on age at death distributions. Thus, in a skeletal sample from a nonstationary population a change in the fertility rate is more likely to be observable in the age at death distribution than a change in mortality.
Fertility information is retrievable from skeletal series. In cases in which good chronological information is available from local series spread out in time diachronic fertility data can be used to investigate cultural changes like subsistence change. Buikstra et al. (1986) use a ratio of individuals who died after age 30 years to individuals who died before age 5 years to estimate fertility and show changes in fertility over time in west-central Illinois. However, in order to facilitate the computation of life table statistics for synchronic studies of skeletal populations, an assumption of stationarity is appropriate (Milner et al., 1989; Paine, 1989).

In order for the second condition to be true one must be relatively certain that the age structure of the skeletal sample reflects the age structure of the living population. Several factors can skew an age distribution of a skeletal sample including:

1) Biased age standards.

2) Insufficient recovery of skeletal remains due to deficient archaeological techniques.

3) Insufficient recovery due to cultural practices of the group under study.

The net affect of each of these three situations is the potential under enumeration or over enumeration of individuals of a certain age category.

If there has been insufficient recovery due to archaeological technique or cultural practices, under enumeration of individuals is often the case. Over enumeration might occur in situations in which it is not recognized that two biological populations are represented at the same site. Such a situation might occur when remains from sites yielding intrusive burials are not adequately documented. A similar result might be due to prehistoric practices in which two biological populations were engaging in cultural
practices that cause them to share burial facilities. If good archaeological techniques are used by an experienced archaeologist both under and over enumeration can be minimized.

In the case of biased age standards, any age category can be under enumerated or over enumerated due to the misappropriation of incorrectly aged skeletons to an age category. Such misappropriation results in too few individuals in one category and too many in another. Ubelaker (1989) and Jackes (1992) suggest that more error is introduced into a paleodemographic study by leaving out individuals of questionable age than is introduced by including them in the wrong age category.

Biased age standards often result in misappropriation of individuals in older adult age categories to younger adult categories (Bouquet-Appel and Masset, 1982; Konigsberg, 1985; Konigsberg and Frankenburg, 1994; Buikstra et al., 1986). In fact, consideration of the entire human life span with regard to age estimates from skeletal material leads to the observation that subadult individuals are most likely to be placed in the correct category and middle aged or old adults are least likely to be correctly categorized (Aykroyd et al., 1999). This is due to the fact that subadults are growing and maturing and these processes leave numerous skeletal and dental indicators which are closely spaced in time.

Age standards used to estimate the age of adult individuals suffer from several deficiencies. Among these are calibration problems (Konigsberg, 1997), problems associated with inappropriately estimating the mean of an individual’s age with methods derived to estimate the mean of a sample (Krogman and Isçan, 1986), and inaccuracies that arise in standards because reference populations did not have similar and sufficient
numbers of individuals from each age category. This last deficiency often results in appropriation of older adults to younger adult age categories. This phenomenon is due to the fact that one of the widely used standards, that for the pubic symphysis, was derived from a medical examiner’s office population which was biased against elderly individuals. Finally, as Lovejoy et al. (1997) note, age indicators estimate biological age which is only an approximation of chronological age. Chronological age estimates are essential if information relating to duration of a disease or exposure to a pathogen is sought.

Paleodemographic reconstructions are altered by biased age standards in several ways. The common case of under enumeration of old adults causes mean age at death calculations to be artificially low, and hence make birth rate estimates artificially large. Buikstra et al. (1986) recommend using a ratio of individuals who died after age 30 years to individuals who died before age 5 years ($D_{30}/D_{5}$) to ameliorate the effects of this type of age bias. Alternatively, each age category can be broadened to reduce the likelihood that individuals will be placed in the wrong category. Unfortunately, this results in a sacrifice of detail in reconstructing demography and does not solve the problem of under enumeration of the elderly.

Perhaps the most workable method, short of deriving your own standards to correct reference population problems, is to use multiple, weighted age indicators. Lovejoy et al. (1985) tested a method in which five age indicators were weighted using principal components analysis. Blind tests of the method on known age at death samples resulted in less bias and better accuracy than methods relying on any single age indicator.
Also affecting paleodemographic analysis is insufficient recovery of skeletal remains due to deficient archaeological techniques. Commonly, if remains have not been carefully recovered, it is the case that very young subadults are likely to be under enumerated. Infant skeletons are easy to miss in the field and are not as likely as more mature skeletons to survive postmortem degradation due to various taphonomic effects (Walker et al., 1988). In addition, they may be only partially collected if the excavator is unfamiliar with human skeletal biology and the number of small epiphyses and developing teeth to expect in an infant. However, if a skeletal sample contains even one reasonably complete infant skeleton an assumption of recovery bias may not be warranted.

Under enumeration of very young individuals can skew estimates of mean age at death to make then artificially high. An artificially high mean age at death may in turn be used to produce an artificially low birth rate (Buikstra et al., 1986).

Another class of remains likely to be differentially collected is cremated remains. For example, Mills (1916) excavated the Tremper Mound which is located in Scioto County, Ohio early in this century and reported that the mound yielded enough cremated remains to account for 375 (presumably adult) individuals. These remains are not present in the collections of the Ohio Historical Society, although other materials excavated from Tremper by Mills are present. Mills’ investigations at Tremper were under the auspices of the Ohio Historical Society and there is little reason to believe the cremations are in another institution. Greber (personal communication, 1998) believes that Mills may have not recovered the cremations even though he comments on their volume in his report (Mills, 1916). In a case like this it is difficult to know what age categories are under
numerated unless you have reason to believe only certain age classes were cremated. In
the case at Tremper, in which almost all of the human remains reported from the site are
part of the 375 individuals estimated, you have seemingly intractable problem.

In order to attempt to overcome problems of insufficient recovery of remains
several tactics can be used. Some information may be available through the use of
archaeological demographic techniques (Paine, 1997). Burial populations can be
compared to population estimates based on site size, amount of floor space or roofed area
in structures, and number of structures. Specific age information is less likely to come
from such methods, but an estimate of how many people should be buried in the cemetery
used by the group can be made if duration of use and other factors are known or can be
estimated.

Another method that may prove useful in determining if age categories are
missing from a skeletal sample is pattern matching as suggested by Milner, Humpf, and
Harpending (1989). This method uses comparisons of skeletal population age
distributions to age distributions generated from life tables using parameters from living
populations. Parameters from living populations of known life style are mixed to
generate a number of possible age distributions. If you have reason to believe your
skeletal age distribution fits the distribution of a known population, except for differences
in one age category that can be reasonably accounted for, you may be able to estimate
how many individuals you are missing from that category and add them to your sample.
For example, Konigsberg (1985) added infants to the Seip Mound 1 population to correct
for collection (or museum) bias. However, if you add individuals to any age category the effect this will have on frequencies in other categories must be considered since the total number of individuals will be artificially large.

Lastly, in some instances additional fieldwork may add individuals to the sample. The probability that this is a workable means of correcting your problem is small given that the context has been disturbed. In the case of the Tremper example, this solution might be workable if Mills left the cremations reasonably *in situ*.

Cultural practices of the group under study may result in insufficient recovery of skeletal remains. Ohio Hopewell individuals, for example, are represented in museum collections almost exclusively by skeletons and cremations from mound or earthwork contexts. We assume that these remains are not necessarily representative of the entire population for two reasons. First, the very young and the very old are seemingly under represented (although certain types of populations, i.e. those with a high mortality rate in youth that steadily declines but remains relatively high in the adult and old adult categories, may reflect this age structure). Secondly, it does not seem as though enough individuals are present in Hopewell skeletal collections to account for even small populations over the period of time various mounds, collectively, were used. However, Konigsberg (1985) and Greber (1976) make a case that Seip Mound 1 was only in use for 1-2 generations. Konigsberg bases this on the total number of individuals in a museum collection (plus some he added to fill in certain age categories) and several assumptions that may or may not be valid.

Other cultural scenarios that might account for insufficient recovery include situations where infants and small children were not buried with other age classes, were
not buried at all, or were subjected to some kind of mortuary practice different from other age classes. It may also be the case that diseased individuals were treated differently or that some individuals were not buried. Taphonomic factors are likely to play a role in obscuring surface deposits of human remains from archaeological observation. Additionally, there may be individuals who died or were killed some distance away from the home territory of the population and were not transported home for mortuary treatment.

In order to detect sample bias due to cultural practices some of the same methods used to detect sample bias due to recovery insufficiency can be used to estimate whether the population represents any living population (pattern matching and archaeological demography for example). Further excavation may produce some unrecovered individuals if predictions can be made as to where separate segments of a population might be buried. In the case of Ohio Hopewell, Sciulli (personal communication, 1998) hypothesizes that individuals were buried near dispersed domestic units rendering them archaeologically difficult to detect because of small numbers of individuals interred in any given location.
CHAPTER 4

METHODS

The Sample:

The materials studied during the course of this research are all part of museum collections of human skeletal remains. What follows is a description of each collection including what is known of its collection history. Though the focus of this research is the skeletal remains of individuals interred at the Hopewell Mound Group, human remains from seven other Hopewell (Middle Woodland) sites were included (Edwin Harness Mound, Raymond Ater Mound, Seip Mounds, Rockhold Mounds, White Mound (West Mound), Tremper Mound, and Bourneville Mound) in order to maximize the sample size for statistical purposes and to insure that there were sufficient subadults on which to base the dental seriations.

The collections chosen for inclusion in this research were recovered from Middle Woodland, Hopewellian contexts within the geographic region defined by the Scioto River drainage from the confluence of the Scioto and Olentangy Rivers to the Ohio River. They are also, for the most part, curated at the Ohio Historical Society in Columbus, Ohio which, prior to 1954, was called the Ohio Archaeological and Historical Society.
There are several benefits to using museum collections as study samples as well as certain caveats. Benefits include the convenience of being able to collect data from archaeological materials without the necessity of going into the field and collecting the sample yourself. The material has been cleaned, conserved, organized and catalogued. The major caveat of studying a museum collection is that you had no control over the manner in which the material was collected, processed and organized. Therefore if the documentation is inadequate for your purposes or material has been damaged, mislabeled, misplaced or substituted from another collection, you may not be able to recognize the problem or correct it. It is important to be able to evaluate with what authority museum records were made. It requires a lot of detective work to gain knowledge of a museum’s procedures (both written and unwritten) and how they have changed over the years and who the players were at various times in the history of the collection.

Not all collection managers and museum curators are diligent at keeping good records on collections of human remains. Sometimes such collections are viewed as secondary to the exhibitable artifact collections from the same site. If such has been the case, the documentation of the collection and its history may not be complete. The longer an institution has had a collection of human remains the greater the chances that the collection has been mismanaged at some point unless there have been mitigating circumstances.

The collections of the Ohio Historical Society included in this research were acquired as long ago as 108 years (Harness) to as recently as 43 years ago (Bourneville Mound). The bulk of the collections were acquired in the early part of the twentieth
century. Hopewell collections are the cornerstone of the Ohio Historical Society’s archaeological collections. Numerous past curators of archaeology at the Ohio Historical Society were Hopewell scholars (Moorehead, Mills, Shetrone, Greenman, Baby) and were responsible for leading excavations at one or more of the sites mentioned below. In addition, the Ohio Historical Society owns or manages a number of Hopewell sites (Seip, Fort Ancient, The Great Circle Earthworks, Octagon Earthworks, Wright Earthworks, Fort Hill).

I suggest that the importance of Hopewell to the Ohio Historical Society has served a protective function for the collections over the years. The human remains were cleaned upon being brought into the museum from the field and in most cases consolidated as well. Individual skeletons were given catalogue numbers and the numbers were written on the bones with India ink. The bones of individuals were stored together as opposed to being split up and stored by element as many of the Hopewell bones curated at the Field Museum eventually were. This is not to say that the collections are perfectly documented, organized, and preserved. There are stray elements, unlabeled elements, and duplicate elements with some individual skeletons. However, relative to other collections of human remains collected at about the same time by the Ohio Historical Society and to Ohio Hopewell collections at other institutions, the Hopewell collections at OHS have survived the years quite well.
The collections used in this study are:

The Hopewell Mound Group:

(Ohio Archaeological Inventory number 33RO27)

Collections of human remains from the Hopewell Mound Group in the collections of the Ohio Historical Society (Columbus, Ohio), the Field Museum of Natural History (Chicago, Illinois) and the Milwaukee Public Museum (Milwaukee, Wisconsin) were examined. The collections of the Ohio Historical Society and the Field Museum of Natural History include numerous individuals, both culturally modified and unmodified. The collections of the Milwaukee Public Museum include only one culturally modified human bone. The Hopewell Mound Group itself, which is located in Ross County, Ohio near Anderson, Ohio, is currently owned by the National Park Service as part of the Hopewell National Cultural Park.

The material in the collection owned by the Ohio Historical Society from Hopewell Mound Group was acquired between 1922 and 1925 by excavation under the direction of Henry Clyde Shetrone, who was at that time Curator of Archaeology. The collection is cataloged under the OHS number A283.

William King Moorehead acquired the material in the collection owned by the Field Museum of Natural History via excavation in 1891-92. Moorehead was working as a field assistant for Frederick W. Putnam, Director of the Department of Ethnology and Archaeology (Department M) 1893 World’s Columbian Exposition. The Field Museum’s collection of human remains from the Hopewell Mound Group is catalogued under the following numbers: 40455, 40456, 41593-41625, 56068, 56095, 56032, 56064, 56033, and 56034.
The Milwaukee Public Museum owns a culturally modified human maxilla fragment that was collected by W.K. Moorehead and transferred from the Field Museum of Natural History to the Milwaukee Public Museum as an exchange in 1945. It is cataloged under the Field Museum number 56034-3 and the Milwaukee Public Museum number A49121/16082.

The Edwin Harness Mound:

(Ohio Archaeological Inventory number 33RO22)

The Ohio Historical Society and the Cleveland Museum of Natural History have collections of human remains from the Edwin Harness Mound which is the largest of the fourteen mounds of the Liberty Earthworks. The Liberty Earthworks are located 8 miles south of Chillicothe in Ross County, Ohio. Recorded explorations begin with Squier and Davis who reported the results of their work in 1848. Frederick Ward Putnam of the Peabody Museum next explored the Edwin Harness Mound. Warren K. Moorehead, Curator of Archaeology for the Ohio Archaeological and Historical Society from 1894 until 1897, did work there in the last decade of the nineteenth century. Excavations were then undertaken in 1903 and 1905 by William C. Mills who was at that time Curator of Archaeology of the Ohio Archaeological and Historical Society.

In addition, excavations of the Edwin Harness Mound were undertaken by N’omi Greber, Curator of Collections at the Cleveland Museum of Natural History, in 1976 and 1977. Human remains from the Greber excavations are curated under the CMNH numbers 33RO22-72 B&C, 921-A-700C, 921-A-271/a, and 921-A-281/e.

The site is now under private ownership. The Ohio Historical Society catalog number associated with the collection from the Mills excavation is A7. Human remains
collected by Moorehead are numbered with one of the following numbers: 13814, 13849, 13851, 13880, 13891, 13892, 13929, 13983, 13994, 13997, 13999, 14024, 14074, 14150, 14152, 14153, 14154, 14155, 14156, 14157, 14159, 14161, 14162, 14164, 14166, 14168, 14171, 14177, 14178.

Raymond Ater Mound:

(Ohio Archaeological Inventory number 33RO63)

The Raymond Ater Mound collection is owned by the Ohio Historical Society and was acquired as the result of a salvage excavation. Ohio Archaeological and Historical Society Curator of Archaeology, Raymond Baby did the fieldwork in the spring of 1948. The mound was located in Concord Township, Ross County, Ohio ½ mile southeast of the town of Frankfort and is named after the landowner, Raymond J. Ater. During a building project the landowner bulldozed approximately one third of the site before realizing the site was there. This accident exposed five cremations, two sub floor pits, and one extended skeleton. Raymond Ater Mound was originally an oval-shaped mound roughly 75-100 feet long. The human remains collected from the mound include 49 cremations and 6 extended burials. The catalog number A3062 is associated with the collections from the Raymond Ater Mound held by the Ohio Historical Society.

Seip Mounds:

(Ohio Archaeological Inventory number 33RO40)

The Seip Mounds are located southwest of Bainbridge in Ross County, Ohio. W. C. Mills carried out excavations of the three conjoined mounds for the Ohio Archaeological and Historical Society in 1905. During the summers of 1925-1928 the Ohio Archaeological and Historical Society explored the central mound. Adjacent non-
mound areas were explored by Ohio Historical Society staff in the 1960s and 1970s. The Ohio Historical Society currently owns the portions of the property from which the collections they curate came. The catalog number A957 is associated with OHS collections of human remains from Seip.

Rockhold Mounds I & II:

(Ohio Archaeological Inventory number 33RO39)

Material from the Rockhold Mounds is owned by the Ohio Historical Society. The mounds were located near Bainbridge in Ross County, Ohio and were excavated by Dr. E. F. Greenman, Curator of Archaeology for the Ohio Archaeological and Historical Society, during the summer of 1929. The catalog number A1020 is associated with material from the Rockhold Mounds in the OHS collections.

White Mound (West Mound):

(Ohio Archaeological Inventory number 33HI13)

Collections from White Mound (West Mound) are owned by the Ohio Historical Society as the result of a gift to the society in 1956 (Wilbur White Collection). White Mound (West Mound) is located in Highland County, Ohio. Raymond Baby, former Curator of Archaeology for the Ohio Historical Society was involved in the recovery of the material. Catalog number A3505 is associated with materials in the Wilber White Collection at the Ohio Historical Society.

Tremper Mound:

(Ohio Archaeological Inventory number 33SC4)

The Ohio Historical Society holds collections from the Tremper Mound which was located in Rush Township, Scioto County, Ohio. The mound was explored in the
summer of 1915 by William C. Mills of the Ohio Archaeological and Historical Society (now the Ohio Historical Society). The site is named for the former landowner, Senator William D. Tremper. Charles Whittlesey surveyed the mound in the early 1840s. Squier and Davis recorded Tremper in Ancient Monuments of the Mississippi Valley in 1846. The site is now under private ownership. The catalog number A125 is associated with the material from Tremper in the Ohio Historical Society’s collections.

Bourneville Mounds:

(Ohio Archaeological Inventory number 33RO46)

The Ohio Historical Society owns material from the Bourneville Mounds which were located east of Bourneville in Twin Township, Ross County, Ohio. The material was recovered during road construction in May 1959 and later purchased by the Ohio Historical Society. The collection is called the David R. Medert Collection and is associated with the OHS catalog number A3719.
Collection of Osteological Data:

A standardized set of data was collected from each skeletal specimen generally following the methods suggested in Buikstra and Ubelaker (1994). The following classes of data were collected:

1) Inventory
2) Skeletal metric and non-metric
3) Dental inventory, pathology, metric, and morphological
4) Taphonomic
5) Pathology and trauma
6) Cultural modification
7) Age Estimation
8) Sex Assignment

Inventory:

A detailed skeletal inventory which documents the presence or absence (or in certain instances, the degree of completeness) of each skeletal element and each joint surface was produced. In addition, a diagrammatic representation of the elements present was produced by shading in corresponding portions of a homunculus.

Skeletal Metric and Non-metric Data:

Skeletal metric and non-metric data (including subadult metrics and scores reflecting degree of union of ossification centers) were collected as recommended in Buikstra and Ubelaker (1994).
Dental Inventory, Pathology, Metric, and Morphological:

Dental inventory data, stages of formation of tooth crowns, roots, and apices, presence of caries and abscesses (or ghomphoses), and enamel defect data were collected as recommended in Buikstra and Ubelaker (1994). Occlusal wear data were collected as outlined in Smith (1984) for incisors, canines and premolars and for molars in Scott (1979). Dental morphological variation was recorded as recommended in Turner (1991). Buccolingual, mesiodistal, crown height, and root length measurements were taken on all teeth where possible and generally following Buikstra and Ubelaker (1994) and Goose (1963). Brothwell (1981) was referred to in descriptions of dental calculus and periodontal disease.

Collection of Taphonomic Data:

Taphonomic data were collected as suggested in Buikstra and Ubelaker (1994) with the exception that cultural modification of bone was recorded separately. Observations were made under light from a lamp that has both an incandescent and a fluorescent bulb which approximates natural light. Some surfaces were also examined under magnification as high as 20X. Bone color was noted when it was irregular or uneven or differed markedly from the expected tan or brown of soil stained bone. A Munsell chart was used to record color in some instances. Cremated bone was rigorously examined for color variation. Color and pattern of color were described in detail and locations noted. Stains from copper and ochre were recorded via description and diagram according to element and location. Bone texture and surface alterations including cracking, checking, splitting, root etching, insect damage, carnivore damage, and rodent damage, were described and diagrammed.
The Behrensmeyer (1978) stage of bone weathering was recorded for the skeleton as a whole or for various elements if weathering was uneven. Most of the material included in this study had not been exposed prehistorically for enough time for weathering to occur. A Behrensmeyer stage was recorded anyway as a general indicator of bone integrity. If a skeleton or bone seemed to have actually undergone weathering due to surface exposure, this was noted along with the Behrensmeyer stage. Peri- or post-mortem cut marks were noted and diagrammed as taphonomic data unless they seemed to be part of modification of the element into an artifact in which case they were recorded separately as cultural modifications. Cut mark cross sectional shape was noted as well as length and depth when possible. Color differences between unaltered bone surfaces and cut surfaces were documented.

Collection of Pathology and Trauma Data:

Evidence of pathological and traumatic alterations to bones were described following the methods suggested in Buikstra and Ubelaker (1994), however, numerical codes for lesion locations and characteristics were not used. The location of an abnormality, its extent or dimensions, and a description using standard terminology following Buikstra and Ubelaker (1994) were recorded.

Collection of Cultural Modification Data:

Evidence of cultural modification of bones and teeth including cut marks, striations, grinding, carving, incising, notching, and drilling was described according to element, location within an element, and extent. In some instances measurements were taken, for example, the diameter of drillings was measured on both ends of the drilled aperture and depth of notches and some cut marks was measured. Modifications were
also drawn either freehand or sketched onto a visual recording form such as the ones in
the appendices of Buikstra and Ubelaker (1994). Most observations were made using
10X-20X magnification. Descriptions include details about the degree to which the
modification altered the bone or tooth, for example, degree of cortical bone or dental
tissue removal, exposure of trabeculae or pulp chambers, and removal of sections of bone
or tooth.

Age Estimation:

Eleven methods of age estimation were used individually. They are:

1) Seriation of the maxillary dentition
2) Seriation of the mandibular dentition
3) Seriation of the auricular surface of the ilium
4) Metamorphosis of the auricular surface of the ilium
5) Seriation of the pubic symphysis
6) Metamorphosis of the pubis symphysis
7) Degree of ectocranial suture closure
8) Degree of union of centers of ossification
9) Stage of formation of the dental crown, root, and apex
10) Categorization of remains as adult or subadult based on overall size and
    robusticity (used in the absence of other indicators)
11) Diaphysis length

The methods applied to a particular skeleton depended upon the stage of life (adult or
subadult) the person was in at the time of death and the completeness and condition of the
remains. Seven of the eleven methods were then used in various combinations to

66
calculate a summary age using principal components analysis in a manner similar to the multifactorial method proposed by Lovejoy et al. (1985a). The methods and the principal components analysis are described below:

Dental Seriations:

Age at death was estimated via degree of molar attrition using the method of Miles (1963b, 1978). In the first step of this process dental arches recovered from Hopewell Mound Group, The Edwin Harness Mound, Raymond Ater Mound, Seip Mounds, White Mound (West Mound), and Rockhold Mounds were physically arranged in order from those with the least degree of molar attrition to those with the most severe molar attrition.

Factors that would contribute to differences in rates of wear between individuals interred at various Scioto Drainage Hopewell sites, such as differing means of subsistence or oral activity, have not been observed. In addition, the ages produced by the dental seriations correspond well with ages derived from each individual indicator. This suggests that there is not enough genetic or environmental variation between the individuals from different Hopewell sites in the Scioto Drainage to alter basic biological processes from group to group. Thus, dental arches from numerous Hopewell sites in the Scioto Drainage were combined in the seriations to serve two purposes. The first purpose is to maximize the precision of the seriations since a larger seriation will perform better as a tool for estimating ages of unknowns. Dental arches from numerous Scioto Drainage sites were also combined so as to include as many developmentally immature arches as possible since the age estimates of older individuals are anchored on those of the immature.
In the next step of the process the arches of individuals with immature dental development were assigned a developmental age based on stages of formation of dental crowns, roots, and apices using the scoring system and norms of Moorees et al. (1963b) as reproduced in Ubelaker (1989). Functional ages (or length of time molars had been functional in the mouth) of molars were calculated based on the fact that first molars tend to become functional (functional age is zero) when the individual is around the age of six years, second molars become functional around the age of twelve years (at the same time the first molar will have a functional age of six years) and third molars become functional at about eighteen years (at the same time that second molars have a functional age of six years and first molars have a functional age of twelve years).

Age of the least worn unknowns in the seriation could be estimated three ways. One way of estimating age is by matching the degree of second molar wear with the degree of first molar wear of an arch which had been assigned a developmental age. Since first molars have a functional age six years older than second molars the age of the unknown can be estimated by adding six to the developmental age of the known. Similarly, age of unknowns could be estimated by matching the degree of third molar wear with the degree of second molar wear of an arch which had been assigned a developmental age. Since second molars have a functional age six years older than third molars the age of the unknown can be estimated by adding six to the developmental age of the known. The third option is to match the degree of third molar wear with the degree of first molar wear of an arch which had been assigned a developmental age. Since first molars have a functional age twelve years older than third molars the age of the unknown can be estimated by adding twelve to the developmental age of the known. The same
steps can be taken to estimate age of arches with higher degrees of attrition once ages of
the more lightly worn arches have been estimated. The lightly worn arches then serve as
the known.

In order to avoid reporting a misleadingly narrow age estimate arches that had
been assigned either a developmental or a calculated age were grouped into five year age
categories. In some cases an individual had been assigned more than one age because
both arches were seriated separately. If the two ages did not fall in the same or adjacent
five year categories, the ages were not used in the principal components analysis.

Metamorphosis of the Auricular Surface of the Ilium and Seriation of Auricular Surfaces
of the Ilium:

Age was estimated by assigning a chronological stage to each auricular surface as
defined in Lovejoy et al (1985b). Stages are defined based on the state of various
features of the auricular surface of the ilium and the retroauricular area. Auricular
surfaces were also aged by seriation. Auricular surfaces from individuals were arranged
in order from most youthful in appearance to least youthful according to descriptions of
morphological changes associated with age found in Lovejoy et al. (1985b). The seriated
ilia were then separated into groups corresponding with the chronological stages
described in Lovejoy et al. (1985b).

Metamorphosis of the Pubic Symphysis and Seriation of Pubic Symphyses:

Pubic symphyses were assigned to a phase which corresponds to a range of
chronological ages as described in Brooks and Suchey (1990). If the unknown had been
assigned to a sex, series of casts based on pubic symphyses that illustrate the
characteristics of each phase for both sexes were used for comparison to aid in choosing
the best phase for the unknown. The casts were obtained from France Casting (Diane France, Ph.D.). Pubic symphyses were also seriated in a manner similar to that described for seriation of the auricular surface of the ilium.

Ectocranial Suture Closure:

Degree of closure of the ectocranial sutures was scored and corresponding age ranges encompassing one standard deviation were calculated as described in Meindl and Lovejoy (1985). In the event that the suture at a particular site could not be scored an age range was determined using the youngest age that a score of no closure at the site would produce (minus one standard deviation) and the oldest age a score of complete closure at the site would produce (plus one standard deviation).

Degree of Union of Centers of Ossification:

The degree of union of ossification centers was scored as recommended in Buikstra and Ubelaker (1994). A chronological age range corresponding to the degree of skeletal maturity exhibited by union or lack of union of ossification centers was estimated by referring published to summaries of data found in Buikstra and Ubelaker (1994), Krogman and Işcan (1986), Bass (1995), and Schwartz (1995).

Stage of Formation of the Dental Crown, Root, and Apex:

Stages of formation of dental crowns, roots, and apices were scored based on drawings that appear in Buikstra and Ubelaker (1994) which are modeled after information in Moorees et al. (1963a, 1963b). Teeth were also documented individually as to whether they had erupted, were in the process of erupting or had not erupted. The scoring system of Moorees et al. (1963a, 1963b) was used to document the stage of
formation. Age at death was estimated using the norms of Moorees et al. (1963b) as reproduced in Ubelaker (1989) and the diagrams illustrating the sequence of formation and eruption that appears in Ubelaker (1989).

Diaphysis Length:

Measurements of subadult bones were collected as recommended in Buikstra and Ubelaker (1994) which are based on the methods described in Fazekas and Kosa (1978). Correlations between diaphyseal length and chronological age as diagramed in Ubelaker (1989) were referred to in order to produce an estimate of age.

Categorization of Remains as Adult or Subadult Based on Overall Size and Robusticity:

Some sets of remains or individual bones examined were incomplete to the extent that none of the age indicators described above could be used. However, the degree of robusticity or general size may render an opinion as to whether the bone is from an adult or a subadult defendable.

Principal Components Analysis:

Because more than one indicator of age was present for many skeletons in the study sample and ages of an individual derived from multiple indicators are highly correlated, a multifactorial method of estimating age via principal components analysis was employed. Principal components analysis is means by which in this case correlated age indicators can be weighted according to the amount of variation they contribute to an age distribution. The number of principal components produced will equal the number of variables with the first component accounting for the most variation. This research is modeled after Lovejoy et al. (1985a) who found that the summary age that resulted from the use of more than one age indicator was more accurate and less biased than ages.
estimated using a single indicator. Bedford et al. (1993) tested the multifactorial method on the skeletons of individuals of known age at death who died during the twentieth century. Their findings confirmed the assertions of Lovejoy et al. (1985a) that the multifactorial method performs better than any individual indicator for estimating ages of skeletal series.

The number of individuals for whom a summary age could be calculated was maximized by identifying the combinations of age estimation methods that had been applied to the largest numbers of individuals. There were seven such combinations. Seven intercorrelation matrices were compiled from the midpoints of age ranges produced by the following indicators:

1) Seriated maxillary dentition and seriated mandibular dentition
2) Seriated mandibular dentition and ectocranial suture closure
3) Seriated maxillary dentition, seriated mandibular dentition, and ectocranial suture closure
4) Seriated mandibular dentition and seriated auricular surface of the ilium
5) Seriated maxillary dentition and ectocranial suture closure.
6) Seriated maxillary dentition, seriated mandibular dentition, and seriated auricular surface of the ilium
7) Seriated maxillary dentition and seriated auricular surface of the ilium.

Seven principal components analyses were carried out using Number Cruncher Statistical System software (version 2000) to produce weighting for each indicator in each of the seven analyses. A weighted average of the individual ages was calculated. The correlation between each individual indicator and the first principal component was
calculated by multiplying the eigenvector by the square root of the first eigenvalue and then dividing the product by the standard deviation of the \(i^{th}\) variable. The best estimate of age was calculated by multiplying each individual age by its correlation with the first principal component and dividing by the sum of the correlations.

Where more than one combination of individual age indicators was used to age an individual the best estimate of age was taken to be the one produced by the principal component analysis with the largest eigenvalue. The results of the principal components analyses are tabulated in Appendix A, Table 1.

**Sex Assignment:**

Fourteen indicators were used in assigning sex. They are listed in Appendix B, Table 2 with the conditions (or scores) of each that indicate maleness or femaleness.

**Seriation of Cranial Robusticity:**

Adult crania of those individuals who had been sexed using pelvic morphology were arranged in groups by sex. The male crania were then arranged in order from least to most gracile and the female crania were arranged in order from most to least gracile. The seriation was carried out under the assumptions that the Hopewell were sexually dimorphic, the sexual dimorphism resulted in male crania being more robust than female crania, and that a continuum in robusticity could be produced by arranging the known sex crania from least to most robust within their respective categories. Some overlap in the two groups was expected, but in general a continuum was produced. Too much overlap
would have rendered the seriation of no utility in assigning sex to unknown crania. Crania of unknown sex were then inserted into the seriation where appropriate based on robusticity.

The cranial traits that proved most useful in seriating the Hopewell crania were the supraorbital tori, nuchal crest and mastoid processes. Sex was assigned if an unknown cranium fit securely within the male or female series. Crania that fell in the area of overlap were not assigned sex based on cranial seriation. A similar procedure was attempted using mandibular morphology. However, many of the mandibles of individuals known to be females based on pelvic morphology were very robust and useful series of males and females could not be produced.

Sex Assignment Via Discriminant Analysis:

Discriminant analysis was used to classify individuals of unknown sex into the male or female category using dental metrics as independent variables. Descriptive statistics, results of the test for equality of covariances, the linear discriminant functions, allocation error, discriminant functions scores and results for each unknown successfully allocated to a sex category are reported in Appendix C.

Buccolingual, mesiodistal, crown height, and root length measurements were taken on all teeth where possible and generally following Buikstra and Ubelaker (1994) and Goose (1963). One hundred individuals with complete or nearly complete sets of dentition were included in the analysis. Of these, fifty-four had been assigned to a sex category via cranial or pelvic morphology (n = 22 males; n = 32 females) and forty-six
were of unknown sex. The majority of the individuals included in the discriminant analysis were from Hopewell Mound Group, but several individuals from Seip, Harness, Rockhold, and Raymond Ater were included as well.

The discriminant analysis was carried out using NCSS 2000 software. In order to minimize missing values among the independent variables the data were transformed such that the measurements of antimers were averaged and in the event that the measurement of one antimere was missing the measurement that was present was used. Sample sizes of the transformed independent variables ranged from n = 3 to n = 26. Each independent variable was tested for normality using the Kolmogorov-Smirnov test (critical value = .05) and normality was accepted for 132 of the 140 variables. In order to test the assumption that group covariance matrices were equal Box’s M test (Box, 1949 as described in Hintze, 1998) was applied and the results for each unknown that was eventually successfully allocated to a sex category are reported in Appendix C, Tables 4, 8, 12, 16, 20, 24, 28, 32, 36, and 40. Probability levels for Box’s M ($F_{prob}$) ranged from .05 to .97.

For each individual of unknown sex, discriminant functions were calculated using combinations of independent variables from the knowns which were chosen so that the sample size would be maximized. The set of functions which produced the least amount of classification error of knowns was chosen for use in allocating an unknown to a sex category. In order to allocate an unknown to a sex category the linear discriminant function of each independent variable (dental metric) of the combination that best allocated knowns to the correct sex category for both dependent variables (sex) was multiplied by the appropriate dental metric (in millimeters) of the unknown. From these
results separate sums were calculated for each dependent variable and the appropriate constant was added. The highest resulting value indicates the sex category the unknown was allocated to by the discriminant analysis.
CHAPTER 5

RESULTS

The most detailed descriptions compiled to date of each set of human remains reported by Moorehead (1891, 1897, 1922) and Shetrone (1923-1926) are reported here for the first time and may be found in Appendices D and E. Tabular records of the skeletons appear in Appendix F, Table 43. These appendices summarize what is currently known about individual human skeletons recovered from the Hopewell Mound Group including the most comprehensive age and sex estimates ever produced. This information will serve as an important source of information for Hopewell scholars in the future.

Summary of Remains Reported:

Shetrone reports encountering seventy-one individual burials, eight double burials, one triple burial, one bundle burial, one cache that included human remains, several individual bones of disturbed burials, and nine examples of cultural modification of human remains. Of the individuals reported by Shetrone (excluding the culturally modified human remains) sixty were inhumations, thirty-two were cremated, and six were partially cremated.
Moorehead reports encountering one hundred and five individual burials, twelve double burials, one triple burial, and nine examples of cultural modification of human remains. Two additional potential examples of cultural modification of human remains are reported but are not included in the total. They are both carved or incised bone shaft sections that Moorehead indicates are parts of human femora placed with Burials 278 and 281 of Mound 25. They are not included in this study as culturally modified human remains because their species of origin has not been determined. Of the individuals reported by Moorehead (excluding the culturally modified human remains), one hundred and twenty-four were inhumations, five were cremated, and three were partially cremated. Based on the reports of the excavators, eleven, or approximately five percent, of the 230 individuals encountered at Hopewell Mound Group were subadults.

Although Moorehead and Shetrone report recovering two hundred and thirty individuals from the Hopewell Mound Group, only seventy-four were identifiable with regard to mound and burial number in museum collections. Skeletal elements identifiable only as having been recovered from the Hopewell Mound Group are also present in the collections of the Ohio Historical Society and the Field Museum, but because they lack documentation their use in this research is limited to inclusion in the seriations.

Shetrone and Moorehead each report encountering nine examples of culturally modified human remains for a total count of eighteen. Each of these, and the individuals that they were interred with at the Hopewell Mound Group, are briefly described below. Refer to the appendices (D, E, and F) for more information. The descriptions, and the discussion that follows them, illustrate the breadth of the variation present among
culturally modified human remains from the Hopewell Mound Group. This variation is important because it indicates that perhaps the best way to learn something about Hopewell from culturally modified human remains is to look at sets of examples that share similar attributes individually instead of considering all culturally modified human remains as a group in the manner of Seeman (1988).

Shetrone’s Mound 2. Burial 5:

Burial 5 (Ohio Historical Society Standardized Osteological Database number 150214) is an individual inhumation accompanied by an additional skull called a “trophy” (described below). Copper staining is present on the cranium, the body of the mandible, and on numerous postcranial elements. A red stain is present on the ectocranial surface of the occipital just inferior to the external occipital protuberance.

Shetrone mentions Burial 5 in his field notes of 8/6/23 as well as on pages 25 and 26 of his 1926 report. The individual was extended on the back with the head toward the southeast and was on the mound floor. Copper artifacts roughly corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone.

Age at death estimated via degree of metamorphosis of the pubic symphysis and ectocranial suture closure was between twenty-four and forty-nine years. Cranial indicators of sex as well as the diameter of the head of the femur suggest that this individual was female.

Shetrone’s Mound 2. Burial 5 “Trophy:”

Burial 5 “Trophy” (Ohio Historical Society Standardized Osteological Database number 150215) is a skull which was located in the grave feature of Burial 5 to the right
of the skull of Burial 5. The remains of Burial 5 “Trophy” include a complete cranium and mandible. Copper staining is present on the cranium and both the mandible and cranium bear numerous fine cut marks.

Shetrone mentions Burial 5 “Trophy” in his field notes of 8/6/23 as well as on pages 26 and 27 of his 1926 report. Copper artifacts corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Age at death estimated via principal components analysis of two indicators is between thirty-five and forty-five years. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that this individual was male.

Moorehead’s Mound 3. Skeleton No. 237 and Associated Modified Maxillae:

Skeleton No. 237 is an individual inhumation accompanied by culturally modified human maxillae that had been placed next to the humerus of Skeleton No. 237. The individual was likely an adult and was unaccompanied by artifacts except for the modified maxillae which were also probably those of an adult. A careful reading of Moorehead’s notes reveals his tendency to note the presence of subadults and to omit age information if the skeleton represents an adult. Thus if age is not specified in Moorehead’s burial descriptions it seems reasonable to assume that the individual had reached maturity. Both the skeleton and the modified maxillae were noted in the field notes for October 27, 1891 (Moorehead 1891, p. 22). Neither were identified in the collections of the Field Museum of Natural History.
Shetrone’s Mound 7. Third Burial:

In the field notes of July 10, 1923 Shetrone describes what he calls the third of the three skeletons discovered in Mound 7. The remains include a partial cranium and partial mandible (Ohio Historical Society Standardized Osteological Database number 150138). Four drillings and several cut marks are observable on the cranium. Shetrone mentions this “Trophy” in his field notes of 7/10/23 as well as on page 38 of his 1926 report. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Discriminant function analysis based on dental metrics indicates that this skull is that of a male.

Moorehead’s Mound 18. Skeleton No. 181 and Associated Culturally Modified Human Remains:

Skeleton No. 181 (Field Museum catalogue number 41618) is an individual inhumation that is mentioned in Moorehead’s field notes of September 10, 1891 (page 6). According to the field notes, an incised human jaw was discovered next to the left humerus of Skeleton No. 181. Age at death, estimated via principle components analysis of two indicators is between forty and fifty years. This individual appears to have been a male based on a cranial robusticity and by comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex.

The perforated and incised partial mandible was assigned the Field Museum catalog number 56033. Age at death of the individual from whom the mandible came is between twenty and twenty-five years as estimated by seriation of the dentition.
Culturally Modified Human Remains from Moorehead’s Mound 18:

In addition to the culturally modified mandible (56033) that was with Skeleton No. 181, four culturally modified bones were recovered from Moorehead’s Mound 18. It is not clear from the field notes and reports whether these were associated with Skeleton No. 181. They are described below:

56034-1:

This specimen is a perforated calotte with striations present near the lambdoidal and squamosal sutures and around the perforation. The individual represented by this calotte was an adult based on the fact that fusion had begun in the ectocranial sutures of the vault. Sex is unknown.

56034-2:

The anterior portions of the alveolar and palatal processes of a left maxilla that has been culturally modified are present. Age at death of the individual represented by this bone is between twenty and twenty-five years as estimated via seriation of the dentition. A partially patent incisive suture provides additional evidence supporting a young age at death. Sex is unknown.

56034-3:

A heavily modified fragment of the alveolar process of a right human maxilla is present. The alveolar process has been removed from the rest of the maxilla just inferior to the apices of the tooth roots, probably by grinding. Age at death of the individual represented by this bone is between twenty and twenty-five years as estimated via seriation of the dentition. The sex of the person is unknown.
A culturally modified human right maxilla including the alveolar process and three fourths of the anterior aspect of the palatal process is present. The bone superior to most of the tooth root apices has been intentionally removed probably by grinding. The age at death, estimated via seriation of the dentition, is between twenty and twenty-five years. A discriminant function analysis based on dental metrics indicates that the maxilla is that of a male ($F_{\text{approx}} = .51$).

Moorehead’s Mound 23. Skeleton No. 213 and Associated Modified Mandible: Skeleton No. 213 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (pages 16 & 17), on pages 98 & 99 of Moorehead’s 1922 work, and on pages 208 and 209 of his 1897 publications. The individual is probably an adult. A catalog record for the main interment does not exist and human remains thought to be Skeleton No. 213 have not been located in the collections of the Field Museum.

A drilled partial mandible (Field Museum catalogue number 56064) bearing several striations is thought to be the bone associated with Skeleton No. 213 which was described by Moorehead as a maxilla. The age at death of the individual represented by this mandible as estimated via dental seriation is twenty to twenty-five years. A discriminant function analysis based on dental metrics indicates that the mandible is that of a female ($F_{\text{approx}} = .87$).

Moorehead’s Mound 23. Skeleton No. 238:

Skeleton No. 238 is an individual inhumation. It is mentioned in Moorehead’s field notes of November 2, 1891 (pages 23 & 24). Although the age of the individual is not mentioned, it is presumably an adult. Moorehead reports that the skeleton was
fragmentary and “no inferior extremities or back bone was found with this skeleton.”

The maxillae and mandible had undergone cultural modifications. The maxillae had been cut and the mandible perforated. Skeleton No. 238 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Moorehead’s Mound 24. Skeleton No. 191:

   Skeleton No. 191 is an individual inhumation. It is mentioned in Moorehead’s field notes of September 23, 1891 (page 13), on pages 96 & 97 of Moorehead’s 1922 work, and on page 180 of his 1897 publications. The skeleton was that of an adult accompanied by shell artifacts, bear’s teeth, and the skull of another individual (Skeleton No. 192). The only bone located in the collections of the Field Museum that can be attributed to Skeleton No. 191 is an adult’s partial left humerus.

Moorehead’s Mound 24. Skeleton No. 192:

   Skeleton No. 192 (Field Museum catalogue number 56068) is a skull that has been drilled and has numerous striations. Age at death, estimated via principle components analysis of two indicators is between fifteen and twenty years. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that this individual was probably female.

Shetrone’s Mound 25. Drilled Human Phalanx Discovered on July 16, 1924:

   In his field notes of July 16th, 1924 Shetrone describes a deposit of charred material that included burned wood and other organics as well as imitation bear teeth, fragments of animal jaws, beads, flint artifacts, eagle claws and human bone. The human bone included several skull fragments and a human phalanx with two perforations (Ohio
Historical society Standardized Osteological Database number 150173). The perforated phalanx appears to have been burned and is grayish white in color, though not calcined. The phalanx appears to have belonged to someone who had reached skeletal maturity as the proximal epiphysis had united with the diaphysis. The sex of the individual is unknown.

Shetrone’s Mound 25. Burial 34:

Burial 34 (Ohio Historical Society Standardized Osteological Database number 150117) is an individual inhumation accompanied by associated culturally modified human remains. The culturally modified human remains include an additional skull called a “trophy” by Shetrone (1926, p. 88; Field Notes of 8/27/24) and culturally modified human maxillae that Shetrone describes as having been an ornament suspended from the neck of the main interment. The remains of the main interment of Mound 25 Burial 34 present in the collections of the Ohio Historical Society are limited to a partial cranium, a nearly complete mandible and part of the right ilium. The individual was extended on the back with the head toward the north and was on the mound floor. Age at death of Burial 34, estimated via principal components analysis of two indicators, is between forty-five and fifty-five years. Discriminant function analysis based on dental metrics indicates that this skeleton is that of a male.

Shetrone’s Mound 25. Burial 34 “Trophy:”

Burial 34 “Trophy” (Ohio Historical Society Standardized Osteological Database number 150118) is a skull bearing numerous fine cut marks which was located in the grave feature of Burial 34. The remains of Burial 34 “Trophy” include a partial cranium and partial mandible. Shetrone mentions Burial 34 “Trophy” in his field notes of 8/27/24
as well as on page 88 of his 1926 report. The skull was on the floor of the mound to the left of the skull of the main interment. Age at death estimated via principal components analysis of two indicators is between thirty-five and forty-five years. Cranial indicators of sex suggest that this individual was male.

Shetrone’s Mound 25. Burial 34 Culturally Modified Maxillae:

The culturally modified human maxillae (Ohio Historical Society Standardized Osteological Database number 150120) that accompanied Burial 34 of Mound 25 are drilled and significantly reduced by grinding. Shetrone mentions this artifact in his field notes of 8/27/24 as well as on page 89 of his 1926 report and speculates that it served as an ornament suspended about the neck. Age estimated via seriation of maxillary dentition is estimated to be between twenty-one and twenty-five years. Discriminant function analysis based on dental metrics indicates that the individual was a male (\( F_{\text{approx.}} = 1.0 \)).

Shetrone’s Mound 25. Burial 35:

Burial 35 (Ohio Historical Society Standardized Osteological Database number 150212) is an individual inhumation accompanied by an additional skull called a “trophy” by Shetrone (1926, p. 89) which was placed to the left of the skull of the main interment. The individual was extended on the back with the head toward the northwest. The skeleton labeled as Burial 35 of Mound 25 does not seem consistent with in situ photographs of the skeleton taken in the field nor is the state of preservation consistent with Shetrone’s description of the bones (Field Notes 8/29/24). However, age at death of
the skeleton labeled as Burial 35, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Pelvic and cranial indicators of sex suggest that the individual was male.

Shetrone’s Mound 25. Burial 35 “Trophy:”

The “trophy” skull that accompanied Burial 35 Mound 25 is described by Shetrone in his report of 1926 on page 89 as well as in the Field Notes of 8/29/24. According to Shetrone the skull was about 15 inch ed to the left of the skull of the main interment. The “trophy” skull of Burial 35 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Shetrone’s Mound 25. Burial 41:

Burial 41 is the only triple interment reported by Shetrone from Hopewell Mound Group. Five individuals are actually represented by the skeletal remains which include a “trophy” skull, culturally modified jaws, and three extended individuals.

Shetrone’s Mound 25. Burial 41 Skeleton 1:

Skeleton 1 (Ohio Historical Society Standardized Osteological Database number 150058) is represented in the collections of the Ohio Historical Society by a complete mandible bearing cut marks. Shetrone mentions Burial 41 Skeleton 1 in his field notes of 9/4/24 as well as on pages 92 and 93 of his 1926 report. The individual was on the mound floor extended on the back on the south side of the grave with the head toward the east. Age at death, estimated via seriation of mandibular dentition, is between forty-one and forty-five years. Discriminant function analysis based on dental metrics indicates that this mandible is that of a female ($F_{approx.} = 0.91$).
Shetrone’s Mound 25. Burial 41 Skeleton 2:

Skeleton 2 (Ohio Historical Society Standardized Osteological Database number 150053) is represented by a partial cranium, partial mandible, and a partial postcranial skeleton. Shetrone mentions Burial 41 Skeleton 2 in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The individual was on the mound floor extended on the back with the head toward the east. Age at death, estimated via principal components analysis of two indicators, is between thirty and forty years. Cranial indicators of sex supported by a relatively small femoral head diameter suggest that the individual is female.

Shetrone’s Mound 25. Burial 41 Skeleton 3:

Skeleton 3 (Ohio Historical Society Standardized Osteological Database number 150057) is represented by a partial cranium, partial mandible, and a partial postcranial skeleton. Cut marks are present on the mandible. Shetrone mentions Burial 41 Skeleton 3 in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The individual was on the mound floor extended on the back with the head toward the east. Age at death, estimated via principal components analysis of two indicators, is between forty and fifty years. Pelvic and cranial indicators of sex supported by a relatively small femoral head diameter suggest that the individual is female.

Shetrone’s Mound 25. Burial 41 “Trophy” Skull:

Burial 41 “Trophy” (Ohio Historical Society Standardized Osteological Database number 150056) is a skull with drillings, cut marks and a pink stain on the palatine processes of the maxillae. Shetrone mentions Burial 41 “Trophy” in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The skull was on the floor of the mound.
to the left and a little above the skull of the central skeleton (Burial 41-2) interment. Age
at death estimated via principal components analysis of two indicators is between twenty-
five and thirty-five years. Cranial indicators of sex suggest that this individual was male.
Shetrone’s Mound 25. Burial 41 Culturally Modified Jaws:

The culturally modified human maxillae and mandible present in Burial 41 (Ohio
Historical Society Standardized Osteological Database number 150172) include a nearly
complete mandible and the alveolar and palatine processes of the maxillae. Both bones
are from the same individual and bear drillings and cut marks. Shetrone mentions these
artifacts in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The jaws
are described by Shetrone as having been on the mound floor about halfway between the
humeri of skeletons 1 and 2 of Burial 41. Age at death estimated via principal
components analysis of two indicators is between fifteen and twenty years. Sex is
unknown.

Shetrone’s Mound 26. Burial 6:

Burial 6 (Ohio Historical society Standardized Osteological Database number
150164) is an individual inhumation accompanied by an additional skull called a
“trophy” by Shetrone (1926, p. 104). The remains of the individual of Mound 26 Burial
6 include a partial cranium, mandible, and postcranial skeleton. Copper staining is
present on some elements and is consistent in pattern with the locations in the grave of
copper artifacts.

Shetrone mentions Burial 6 in his field notes of 9/13/22 as well as on pages 103
and 104 of his 1926 report. The individual was extended on the back with the limbs
“akimbo” and head oriented toward the east according to Shetrone. Age at death of
Burial 6, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Cranial and pelvic indicators of sex agree indicate that the individual was male.


Burial 6 “Trophy” is a skull that was located in the grave feature of Burial 6 to the left of the skull of Burial 6. Shetrone mentions Burial 6 “Trophy” in his field notes of 9/13/22 as well as on page 104 of his 1926 report. Shetrone estimated that the individual was an adult in his or her mid-twenties at the time of death. The remains were not located in the collections of the Ohio Historical Society.

**Age and Sex Variability:**

Of the seventy-four individuals that are identifiable, thirty-seven could be assigned to a sex category and age could be estimated for seventy (see Appendix F). However, of the seventy that could be aged, thirty were aged only in the general sense of being an adult. Of the eighteen sets of culturally modified human remains reported, age was estimated for twelve of them and sex assigned to eight (see Appendices G and H). Of the eleven individuals with the culturally modified human remains age was estimated for eight of them and sexes assigned to eight of them (see Appendices I and J).

Age estimates of culturally modified human remains from the Hopewell Mound Group are presented in Appendix G, Table 44 and Figure 9. Although nine of the eighteen reported examples of culturally modified human remains were younger than 25 years at the time of death, three fall into older age categories and six could not be assigned to any particular adult age category. Of the six not assigned to an age category, four were not located in the collections (the culturally modified human remains of Burial
237 Mound 3, Burial 238 Mound 23, Burial 35 Mound 25, and Burial 6 Mound 26) but are presumed to be from adults. In the case of the two sets of culturally modified human remains encountered by Shetrone but not located in the collections of the Ohio Historical Society (those of Burial 35 Mound 25, and Burial 6 Mound 26) Shetrone indicated in the field notes that these were from adult individuals (Field Notes of 8/29/24 and 9/13/22).

Moorehead did not specify the stage of life of the culturally modified human remains from Burial 237 Mound 3 or Burial 238 Mound 23 so their placement in the adult category is somewhat tenuous. However, an examination of Moorehead’s comments on the ages of individuals he encountered at Hopewell Mound Group reveals his tendency to make a note regarding age when a subadult was encountered and to not mention age when an adult was encountered. It is for this reason that the culturally modified human remains of Burial 237 Mound 3 and Burial 238 Mound 23 are assumed to be adults.

Sex assignments of culturally modified human remains from the Hopewell Mound Group are presented in Appendix H, Table 45 and Figure 10. Less than half of the eighteen sets of culturally modified human remains from the Hopewell Mound Group were assigned to a sex category. However, of the eight sets that were assigned a sex, two were found to be female and six were found to be male. One of the females (Burial 192 Mound 24), represented by a skull, was between the age of fifteen and twenty years at the time of death. The sex assignment of this individual is based on sexual dimorphism of the cranium, which in an adolescent may not be well expressed (Buikstra and Ubelaker, 1994). Hence the sex assignment of one of the two females is questionable.
Of the ten sets of culturally modified human remains that were not assigned a sex, four were not located in the collections and were not assigned a sex by the excavator (the culturally modified human remains of Burial 237 Mound 3, Burial 238 Mound 23, Burial 35 Mound 25, and Burial 6 Mound 26), four were heavily modified jaws which were not allocated to a sex category by the discriminant function and were not assigned to a sex category by the excavator (the culturally modified human remains of Burial 181 Mound 18 (three specimens) and the mandible and maxillae of Burial 41 Mound 25), and two expressed no indicators of sex (a drilled calotte from Burial 181 Mound 18 and a drilled hand phalanx from Mound 25).

Age estimates of individuals interred with culturally modified human remains from the Hopewell Mound Group are presented in Appendix I, Table 46 and Figure 11. Eight of the eleven individuals could be assigned to a particular age category based on the best estimate of age and the remaining three individuals are likely to have been adults at the time of death.

Of the three individuals for whom age at death could not be estimated other than to presume that they were adults, two were not located in the collections examined. One of these, Burial 213 Mound 23, was measured in situ and found to have been at least 6’ 8” tall (Moorehead’s Field Notes of 10/1/1891). If this stature estimate is accurate then this individual was surely an adult. It seems likely that Moorehead measured the in situ stature of someone who was probably big enough to have been an adult or almost an adult, but it is unlikely that 6’ 8” was the living stature of Burial 213 Mound 23. The frequency of people this tall, even in modern populations, is very low and so would be the chances of finding someone of this stature in the prehistoric record. Moorehead’s
observations may have been erroneous, he may have exaggerated this individual’s stature, or he may have measured bones that, due to taphonomic factors, were not articulated as closely as they would have been in life. The other individual that was not located, Burial 237 Mound 3, is assumed to have been an adult based on Moorehead’s tendency, described above, to make a note regarding age when a subadult was encountered and to not mention age when an adult was encountered. The third individual for whom an age at death category (other than adult) could not be estimated, Burial 191 of Mound 24, is represented in the collections of the Field Museum by a left humerus which had reached skeletal maturity.

All eight of the individuals interred with culturally modified human remains for whom an age category (based on the best estimate of age at death) could be assigned were likely older than thirty-one years at the time of death. Four of these were likely to have been older than forty-one years old at death. None of the individuals interred with culturally modified human remains were definitively youthful.

Sex was assignable to eight of the eleven individuals who were interred with culturally modified human remains (Appendix J, Table 47 and Figure 12). Of the three for whom sex could not be assigned, two were not located in the collections examined (Burial 237 Mound 3 and Burial 213 Mound 23) and no observations regarding the sex of these individuals were recorded by the excavator. The other individual who could not be assigned to a sex category (Burial 191 Mound 24) exhibited no clear indicators of sex. The sex ratio of the eight individuals who could be assigned to a sex category is 1:1.
Variability:

It is clear that not only do culturally modified human remains from Hopewell Mound Group exhibit variability in terms of age at death and sex, but so do the individuals with whom they were interred. Variability is expressed in the combinations of ages and sex in various deposits as well. The sexes of both the culturally modified individual and of the main interment are known in three cases (Burial 24 Mound 25, Burial 41 Mound 25, and Burial 5 Mound 2). In two of these cases the main interment(s) are female and at least one male is represented by culturally modified human remains (Burial 5 Mound 2 and Burial 41 Mound 25). In fact, all three of the interments in Burial 41 of Mound 25 are female while the skull placed to the left and slightly above the skull of the central burial is male. An example of culturally modified human remains placed with a male main interment exists in Burial 34 of Mound 25. Missing data cannot be ruled out as an explanation for the absence of evidence of other combinations of males and females.

There are four cases in which the ages of both the person represented by culturally modified human remains and the associated interment(s) are known. In three of these cases the interment(s) died at an older age than the person (or people) from whom the culturally modified bone was obtained (Burial 181 Mound 18, Burial 34 Mound 25, Burial 41 Mound 25). Interestingly, the main interment of Burial 34 Mound 25 is older than both culturally modified individuals included in Burial 34 and both culturally modified individuals included in Burial 41 Mound 25 are younger than all three of the interments. In one case, that of Burial 5 of Mound 2, the main interment and the culturally modified remains are probably similar in age. The age range for the main
interment is large (24-49 years) but the age range of the associated culturally modified person (35-45 years) overlaps well enough with the larger range that it is reasonable to conclude that these two individuals died during the same phase of adult life.

**Variably Expressed Modifications:**

Two facets of modification are variably expressed among the culturally modified human remains from the Hopewell Mound Group: choice of anatomical element and ways in which the element is reduced or altered.

All but one culturally modified human bone from the Hopewell Mound Group is a skull or a part of a skull. A perforated first proximal hand phalanx was recovered from Mound 25 by H. C. Shetrone from a non-grave context on July 16, 1924. This specimen also differs from all of the other modified human remains from the Hopewell Mound Group in that it is the only example of a culturally modified human bone from the site that has been burned. However, it had not been burned at a sufficiently high enough temperature or for long enough for calcination to occur. Other materials from the deposit it came from were burned as well. Two additional bones that, if they prove to be human in origin, can be added to the list of culturally modified human postcranial elements from the Hopewell Mound Group are the carved long bone shaft segments recovered by W. K. Moorehead from Burials 278 and 281 of Mound 25.

Marked variability of choice of element is evident upon examination of the non-postcranial material that was modified. Modified skulls were included in seven graves at Hopewell Mound Group: Burial 5 Mound 2, the third burial of Mound 7, Burial 192 Mound 24, Burial 34 Mound 25, Burial 35 Mound 25, Burial 41 Mound 25 and Burial 6 Mound 26. A skull, by definition, includes a cranium and mandible (White and Folkens,
Of these seven, five were located and examined (the extra skulls with Burial 35 Mound 25 and Burial 6 Mound 26 were not located). An eighth example may be present in the calotte recovered by W. K. Moorehead from Mound 18 (Field Museum catalogue number 56034-1). A calotte is a cranium minus the bones that make up the face and the cranial base (White and Folkens, 1991). Most of the breaks evident on 56034-1 from Mound 18 that contributed to its reduction do not appear to be fresh breaks. This suggests that it was deposited prehistorically not as a skull or cranium but in more or less the state of reduction it is in today. For this reason, it is not included as a modified skull here, but rather is considered to represent another choice of element.

Five examples of cultural modification of human bone from the Hopewell Mound Group are upper jaws or maxillae (or parts of the maxilla). These were encountered in the following deposits: Burial 237 Mound 3, three specimens from Mound 18 (Field Museum catalogue numbers 56034-2, 56034-3, and 56034-4), and Burial 34 Mound 25. In two deposits the modified jaws, both maxillae and mandible, of an individual had been placed: Burial 238 Mound 23 and Burial 41 Mound 25. Modified lower jaws (mandibles) were recovered from two burials: Burial 181 Mound 18 and Burial 213 Mound 23.

The degree and manner in which the bones were modified varies. There are three main means of modification: cutting, grinding, and drilling. Cutting includes cuts made for decoration or to reduce the bone or remove it from surrounding bone, and striations left presumably from defleshing. Specimens that exhibit evidence of grinding also tend
to have numerous tiny striations that resemble very fine cut marks but are more likely to be artifacts of the granularity of the material against which the bone was ground (sandstone for example).

In most cases, cut marks appear to be the results of defleshing and are most evident on skulls near sites of muscle attachments. All of the observed skulls have them except the skull from Mound 7. Mandibles and maxillae may also have been defleshed, but due to the much greater degree of reduction by modification, the signatures of defleshing could easily have been obliterated. Only one specimen, the mandible from Burial 181 Mound 18, has decorative cut marks. The same specimen also exhibits evidence of cut marks associated with the reduction process that may have been done using scoring to cause a section of bone to break off when pressure is applied. The skull with Burial 191 Mound 24 (Field Museum catalogue number 56068; Burial 192 Mound 24) exhibits another kind of cut. It appears as though a large cut was made through the right mastoid process extending to the right mandibular condyle. This pattern is consistent with an attempt to remove the head from the body.

Three of the seven skulls located have one or more drilled perforations (Third Burial from Mound 7, Burial 192 Mound 24, and Burial 41 Mound 25). The calotte from Mound 18 is also perforated. None of the other culturally modified material from Mound 18 is drilled nor are the skulls with Burial 5 Mound 2 and Burial 34 Mound 25. The skulls with Burial 35 Mound 25 and Burial 6 Mound 26 were not located, but Shetrone’s descriptions of them do not mention any perforations. The mandible from Burial 213
Mound 23 is drilled, as is the one from Burial 238 Mound 23 (according to Moorehead’s Field Notes of 11/2/1891). The maxillae of Burial 34 Mound 25 and the mandible and maxillae set from Burial 41 Mound 25 are drilled as well.

Most of the perforations are nearly perfectly round in shape. Some have beveled margins such as those on all of the modified bones of Burial 41 Mound 25 except the maxillae that were part of the set of jaws placed between Skeletons 1 and 2 and some have very sharp, non-beveled margins such as the aforementioned maxillae (see Appendix E, Figures 6-8). These differences are likely due to the use of different perforating techniques. Perforations range in size from 1.4 mm in diameter (on the perforated phalanx from Mound 25) to 5.0 mm in diameter (on the maxillae from Burial 34 Mound 25). Some specimens bear drillings that are all the same size such as those on the mandible from Burial 213 Mound 23 while specimens have perforations of various diameters (the skull of Burial 192 Mound 24 for example).

None of the margins of the perforations show signs of polish or wear that might be expected to be present if the modified bone was suspended and worn. Two of the modified maxillae from Mound 18 (Field Museum catalogue numbers 56034-2 and 56034-4) have surfaces that appear to be polished, but these specimens bear no perforations for suspension.

Many of the specimens have retained their anterior teeth. The single rooted anterior teeth are very easily lost once the periodontal ligament, which holds them in their alveoli in life, decomposes. If the perforated human remains from the Hopewell Mound
Group were suspended or strung for some reason, they were either kept fairly stationary while suspended or were carefully suspended for only a short period of time perhaps before the periodontal ligaments had completely decomposed.

It is also possible that some sort of mastic was used to keep the anterior teeth from being lost once the periodontal ligament was gone. The retention of the teeth or the appearance that the teeth had been retained may have held some importance prehistorically hence one might expect to find evidence that lost teeth were replaced. A specimen from another classic Scioto Hopewell site, the Edwin Harness Mound, seems to provide such evidence. The specimen is a mandible from the Edwin Harness Mound that was reported by Mills (1907) to have been deposited with a human cremation. Mills reports that three of the incisor teeth had been replaced with the incisor teeth of a deer. Upon inspection of the mandible, which is in the Archaeology Collections of the Ohio Historical Society (OHS catalogue number A7/51; Standardized Osteological Database number 150314), it was noted that a deer incisor was in the alveolus of the right lateral mandibular incisor and both central incisors had been lost postmortem. Presumably the other two deer incisors had been lost after Mills photographed the mandible for his 1907 publication on the Edwin Harness Mound.

Evidence of grinding as a means of modification is observable on most of the isolated modified maxillae and on one mandible, but not on the skulls or calotte. All of the modified material from Mound 18 has been ground except the calotte (Field Museum Catalogue number 56034-1). In the cases of the Mound 18 modified maxillae (Field Museum catalogue numbers 56034-2, 56034-3, and 56034-4), the grinding produced a very flat surface oriented along the transverse plain superior to, or impinging upon, the
apices of the tooth roots. The ground surface of the mandible (Field Museum catalogue number 56033) is somewhat flat, though less regular than the ground surfaces of the maxillae. In addition no tooth roots are exposed and the modification is oriented along a transverse plane.

Moorehead reports that the maxillae of Burial 238 Mound 23 were “cut” (Field Notes of 11/2/1891). The material from this deposit was not located in the collections of the Field Museum, however it is likely that the maxillae had actually been ground producing a surface that appeared to have been cut. Moorehead’s descriptions of the maxillae from Mound 18, which were located in the collections of the Field Museum and bear evidence of grinding, indicate that they, too, were “cut” (Moorehead, 1922 pp. 92-93).

The modified maxillae of Burial 34 Mound 25 are the most heavily ground specimens observed during a survey of human remains museum collections from the Hopewell Mound Group. Their modification differs from the maxillae of Mound 18 in two major ways. First, the Burial 34 Mound 25 specimen includes both maxillae which were modified as an articulated unit whereas the Mound 18 specimens are either the right or left maxilla which was detached from and deposited without its antimere (none of the modified maxillae from Mound 18 are thought to be antimeres of each other although this statement cannot be made with certainty). Secondly, the ground surfaces of the maxillae of Burial 34 Mound 25 are not flat as are those of the Mound 18 examples, but are curved. No drillings are present on any of the Mound 18 maxillae, however the Burial 34
Mound 25 maxillae have five drillings. Interestingly, all three modified maxillae from Mound 18 and Burial 34 Mound 25 came from individuals who died in the first half of the third decade of life.

**Variables Related to Deposition:**

There are at least four depositional variables that are relevant: non-perishable artifacts deposited with culturally modified human remains, non-perishable artifacts deposited with interments that have associated culturally modified human remains, placement of culturally modified human remains in the grave relative to the main interment, and the number of culturally modified human remains deposited with each interment.

Two of the eighteen culturally modified human remains deposited at the Hopewell Mound Group are associated with non-perishable artifacts that seem to be associated directly with the individual who was culturally modified. The skull deposited with Burial 5 of Mound 2 (an adult male) was deposited with a curved copper head plate in place on the cranium. The main interment of Burial 5 Mound 2 (an adult female) is associated with not only the extra skull, but with artifacts of ocean shell (container near head), copper (ear spool in each hand and plate with fabric attached under head), mussel shell (spoon located at feet), shell beads at the neck and head, and mica (plate near right shoulder). The other burial that included culturally modified human remains associated with artifacts is Burial 6 Mound 26. In this deposit it is the main interment (an adult male) who wore the copper head plate, although in this case Shetrone describes the plate as part of an elaborate multicomponent head dress (Field Notes 9/13/22). Numerous pearl and shell beads, bear canines (including both split and whole teeth set with pearls),
a copper plate under the hips, and an ocean shell container at the feet were associated with the main interment. The culturally modified skull of Burial 6 Mound 26 had its own set of associated artifacts which included a platform pipe, four circular shell disks, and shell beads. Unfortunately the skull (an adult according to Shetrone’s Field Notes of 9/13/22) was not located in the collections of the Ohio Historical Society.

Burial 5 Mound 2 and Burial 6 Mound 26 are unusual in that both main interments are associated with culturally modified human remains with their own grave inclusions. These two deposits are not unusual among graves including culturally modified human remains in terms of having numerous non-perishable grave inclusions made from a variety of raw materials. Most of the grave deposits containing culturally modified human remains at the Hopewell Mound Group were richly appointed with non-perishable items. The exceptions are Burial 181 of Mound 18 and Burial 237 of Mound 3. Moorehead reports no associations with the main interments in these deposits other that culturally modified human remains.

Greber and Ruhl (1989) define groupings of burials, each exhibiting evidence of internally consistent burial practices, within Mound 25 at the Hopewell Mound Group based on an estimated floor plan and structural attributes of the mound itself. They calculated an index sum to rank the burials of Mound 25 using counts of nonperishable artifacts associated with interments. All of the culturally modified human remains recovered from Mound 25 (with the exception of the drilled phalanx (Ohio Historical Society Standardized Osteological Database number 150173)) were recovered from graves that are included in Group C as defined by Greber and Ruhl (1989). Graves containing culturally modified human remains from Mound 25 include Burial 34, Burial
35, and Burial 41. Burials 34 and 35 are ranked in the top ten percent by index sum. The main interments of the triple burial, Burial 41, are ranked such that the southern-most skeleton is in the top 10%, the middle skeleton is in the 21-30% category and the northern-most burial is in the 41-100% category. Thus the burials of Mound 25 that include culturally modified human remains (Burials 34, 35 and the two individuals most closely spatially associated with the culturally modified human remains of Burial 41, the southern-most and middle skeletons) are among the most richly supplied with non-perishable artifacts in the mound.

Another aspect of the deposition of culturally modified human remains at the Hopewell Mound Group further defines the variability represented. The placement of culturally modified human remains in the grave relative to the main interment seems to vary according to the anatomical element that was modified. Culturally modified skulls invariably are placed to the right (Burial 5 Mound 2, Burial 192 Mound 24) or left (Burials 34, 35, and 41 Mound 25 and Burial 6 Mound 26) of the head or shoulders of the main interment. Maxillae and mandibles tend to be placed next to the upper arm or elbow with the exceptions of the modified maxillae of Burial 34 Mound 25 which was placed on the chest of the main interment and the modified maxillae of Burial 213 Mound 23 which was placed near the head of the main interment. In two instances a reading of the field notes and reports indicates that the modified elements might have been part of the main interment (Burial 238 Mound 23 and the third burial of Mound 7). The location(s) of the deposit(s) containing the modified human remains from Mound 18 (with the exception of the mandible: Field Museum catalogue number 56033) are unknown.
Most deposits at the Hopewell Mound Group containing culturally modified human remains include only one specimen. The exceptions are Burials 34 and 41 of Mound 25 which each include two culturally modified individuals. Mound 18 may present some exceptions as well, but the provenience(s) of four of the five modified bones from Mound 18 is (are) unknown. Since Burial 41 Mound 25 includes three main interments, Burial 34 Mound 25 with a single main interment and two culturally modified individuals has the highest ratio of modified to non-modified individuals of all the known interments at the Hopewell Mound Group that include culturally modified human remains.

The list of variables associated with culturally modified human remains from the Hopewell Mound group is long and certainly some have been omitted here. However, the variables detailed serve to support the following statements:

1) The variability within and between deposits is great.

2) The fact that there are so many types of formal, depositional, and biological variability represented suggests that there may also have been considerable variability in the meanings associated with the manufacture, use, and deposition of culturally modified human remains at the Hopewell Mound Group.

3) It is likely that a single explanation for the manufacture, use, and deposition of culturally modified human remains is not going to be sufficient.
CHAPTER 6

CONCLUSIONS

The “Trophy Taking” or “Victory Token” Hypothesis:

The hypothesis that culturally modified human remains from the Hopewell Mound Group represent trophies or victory tokens predicts that the individuals from whom the “trophies” were taken were young adult males since in most human groups the participants in conflicts are predominately young and male. In other words, the assumption is made that older individuals and females would be less likely than young males to become trophies since they would be less likely to be involved in a conflict between groups. This is supported by the work of Mensforth (2001) who looked for evidence of warfare and trophy taking in Late Archaic skeletons from Kentucky and Ohio sites. Mensforth notes that adult males predominate as victims of conflicts that lead to death. Although Milner (1995) cautions against extrapolating a sex ratio for participants in prehistoric warfare from human skeletal samples, the tendency for there to be a greater number of the skeletons of males exhibiting evidence of antemortem and perimortem trauma associated with conflict is noted in his summary of osteological evidence of prehistoric warfare. It is a reasonable assumption that if females participated in conflicts
they would not have been present in the same numbers as males. Therefore, the smaller the sample of culturally modified human remains the less likely it is that a female will be represented even if conflicts were not an exclusively male endeavor.

This hypothesis also predicts that the individuals with whom culturally modified human remains were interred are expected to have been adult males though not necessarily of any particular age category. If males were the main participants in conflicts then it is reasonable to assume that they were the ones taking trophies and thus would be the ones buried with the trophies.

Age and sex estimates of culturally modified human remains from the Hopewell Mound Group do not support the “Trophy Taking” or “Victory Token” hypothesis as it is stated in Chapter 1. Although most of the individuals from whom elements were taken for modification were younger than twenty-five years old at death, one individual was between thirty-one and forty years old and two individuals were older than forty-one years. Not insignificant, yet not particularly informative, are the six individuals representing a third of the sample who could not be placed in a specific age category. Similarly, the presence of females among those culturally modified and those interred with modified individuals renders the “Trophy Taking” or “Victory Token” hypothesis unsupported by the data. Only two females were identified among those culturally modified and the sex of one of these is questionable. However, more than half the sample could not be sexed (55%). Perhaps more significant is that there are equal numbers of males and females among individuals interred with culturally modified human remains and that the proportion of this group who could not be assigned to a sex category is relatively small (27%).
In summary, the “Trophy Taking” or “Victory Token” hypothesis as stated in Chapter 1 is rejected because of the presence of older individuals among the culturally modified and the presence of females among both the modified and those interred with them.

The “Revered Ancestor” Hypothesis:

The “Revered Ancestor” hypothesis predicts that if the individuals whose remains were fashioned into culturally modified human remains were chosen for modification because they are honored ancestors of those with whom they were buried, of those who buried them, or of the group represented by those buried at Hopewell Mound Group, then they are expected to have been adults and could have been of either sex. However, one sex may have predominated depending on how descent was reckoned.

The expectation that ancestors should be adults results from the biological fact that in order to be someone’s biological ancestor you must have left descendants. Children, incapable of reproducing, would not have left descendants and thus could not be anyone’s ancestor in the biological sense of the term (Parker Pearson, 1999). It is possible for a person to be considered an ancestor for cultural reasons even if the person did not leave biological descendants. However, ancestor worship often involves not only a belief in the immortality of ancestors but also a belief in their power and wisdom and represents continuity across generations (Parker Pearson, 1999). Even if a particular group’s definition of ancestor does not require a biological connection by descent, it is not uncommon for there to be some requirement that the person was a well respected elder in life. Thus, the assumption that revered ancestors are adults is sound in either case.
The “Revered Ancestor” hypothesis also predicts that the age and sex distributions of individuals with whom culturally modified human remains were interred may be expected to reflect the age and sex distributions of the burial population since no one is prevented, based on age or sex, from having a revered or worshiped ancestor.

The “Revered Ancestor” hypothesis, as stated in Chapter 1, is supported by the data to the extent that none of the individuals interred at Hopewell Mound Group who are represented by culturally modified human remains are thought to have been younger than fifteen years old at death. Also consistent with the predictions of the hypothesis is the fact that both sexes are represented among this group. However, the large proportion of missing sex data renders an evaluation of the sex ratio untenable.

Difficulty is encountered in evaluating whether or not the prediction regarding the individuals interred with culturally modified human remains is met. The hypothesis predicts that the age and sex distributions of those interred with culturally modified human remains mirrors the age and sex distributions of those buried without culturally modified human remains. In other words, whatever selection process was used to decide who was buried at the site in general, was used to decide who was buried with culturally modified human remains. Only about one third of the individuals that the excavators of Hopewell Mound Group reported encountering were located in the museum collections and securely provenienced and only about half of these were assigned an age and sex category.

Missing data render knowledge of the age and sex distributions of those buried at Hopewell Mound Group unknown and thus prevent an evaluation of this prediction. However, if only age is considered, and if the assumption holds that the excavators noted
all of the subadults they encountered and everyone else is an adult, then an argument can be made that the age distribution of those interred with culturally modified human remains is patterned after the age distribution of the burial population at least in terms of the proportion of subadults present. It is reasonable to interpret the absence of subadults in the sample of individuals interred with culturally modified human remains the result of sampling bias. Only about five percent (11 out of 230) of individuals interred at Hopewell Mound Group were subadults according to Moorehead and Shetrone. If the assumption that five percent of the individuals interred with culturally modified human remains (n = 11; .05 X 11 = .55) should be subadults holds, then it is reasonable to conclude that even if there was no selection process that excluded subadults, a subadult would not be expected to be present among those interred with culturally modified human remains unless this group was at least about twice as large.

This reasoning can be applied to the culturally modified human remains as well. If five percent of them are expected to be subadults based on the proportion of subadults in the burial population then approximately one subadult would be expected to be present among those culturally modified (n = 18; .05 X 18 = .9). No subadults are represented among the culturally modified individuals, thus the expectation of the “Revered Ancestor” hypothesis that all of those modified are adults is tentatively met.

In summary, the “Revered Ancestor” hypothesis as stated in Chapter 1 is tentatively not rejected because its expectations are met in terms of the absence of subadult individuals among the culturally modified and the fact that sampling bias can
not be ruled out as a cause of the absence of subadults among those interred with culturally modified human remains. The sample is so small that definitive conclusions based on the expected absence of subadults are not appropriate.

The “Memento Mori” and “Ritual Use” Hypotheses:

These hypotheses are considered together since they both predict that the age and sex distributions of culturally modified individuals and those with whom they were interred are patterned after the age and sex distributions of the burial population. The “Memento Mori” hypothesis is based on the idea that culturally modified human remains are simply tokens of remembrance of someone who has died (Konigsberg and Frankenberg, 1993). The “Ritual Use” hypothesis holds that the significance of culturally modified human remains may not come from who they were in life but instead may be derived from what they are in terms of being an anatomical element from a human. The time and place of death of the individual from whom the remains were taken may dictate whose remains become modified if a certain modified element is needed for a particular ritual (Konigsberg and Frankenberg, 1993). Neither the “Memento Mori” nor the Ritual Use” hypothesis predict age and sex distributions for culturally modified human remains or those that they were interred with that differ from the age and sex distribution of the remainder of those buried at Hopewell Mound Group.

The same logic that was applied to the “Revered Ancestor” hypothesis regarding the age and sex distributions of the burial population from Hopewell Mound Group can be applied in evaluating the “Memento Mori” and “Ritual Use” hypotheses. The sex distribution of those buried at Hopewell Mound Group is unknown due to missing data. The age distribution meets a similar fate with the exception that the proportion of
subadults in the group can be estimated under the assumptions that the excavators reported all subadults and that the rest of the individuals recovered are adults. Shetrone and Moorehead report that eleven of the two hundred and thirty individuals (5%) interred at Hopewell Mound Group were subadults. If five percent of the culturally modified individuals are expected to be subadults based on the proportion of subadults in the burial population then approximately one subadult would be expected to be present among those culturally modified (n = 18; .05 X 18 = .9). No subadults are represented among the culturally modified individuals. The expectation of the “Memento Mori” and “Ritual Use” hypotheses that the age distribution of culturally modified individuals is patterned after the age distribution of the burial population is tentatively not met. Similarly, if the assumption that five percent of the individuals interred with culturally modified human remains (n = 11; .05 X 11 = .55) should be subadults holds, then it is reasonable to conclude that this group is small enough that sampling bias can not be ruled out as the cause of the lack of subadults.

In summary, the “Memento Mori” and “Ritual Use” hypotheses may tentatively be rejected because subadults are not represented among the culturally modified individuals. As in the case of the “Revered Ancestor” hypothesis, the sample is so small that definitive conclusions based on the expected absences of subadults are not appropriate.

Discussion:

It seems clear from this and previous studies (Konigsberg and Frankenberg, 1993; Nawrocki, 1997; Johnston et al., 1997) that the hypothesis that culturally modified human remains from Hopewell contexts are trophies of war based on the expectation that they
were made from skeletal elements of young adult males is not supported. Recent studies of prehistoric warfare and trophy taking (Milner, 1995; Mensforth, 2001) reveal a pattern that includes the interment of multiple individuals in a grave, osteological evidence of antemortem and perimortem injuries received in conflicts, and trophy taking which includes scalping, decapitation, and removal of other body parts. Although some of the graves at Hopewell Mound group are multiple, of the two-hundred and one grave features reported by Shetrone and Moorehead only twenty are double burials and only two are triple burials. There is also one burial feature that Shetrone calls a “bundle burial” which includes skeletal elements minimally representing three adults and one subadult. There is no evidence among any of the individuals examined from Hopewell Mound Group, whether interred individually or multiply, of scavenger damage sometimes seen on remains of victims of conflict who were not buried immediately after death (Milner, 1995). Evidence of antemortem or perimortem injury that might have been the result of warfare is virtually absent as are individuals who are missing body parts from whom trophies might have been taken. No evidence of scalping was observed.

The “Ancestor Worship” hypothesis, though not rejected, is somewhat tenuous due to the small sizes of the samples of culturally modified individuals and individuals interred with them. Conversely, the “Memento Mori” and “Ritual Use” hypotheses were rejected, but a larger sample might reveal a better fit (or lack thereof) between the age and sex distributions those who were modified or buried with modified bones and the rest of the burial population. However, it may be the case that subadults are not missing from the Hopewell Mound Group samples because of sampling bias. Observations of
culturally modified human remains from numerous other Midwestern Hopewell contexts reveals that there is an absence of subadults in general among those chosen for modification.

Why were culturally modified human remains made? They were probably made for numerous reasons. Just as the magnitude of the variation among Hopewellian earthworks has recently been re-evaluated (Mainfort and Sullivan, 1998) so should be the variation represented among Hopewell mortuary attributes including the production, use, and deposition of culturally modified human remains. It is not necessarily the case that they were made, used, and deposited for the same reasons, to serve the same purpose, or by the same people. Some may have been trophies, some may have been ancestors, some may have been shamanistic equipment, some may have been parts of death bundles (see Hall, 1997), some may have clan or group symbols, some may have been made for reasons we will never know. It is clear that the contexts in which they are found, the people they were made from and deposited with, and the way they were made are numerous which suggests numerous meanings or significances.

How were they made and used? Most were probably made from fleshed remains that had to be cleaned or from fairly fresh bone. There would have been no cultural prohibition against handling human remains, or if there were one there would have been a way to suspend it, at least for certain people participating in whatever Hopewell was. Given the different modification techniques used perhaps it is the case that they were made by more than one person. Some exhibit polish that is perhaps from being handled
or carried in a bag, others do not. Some were drilled, perhaps for suspension, although the evidence suggests that if they were suspended it was not for very long and they were probably not worn for any length of time.

Why were they deposited with certain individuals at Hopewell Mound Group? The answer to this question depends on the cultural significance of each example and the cultural significance of being buried at the Hopewell Mound Group in general.

Unfortunately there are no satisfying answers to many of our questions about Hopewell. What can be said about the cultural modification of human remains that were deposited at the Hopewell Mound Group is that regardless of the purpose cultural modification of human remains served in Hopewellian mortuary behavior, either sex could participate as donors of raw material or posthumous recipients of culturally modified human remains as long as biological maturity had been reached and there were multiple stimuli that lead to the production, use, and deposition of culturally modified human remains.

Future lines of inquiry must recognize and document the variation expressed by culturally modified human remains. Perhaps a bigger sample that includes numerous other Hopewell sites in other regions will reveal meaningful patterns in the variation and stimulate the formulation of new hypotheses which when tested will provide a means by which the numerous functions culturally modified human remains undoubtedly served in Middle woodland time can be identified.
APPENDIX A

PRINCIPAL COMPONENTS ANALYSES RESULTS
ID#
150108
150109
150112
150215
150129
150143
150127
150137
150138
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41602A
41598A
41613
41606
56068
150165
150166
150213
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150131
150132
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150061
150062
150210
150209
150128
150121
150117
150118
150212
150056
150172
150053
150057
150116
150115
150164
150107

Mound
/Burial
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2/3
2/4
2/5
4/3
4/4
4/9
7/1
7/3
18/181
23/198
23/198
23/205
23/228
24/192
25/6
25/7
25/11
25/12
25/15
25/15
25/16
25/22A
25/22B
25/23N
25/23S
25/24
25/25
25/34
25/34
25/35
25/41
25/41
25/41-2
25/41-3
25/42
25/45
26/6
27/1

Age
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PCA
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PCA
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PCA PCA PCA
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PCA Best Range
#7 Est.
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21 20-25
---41 35-45
27
31 25-35
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43 35-45
---50 45-55
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28 25-35
---23 20-30
---43 40-50
---25 20-30
---21 20-25
---26 20-30
---23 20-30
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---50 45-55
---42 35-45
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38 35-45
---31 25-35
---18 15-20
---36 30-40
---46 40-50
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28 25-35
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38 35-45
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38 35-45
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31 25-35

Table 1. Principal components analyses results. Note key on next page.

116


Key to Table 1:

Age 1: Midpoint of age range produced by seriation of the maxillary dentition

Age 2: Midpoint of age range produced by seriation of the mandibular dentition

Age 3: Midpoint of age range produced by seriation of the auricular surface of the ilium

Age 7: Midpoint of age range produced by degree of ectocranial suture closure

PCA #1: Principal components analysis based on midpoint of ranges produced by age methods 1 and 2. First principal component accounts for 94% of the variation in age estimates.

PCA #2: Principal components analysis based on midpoint of ranges produced by age methods 2 and 7. First principal component accounts for 85% of the variation in age estimates.

PCA #3: Principal components analysis based on midpoint of ranges produced age methods 1, 2 and 7. First principal component accounts for 80% of the variation in age estimates.

PCA #4: Principal components analysis based on midpoint of ranges produced by age methods 2 and 3. First principal component accounts for 77% of the variation in age estimates.

PCA #5: Principal components analysis based on midpoint of ranges produced by age methods 2 and 7. First principal component accounts for 77% of the variation in age estimates.

PCA #6: Principal components analysis based on midpoint of ranges produced by age methods 1, 2, and 3. First principal component accounts for 70% of the variation in age estimates.

PCA #7: Principal components analysis based on midpoint of ranges produced by age methods 1 and 3. First principal component accounts for 57% of the variation in age estimates.
APPENDIX B

METHODS USED IN THE ASSIGNMENT OF SEX
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Females</th>
<th>Males</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence/absence of the ventral arc</td>
<td>Present</td>
<td>Absent</td>
<td>Phenice (1969)</td>
</tr>
<tr>
<td>Presence/absence of the subpubic concavity</td>
<td>Present</td>
<td>Absent</td>
<td>Phenice (1969)</td>
</tr>
<tr>
<td>Breadth of the ischiopubic ramus</td>
<td>Narrow</td>
<td>Broad</td>
<td>Phenice (1969)</td>
</tr>
<tr>
<td>Width of the sciatic notch</td>
<td>1</td>
<td>2-5</td>
<td>Buikstra and Ubelaker (1994)</td>
</tr>
<tr>
<td>Condition of the sacroiliac articulation</td>
<td>Raised</td>
<td>Flat</td>
<td>Bass (1987)</td>
</tr>
<tr>
<td>Presence/absence of the preauricular sulcus</td>
<td>Present</td>
<td>Absent</td>
<td>Buikstra and Ubelaker (1994)</td>
</tr>
<tr>
<td>Breadth of the subpubic angle</td>
<td>Broad</td>
<td>Narrow</td>
<td>Bass (1995)</td>
</tr>
<tr>
<td>Robusticity of the supraorbital tori</td>
<td>1, 2</td>
<td>4, 5</td>
<td>Buikstra and Ubelaker (1994)</td>
</tr>
<tr>
<td>Robusticity of the mastoid processes</td>
<td>1, 2</td>
<td>4, 5</td>
<td>Buikstra and Ubelaker (1994)</td>
</tr>
<tr>
<td>Robusticity of the nuchal crest</td>
<td>1, 2</td>
<td>4, 5</td>
<td>Buikstra and Ubelaker (1994)</td>
</tr>
<tr>
<td>Diameter of the femoral head</td>
<td>&lt; 43.5 mm</td>
<td>&gt; 46.5 mm</td>
<td>Bass (1995)</td>
</tr>
<tr>
<td>Diameter of the humeral head</td>
<td>&lt; 43 mm</td>
<td>&gt; 47 mm</td>
<td>Bass (1995)</td>
</tr>
<tr>
<td>Seriation of cranial robusticity</td>
<td>See text page 73</td>
<td>See text Page 73</td>
<td>See text page 73</td>
</tr>
<tr>
<td>Discriminant function calculated using dental metrics</td>
<td>See text pages 74-76</td>
<td>See text pages 74-76</td>
<td>See text pages 74-76</td>
</tr>
</tbody>
</table>

Table 2. Methods used in the assignment of sex.
APPENDIX C

RESULTS OF DISCRIMINANT FUNCTIONS ANALYSES
Note:

Abbreviations that appear in Appendix C for variables used in the discriminant function analyses are as follows:

Maxillary Molar Metrics:
XM2ABL: anterior buccolingual measurement of the maxillary second molar.
XM2PBL: posterior buccolingual measurement of the maxillary second molar.
XM3PBL: posterior buccolingual measurement of the maxillary third molar.

Mandibular Molar Metrics:
XLM2ABL: anterior buccolingual measurement of mandibular second molar.
XLM2PBL: posterior buccolingual measurement of mandibular second molar.
XLM3ABL: anterior buccolingual measurement of mandibular third molar.
XLM3PBL: posterior buccolingual measurement of mandibular third molar.

Maxillary Premolar Metrics
XAPBL: buccolingual measurement of the maxillary anterior premolar.
XPPBL: buccolingual measurement of the maxillary posterior premolar.

Mandibular Premolar Metrics:
XLAPBL: buccolingual measurement of the mandibular anterior premolar.
XLPPBL: buccolingual measurement of the mandibular posterior premolar.

Maxillary Canine Metrics:
XCBL: buccolingual measurement of the maxillary canine.
Mandibular Canine Metrics:

XLCBL: buccolingual measurement of the mandibular canine.

Mandibular Incisor Metrics:

XLLIBL: buccolingual measurement of the mandibular lateral incisor.
Discriminant Function Analysis Results for Burial 4 of Mound 4, Hopewell Mound Group:

Table 3. Summary statistics for discriminant function analysis of dental metrics from Burial 4 of Mound 4, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Femaless</th>
<th>Unknown Mound 4 Burial 4 (150143)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=10</td>
<td>N=12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>11.992</td>
<td>0.5491923</td>
<td>11.43208</td>
</tr>
<tr>
<td>XM2PBL</td>
<td>10.4235</td>
<td>0.5396709</td>
<td>10.27583</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>10.647</td>
<td>0.3144855</td>
<td>10.27208</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.469</td>
<td>0.5420271</td>
<td>10.51667</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>8.555</td>
<td>0.3383785</td>
<td>8.47625</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.2545</td>
<td>0.4882477</td>
<td>8.085417</td>
</tr>
<tr>
<td>XLCBL</td>
<td>8.084</td>
<td>0.5882781</td>
<td>7.512084</td>
</tr>
</tbody>
</table>

Table 4. Results of Box's M test for equivalency of group covariance matrices for Burial 4 of Mound 4, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>67.7872</td>
<td>28</td>
<td>1.46</td>
<td>0.056668</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Burial 4 of Mound 4, Hopewell Mound Group (continued):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-547.1602</td>
<td>-519.5477</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>20.87516</td>
<td>16.11511</td>
</tr>
<tr>
<td>XM2PBL</td>
<td>23.8555</td>
<td>26.28759</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>19.94418</td>
<td>16.127</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>11.29307</td>
<td>14.64624</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>26.696</td>
<td>29.08726</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>-9.713597</td>
<td>-5.413616</td>
</tr>
<tr>
<td>XLCBL</td>
<td>14.41756</td>
<td>8.289599</td>
</tr>
</tbody>
</table>

Table 5. Linear discriminant functions of sex based on dental metrics of Burial 4 of Mound 4, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Error</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/10 (.10)</td>
<td>1/12 (.08)</td>
<td>2/22 (.09)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Frequencies of classification error of linear discriminant function of dental metrics of Burial 4 of Mound 4, Hopewell Mound Group

Discriminant Function Score for Males = 547.7172
Discriminant Function Score for Females = 549.6257

Result: The sex of Burial 4 of Mound 4 Hopewell Mound Group (150143) based on discriminant function analysis of dental metrics is Female.
Discriminant Function Analysis Results for Burial 3 of Mound 7, Hopewell Mound Group:

Table 7. Summary statistics for discriminant function analysis of dental metrics from Burial 3 of Mound 7, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 7 Burial 3 (150138)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XM3PBL</td>
<td>9.339176</td>
<td>0.7130212</td>
<td>8.756</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>11.9325</td>
<td>0.5503656</td>
<td>11.4285</td>
</tr>
<tr>
<td>XM2PBL</td>
<td>10.44875</td>
<td>0.5080673</td>
<td>10.05</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.47458</td>
<td>0.5352165</td>
<td>10.527</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>8.501667</td>
<td>0.3306971</td>
<td>8.5075</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.229584</td>
<td>0.4516609</td>
<td>8.1435</td>
</tr>
</tbody>
</table>

Table 8. Results of Box's M test for equivalency of group covariance matrices for Burial 3 of Mound 7, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box’s M</td>
<td>33.0255</td>
<td>21</td>
<td>1356</td>
<td>1.04</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Burial 3 of Mound 7, Hopewell Mound Group (continued):

<table>
<thead>
<tr>
<th>Linear Discriminant Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>XM3PBL</td>
</tr>
<tr>
<td>XM2ABL</td>
</tr>
<tr>
<td>XM2PBL</td>
</tr>
<tr>
<td>XLM3PBL</td>
</tr>
<tr>
<td>XLPPBL</td>
</tr>
<tr>
<td>XLAPBL</td>
</tr>
</tbody>
</table>

Table 9. Linear discriminant functions of sex based on dental metrics of Burial 3 of Mound 7, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>3/12 (.25)</td>
<td>1/10 (.10)</td>
<td>4/22 (.18)</td>
</tr>
</tbody>
</table>

Table 10. Frequencies of classification error of linear discriminant function of dental metrics of Burial 3 of Mound 7, Hopewell Mound Group

Discriminant Function Score for Males = 507.5952
Discriminant Function Score for Females = 506.2320

Result: The sex of Burial 3 of Mound 7 Hopewell Mound Group (150138) based on discriminant function analysis of dental metrics is Male.
Discriminant Function Analysis Results for Culturally Modified Human Remains 56034-4 of Mound 18, Hopewell Mound Group:

Table 11. Summary statistics for discriminant function analysis of dental metrics from 56034-4 of Mound 18, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 18 (56034-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XPPBL</td>
<td>9.726111</td>
<td>0.4598082</td>
<td>9.359706</td>
</tr>
<tr>
<td>XCBL</td>
<td>9.150556</td>
<td>0.2875157</td>
<td>8.508823</td>
</tr>
</tbody>
</table>

Table 12. Results of Box's M test for equivalency of group covariance matrices for 56034-4 of Mound 18, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>1.6978</td>
<td>3</td>
<td>6491</td>
<td>0.51</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Culturally Modified Human Remains 56034-4 of Mound 18, Hopewell Mound Group (continued):

Table 13. Linear discriminant functions of sex based on dental metrics of 56034-4 of Mound 18, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-428.1943</td>
<td>-377.2253</td>
</tr>
<tr>
<td>XPPBL</td>
<td>23.05198</td>
<td>22.8101</td>
</tr>
<tr>
<td>XCBL</td>
<td>69.08678</td>
<td>63.57575</td>
</tr>
</tbody>
</table>

Table 14. Frequencies of classification error of linear discriminant function of dental metrics of 56034-4 of Mound 18, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Error</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>1/9 (.11)</td>
<td>4/17 (.23)</td>
<td>5/26 (.19)</td>
</tr>
</tbody>
</table>

Discriminant Function Score for Males = 416.9639
Discriminant Function Score for Females = 416.2291

Result: The sex of 56034-4 of Mound 18 Hopewell Mound Group based on discriminant function analysis of dental metrics is Male
Discriminant Function Analysis Results for Culturally Modified Human Remains of Burial 213 of Mound 23, Hopewell Mound Group:

Table 15. Summary statistics for discriminant function analysis of dental metrics from Burial 213 of Mound 23, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
<th>Unknown Mound 23 Burial 213 (56064)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Measurement (mm)</td>
</tr>
<tr>
<td>N=10</td>
<td></td>
<td></td>
<td>N=10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>10.662</td>
<td>0.3259618</td>
<td>10.301</td>
<td>0.4794024</td>
<td>10.12</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.486</td>
<td>0.5422884</td>
<td>10.6055</td>
<td>0.5437751</td>
<td>11.13</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.2935</td>
<td>0.490108</td>
<td>8.0885</td>
<td>0.3634484</td>
<td>8.395</td>
</tr>
<tr>
<td>XLCBL</td>
<td>8.1475</td>
<td>0.6401703</td>
<td>7.544</td>
<td>0.2927342</td>
<td>7.62</td>
</tr>
<tr>
<td>XLLIBL</td>
<td>6.259</td>
<td>0.3571088</td>
<td>6.0545</td>
<td>0.1836732</td>
<td>5.96</td>
</tr>
</tbody>
</table>

Table 16. Results of Box’s M test for equivalency of group covariance matrices for Burial 213 of Mound 23, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Box’s M</th>
<th>DF1</th>
<th>DF2</th>
<th>FApprox</th>
<th>FProb</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.8899</td>
<td>15</td>
<td>1305</td>
<td>0.87</td>
<td>0.596480</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Culturally Modified Human Remains of Burial 213 of Mound 23, Hopewell Mound Group (continued):

Table 17. Linear discriminant functions of sex based on dental metrics of Burial 213 of Mound 23, Hopewell Mound Group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Linear Discriminant Functions</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-716.545</td>
<td>-665.7643</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>91.41807</td>
<td>85.34204</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>-26.97749</td>
<td>-22.81565</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>20.52294</td>
<td>21.64916</td>
</tr>
<tr>
<td>XLCBL</td>
<td>-17.1429</td>
<td>-20.82171</td>
</tr>
<tr>
<td>XLL1BL</td>
<td>113.5551</td>
<td>111.7122</td>
</tr>
</tbody>
</table>

Table 18. Frequencies of classification error of linear discriminant function of dental metrics of Burial 213 of Mound 23, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>0/10 (0.0)</td>
<td>1/10 (.10)</td>
<td>1/20 (.05)</td>
</tr>
</tbody>
</table>

Result: The sex of Burial 213 of Mound 23 Hopewell Mound Group (56064) based on discriminant function analysis of dental metrics is Female
Discriminant Function Analysis Results for Burial 12 of Mound 25, Hopewell Mound Group:

Table 19. Summary statistics for discriminant function analysis of dental metrics from Burial 12 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 25 Burial 12 (150124)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=12</td>
<td>N=10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XM3PBL</td>
<td>9.330167</td>
<td>0.7130212</td>
<td>8.756</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>11.9325</td>
<td>0.5503656</td>
<td>11.4285</td>
</tr>
<tr>
<td>XM2PBL</td>
<td>10.44875</td>
<td>0.5080673</td>
<td>10.05</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.47458</td>
<td>0.5352165</td>
<td>10.527</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>8.501667</td>
<td>0.3306971</td>
<td>8.5075</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.229584</td>
<td>0.4516609</td>
<td>8.1435</td>
</tr>
</tbody>
</table>

Table 20. Results of Box's M test for equivalency of group covariance matrices for Burial 12 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Box's M</th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>33.0255</td>
<td>21</td>
<td>1356</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Table 20. Results of Box's M test for equivalency of group covariance matrices for Burial 12 of Mound 25, Hopewell Mound Group
Discriminant Function Analysis Results for Burial 12 of Mound 25 Hopewell Mound Group (continued):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-536.5046</td>
<td>-514.0309</td>
</tr>
<tr>
<td>XM3PBL</td>
<td>5.63278</td>
<td>4.897296</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>6.524804</td>
<td>4.124303</td>
</tr>
<tr>
<td>XM2PBL</td>
<td>39.3479</td>
<td>38.54188</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>14.42058</td>
<td>14.98504</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>21.59104</td>
<td>22.5983</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>23.91384</td>
<td>24.64519</td>
</tr>
</tbody>
</table>

Table 21. Linear discriminant functions of sex based on dental metrics of Burial 12 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Error</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3/12 (.25)</td>
<td>1/10 (.10)</td>
<td>4/22 (.18)</td>
</tr>
</tbody>
</table>

Table 22. Frequencies of classification error of linear discriminant function of dental metrics of Burial 12 of Mound 25, Hopewell Mound Group

Discriminant Function Score for Males = 432.0217
Discriminant Function Score for Females = 433.4305

Result: The sex of Burial 12 of Mound 25 Hopewell Mound Group (150124) based on discriminant function analysis of dental metrics is Female
Discriminant Function Analysis Results for Burial 23N of Mound 25, Hopewell Mound Group:

Table 23. Summary statistics for discriminant function analysis of dental metrics from Burial 23N of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 25 Burial 23N (150210)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=8</td>
<td>N=13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XAPBL</td>
<td>10.015</td>
<td>0.3010102</td>
<td>9.448462</td>
</tr>
<tr>
<td>XCBL</td>
<td>9.1475</td>
<td>0.307211</td>
<td>8.474231</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>8.450625</td>
<td>0.2981783</td>
<td>8.370384</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.34125</td>
<td>0.28029</td>
<td>8.006154</td>
</tr>
</tbody>
</table>

Table 24. Results of Box's M test for equivalency of group covariance matrices for Burial 23N of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>12.2371</td>
<td>10</td>
<td>1012</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Table 23. Summary statistics for discriminant function analysis of dental metrics from Burial 23N of Mound 25, Hopewell Mound Group

Table 24. Results of Box's M test for equivalency of group covariance matrices for Burial 23N of Mound 25, Hopewell Mound Group
Discriminant Function Analysis Results for Burial 23N of Mound 25, Hopewell Mound Group (continued):

### Table 25. Linear discriminant functions of sex based on dental metrics of Burial 23N of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-642.275</td>
<td>-573.6003</td>
</tr>
<tr>
<td>XAPBL</td>
<td>8.518787</td>
<td>7.371624</td>
</tr>
<tr>
<td>XCBL</td>
<td>45.28368</td>
<td>40.23145</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>-18.06275</td>
<td>-13.78104</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>112.4104</td>
<td>106.4146</td>
</tr>
</tbody>
</table>

### Table 26. Frequencies of classification error of linear discriminant function of dental metrics of Burial 23N of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>0/8 (0)</td>
<td>2/13 (.15)</td>
<td>2/21 (.09)</td>
</tr>
</tbody>
</table>

Discriminant Function Score for Males = 534.8646
Discriminant Function Score for Females = 541.1223

Result: The sex of Burial 23N of Mound 25 Hopewell Mound Group (150210) based on discriminant function analysis of dental metrics is Female
Discriminant Function Analysis Results for Burial 34 of Mound 25, Hopewell Mound Group:

Table 27. Summary statistics for discriminant function analysis of dental metrics from Burial 34 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 25 Burial 34 (150117)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=7</td>
<td>N=13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XM2ABL</td>
<td>12.06571</td>
<td>0.5979578</td>
<td>11.27654</td>
</tr>
<tr>
<td>XPPBL</td>
<td>9.656428</td>
<td>0.5317637</td>
<td>9.3</td>
</tr>
<tr>
<td>XLM2PBL</td>
<td>10.31786</td>
<td>0.313021</td>
<td>10.015</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.228572</td>
<td>0.4001949</td>
<td>7.969231</td>
</tr>
<tr>
<td>XLCBL</td>
<td>7.965</td>
<td>0.6021628</td>
<td>7.505769</td>
</tr>
</tbody>
</table>

Table 28. Results of Box's M test for equivalency of group covariance matrices for Burial 34 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_Approx</th>
<th>F_Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>10.0212</td>
<td>15</td>
<td>604</td>
<td>0.42</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Burial 34 of Mound 25, Hopewell Mound Group (continued):

<table>
<thead>
<tr>
<th>Linear Discriminant Functions</th>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-648.3575</td>
<td>-601.7119</td>
<td></td>
</tr>
<tr>
<td>XM2ABL</td>
<td>30.04836</td>
<td>24.04356</td>
<td></td>
</tr>
<tr>
<td>XPPBL</td>
<td>-49.6818</td>
<td>-48.00888</td>
<td></td>
</tr>
<tr>
<td>XLM2PBL</td>
<td>87.60396</td>
<td>86.91337</td>
<td></td>
</tr>
<tr>
<td>XLAPBL</td>
<td>60.65782</td>
<td>65.24715</td>
<td></td>
</tr>
<tr>
<td>XLCBL</td>
<td>1.36806</td>
<td>-1.549291</td>
<td></td>
</tr>
</tbody>
</table>

Table 29. Linear discriminant functions of sex based on dental metrics of Burial 34 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>2/7 (.286)</td>
<td>1/13 (.08)</td>
<td>3/20 (.15)</td>
</tr>
</tbody>
</table>

Table 30. Frequencies of classification error of linear discriminant function of dental metrics of Burial 34 of Mound 25, Hopewell Mound Group

Discriminant Function Score for Males = 611.3477
Discriminant Function Score for Females = 609.9122

Result: The sex of Burial 34 of Mound 25 Hopewell Mound Group (150117) based on discriminant function analysis of dental metrics is Male.
Discriminant Function Analysis Results for Culturally Modified Maxillae of Burial 34 of Mound 25, Hopewell Mound Group:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 25 Burial 34 (150120)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=8</td>
<td>N=13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XPPBL</td>
<td>9.748125</td>
<td>0.486459</td>
<td>9.423077</td>
</tr>
<tr>
<td>XAPBL</td>
<td>10.015</td>
<td>0.3010102</td>
<td>9.444615</td>
</tr>
<tr>
<td>XCBL</td>
<td>9.1475</td>
<td>0.307211</td>
<td>8.458076</td>
</tr>
</tbody>
</table>

Table 31. Summary statistics for discriminant function analysis of dental metrics from culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box's M</td>
<td>7.4105</td>
<td>6</td>
<td>1424</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 32. Results of Box's M test for equivalency of group covariance matrices for culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group
Discriminant Function Analysis Results for Culturally Modified Maxillae of Burial 34 of Mound 25, Hopewell Mound Group (continued):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-440.9154</td>
<td>-385.3465</td>
</tr>
<tr>
<td>XPPBL</td>
<td>10.8154</td>
<td>12.3168</td>
</tr>
<tr>
<td>XAPBL</td>
<td>22.7322</td>
<td>20.3737</td>
</tr>
<tr>
<td>XCBL</td>
<td>59.9877</td>
<td>54.6469</td>
</tr>
</tbody>
</table>

Table 33. Linear discriminant functions of sex based on dental metrics of culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>0/8</td>
<td>2/13</td>
<td>2/21</td>
</tr>
</tbody>
</table>

Table 34. Frequencies of classification error of linear discriminant function of dental metrics of culturally modified maxillae of Burial 34 of Mound 25, Hopewell Mound Group.

Discriminant Function Score for Males = 425.2100
Discriminant Function Score for Females = 424.0514

Result: The sex of the Culturally Modified Maxillae of Burial 34 of Mound 25, Hopewell Mound Group (150120) based on discriminant function analysis of dental metrics is Male.
Discriminant Function Analysis Results for Burial 41-1 of Mound 25, Hopewell Mound Group:

Table 35. Summary statistics for discriminant function analysis of dental metrics from Burial 41-1 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th></th>
<th></th>
<th>Females</th>
<th></th>
<th></th>
<th>Unknown Mound 25 Burial 41-1 (150058)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Measurement (mm)</td>
<td></td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>10.25</td>
<td>1.350078</td>
<td>10.29864</td>
<td>0.624312</td>
<td>10.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.37364</td>
<td>0.6036973</td>
<td>10.55182</td>
<td>0.5627534</td>
<td>10.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLM2ABL</td>
<td>10.70273</td>
<td>0.3419237</td>
<td>10.36954</td>
<td>0.4649056</td>
<td>10.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLM2PBL</td>
<td>10.51409</td>
<td>0.4779583</td>
<td>10.27318</td>
<td>0.432714</td>
<td>10.52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLPPBL</td>
<td>8.575455</td>
<td>0.328104</td>
<td>8.505455</td>
<td>0.4768042</td>
<td>9.29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLAPBL</td>
<td>8.300454</td>
<td>0.4876241</td>
<td>8.111818</td>
<td>0.345574</td>
<td>8.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XLCBL</td>
<td>8.098182</td>
<td>0.5600682</td>
<td>7.498636</td>
<td>0.3188267</td>
<td>7.96</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 36. Results of Box's M test for equivalency of group covariance matrices for Burial 41-1 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Box’s M</th>
<th>DF1</th>
<th>DF2</th>
<th>F_{Approx}</th>
<th>F_{Prob}</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.7932</td>
<td>28</td>
<td>1394</td>
<td>0.91</td>
<td>0.597957</td>
</tr>
</tbody>
</table>
Discriminant Function Analysis Results for Burial 41-1 of Mound 25, Hopewell Mound Group (continued):

### Table 37. Linear discriminant functions of sex based on dental metrics of Burial 41-1 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-411.9371</td>
<td>-397.2495</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>2.544105</td>
<td>2.51794</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>7.699636</td>
<td>9.259731</td>
</tr>
<tr>
<td>XLM2ABL</td>
<td>35.40922</td>
<td>32.98222</td>
</tr>
<tr>
<td>XLM2PBL</td>
<td>7.199479</td>
<td>7.103782</td>
</tr>
<tr>
<td>XLPPBL</td>
<td>10.94827</td>
<td>12.65691</td>
</tr>
<tr>
<td>XLAPBL</td>
<td>21.16245</td>
<td>23.08733</td>
</tr>
<tr>
<td>XLCBL</td>
<td>-0.7769288</td>
<td>-5.209128</td>
</tr>
</tbody>
</table>

Table 38. Frequencies of classification error of linear discriminant function of dental metrics of Burial 41-1 of Mound 25, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>2/11 (.18)</td>
<td>2/11 (.18)</td>
<td>4/22 (.18)</td>
</tr>
</tbody>
</table>

Discriminant Function Score for Males = 436.3261
Discriminant Function Score for Females = 436.9572

Result: The sex of Burial 41-1 of Mound 25 Hopewell Mound Group (150058) based on discriminant function analysis of dental metrics is Female.
Discriminant Function Analysis Results for Burial 1 of Mound 27, Hopewell Mound Group:

Table 39. Summary statistics for discriminant function analysis of dental metrics from Burial 1 of Mound 27, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>Unknown Mound 27 Burial 1 (150107)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=8</td>
<td>N=11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
</tr>
<tr>
<td>XAPBL</td>
<td>10.015</td>
<td>0.3010102</td>
<td>9.532727</td>
</tr>
<tr>
<td>XCBL</td>
<td>9.1475</td>
<td>0.307211</td>
<td>8.492272</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>10.49813</td>
<td>0.3267911</td>
<td>10.23682</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.37813</td>
<td>0.6182518</td>
<td>10.56136</td>
</tr>
</tbody>
</table>

Table 40. Results of Box's M test for equivalency of group covariance matrices for Burial 1 of Mound 27, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Box’s M</th>
<th>DF1</th>
<th>DF2</th>
<th>F_Approx</th>
<th>F_Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.8741</td>
<td>10</td>
<td>1065</td>
<td>0.94</td>
<td>0.499115</td>
</tr>
</tbody>
</table>

Table 39. Summary statistics for discriminant function analysis of dental metrics from Burial 1 of Mound 27, Hopewell Mound Group

Table 40. Results of Box's M test for equivalency of group covariance matrices for Burial 1 of Mound 27, Hopewell Mound Group
Discriminant Function Analysis Results for Burial 1 of Mound 27, Hopewell Mound Group (continued):

Table 41. Linear discriminant functions of sex based on dental metrics of Burial 1 of Mound 27, Hopewell Mound Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-509.204</td>
<td>-463.4264</td>
</tr>
<tr>
<td>XAPBL</td>
<td>46.25615</td>
<td>43.74122</td>
</tr>
<tr>
<td>XCBL</td>
<td>38.39431</td>
<td>34.35093</td>
</tr>
<tr>
<td>XLM3ABL</td>
<td>9.163615</td>
<td>8.612453</td>
</tr>
<tr>
<td>XLM3PBL</td>
<td>10.38144</td>
<td>12.30883</td>
</tr>
</tbody>
</table>

Table 42. Frequencies of classification error of linear discriminant function of dental metrics of Burial 1 of Mound 27, Hopewell Mound Group

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error</td>
<td>1/8 (.125)</td>
<td>2/11 (.18)</td>
<td>3/19 (.158)</td>
</tr>
</tbody>
</table>

Discriminant Function Score for Males = 461.0991
Discriminant Function Score for Females = 461.1789

Result: The sex of Burial 1 of Mound 27 Hopewell Mound Group (150107) based on discriminant function analysis of dental metrics is Female.
APPENDIX D

DESCRIPTIONS OF BURIALS FROM
W. K. MOOREHEAD’S EXCAVATIONS AT
THE HOPEWELL MOUND GROUP
APPENDIX D

HOPEWELL MOUND GROUP BURIAL DESCRIPTIONS FROM W. K. MOOREHEAD’S EXCAVATIONS

Note:

Some burial descriptions include information about dentition. Teeth are numbered according to the system recommended in Buikstra and Ubelaker (1994):

Tooth 1 is the maxillary right third molar.
Tooth 2 is the maxillary right second molar.
Tooth 3 is the maxillary right first molar.
Tooth 4 is the maxillary right posterior premolar
Tooth 5 is the maxillary right anterior premolar
Tooth 6 is the maxillary right canine.
Tooth 7 is the maxillary right lateral incisor.
Tooth 8 is the maxillary right central incisor.
Tooth 9 is the maxillary left central incisor.
Tooth 10 is the maxillary left lateral incisor.
Tooth 11 is the maxillary left canine.
Tooth 12 is the maxillary left anterior premolar.
Tooth 13 is the maxillary left posterior premolar.
Tooth 14 is the maxillary left first molar.
Tooth 15 is the maxillary left second molar.
Tooth 16 is the maxillary left third molar.
Tooth 17 is the mandibular left third molar.
Tooth 18 is the mandibular left second molar.
Tooth 19 is the mandibular left first molar.
Tooth 20 is the mandibular left posterior premolar.
Tooth 21 is the mandibular left anterior premolar.
Tooth 22 is the mandibular left canine.
Tooth 23 is the mandibular left lateral incisor.
Tooth 24 is the mandibular left central incisor.
Tooth 25 is the mandibular right central incisor.
Tooth 26 is the mandibular right lateral incisor.
Tooth 27 is the mandibular right canine.
Tooth 28 is the mandibular right anterior premolar.
Tooth 29 is the mandibular right posterior premolar.
Tooth 30 is the mandibular right first molar.
Tooth 31 is the mandibular right second molar.
Tooth 32 is the mandibular right third molar.
Moorehead’s Mound 3:

**Skeleton No. 237 and Associated Modified Maxillae:**

There is some ambiguity in the records of the Field Museum regarding the catalog numbers for Skeletons No. 227 and 237. The catalog numbers 41614 and 40183 are listed as in the catalogs in reference to both skeletons. Moorehead’s field notes do not refer to a catalog number for Skeleton No. 237 and indicate that 40183 is the catalog number of Skeleton No. 227. Skeleton No. 237 and the modified maxilla that was with it are not identified in the collection.

Skeleton No. 237 is an individual inhumation accompanied by culturally modified human maxillae. The individual is an adult and was unaccompanied by artifacts except for the modified human bone which Moorehead (1891, p.22) describes as follows:

“…superior maxillary (jaw) which had been cut across as in several other instances…”

The modified bone had been placed next to the humerus of Skeleton No. 237. Both the skeleton and the modified maxillae were noted in the field notes for October 27, 1891 (Moorehead, 1891, p. 22).
Moorehead’s Mound 8:

**Skeleton No. 239:**

Skeleton No. 239 is part of a double inhumation that includes Skeleton No. 240. No artifacts were noted with either skeleton and both are presumably adults. Moorehead described Skeleton No. 239 as fragmentary with less than half the bones missing at the time of discovery. It was mentioned in the field notes of November 13, 1891 (Moorehead, 1891, p.25) and is noted in Moorehead’s 1922 publication (page 102).

Skeleton No. 239 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 240:**

Skeleton No. 240 is part of a double inhumation that includes Skeleton No. 239. See description of Skeleton No. 239.

Skeleton No. 240 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 241:**

Skeleton No. 241 is an individual inhumation that was accompanied by mica, shell and lithic artifacts. The person is presumably an adult and is described by Moorehead (1922, p. 102; 1891, p. 25-26) as fragmentary. Skeleton No. 241 was mentioned in the field notes of November 13, 1891 (Moorehead, 1891, p.25-26).

Skeleton No. 241 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Moorehead’s Mound 16:

**Unnumbered Skeleton:**

Moorehead describes a partial cremation from Mound 16 in the field notes of October 12, 1891 (Moorehead, 1891, page 20). The individual was, according to Moorehead, a child of approximately eight years. A skeleton number was not assigned. The remains were also mentioned in Greber & Ruhl (1989, page 21). No artifacts accompanied the remains.

This skeleton was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Moorehead’s Mound 17:

**Skeleton No. 167:**

Skeleton No. 167 is an individual inhumation that is mentioned in the field notes of September 3, 1891 (Moorehead, 1891, p. 4) and was accompanied by a “copper implement.” Moorehead notes the burial in his publication of 1922 (page 91 & Plate XL). The age of the individual is not indicated in Moorehead’s works, but presumably it was an adult.

Skeleton No. 167 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 168:**

Skeleton No. 168 is an individual inhumation that is mentioned in the field notes of September 3, 1891 (Moorehead, 1891, p. 4) and was accompanied by an unspecified number of copper awls. Moorehead notes the burial in his publication of 1922 (page 91 & Plate XL). The age of the individual is not indicated in Moorehead’s works, but presumably it was an adult.

Skeleton No. 168 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 169:**

Skeleton No. 169 is an individual inhumation that is mentioned in the field notes of September 3, 1891 (Moorehead, 1891, p. 4). No artifacts are noted with the remains. Moorehead notes the burial in his publication of 1922 (page 91 & Plate XL). The age of the individual is not indicated in Moorehead’s works, but presumably it was an adult.
The Field Museum catalog numbers 56032 and 56597 were assigned to the bones. Fragmentary charred and calcined bone numbered 56032 was encountered during this investigation. Data were not collected.

**Unnumbered Skeletons:**

Moorehead describes two cremations from Mound 17 (1922, p. 91) which are not assigned a number. They are mentioned in the field notes of September 8, 1891 (Moorehead, 1891, p.5). Copper ear ornaments, a copper celt, and a large copper plate accompanied one. No artifacts are mentioned with the other cremation but it is noted as having been in a small clay “alter.” These remains were not located in the collections of the Field Museum of Natural History and there is no catalog record of them in the Field Museum files.
Moorehead’s Mound 18:

**Skeleton No. 170:**

Skeleton No. 170 is an individual inhumation that is described in Moorehead, 1922 (page 94) and Moorehead, 1891 (page 6). The age of the individual is not indicated in Moorehead’s works, but presumably it was an adult. Moorehead mentions no associated artifacts.

Skeleton No. 170 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 181 and Associated Culturally Modified Human Remains:**

Skeleton No. 181 is an individual inhumation that is mentioned in Moorehead’s field notes of September 10, 1891 (page 6). Moorehead does not indicate the age or sex of the individual. According to the field notes, an incised human jaw was discovered next to the left humerus of Skeleton No. 181.

The Field Museum catalog numbers 40211 and 41618 were assigned to Skeleton No. 181. Human remains labeled 41618 were identified in the collections of the Field Museum. Age at death, estimated via principle components analysis of two indicators is between forty and fifty years. This individual appears to have been a male based on a cranial robusticity and by comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex.
The culturally modified jaw was assigned the Field Museum catalog number 56033. A partial mandible labeled 56033 was identified in the collections of the Field Museum (Figure 1). The mandible is missing the condyles, coronoid processes, gonial angles and the portion of the inferior border of the body of the mandible inferior to the level of the mental foramina. The teeth and alveolar processes remain. The missing parts appear to have been intentionally removed.

Figure 1. Culturally Modified Mandible of Burial 181 Mound 18 Hopewell Mound Group (Oblique left lateral view; Field Museum catalogue number 56033)
The teeth have been glued in the sockets. Most of the teeth are present with the exception of the third molars, a posterior premolar, and the right lateral incisor. The third molars may have never been present as there is no socket for them, no unerupted teeth appear on x-ray, and no distal interproximal wear facets are present on the second molars. It appears as though the posterior premolar that is present was glued in its missing antimere’s socket. It also appears as though tooth 24 is in the socket for the missing tooth 26.

A semicircular perforation is observable on the inferior margin of the mental area slightly right of midline. Under magnification it appears to be lighter in color than the surrounding bone and the margins are irregular suggesting that it may not be of prehistoric origin.

A bilaterally symmetrical incised geometric design is present on the labial and buccal surfaces of the mandibular body. The design seems to have been made by repeatedly incising the same lines in order to produce a broader line than a single incision would have made.

Tiny striations are present on most cortical surfaces but are especially concentrated around the mental foramina. Striations from the cultural modification process are not observable macroscopically on the teeth. In some areas striations are oriented parallel to the incised lines of the design. Striations running parallel to the margin of the bone are observable on the inferior surfaces of the mandibular body. Under magnification the channels produced by the striations are “U” shaped in cross section with smaller stria present within the channels. Neither the incised lines forming the design or the striations appear to have “V” shaped channels.
Some striations are continuous from one side of the incised line of the design. It appears as though striations were created prior to the modification that produced the design. There are no striations that cross the incised line leaving a mark in the channel of the incision. The process of creating the design seems to have come after the modifications that produced the striations. The posterior margin of the right buccal (or lateral) aspect of the mandible has striations oriented parallel to the surface along which the posterior portion of the bone was detached. This suggests that the modification process included scoring the bone and then snapping it along the score line in order to remove portions. The posterior margin of the left buccal aspect does not bear striations in the same place, but is striated on the posterior facing part of the cortical bone where detachment of the ramus occurred. Some sort of mounting material has been applied to the posterior margins of the piece obscuring many of the surfaces along which reduction of the bone occurred.

Age at death of the individual from whom the mandible came is between twenty and twenty-five years as estimated by seriation of the dentition.

**Culturally Modified Human Remains from Moorehead’s Mound 18:**

In addition to the culturally modified mandible (56033) that was with Skeleton No. 181, several similar objects were recovered from Moorehead’s Mound 18. There are four specimens cataloged under the number 56034. Three of these are in the collections of the Field Museum (56034-1, 56034-2, 56034-1 [also cataloged as 41593-N]). One specimen was once part of the Field Museum’s collection (Catalog number 56034-3) but is now in the collections of the Milwaukee Public Museum and is cataloged under the number A49121/16082. These four culturally modified human bones are not mentioned
in Moorehead’s field notes, but the Field Museum’s catalog record indicates that they were with Skeleton No. 181. In his work of 1922 (page 92) Moorehead indicates only that they are from Mound 18.

In the series of articles Moorehead published in the Antiquarian he notes that these objects were near the skull of a skeleton but he does not specify which skeleton (Moorehead, 1897 page 153).

56034-1:

A culturally modified calotte labeled 56034-1 and 41593-N is present in the collections of the Field Museum. The calotte has been reconstructed from fragments and much bone is missing. Most of the breaks appear to be old except those along the left parietal just superior to the squamosal suture. This broken margin is lighter in color than the surrounding bone. Striations are present near the lamboidal and squamosal sutures and around the perforation. Under magnification the striations appear to have channels with “U” shaped cross sections. A circular perforation is present on the right side of the occipital 8.5 mm medial to the right occipito-mastoid suture. The perforation is approximately 20 mm from right asterion (measured from asterion to the midpoint of the perforation). The ectocranial aspect of the perforation is 4.5 mm in diameter. The perforation’s endocranial aspect is 3.5 mm in diameter. Striations do not appear on the endocranial surface. All margins of the perforation appear sharp with two exceptions:

1) There is a small chip on the medial margin of the ectocranial aspect that is lighter in color than the surrounding bone. The differential staining of the bone is evidence that the chip was made relatively recently.
2) There are small chips on the inferior margin of the endocranial aspect that are the same color as the surrounding bone. There is no evidence that these chips were not made prehistorically.

The individual represented by this calotte was an adult based on the fact that fusion had begun in the ectocranial sutures of the vault. Only one cranial indicator of sex was observable. The degree of robusticity of the external occipital protuberance compared to the same trait in Hopewell individuals with unambiguous pelvic indicators of sex was intermediate between the males and females compared to. Sex is unknown.

56034-2:

A fragment of a left maxilla that has been culturally modified is present in the collections of the Field Museum (Figure 2). It is labeled 56034-2. Only the anterior portions of the alveolar and palatal processes of the maxilla are present. The bone superior to the roots of the teeth and some tooth root apices have been removed in a horizontal (relative to anatomical position) plane. The roots of teeth 9-11 appear to have been impinged upon, although only the tooth 10 is still present. The left maxillary fragment was detached from its antimere along the anterior palatine suture. There are no apparent cuts along the suture but it looks as though the interdigitations of the suture have been smoothed slightly. Perhaps this is the polish that can be the result of much handling. The posterior portion of the maxilla is not present but the remaining margin of bone separating it from the anterior portion is somewhat irregular (jagged) in outline and lighter in color than the surrounding bone. The differential staining observed is evidence that the break may have occurred relatively recently. Striations are not observable, even
under magnification, except for some indistinct, but observable under magnification striations on the flattened apex of tooth 10. The orientation of these striations is parallel to the dental arcade.

Age at death of the individual represented by this bone is between twenty and twenty-five years as estimated via seriation of the dentition. A partially patent incisive suture provides additional evidence supporting a young age at death.

Figure 2: Culturally Modified Left Maxilla of Mound 18 Hopewell Mound Group (Inferior view; Field Museum catalogue number 56034-2)
This specimen was once part of the Field Museum’s collection (Catalog number 56034-3) but is now in the collections of the Milwaukee Public Museum and is cataloged under the number A49121/16082. A heavily modified fragment of a right human maxilla is present (Figure 3). Only the alveolar process of the maxilla and teeth 2-4 are present. Alveolar bone is present from the area where the alveolus for tooth 1 would be (tooth 1 is not present and there is no crypt) to the empty alveolus for tooth 5. Tooth 1 may have been congenitally absent as there is no interproximal wear facet on the distal aspect of Tooth 2 and no unerupted tooth is observable on x-ray. On the lingual aspect of the alveolar process between teeth 3 and 4 there is what looks like, under10X magnification, an amorphous fragment of tooth root. It is loose in its “crypt” and can be made to wiggle back and forth.
The alveolar process has been removed from the rest of the maxilla just inferior to the apices of the roots of teeth 2-4 (the apices were removed as well). The surface along which the alveolar process has been removed from the rest of the maxilla is very flat in a transverse plane with sharp, unbeveled margins. Dirt and sand grains are lodged in the exposed trabeculae. Tiny striations are present oriented approximately mediolaterally with a slight distal tilt on the flattened surface. These striations are observable macroscopically as are striations on the buccal and posterior surfaces of the alveolar
process. Striations are visible under 30X magnification on the buccal aspect of the
crowns of tooth 2 and tooth 3. Under 30X magnification all of the striations appear to
have a channel that is “U” shaped in cross section.

Age at death of the individual represented by this bone is between twenty and
twenty-five years as estimated via seriation of the dentition. The sex of the person is
unknown.

56034-4:

A culturally modified human right maxilla bearing the label 56034-4 is present in
the collections of the Field Museum (Figure 4). The alveolar process, three fourths of the
anterior aspect of the palatal process, teeth 3-7, and sockets for teeth 1, 2, and 8 remain.
Missing teeth were lost postmortem. The bone superior to most of the tooth root apices
has been intentionally removed leaving behind a very flat surface. Only the apex of tooth
6 has been impinged upon by the process that flattened the superior surfaces. A portion
of the floor of the nasal aperture is observable. Striations are present on the cortical bone
bounding an area of exposed trabeculae that is located just superior to the tooth root
apices and just inferior to the area where the maxillary sinus would be. The striations on
the medial margin of this area are oriented roughly medio-laterally while the striations on
the lateral margin are oriented roughly anterior-posteriorly (including striations present
on the flattened apex of the root of tooth 6). None of the tooth crowns appear to bear
striations. All striations appear, under magnification, to have channels that are “U”
shaped in cross section. The medial palatine suture does not show signs of cutting or
grinding but the margins are somewhat smooth in appearance even under magnification
as though polished.
The age at death, estimated via seriation of the dentition, is between twenty and twenty-five years. A discriminant function analysis based on dental metrics indicates that the maxilla is that of a male \( (F_{\text{approx}} = .51) \).

**Figure 4:** Culturally Modified Left Maxilla of Mound 18 Hopewell Mound Group (Inferior view; Field Museum catalogue number 56034-4)
Moorehead’s Mound 19:

Unnumbered Skeleton:

Moorehead describes a cremation from Mound 19 on page 94 of Moorehead (1922). A skeleton number was not assigned. The remains were mentioned in the field notes of September 14, 1891 (Moorehead, 1891, p.8) and described as having been in a clay “alter.” Mica, galena, fragments of worked bone and two flake knives were with the material.

This skeleton was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Moorehead’s Mound 20:

**Skeleton No. 172:**

Skeleton No. 172 appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 15, 1891 (Moorehead, 1891, p. 8) as “badly burned.” The individual was an adult according to Moorehead and was unaccompanied by artifacts.

Skeleton No. 172 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 173:**

Skeleton No. 173 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 15, 1891 (Moorehead, 1891, p. 8). The individual was an adult according to Moorehead and was accompanied by copper ear “busks,” a flake knife, and mussel shells.

Skeleton No. 173 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 174:**

Skeleton No. 174 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 15, 1891 (Moorehead, 1891, p. 8) as badly decayed and missing its feet. The individual was a child according to Moorehead and was unaccompanied by artifacts.
Skeleton No. 174 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 175:

Skeleton No. 175 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 15, 1891 (Moorehead, 1891, p. 8) as broken, decayed, and missing one arm. Moorehead indicates that he did not save any of the skeleton. The individual was an adult according to Moorehead and was accompanied by copper and shell artifacts.

Skeleton No. 175 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 176:

Skeleton No. 176 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 9; 1897, p. 183; and 1922, p. 94-95). Moorehead notes that the bones are those of a child approximately nine years old and were not well preserved enough to save. Copper and shell objects accompanied the skeleton.

Skeleton No. 176 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 177:

Skeleton No. 177 is an individual inhumation that is mentioned in at least two of Moorehead’s works (1891, p.10 and 1922, p.95). Moorehead notes that the skeleton was 5’ 6” in length (presumably an adult?) and that the bones were not well preserved. Bear teeth plated with copper accompanied the skeleton.
The Field Museum catalog numbers 40180 and 41617 were assigned to this skeleton. Human remains labeled 41617 were identified in the collections of the Field Museum. Age at death of 41617 estimated via seriation of the dentition is thirty to forty years.

**Skeleton No. 178:**

Skeleton No. 178 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 16, 1891 (Moorehead, 1891, p. 10). Moorehead indicates that the skull was crushed. The individual was an adult female according to Moorehead and was unaccompanied by artifacts.

Skeleton No. 178 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 179:**

Skeleton No. 179 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 16, 1891 (Moorehead, 1891, p. 10). Moorehead indicates that the bones were not saved. The individual was a child about four years old according to Moorehead and was unaccompanied by artifacts.

Skeleton No. 179 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 180:

Skeleton No. 180 is an individual inhumation that appears on Moorehead’s (1922) map labeled Plate XLIA but is not mentioned in the text of the 1922 work. It is described in the field note entry for September 16, 1891 (Moorehead, 1891, p. 10 & 11). Moorehead indicates that the bones were not saved. The individual was an adult according to Moorehead and was unaccompanied by artifacts.

Skeleton No. 180 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Moorehead’s Mound 23:

**Skeleton No. 182:**

Skeleton No. 182 is an individual inhumation described in Moorehead’s field notes of September 22, 1891 (Moorehead, 1891, p. 12). Moorehead notes that the bones could not be saved. The age of the individual is not mentioned, but presumably the skeleton is that of an adult. Artifacts accompanying the skeleton are not mentioned.

Skeleton No. 182 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 183:**

Skeleton No. 183 is an individual inhumation described in Moorehead’s field notes of September 22, 1891 (Moorehead, 1891, p. 12). Moorehead notes that the bones could not be saved. The age of the individual is not mentioned, but presumably the skeleton is that of an adult. Artifacts accompanying the skeleton are not mentioned.

Skeleton No. 183 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 184:**

Skeleton No. 184 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead notes that the bones could not be saved. Copper and shell objects accompanied the skeleton. The age of the individual is not mentioned, but presumably the skeleton is that of an adult. Artifacts accompanying the skeleton are not mentioned.

Skeleton No. 184 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 185:

Skeleton No. 185 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead notes that the bones are those of a female (presumably an adult). No objects are reported to have accompanied the skeleton.

The Field Museum catalog numbers 40170 and 41599 were assigned to the bones. A partial humeral diaphysis labeled with these numbers was located in the collections of the Field Museum. The bone is that of an adult.

Skeleton No. 186:

Skeleton No. 186 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead notes that the bones are those of a “boy” and that they had been “crushed by the weight of the earth.” Five stone celts, one arrowhead, cut jaws of fox and lynx, and bone points are reported to have accompanied the skeleton.

Skeleton No. 186 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 187:

Skeleton No. 187 is an individual inhumation that is mentioned in at least two of Moorehead’s works (1891, p. 12 and 1922, p. 97). Moorehead notes that the bones are those of an old adult male. One bone awl is reported to have accompanied the skeleton.

Skeleton No. 187 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 188:

Skeleton No. 188 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead indicates that he believes this skeleton is an intrusive burial because it was not on the mound floor. No objects are reported to have accompanied the skeleton. The skull was described as “brachycephalic” and the left humerus was perforated.

The Field Museum catalog numbers 40171 and 40455 were assigned to the bones. An adult’s left humerus labeled 40455 was located in the collections of the Field Museum.

Skeleton No. 189:

Skeleton No. 189 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead indicates that he believes this skeleton is an intrusive burial because it was not on the mound floor. No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

The Field Museum catalog number 40166 was assigned to the bones. No human remains under this number were located in the collections of the Field Museum.

Skeleton No. 190:

Skeleton No. 190 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 12; 1897, p. 208; and 1922, p. 97). Moorehead indicates that he believes this skeleton is an intrusive burial because it was not on the mound floor. No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.
The Field Museum catalog numbers 40172 and 40456 were assigned to the bones. An adult’s left humerus labeled 40456 was located in the collections of the Field Museum.

Skeleton No. 197:

Skeleton No. 197 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p. 15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit and had been charred. The bones had to be removed in fragments. No objects are reported to have accompanied the skeleton. Moorehead does not mention the age of the individual, but presumably it is an adult.

The Field Museum catalog numbers 40190 and 41611 were assigned to the bones. The catalog record indicates that remains under the numbers 40190, 40191, and 41611 are those of Skeleton No. 197 and Skeleton No. 203 of Mound 23. Human remains labeled 41611 were located in the collections of the Field Museum. Three adult individuals are represented (Pickering, 1987). A left hemimandible included in the commingled remains bears a cutmark measuring 6.5 mm in length with a “U” shaped cross section. The cutmark is located left of midline just inferior to the alveolus for tooth 22 on the labial aspect of the bone. The color of the bone exposed by the cutmark matches that of the surrounding undamaged bone.

Skeleton No. 198:

Skeleton No. 198 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.16; 1897, p. 208; and 1922, p. 98 & Plate XLVI).
Moorehead indicates that this skeleton was covered with a mineral deposit and may have been charred. No objects are reported to have accompanied the skeleton. Moorehead does not mention the age of the individual, but presumably it is an adult.

The Field Museum catalog numbers 40181 and 41602 were assigned to the bones. The catalog record indicates that remains under these numbers are those of Skeleton No. 198 of Mound 23. Human remains labeled 41602 were located in the collections of the Field Museum. An additional catalog number, 41598, appears on some of the elements labeled 41602. The number 41598 does refer to “Fragments (few) of three burials” according to the Field Museum’s catalog records. At least three adult individuals are represented among the remains labeled 41602 (including the ones also labeled 41598). Two of these (41602A and 41598A) are estimated to have been between twenty and thirty years old at death based on principle components analysis of two indicators. These two individuals were likely to have been females by virtue of their lack of cranial robusticity and by comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex. The third individual (41602B) is of unknown sex and was likely between thirty and sixty years old at the time of death based on degree of cranial suture closure. It is not known which of the individuals is Skeleton No. 198.

**Skeleton No. 199:**

Skeleton No. 199 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was found near an “alter,” covered with a mineral deposit, and may have been charred. A large ocean shell and two copper plates are reported to have accompanied the skeleton. The age of the individual is not mentioned,
but presumably it is an adult. The Field Museum catalog numbers 401817 and 41615 were assigned to the bones. Human remains labeled 41615 were located in the collections of the Field Museum. One adult individual is represented by a partial mandible and several postcranial elements (Pickering, 1987).

Skeleton No. 200:

Skeleton No. 200 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was an adult and the bones were covered with a mineral deposit and may have been charred. No objects are reported to have accompanied the skeleton.

Skeleton No. 200 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 201:

Skeleton No. 201 is part of a double inhumation with Skeleton No. 202 located on the south side of Mound 23. Moorehead indicates that this skeleton is that of an adult and the bones were covered with a mineral deposit and may have been charred (Moorehead 1897, p. 210). No objects are reported to have accompanied the skeleton. In his 1897 work (page 208), Moorehead notes that the skeletons labeled 231 and 232 (Figure XV) on the south side of the mound are really Skeletons No. 201 and 202 (not to be confused with skeletons labeled 231 and 232 on the north side of the mound which are part of a triple burial with Skeleton No. 230). In Moorehead’s 1922 report the numbers 231 and 232 appear twice on Plate XLVI, which is very similar to the map labeled Figure XV in Moorehead’s Antiquarian series of articles.
In addition to mislabeling Skeletons 201 and 202 in Mound 23, Moorehead uses 201 and 202 to refer to two cremations from Mound 24 (Moorehead, 1891 p.15). See burial descriptions for Mound 24 skeletons.

**Skeleton No. 202:**

Skeleton No. 202 is part of a double burial with Skeleton No. 201. Moorehead indicates that this skeleton was an adult and the bones were covered with a mineral deposit and may have been charred (Moorehead, 1897, p. 210). No objects are reported to have accompanied the skeleton. Skeleton No. 202 is depicted in Plate XLVI of Moorehead’s 1922 report as Skeleton No. 232 on the south side of the mound (not to be confused with the skeleton labeled 232 on the north side of the mound). See the description of Skeleton No. 201 for a discussion of the multiple use of the number 202 by Moorehead.

**Skeleton No. 203:**

Skeleton No. 203 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and was charred. The bones had to be removed in fragments. No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

The Field Museum catalog numbers 40190, 40191, and 41611 were assigned to the bones. The catalog record indicates that remains under the numbers 40190, 40191, and 41611 are those of Skeleton No. 197 and Skeleton No. 203 of Mound 23. Human remains labeled 41611 were located in the collections of the Field Museum. Three adult
individuals are represented (Pickering, 1987). A left hemimandible included in the commingled remains bears a cutmark measuring 6.5 mm in length with a “U” shaped cross section. The cutmark is located left of midline just inferior to the alveolus for tooth 22 on the labial aspect of the bone. The color of the bone exposed by the cutmark matches that of the surrounding undamaged bone.

**Skeleton No. 204**

Skeleton No. 204 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and may have been charred. No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

Skeleton No. 204 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 205:**

Skeleton No. 205 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and may have been charred. No objects are reported to have accompanied the skeleton. Moorehead does not mention the age of the individual, but presumably it is an adult.

The Field Museum catalog numbers 40185 and 41613 were assigned to the bones. The remains of an individual labeled 41613 were identified in the collections of the Field Museum. Age at death estimated via principle components analysis of two indicators is between twenty and thirty years. Sex could not be assigned.
Skeleton No. 206:

Skeleton No. 206 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and was charred. The bones had to be removed in fragments. No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned by Moorehead, but presumably it is an adult.

The Field Museum catalog numbers 40186 and 41601 were assigned to the bones. The left humerus of an adult labeled 41601 was located in the collections of the Field Museum.

Skeleton No. 207:

Skeleton No. 207 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and may have been charred. Moorehead reports that masses of black earth had been placed around the burial (1897, p. 209). Copper ornaments and numerous drilled wolf teeth are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

Skeleton No. 207 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 208:

Skeleton No. 208 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI).
Moorehead indicates that this skeleton was covered with a mineral deposit, and may have been charred. Moorehead reports that masses of black earth had been placed around the burial (1897, p. 209). No objects are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

Skeleton No. 208 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 209:

Skeleton No. 209 is an individual inhumation that is mentioned in at least three of Moorehead’s works (1891, p.15 & 16; 1897, p. 208-210; and 1922, p. 98 & Plate XLVI). Moorehead indicates that this skeleton was covered with a mineral deposit, and may have been charred. Moorehead reports that masses of black earth had been placed around the burial (1897, p. 209). A copper plate, two pipes, pearl beads and several bear’s teeth are reported to have accompanied the skeleton. The age of the individual is not mentioned, but presumably it is an adult.

Skeleton No. 209 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 210:

Skeleton No. 210 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on pages 208 and 209 of his 1897 publications. Moorehead reports that masses of black earth had been placed around the burial (1897, p. 209). Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 210 is depicted on Plate XLVI of Moorehead’s 1922 report.
Skeleton No. 210 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 211:**

Skeleton No. 211 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on pages 208 and 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 211 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 211 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 212:**

Skeleton No. 212 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on pages 208 and 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 212 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 212 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 213 and Associated Modified Maxillae:**

Skeleton No. 213 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (pages 16 and 17), on pages 98 and 99 of Moorehead’s 1922 work, and on pages 208 and 209 of his 1897 publications. The individual is an adult and according to Moorehead the length of the skeleton from the top of the skull to the distal
articulation of the tibia was 6’ 8”. Skeleton No. 213 is depicted on Plate XLVI of Moorehead’s 1922 report. It was covered with a ten-foot thick layer of clay and gravel. The feet were not present at the time it was discovered and the skeleton was so badly crushed that only fragments were recovered. Moorehead reports that an adult human maxillary bone that had been culturally modified (cut just above the alveoli) was discovered next to the head of the individual. Also present with the skeleton were bone, pearl, and shell beads, bear’s teeth, a copper plate, and four ear ornaments.

The catalog records of the Field Museum associate the number 56064 with Skeleton No. 213 of Mound 23. A description in the catalog of 56064 indicates that it is an “Inferior maxillary bone with 2 perforations.” A catalog record for the main interment does not exist. Human remains thought to be Skeleton No. 213 have not been located in the collections of the Field Museum.

Although Moorehead describes the culturally modified bone as a human maxilla that had been cut just above the alveoli, the bone cataloged as a culturally modified dental arch is actually a drilled mandible.

The mandible is in a poor state of preservation and is missing both condyles, the apices of the coronoid processes, the distal margins of the gonial angles, and portions of the labial and buccal aspects of the alveoli. All teeth are present except the left third molar (tooth 17). Lack of an interproximal wear facet on the distal aspect of the adjacent tooth (18) indicates that tooth 17 was likely never in occlusion.

Cultural modifications include three drillings and several striations. Drillings are present near the right gonial angle, and on either side of the mental eminence. All of the drillings are circular and extend completely through the bone creating an aperture. The
margins of the drilling on the right gonial angle have eroded due to taphonomic conditions and the posterior portion of the drilling is missing along with part of the bone of the gonial angle. The other drillings have very sharp margins that do not exhibit degradation due to taphonomy or use. The apertures of all of the drillings are 3.24 mm in diameter and are the same on both ends of the drilling. The drillings present near the mental eminence are oriented such that the labial aspects are slightly superior to the lingual aspects.

Several striations are observable and are obliquely oriented between the right mental foramen and the drilling to the right of the mental eminence. This area is the only area of intact cortical bone remaining on buccal or labial surfaces of the mandible. Under magnification (30X) the striations appear to have wide “V” shaped channels. The channels appear to have some striations within them. The only other area with intact cortical bone (lingual aspect near midline) bears no observable striations.

The age at death of the individual represented by this mandible as estimated via dental seriation is twenty to twenty-five years. A discriminant function analysis based on dental metrics indicates that the mandible is that of a female ($F_{\text{approx}} = .87$).

**Skeleton No. 214:**

Skeleton No. 214 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 214 is depicted on Plate XLVI of Moorehead’s 1922 report.
Skeleton No. 214 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 215:

Skeleton No. 215 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 215 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 215 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 216:

Skeleton No. 216 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead describes the skeleton as surrounded by boulders. Skeleton No. 216 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 216 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 217:

Skeleton No. 217 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 217 is depicted on Plate XLVI of Moorehead’s 1922 report.
report. Skeleton No. 217 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 218:

Skeleton No. 218 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 218 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 218 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 219:

Skeleton No. 219 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (pages 16 & 18), on page 98 of Moorehead’s 1922 work, and on pages 209 and 211 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes a correction to the map of Mound 23 published in his 1897 Antiquarian series (the same map appears as Plate XLVI in Moorehead’s 1922 report). The skeleton labeled 229 on the north side of the mound should be labeled 219. A pipe and a spool-shaped object were among the grave goods.

Skeleton No. 219 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 220:

Skeleton No. 220 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page
209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 220 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 220 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 221:

Skeleton No. 221 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 221 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 221 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 222:

Skeleton No. 222 is an individual inhumation mentioned in Moorehead’s field notes of October 1, 1891 (page 16), on page 98 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 222 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 222 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 223:

Skeleton No. 223 is a double inhumation with Skeleton No. 224. It is mentioned in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 211 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes that Skeleton No. 223 is brachycephalic and fragmentary. Skeleton No. 223 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 223 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 224:

Skeleton No. 224 is a double inhumation with Skeleton No. 223. It is mentioned in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 211 of his 1897 publications. Although Moorehead does not mention the age of the individual, it is presumably an adult. Moorehead notes that Skeleton No. 224 is brachycephalic and fragmentary. Fragments of a pipe accompanied the skeleton. Skeleton No. 224 is depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40188 and 41616 were assigned to the bones. Fragmentary remains of an adult labeled 41616 were located in the collections of the Field Museum. Some fragments appear to be charred.

Skeleton No. 225:

Skeleton No. 225 is an individual inhumation. It is mentioned in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 211 of his 1897 publications. Although the age of the individual is not mentioned, it
is presumably an adult. Moorehead notes that Skeleton No. 225 is brachycephalic and fragmentary. Fragments of a pipe accompanied the skeleton. Skeleton No. 225 is depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40175 and 41610 were assigned to the bones. The distal half of an adult’s right humerus labeled 41610 was located in the collections of the Field Museum.

Skeleton No. 226:

Skeleton No. 226 is an individual inhumation located on the southern side of Mound 23. It is distinguished from Skeleton No. 226A which is located on the northern side of the mound (Moorehead 1897 p. 208). It is described in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 211 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes that Skeleton No. 226 is brachycephalic and fragmentary. Two copper ear ornaments and a button covered with copper accompanied the skeleton. Skeleton No. 226 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 226 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 226A:

Skeleton No. 226A is an individual inhumation located on the northern side of Mound 23. It is distinguished from Skeleton No. 226, which is located on the southern side of the mound (Moorehead, 1897 p. 208). Skeleton No. 226A is not otherwise specifically noted in any of Moorehead’s writings on the work at the Hopewell Mound Group.
Skeleton No. 226A was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 227:**

Skeleton No. 227 is an individual inhumation. It is described in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 209 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes that boulders surrounded Skeleton No. 227. Fragments of a pipe accompanied the skeleton. Skeleton No. 227 is depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40183 and 41614 were assigned to the bones. There is some ambiguity in the records of the Field Museum regarding the catalog numbers for Skeletons No. 227 and 237. The catalog numbers 41614 and 40183 are listed as in the catalogs in reference to both skeletons. Moorehead’s field notes do not refer to a catalog number for Skeleton No. 237 and indicate that 40183 is the catalog number of Skeleton No. 227. The number 41614 replaced the number 40183 at some point in the past when the collection was recataloged.

Remains labeled 41614 were observed in the Field Museum’s collections. A right hemimandible from an individual estimated via dental seriation to have been between forty and fifty years old at death is present. Cutmarks are present on the lateral aspect of the coronoid process and posterior aspect of the ramus. The cutmarks appear in cross section to have a “U” shaped channel. Maxillae are also present and represent an individual whose age at death was between twenty and thirty years based on dental seriation. An adult cranium is present which appears to be from a female based on a lack
of cranial robusticity and by comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex. The hemimandible and maxillae do not occlude well together and likely represent two people. The maxillae do not fit with the cranium.

Pickering (1987) observed that three individuals are represented among the postcranial remains under the number 41614. It is not clear which, if any, of the remains under the number 41614 are those of Skeleton No. 227. The age and sex of this individual are unknown.

**Skeleton No. 228:**

Skeleton No. 228 is an individual inhumation. It is described in Moorehead’s field notes of October 2, 1891 (page 18) and on page 99 of Moorehead’s 1922 work. Although Moorehead does not mention the age of the individual, it is presumably an adult. Skeleton No. 228 is depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40184 and 41606 were assigned to the bones. Human remains labeled 41606 were identified in the collections of the Field Museum. Age at death, estimated via principle components analysis of two indicators, is between twenty and thirty years. This individual appears to have been a female based on a lack of cranial robusticity and by comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex.

**Skeleton No. 229:**

Skeleton No. 229 is an individual inhumation. It is described in Moorehead’s field notes of October 2, 1891 (page 18), on page 99 of Moorehead’s 1922 work, and on page 208 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes that the number 229 was used twice in his map.
of Mound 23 that appears on page 209 of the Antiquarian series of articles and as Plate XLVI in Moorehead’s 1922 report (Moorehead, 1897, p. 208). Skeleton No. 229 on the east side of the mound is correctly labeled. The skeleton labeled 229 depicted on the west side should be labeled Skeleton No. 219.

Skeleton No. 229 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 230:

Skeleton No. 230 appears to be part of a triple inhumation with Skeleton No. 231 and Skeleton No. 232. It is mentioned in Moorehead’s field notes of October 8, 1891 (page 18), on page 99 and depicted in Plate XLVI of Moorehead’s 1922 work, and on page 208 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult.

Skeleton No. 230 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 231:

Skeleton No. 231 appears to be part of a triple inhumation with Skeleton No. 230 and Skeleton No. 232. It is mentioned in Moorehead’s field notes of October 8, 1891 (page 18), on page 99 and depicted in Plate XLVI of Moorehead’s 1922 work, and on page 208 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. A shell cup accompanied the skeleton. Moorehead notes that the number 231 was used twice in his map of Mound 23 that appears on page 209 of the Antiquarian series of articles and as Plate XLVI in Moorehead’s 1922 report.
(Moorehead, 1897, p. 208). Skeleton No. 231 on the north side of the mound is correctly labeled. The skeleton labeled 231 depicted on the south side should be labeled Skeleton No. 201.

Skeleton No. 231 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 232:**

Skeleton No. 232 appears to be part of a triple inhumation with Skeleton No. 230 and Skeleton No. 231. It is mentioned in Moorehead’s field notes of October 8, 1891 (page 18), on page 99 and depicted in Plate XLVI of Moorehead’s 1922 work, and on page 208 of his 1897 publications. Although the age of the individual is not mentioned, it is presumably an adult. Moorehead notes that the number 232 was used twice in his map of Mound 23 that appears on page 209 of the Antiquarian series of articles and as Plate XLVI in Moorehead’s 1922 report (Moorehead 1897, p. 208). Skeleton No. 232 on the north side of the mound is correctly labeled. The skeleton labeled 232 depicted on the south side should be labeled Skeleton No. 202.

Skeleton No. 232 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 233:**

Skeleton No. 233 is an individual inhumation. It is mentioned in Moorehead’s field notes of October 8, 1891 (page 19) and on page 99 of Moorehead’s 1922 work. Although Moorehead does not mention the age of the individual, it is presumably an adult. Moorehead notes that both humeri are perforated. Skeleton No. 233 is depicted on Plate XLVI of Moorehead’s 1922 report.
The Field Museum catalog numbers 40212 and 41619 were assigned to the bones. Human remains labeled 41619 were identified in the collections of the Field Museum. Three adults are represented (Pickering, 1987).

Skeleton No. 234:

Skeleton No. 234 is an individual inhumation. It is mentioned in Moorehead’s field notes of October 9, 1891 (page 19) and on page 99 of Moorehead’s 1922 work. Although Moorehead does not mention the age of the individual, it is presumably an adult. Skeleton No. 234 is depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40189 and 41608 were assigned to the bones. Human remains labeled 41608 were identified in the collections of the Field Museum. Age at death estimated via seriation of the dentition indicates that this individual was between forty and fifty years old at death. This individual appears to have been a female based on comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex.

Skeleton No. 235:

Skeleton No. 235 is an individual inhumation. It is mentioned in Moorehead’s field notes of October 9, 1891 (page 19) and on page 99 of Moorehead’s 1922 work. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 235 is depicted on Plate XLVI of Moorehead’s 1922 report.

Skeleton No. 235 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 236:

Skeleton No. 236 is an individual inhumation. It is mentioned in Moorehead’s field notes of October 9, 1891 (page 19) and on page 99 of Moorehead’s 1922 work. Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 236 is not depicted on Plate XLVI of Moorehead’s 1922 report.

The Field Museum catalog numbers 40182 and 41607 were assigned to the bones. Human remains labeled 41607 were identified in the collections of the Field Museum. Age at death estimated via degree of ectocranial suture closure is between thirty and sixty years. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that this individual was probably female. Several striations which when examined in cross section have “V” shaped channels are present on the left aspect of the frontal.

Skeleton No. 238:

Skeleton No. 238 is an individual inhumation. It is mentioned in Moorehead’s field notes of November 2, 1891 (pages 23 & 24). Although the age of the individual is not mentioned, it is presumably an adult. Skeleton No. 238 is not depicted on Plate XLVI of Moorehead’s 1922 report. Moorehead reports that the skeleton was fragmentary and “no inferior extremities or back bone was found with this skeleton.” The maxillae and mandible had undergone cultural modifications. The maxillae had been cut and the mandible perforated.

Skeleton No. 238 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Moorehead’s Mound 24:

Note: Moorehead attributes Skeletons numbered 191-196 to Mound 4 in the Antiquarian (Moorehead, 1897, p. 208). Skeletons 191-196 are attributed to Mound 24 in the field notes (Moorehead 1891) and in Moorehead’s report of 1922. Greber notes this discrepancy (Greber & Ruhl, 1989, pages 68-69) and presents Charles Willoughby’s description of the contents of Moorehead’s Mound 24 which agrees with the attribution of Skeleton’s No. 191-196 to this mound.

Skeleton No. 191:

Skeleton No. 191 is an individual inhumation. It is mentioned in Moorehead’s field notes of September 23, 1891 (page 13), on pages 96 and 97 of Moorehead’s 1922 work, and on page 180 of his 1897 publications. The skeleton was that of an adult accompanied by shell artifacts, bear’s teeth, and the skull of another individual (Skeleton No. 192). Moorehead notes that the skull of Skeleton No. 191 is different in type than the skull placed with it (Skeleton No. 192). Skeleton No. 191 is depicted on Plate XLIV of Moorehead’s 1922 report.

The Field Museum catalog number 40173 was assigned to the bones. The numbers 41609 and 40178 may also be associated with Skeleton No. 191 although there is some ambiguity in the catalog records regarding these numbers. The diaphysis of an adult’s left humerus labeled 40173 and 41609 and a mandible labeled 41609 were located in the collections of the Field Museum. The mandible differs markedly in color from the humerus. The catalog number of the humerus (40173) unambiguously represents Skeleton No. 191 in the catalog record of the Field Museum.
Skeleton No. 192:

Skeleton No. 192 is a culturally modified skull that was placed about two feet from the right shoulder of Skeleton No. 191. It is mentioned in Moorehead’s field notes of September 23, 1891 (page 13), on page 96 of Moorehead’s 1922 work, and on page 180 of his 1897 publications. According to Moorehead, the skull was that of an adult and had been drilled. Moorehead notes that this skull is different in type than the skull of the skeleton with which it was placed (Skeleton No. 191). Skeleton No. 192 is depicted on Plate XLIV of Moorehead’s 1922 report.

The Field Museum catalog numbers 40169 and 56068 were assigned to the bones. A culturally modified skull labeled 40169 and 56068 was identified in the collections of the Field Museum. Age at death, estimated via principle components analysis of two indicators is between fifteen and twenty years. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that this individual was probably female.

The cranium and mandible are in good condition. All teeth are present except 12, 13, and 27, which were lost postmortem. Missing bone is limited mainly to the cranial base with several additional small areas missing on the right mastoid (from cultural modification), right zygomatic process, labial aspect of the alveolus of tooth 27, right maxilla, the apices of both coronoid processes, and both mandibular condyles. Cortical damage is present at glabella, on the superior margin of the left orbit, left zygomatic, left mandibular body, left parietal, and on the external occipital protuberance. Porotic hyperostosis is present on the posterior aspect of the frontal, both parietals near the sagittal suture and on the superior aspect of the occipital. This defect ranges in degree of
expression from many tiny pits on the occipital to a thin, porous, sclerotic plaque on the parietals and frontal. The posterior aspects of both temporals appear porous and sclerotic just superior to the mastoid processes.

Three drillings, all of which perforate the bone completely, are evident on the occipital. One drilling is located on the inferior aspect of the squamous portion of the occipital to the left of midline and 44 mm from left asterion. This drilling is 4.32 mm in diameter. The margins of the drilling are rounded and the bone adjacent exhibits cortical flaking. If a drilling was present symmetrically to the right of midline it is no longer observable as the bone in this area is missing due to postmortem damage.

A second drilling, measuring 2.14 mm in ectocranial diameter, is present on the superior aspect of the squamous portion of the occipital about half way between lambda and right asterion. It is only 3.3 mm from the lamboidal suture (measured from the center of the aperture created by the drilling). The ectocranial cortical bone between the lateral margin of the drilling and the lamboidal suture is flaked. It appears as though this happened recently as the newly exposed bone is very light in color. There is also flaking of the ectocranial cortical bone adjacent to the superior margin of the drilling. A small, semi-spherical, false start modification abuts the infero-medial of the drilling. It is also light in color, but appears quite smooth as though the bone was green at the time the false start was made. The endocranial margins of the drilling are also flaked on all sides except the medial. The surfaces exposed by this flaking are slightly lighter in color than the surrounding bone. The endocranial diameter of the drilling appears to be similar to the ectocranial diameter.
The third drilling is 2.2 mm in diameter as measured on the ectocranial surface and appears to be about the same diameter endocranially. It is located approximately halfway between lambda and left asterion and is 6.12 mm from the lamboidal suture (measured from center of the aperture created by the drilling). The ectocranial margins appear to be sharp with the exception of a very tiny flake in the medial aspect of the margin. The supero-lateral margin is beveled slightly. The medial aspect of the endocranial margin is flaked leaving lighter colored surfaces exposed.

Numerous striations are present on almost every ectocranial and mandibular surface that is intact. They are especially numerous near areas of muscle attachment such as around the temporal lines. Stria are not located on the palate nor on what remains of the cranial base. Under magnification the striations appear broad and have “U” shaped channels in cross section.

A linear plane of modification is present on the right mastoid process extending from the posterior aspect of the mastoid to the area of the right zygotemporal suture. With the maxillary and mandibular teeth in occlusion a line of sight can be established along a flat surface on the right mastoid left there by modification that removed the apex of the mastoid process. The line of sight extends along this plane to the right articular eminence, which is missing a triangular piece of bone. The portion of the mandibular condyle that would be in the way in this line of sight is missing and the surfaces exposed are stained similarly to the surrounding bone indicating an old break. The broken condylar process has not been flattened as the mastoid has. It looks as though a bladed instrument impinged upon the skull in the area of the right mastoid and right mandibular condyle.
Skeleton No. 193:

Skeleton No. 193 is an individual inhumation. It is mentioned in Moorehead’s field notes of September 24, 1891 (page 14) and is depicted in Plate XLIV of Moorehead’s report of 1922 though it is not mentioned in the text of the report. Although the age of the individual is not mentioned, it is presumably an adult. Bone artifacts, a shell cup, and bear’s teeth accompanied the skeleton.

A catalog record of this skeleton could not be found in the catalogs of the Field Museum. No remains were located.

Skeleton No. 194:

Skeleton No. 194 is a double inhumation with Skeleton No. 195. It is mentioned in Moorehead’s field notes of September 28, 1891 (page 14) and on page 96 of Moorehead’s 1922 report. It is depicted in Plate XLIV of Moorehead’s 1922 report. The skeleton was that of an adult according to Moorehead and was unaccompanied by artifacts.

The Field Museum catalog numbers 40174 and 41600 were assigned to the bones. The distal portion of an adult’s left humerus labeled 41600 was located in the collections of the Field Museum.

Skeleton No. 195:

Skeleton No. 195 is a double inhumation with Skeleton No. 194. It is mentioned in Moorehead’s field notes of September 28, 1891 (page 14) and on pages 96 and 97 of
Moorehead’s 1922 report. It is depicted in Plate XLIV of Moorehead’s report of 1922. The skeleton was that of an adult and was unaccompanied by artifacts. Moorehead reports that the skeleton had neither a mandible nor a right radius.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 195 were located in the collections of the Field Museum.

**Skeleton No. 196:**

Skeleton No. 196 is an individual inhumation. A skeleton that is likely 196 is mentioned in Moorehead’s field notes of September 25, 1891 (page 14) but is not noted by number. Skeleton No. 196 is depicted in Plate XLIV of Moorehead’s report of 1922 on the east side of the mound. The unnumbered skeleton is described as having been on the east side of the mound (Moorehead, 1891 p. 14; 1922, p. 96). Although the age of the individual is not mentioned, it is presumably an adult. Copper ear ornaments accompanied the skeleton.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 196 were located in the collections of the Field Museum.

**Skeleton No. 201:**

Skeleton No. 201 of Mound 24 is a cremation (not to be confused with Skeleton No.201 of Mound 23 which is an inhumation—see burial descriptions for Mound 23 skeletons). It is mentioned in Moorehead’s report of 1922 on page 97, but is not referred to by number. In his field notes of September 28, (1891, page 15) Moorehead indicates that a cremation, which he calls Skeleton No. 201, was found in Mound 24. The age of the individual is not mentioned. The cremation was accompanied by small shells and mica ornaments.
No Field Museum catalog record exists for this cremation. No remains thought to be Skeleton No. 201 of Mound 24 were located in the collections of the Field Museum.

**Skeleton No. 202:**

Skeleton No. 202 of Mound 24 is a cremation (not to be confused with Skeleton No. 202 of Mound 23 which is an inhumation—see burial descriptions for Mound 23 skeletons). It is mentioned in Moorehead’s report of 1922 on page 97, but is not referred to by number. In his field notes of September 28 (1891, page 15) Moorehead indicates that a cremation, which he calls Skeleton No. 202, was found in Mound 24. The age of the individual is not mentioned. The cremation was accompanied by small shells and mica ornaments.

No Field Museum catalog record exists for this cremation. No remains thought to be Skeleton No. 202 of Mound 24 were located in the collections of the Field Museum.

**Unnumbered Skeleton:**

Moorehead refers to two cremated skeletons found in Mound 24 in his field notes of September 28, 1891 (page 15; Skeletons 201 and 202 described above). He also mentions discovering “the backbone and pelvis of another.”

No Field Museum catalog record exists for “the backbone and pelvis.” No remains thought to be these were located in the collections of the Field Museum.
Moorehead’s Mound 25:

**Unnumbered Tibia Fragments:**

Moorehead refers to the discovery of human tibia fragments in cut 1 on page 105 of his report of 1922 and in the field notes of October 29, 1891 (page 23). The age of the individual from whom the fragments came is not mentioned.

No Field Museum catalog record exists for these remains. No remains thought to be these were located in the collections of the Field Museum.

**Skeleton No. 242:**

Skeleton No. 242 is a double inhumation with Skeleton No. 243 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (page 26) and on page 106 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that pearl beads and copper objects accompanied the skeleton.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 242 were located in the collections of the Field Museum.

**Skeleton No. 243:**

Skeleton No. 243 is a double inhumation with Skeleton No. 242 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (pages 26 and 28) and on page 106 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that pearl beads and copper objects accompanied the skeleton.
No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 243 were located in the collections of the Field Museum.

**Skeleton No. 244:**

Skeleton No. 244 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (pages 26 and 28) and on page 106 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that beads accompanied the skeleton.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 244 were located in the collections of the Field Museum.

**Skeleton No. 245:**

Skeleton No. 245 is a double inhumation with Skeleton No. 246 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (pages 26 and 29) and on page 107 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that a flint knife, beads, and bone objects accompanied the skeleton.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 245 were located in the collections of the Field Museum.
**Skeleton No. 246:**

Skeleton No. 246 is a double inhumation with Skeleton No. 245 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (page 29) and on page 107 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that copper objects and beads accompanied the skeleton.

No Field Museum catalog record exists for this skeleton. No remains thought to be Skeleton No. 246 were located in the collections of the Field Museum.

**Skeleton No. 247:**

Skeleton No. 247 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (page 29) and on page 107 of Moorehead’s 1922 report. It is depicted in Plates XLVII and XLVIII of Moorehead’s report of 1922. Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that copper objects, bear’s teeth, bark, beads, and other objects accompanied the skeleton.

Moorehead’s field notes indicate that the Field Museum catalog number 40167 was assigned to the bones. This number corresponds to Skeleton No. 247 in the catalog records of the Field Museum. No remains associated with the number 40167 could be located in the collections of the Field Museum.

**Skeleton No. 248:**

Skeleton No. 248 is a double inhumation with Skeleton No. 248-1 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891
(pages 29 and 30) and on pages 107 and 108 of Moorehead’s 1922 report. In these works the double burial is collectively called Skeleton No. 248. Greber (1989) refers to the skeleton without grave goods as Skeleton No. 248-1. Plates XLVII, XLVIII, and L of Moorehead’s report of 1922 depict Skeleton No. 248, which is the more heavily, adorned skeleton of the two. Moorehead reports that the skeleton was a poorly preserved adult and measured 5’ 11” in length. Numerous artifacts accompanied the skeleton including an elaborate copper and wood headdress in the shape of antlers.

The Field Museum catalog numbers 40151 and 41612 were assigned to the bones. The human remains labeled 41612 in the collections of the Field Museum include at least three individuals. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that one of the individuals was male and the other two were probably male. None of the material examined appeared to be from a subadult. Dental seriation indicates that two of the individuals were between 25 years and 35 years old at death.

Skeleton No. 248-1:

Skeleton No. 248-1 is a double inhumation with Skeleton No. 248 located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of November 12, 1891 (page 29) and on page 107 of Moorehead’s 1922 report. In these works the double burial is collectively called Skeleton No. 248. Greber and Ruhl (1989) refer to the skeleton without grave goods as Skeleton No. 248-1. Plates XLVII and XLVIII of Moorehead’s report of 1922 depict only the more heavily adorned burial (Skeleton No. 248). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead indicates that the individual was of small stature.
The Field Museum catalog numbers 40151 and 41612 were assigned to the bones of Skeleton No. 248. It is not clear from his writings whether Moorehead collected both Skeleton No. 248 and Skeleton No. 248-1. However since at least three people are represented in the collections of the Field Museum under the number 41612 perhaps at least parts of both skeletons were collected. It may be the case that a labeling error made in the museum or Moorehead’s failure to recognize a third person in the field account for the discrepancy between the number of individuals reported and the number cataloged.

Skeleton No. 249:

Skeleton No. 249 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

The Field Museum catalog number 56095 was assigned to the bones. Fragmentary, burned remains of an adult labeled with this number were identified in the collections of the Field Museum.

Skeleton No. 250:

Skeleton No. 250 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned,
presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved. Skeleton No. 250 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 251:

Skeleton No. 251 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 251 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 252:

Skeleton No. 252 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 252 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 253:

Skeleton No. 253 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 253 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 254:

Skeleton No. 254 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 254 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 255:

Skeleton No. 255 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted
in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 255 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 256:

Skeleton No. 256 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 256 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 257:

Skeleton No. 257 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 257 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 258:

Skeleton No. 258 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 258 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 259:

Skeleton No. 259 is an individual inhumation located in Moorehead’s cut 2. It is mentioned in Moorehead’s field notes of early to mid-December, 1891 (page 31) and on page 108-109 of Moorehead’s 1922 report. Skeletons 249-259 are collectively depicted in Plate XLVII (Moorehead, 1922). Although the age of the individual is not mentioned, presumably the skeleton was that of an adult. Moorehead reports that the bones were not in good condition and could not be preserved.

Skeleton No. 259 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeletons No. 260 & 261:

Skeleton No. 260 is part of a double inhumation with Skeleton No. 261 located in Moorehead’s cut 3. The double burial is mentioned in Moorehead’s field notes of December 14, 1891 (page 33), on pages 241-244 of Moorehead’s Antiquarian series of
articles (1897), and on page 110 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The skeletons are adults that were buried with numerous objects. An elaborately carved femoral diaphysis section, said to be human, accompanied the skeletons. Moorehead says of the double burial “The mass of material deposited with them exceeds that associated with any other burial so far discovered in the United States” (Moorehead, 1922, page 110). The skeletons were poorly preserved and were not recovered (Moorehead, 1897 p. 241).

The Field Museum catalog numbers 40165 and 41622 were assigned to the bones. Human remains labeled 41622 were identified in the collections of the Field Museum. Dental remains represent at least three adults. Ages at death of two of the individuals, based on dental seriation, are fifteen to twenty years and thirty to forty years. The third individual was a young adult, probably in the third decade of life, based on degree of closure of the palatine sutures. The sexes of these individuals are not known.

A culturally modified left mandibular condyle is also present. A drilling is present on the anterior aspect just inferior to the articular surface. This perforation measures 2.79 mm in diameter and appears to be perfectly circular. Another perforation of the same size is present on the articular surface of the condyle. The two perforations are continuous. Under magnification, the perforation on the articular surface exhibits a sharp margin on its anterior-medial aspect and as slightly flaked on the posterio-lateral aspect. No striations are visible around or in the perforation. The perforation on the anterior aspect of the condyle exhibits under magnification a shallow, circular, semispherical depression just medial to the perforation. It looks like a false start mark and measures 1.8 mm in diameter. All of the margins of the perforation are flaked with
the superior margin slightly more than other aspects. Some of the flakes look like they were made recently while some look like they were caused long ago. Several long stria with “U” shaped channels are present on the lateral surface of the bone. The posterior aspect of the condyle looks smoothed and slightly flattened but no stria are present. If the perforations are for suspension, rubbing against a smooth surface like clothing could have produced the condition of the posterior aspect of the condyle. A right condyle of similar size is present and is similar enough to be the antimere of the modified condyle. The right condyle is not modified.

Skeleton No. 262:

Skeleton No. 262 is an individual inhumation located in Moorehead’s cut 4. It is mentioned in Moorehead’s field notes of December 16, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 113 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The skeleton is that of an adult which was buried with a large stone celt. Moorehead was of the opinion that Skeleton No. 262 was an intrusive burial due to the fact that it was well preserved and not buried deeply (Moorehead, 1891 p. 34).

Skeleton No. 262 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 263:

Skeleton No. 263 is an individual inhumation located in Moorehead’s cut 4. It is mentioned in Moorehead’s field notes of December 16, 1891 (page 34), on page 255 of Moorehead’s Antiquarian series of articles (1897), and on page 113 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The
skeleton is that of a child approximately 4-5 years old (Moorehead, 1891 p. 34) and was poorly preserved. Skeleton No. 263 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 264:**

Skeleton No. 264 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 16, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 110 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The skeleton is that of an adult and was poorly preserved. Several copper objects, some beads and a flint drill accompanied the remains.

Skeleton No. 264 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 265:**

Skeleton No. 265 is a double inhumation with Skeleton No. 266 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 16, 1891 (page 34) and on page 110 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. A copper object accompanied the remains.

Skeleton No. 265 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 266:

Skeleton No. 266 is a double inhumation with Skeleton No. 265 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 16, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 110 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The skull was missing at the time Moorehead discovered the skeleton. The age of the individual is not indicated, but presumably it was an adult. An eagle effigy accompanied the remains.

Skeleton No. 266 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 267:

Skeleton No. 267 is a double inhumation with Skeleton No. 268 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 110 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The bones were not well preserved. The age of the individual is not indicated, but presumably it was an adult. Two copper ear ornaments and some beads accompanied the remains.

Skeleton No. 267 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 268:

Skeleton No. 268 is a double inhumation with Skeleton No. 267 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891
Skeleton No. 268:

Skeleton No. 268 is a double inhumation with Skeleton No. 270 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. Moorehead does not indicate the age of the individual, but presumably it was an adult. A copper plate and some beads accompanied the remains.

The Field Museum catalog numbers 40178 and 41603 were assigned to the bones. The catalog number 40177 is also associated with Skeleton No. 268 in the records of the Field Museum. Human remains labeled 41603 were identified in the collections of the Field Museum. At least five adults (of both sexes) and one adolescent are represented among the remains by cranial and/or dental material. It is not clear which, if any, of these individuals is Skeleton No. 268.

Skeleton No. 269:

Skeleton No. 269 is a double inhumation with Skeleton No. 270 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 34), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. Moorehead does not indicate the age of the individual, but presumably it was an adult. A copper plate, a shell, and some beads accompanied the remains.

The Field Museum catalog number 40179 was assigned to the bones. The catalog number 40177 is also associated with Skeleton No. 269 in the records of the Field Museum. Skeleton No. 269 was not located in the collections of the Field Museum of Natural History.
Skeleton No. 270:

Skeleton No. 270 is a double inhumation with Skeleton No. 269 located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The bones were not well preserved. The age of the individual is not indicated, but presumably it was an adult. Several copper objects, cut mica, bear’s teeth, bark, and some beads accompanied the remains.

Skeleton No. 270 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 271:

Skeleton No. 271 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. Beads and mica accompanied the remains.

Skeleton No. 271 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 272:

Skeleton No. 272 is an individual partial cremation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35) and on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The bones were not well preserved. The age of the individual is not indicated, but presumably it was an adult. Several copper objects, cut mica, and some beads accompanied the remains.

Skeleton No. 272 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of
Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it
was an adult. No objects are reported to have accompanied the remains.

Skeleton No. 272 was not located in the collections of the Field Museum of
Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 273:

Skeleton No. 273 is an individual inhumation located in Moorehead’s cut 3. It is
mentioned in Moorehead’s field notes of December 17, 1891 (page 35) and on page 111
of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s
report of 1922. The age of the individual is not indicated, but presumably it was an adult.
No objects are reported to have accompanied the remains.

Skeleton No. 273 was not located in the collections of the Field Museum of
Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 274:

Skeleton No. 274 is an individual inhumation located in Moorehead’s cut 3. It is
mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 241 of
Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922
report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age
of the individual is not indicated, but presumably it was an adult. The remains were not
well preserved. Two copper ear ornaments and a stone celt accompanied the remains.

Skeleton No. 274 was not located in the collections of the Field Museum of
Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 275:

Skeleton No. 275 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35) and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. The remains were not well preserved.

Skeleton No. 275 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 276:

Skeleton No. 276 is an individual inhumation located in Moorehead’s cut 4. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 255 of Moorehead’s Antiquarian series of articles (1897), and on page 113 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult.

Skeleton No. 276 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 277:

Skeleton No. 277 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 241 of Moorehead's Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. A copper plate accompanied the remains.
Skeleton No. 277 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 278:**

Skeleton No. 278 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes of December 17, 1891 (page 35), on page 241 of Moorehead’s Antiquarian series of articles (1897), and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The skeleton is that of an adult. Numerous objects were with the skeleton including a culturally modified section of human femur.

Skeleton No. 278 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 279:**

Skeleton No. 279 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 36) and on page 111 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. The remains were not well preserved. Mica, galena, and shell objects accompanied the remains.

Skeleton No. 279 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 280:

Skeleton No. 280 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 36) and on page 111 of Moorehead’s 1922 report. The skeleton is that of an adult and was not well preserved. Beads accompanied the remains.

Skeleton No. 280 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 281:

Skeleton No. 281 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 36) and on pages 111 and 112 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. Moorehead notes that some of the bones were saved. Numerous objects, including a culturally modified section of a human femur (Field Museum catalog number 56413), accompanied the remains.

Skeleton No. 281 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 282:

Skeleton No. 282 is represented as an individual inhumation in Moorehead’s map of Mound 25 (Moorehead, 1922 Plate XLVII) and appears to have been located in the margin between Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 37) but not described. Moorehead describes “Altar 282” on page 38 of the field notes, but does not indicate that any human remains were recovered.
from it. Skeleton No. 282 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 283:**

Skeleton No. 283 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 37), in the series Moorehead published in the Antiquarian (1897, page 254), and on page 113 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. The remains were not well preserved.

Skeleton No. 283 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

**Skeleton No. 284:**

Skeleton No. 284 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes of December 28, 1891 (page 37) and on page 113 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. The remains were not well preserved.

The Field Museum catalog number 40168 was assigned to the bones. Skeleton No. 284 was not located in the collections of the Field Museum of Natural History.
Skeleton No. 285:

Skeleton No. 285 is an individual inhumation located in Moorehead’s cut 5. It is mentioned in Moorehead’s field notes (page 39) and on page 114 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. Moorehead indicates that the remains are those of an adult.

Skeleton No. 285 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 286:

Skeleton No. 286 is an individual inhumation located in the margins of Moorehead’s cuts 3 and 5. It is mentioned in Moorehead’s field notes (page 39), in the series Moorehead published in the Antiquarian (1897, page 241), and on page 114 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. Moorehead indicates that the remains are those of an adult. The skeleton was well preserved and accompanied by numerous beads and ocean shells.

Skeleton No. 286 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 287:

Skeleton No. 287 is an individual inhumation located in Moorehead’s cut 3. It is mentioned in Moorehead’s field notes (page 39). Moorehead indicates that the remains are those of an adult. The skull was well preserved but the rest of the skeleton was not.

Skeleton No. 287 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.
Skeleton No. 288:

Skeleton No. 288 is an individual inhumation located in Moorehead’s cut 5 or 6. It is mentioned in Moorehead’s field notes (page 39) and on page 114 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individual is not indicated, but presumably it was an adult. The skeleton was not well preserved.

Skeleton No. 288 was not located in the collections of the Field Museum of Natural History and there is no catalog record of it in the Field Museum files.

Skeleton No. 289 and 290:

Skeleton No. 289 is a double inhumation with Skeleton No. 290. The burials were located in Moorehead’s cut 6. They are mentioned in Moorehead’s field notes (pages 39 and 40) and on page 114 of Moorehead’s 1922 report. In addition, it is depicted in Plate XLVII of Moorehead’s report of 1922. The age of the individuals is not indicated, but presumably they were adults. The skull of Skeleton No. 289 was well preserved. Moorehead reports that there was some kind of resin or gum adhering to one of the scapulae of Skeleton No. 290. Numerous beads accompanied Skeleton No. 289 and rocks had been arranged around the skulls and over the bodies of both individuals.

The Field Museum catalog number 40176 was assigned to Skeleton No. 289. Skeleton No. 289 and Skeleton No. 290 were not located in the collections of the Field Museum of Natural History and there is no catalog record of Skeleton No. 290 in the Field Museum files.
APPENDIX E

DESCRIPTIONS OF BURIALS
FROM H. C. SHETRONE’S EXCAVATIONS
AT THE HOPEWELL MOUND GROUP
APPENDIX E

HOPEWELL MOUND GROUP BURIAL DESCRIPTIONS FROM H. C.
SHETRONE’S EXCAVATIONS

Note:
Some burial descriptions include information about dentition. Teeth are numbered according to the system recommended in Buikstra and Ubelaker (1994):

Tooth 1 is the maxillary right third molar.
Tooth 2 is the maxillary right second molar.
Tooth 3 is the maxillary right first molar.
Tooth 4 is the maxillary right posterior premolar
Tooth 5 is the maxillary right anterior premolar
Tooth 6 is the maxillary right canine.
Tooth 7 is the maxillary right lateral incisor.
Tooth 8 is the maxillary right central incisor.
Tooth 9 is the maxillary left central incisor.
Tooth 10 is the maxillary left lateral incisor.
Tooth 11 is the maxillary left canine.
Tooth 12 is the maxillary left anterior premolar.
Tooth 13 is the maxillary left posterior premolar.
Tooth 14 is the maxillary left first molar.
Tooth 15 is the maxillary left second molar.
Tooth 16 is the maxillary left third molar.
Tooth 17 is the mandibular left third molar.
Tooth 18 is the mandibular left second molar.
Tooth 19 is the mandibular left first molar.
Tooth 20 is the mandibular left posterior premolar.
Tooth 21 is the mandibular left anterior premolar.
Tooth 22 is the mandibular left canine.
Tooth 23 is the mandibular left lateral incisor.
Tooth 24 is the mandibular left central incisor.
Tooth 25 is the mandibular right central incisor.
Tooth 26 is the mandibular right lateral incisor.
Tooth 27 is the mandibular right canine.
Tooth 28 is the mandibular right anterior premolar.
Tooth 29 is the mandibular right posterior premolar.
Tooth 30 is the mandibular right first molar.
Tooth 31 is the mandibular right second molar.
Tooth 32 is the mandibular right third molar.
Shetrone’s Mound 2:

Burial 1:

Burial 1 is part of a double inhumation with Burial 2 of Mound 2. The remains of the individual of Mound 2 Burial 1 include a complete cranium and mandible and most of the postcranial skeleton. Teeth 2-6, 14-23, and 27-31 are present. The teeth that are missing were lost postmortem. The bones have suffered some exfoliation, but were conserved with a consolidant at some point in the past. They are labeled “283/395” and “BL. 1 MD 2.” Copper staining is present on the alveolar processes of the anterior mandibular teeth, as well as on the anterior aspect of the proximal portion of both femora.

Shetrone mentions Burial 1 in his field notes of 7/31/23 and 8/1/23 as well as on page 20 of his 1926 report. The individual was extended on the back with the head toward the west and was six inches above the mound floor. Copper artifacts roughly corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Shetrone estimated that the individual was “not more than 25 years old” at the time of death and was male.

The Standardized Osteological Database (SOD) number 150108 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between thirty and forty years. Pelvic and cranial indicators of sex support Shetrone’s sex assignment.

Burial 2:

Burial 2 is part of a double inhumation with Burial 1 of Mound 2. The remains of the individual of Mound 2 Burial 2 include most of the postcranial skeleton. No teeth are present. The bones are labeled “283/445.” Two proximal hand phalanges are heavily
copper stained. Shetrone mentions Burial 2 in his field notes of 8/1/23 as well as on pages 20 and 22 of his 1926 report. The individual was extended on the back with the head toward the west and was six inches above the mound floor. Copper artifacts were recovered from the area of the left hand which corresponds with the copper staining observed on the skeletal remains. Shetrone estimated that the individual was “not more than 20 years old” at the time of death and was female.

The Standardized Osteological Database (SOD) number 150168 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via degree of skeletal maturation is between fourteen and nineteen years. Femoral and humeral head diameters suggest that the individual was male.

Burial 3:

Burial 3 is an individual inhumation. The remains of the individual of Mound 2 include a complete cranium and mandible and most of the postcranial skeleton. Teeth 2-6, 9, 10, 13-15, 17-21, and 28-31 are present. The teeth that are missing were lost postmortem. Several extra or duplicate postcranial elements are present as well as an extra cranium and mandible. The extra cranium and mandible are not consistent with Shetrone’s description of the skull Burial 3 and the cranium does not articulate as well with the atlas as does the cranium of Burial 3. The postcranial elements of Burial 3 exhibit some exfoliation. The bones are labeled “283/396” and “B 3 Md 2.”

Copper staining is present on the mandibular body and ramus (right side), the left ribs, left scapula, posterior surface of the left femoral head and neck, posterior surface of the sacrum, lateral surface of the left ilium and right ischium, the neural arches of the sixth and seventh cervical vertebrae and the second, third and fourth thoracic vertebrae,
and the volar surfaces of the metacarpals and hand phalanges. Shetrone mentions Burial 3 in his field notes of 8/6/23 as well as on pages 23 and 24 of his 1926 report. The individual was extended on the back with the head toward the southeast and was one foot below the base of the mound. Copper artifacts roughly corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Shetrone estimated that the individual was as young adult at the time of death.

The Standardized Osteological Database (SOD) number 150109 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and twenty-five years. Pelvic and cranial indicators of sex as well as humeral and femoral head diameters suggest that this individual was female.

Burial 4:

Burial 4 is an individual inhumation. The remains of the individual of Mound 2 Burial 4 include an almost complete cranium and mandible and most of the postcranial skeleton. All teeth except 8, 10, and 22 are present. The teeth that are missing were lost postmortem. The bones have suffered some exfoliation, but were conserved with a consolidant at some point in the past. They are labeled “283/397” and “B 4 MD 2.” Copper staining is present on the volar surfaces of the hand elements.

Shetrone mentions Burial 4 in his field notes of 8/6/23 as well as on page 25 of his 1926 report. The individual was extended on the back with the head toward the southeast and was on the mound floor. Copper artifacts corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Shetrone estimated that the individual was a young adult at the time of death.
The Standardized Osteological Database (SOD) number 150112 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and twenty-five years. Pelvic and cranial indicators of sex as well as humeral and femoral head diameters suggest that this individual was female.

**Burial 5:**

Burial 5 is an individual inhumation accompanied by an additional skull called a “trophy” by Shetrone (1926, p. 26). The remains of the individual of Mound 2 Burial 5 include a complete cranium and mandible and a fragmentary postcranial skeleton. All teeth except 32 are missing and most were lost antemortem. The bones have suffered considerable exfoliation. They are labeled “283/424” and “283.” Ohio Historical Society accession records indicate that 283/424 is Burial 5 Mound 2 of Hopewell Mound Group. Copper staining is present on the right posterior aspect of the cranium, the lateral surface of the right body of the mandible, one right rib head and tubercle, six rib fragments, seven thoracic vertebral neural arches, the anterior aspect of the head and neck of the right femur, and the posterior aspect of the sacrum and coccyx. A red stain is present on the ectocranial surface of the occipital just inferior to the external occipital protuberance.

Shetrone mentions Burial 5 in his field notes of 8/6/23 as well as on pages 25 and 26 of his 1926 report. The individual was extended on the back with the head toward the southeast and was on the mound floor. Copper artifacts roughly corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Shetrone estimated that the individual was a very old adult male.
The Standardized Osteological Database (SOD) number 150214 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via degree of metamorphosis of the pubic symphysis and ectocranial suture closure was between twenty-four and forty-nine years. Cranial indicators of sex as well as the diameter of the head of the femur suggest that this individual was female.

**Burial 5 “Trophy:”**

Burial 5 “Trophy” is a skull which was located in the grave feature of Burial 5 to the right of the skull of Burial 5. The remains of Burial 5 “Trophy” include a complete cranium and mandible. All teeth except 5 and 26, which were lost postmortem, are present. Exfoliation has occurred on the ectocranial surface of the occipital, along the ectocranial surface of the sagittal suture, on the left zygomatic and left supraorbital area, on the posterior aspect of the left temporal and on the inferior aspect of the mandible. The cranium is labeled “283/66” which corresponds with the Ohio Historical Society accession record for the “Trophy” skull with Burial 5 Mound 2. Copper staining is present on the frontal, superior aspects of both parietals, and the superior to the external occipital protubercane of the occipital. Numerous fine cutmarks are present along both temporal lines, on the squamous portions of both temporals, just superior to the squamosal sutures, and on the lateral aspect of the right coronoid process and on the lateral aspect of the right mandibular body from the mental foramen to the mandibular angle.

Shetrone mentions Burial 5 “Trophy” in his field notes of 8/6/23 as well as on pages 26 and 27 of his 1926 report and notes “the marks of the flint knife employed in detaching the scalp and tissues.” In photographs of Burial 5 and Burial 5 “Trophy” the
“Trophy” skull appears to face in the opposite direction of the main interment. It is unknown whether the “Trophy” skull actually faced opposite the main interment or if this is a result of posing the contents of the grave for photography. Shetrone does not mention the position of the “Trophy” except to indicate that it sat upright in the grave. Copper artifacts corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone. Shetrone estimated that the individual was a young adult male.

The Standardized Osteological Database (SOD) number 150215 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between thirty-five and forty-five years. Cranial robusticity and comparison with Ohio Hopewell crania of individuals with unambiguous pelvic indicators of sex suggest that this individual was male.
Shetrone’s Mound 3:

One set of human remains, a cremated burial, is mentioned in Shetrone (1926, p. 30) and in field notes of 8/23/24. This set of remains was not located in the collections of the Ohio Historical Society, nor is there a catalog record of it in the Ohio Historical Society’s records. It is unknown whether Shetrone collected it or left it in the field, however, since no burial number was assigned it is likely that the material was not collected.

Shetrone indicates that the cremation had not been disturbed prior to his discovery of it. The cremation had been deposited one inch above the mound floor and, due to the fact that it was near the margin of the mound, it was just under the plow zone. No artifacts were with the cremation and no observations regarding age at death or sex were recorded by Shetrone.
Shetrone’s Mound 4:

**Burial 1:**

Shetrone mentions in his field notes of 6/24/24 finding scattered human bones just inside the south margin of Mound 4. He speculates in the field notes that the bones had been “dislodged and thrown back by former examination…” Although Shetrone does not describe the scattered bones as Burial 1 of Mound 4 there is a Burial 1 on the map on page 32 of Shetrone’s report (Shetrone, 1926). Shetrone does not refer to the scattered bones as Burial 1 in the text of the report or the field notes. There is no accession record or catalog number in the Ohio Historical Society records for Burial 1 nor is there any material in the collection labeled Burial 1 Mound 4. It is unclear whether or not the scattered bones were collected although two bear teeth found with them were collected (A283/165).

**Burial 2:**

Burial 2 is called a “bundle burial” by Shetrone (Shetrone, 1926) who speculates that “two or more adult individuals” are represented. The material in the Ohio Historical Society’s collections from Burial 2 represents at least three adults (based on the inclusion of three distal left femora, left patellae, and right first ribs) and one subadult (represented only by an unfused femoral head epiphysis).

Included in the material of Burial 2 are two partial crania and a mandible. Due to the fragmentary nature of the crania and the mandible neither of the crania can be articulated with the mandible. Age estimations for the crania based on degree of ectocranial suture closure indicate that both individuals were older than the middle of the third decade and younger than the end of the sixth decade of life. The age at death of the
person represented by the mandible is greater than fifty years as estimated using dental seriation. An individual represented by a right ilium was likely to have been between twenty-five and thirty-five years old at the time of death. One of the crania (150135) exhibits cranial morphology consistent with that of a female.

The bones are labeled “283/415” which is the Ohio Historical Society’s catalog number for Burial 2 of Mound 4.

Shetrone mentions Burial 2 in his field notes of 6/24/24 as well as on page 33 of his 1926 report. The burial was about eight inches above the mound floor. No copper staining was noted on the bones although Shetrone reports finding a copper ear spool with the material.

The Standardized Osteological Database (SOD) numbers 150133-150136 were assigned to the remains which are part of the collections of the Ohio Historical Society.

**Burial 3:**

Burial 3 is an individual inhumation. The remains of the individual of Mound 4 Burial 3 include a partial cranium, mandible, and postcranium skeleton. Teeth 1-8, 10-24, 28, 29, 31, and 32 are present. Tooth 9 was lost postmortem. Tooth 30 was lost antemortem. The alveolar bone associated with 25-27 is missing along with the teeth rendering an estimate of the timing of their loss relative to death unobtainable. A duplicate left femoral condyle fragment and atlas fragment are present. A consolidant was applied to the bones at some point in the past. The bones are labeled “283/412” and “3 Md 4.”
Shetrone mentions Burial 3 in his field notes of 6/26/24 as well as on page 33 of his 1926 report. The individual was extended on the back, arms and legs “akimbo,” with the head toward the east. No artifacts accompanied the remains. Shetrone estimated that the individual was a young adult at the time of death.

The Standardized Osteological Database (SOD) number 150129 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty-five and thirty-five years. Pelvic and cranial indicators of sex as well as femoral head diameter suggest that this individual was male.

Burial 4:

Burial 4 is an individual inhumation. The remains of the individual of Mound 4 Burial 4 include a nearly complete cranium and mandible and most of the postcranial skeleton. Teeth 2-6, 8, 13-15, 17-32 are present. Tooth 1 was lost antemortem and the other missing teeth (7, 9-11, and 16) were lost postmortem. An extra left patella and left calcaneus are present that do not match the rest of the skeleton in size and morphology. In addition, of nine complete lumbar vertebrae it is unclear which are extras. The bones of Burial 4 have been consolidated. The bones are labeled “283/417” and “B 4 M 4.”

Shetrone mentions Burial 4 in his field notes of 6/26/24 as well as on pages 33 and 44 of his 1926 report. The individual was extended on the back with the head toward the west. According to Shetrone, two cut and perforated wolf jaws were at the neck of the individual. A cremation (Burial 7 Mound 4) was beneath Burial 4. The head of Burial 4 was on the mound floor but the pelvis and lower body were higher. Shetrone explains that this is due to the cremation under Burial 4. Shetrone estimated that the individual of
Burial 4 was a young adult at the time of death. The Standardized Osteological Database (SOD) number 150143 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between forty and forty-five years. Pelvic and cranial indicators of sex are ambiguous, but femoral and humeral head diameters are well into the male range. However discriminant function analysis based on dental metrics indicates that this skeleton is that of a female ($F_{approx} = 1.46$). The sex of this individual is not known.

Burial 5:

Burial 5 is an individual inhumation. The remains in the collections of the Ohio Historical Society that are labeled as Mound 4 Burial 5 include a partial cranium and mandible and a fragmentary postcranial skeleton. Most of the mandibular teeth were lost antemortem. The maxillae are not present. The bones of Burial 5 have been consolidated. The bones are labeled “283/438” and “283/B 5 M 4.”

Shetrone mentions Burial 5 in his field notes of 6/26/24 as well as on pages 34 of his 1926 report. The individual was extended on the back with the head toward the northwest. No copper artifacts were discovered with Burial 5 and no copper staining is observable on the skeleton. Shetrone estimated that the individual of Burial 5 was a “youth” at the time of death.

The Standardized Osteological Database (SOD) number 150025 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated using the degree of ectocranial suture closure is between thirty and sixty-five years. The discrepancy between the age reported by Shetrone (“youth”) and the age
estimated from the cranial sutures renders the identity of the remains labeled as Burial 5 Mound 4 suspect. Pelvic indicators of sex are not observable and cranial indicators of sex are ambiguous. The sex of this individual is not known.

**Burial 6:**

Shetrone reports that Burial 6 is an individual inhumation (Field Notes 6/26/24). There is no entry for the skeleton of Burial 6 in the catalog of the Ohio Historical Society and no remains bearing the label Burial 6 Mound 4 have been discovered in the collections of the Ohio Historical Society.

Burial 6 is mentioned in Shetrone’s field notes from 6/26/24 and on page 34 of his report (Shetrone, 1926). The individual was extended on the back with the head toward the northeast. According to Shetrone, a small container made from ocean shell was at the feet of Burial 6 and the skeleton was not well preserved. Shetrone estimated that the individual of Burial 6 was a child about six years old at the time of death.

There are very few sets of subadult remains present in the OHS human remains collection from Hopewell Mound Group. The majority of these are labeled as Burial 8 of Mound 25. However, Shetrone reports (Shetrone, 1926 p. 66 and Field Notes 8/16/23) that Burial 8 Mound 25 is a cremation. None of the remains labeled as Burial 8 Mound 25 are cremated or even charred. Two of the three subadult individuals labeled Burial 8 Mound 25 are candidates to be the remains of Burial 6 Mound 4.

These are:

1) The individual represented under the Standardized Osteological Database numbers 150035 (postcranial remains), 150049 (mandible), 150050 (right maxilla), and 150052 (cranium). These remains may represent more than one
individual, however they are all from an individual who was between six and nine years old at death (estimated via dental and skeletal maturation).

2) The individual represented under the Standardized Osteological Database number 150125. This set of remains is comprised of a cranium only. Age was estimated by observation of size and gracility is three to six years.

**Burial 7:**

Burial 7 is a cremation. The remains in the collections of the Ohio Historical Society that are labeled as Mound 4 Burial 7 include numerous cranial and postcranial fragments varying degrees of incineration. Most fragments of Burial 7 have been consolidated. The bones are labeled “283/” and a note with the material reads “Burial 7 Mound 4 located beneath Burial 4 Mound 4.” One fragment is labeled “283/415” which is the catalog number of Burial 2 Mound 4. The bone fragments of Burial 7 exhibit characteristics of bones that were burned “green” or in the flesh (warping, longitudinal splitting, curved cracks, differential degree of burning of bones shielded by soft tissue).

Shetrone mentions Burial 7 in his field notes of 6/26/24 as well as on pages 34 of his 1926 report. The individual was located beneath Burial 4 Mound 4. Shetrone reports that among other artifacts, four copper ear spools were with Burial 7. Copper staining is evident on a calcined fragment of a hand phalanx.

The Standardized Osteological Database (SOD) number 150026 was assigned to the remains of Burial 7 which are part of the collections of the Ohio Historical Society.
No specific age indicators are observable, however the individual appears to have been an adult at the time of death based on observations of skeletal maturation and root crypts for complete (mature) tooth roots. Indicators of sex are not observable. The sex of this individual is not known.

Burial 8:

Shetrone reports that Burial 8 is a cremation unaccompanied by artifacts or associated human remains (Shetrone, 1926 p. 35; Field Notes of 6/26/24). There is no entry for the remains of Burial 8 in the catalog of the Ohio Historical Society and no remains bearing the label Burial 8 Mound 4 have been discovered in the collections of the Ohio Historical Society. It is unknown whether the cremation was collected or left in the field by Shetrone.

Burial 9:

Burial 9 is an individual inhumation. The remains in the collections of the Ohio Historical Society that are labeled as Mound 4 Burial 9 include a partial cranium and mandible and a partial postcranial skeleton. Teeth 12, 13, 17-22, and 30-32 are present. Of the teeth that are not present some were lost postmortem. Other teeth are missing along with their associated alveolar bone rendering the timing of their loss relative to the death of the individual unknown. The bones of Burial 9 have been consolidated and are labeled “283/B9M4” and “283/419.” There are two labels on the left maxilla: “283/B9M4” and “283/ B22bMd25.” The presence of the label for Burial 22b Mound 25 renders the identity of the skull of Burial 9 Mound 4 suspect. However, the skull was associated with the unambiguously labeled postcranial portion of Burial 9 in the collections of the Ohio Historical Society. There is a skull associated with the postcranial
remains of Burial 22b Mound 25 which bears several labels, among them “283/B9M4.”

Settling the question of the identity of the skulls of Burial 9 Mound 4 and Burial 22b Mound 25 by congruence of articulations is not possible due to the absence of the atlases of both sets of postcranial remains.

The presence of tiny fine, cut marks on the cranial and postcranial material lends support to the argument that the cranium belongs to the same individual as the postcranial remains. Cut marks are present on the parietals near the squamosal sutures, around both temporal lines, above both supraorbital tori, and just inferior to the external occipital protuberance. Similar cut marks are present on the capitulum of the right humerus, the trochlea of the left humerus, and the proximal epiphyses of both tibiae.

Shetrone mentions Burial 9 in his field notes of 6/26/24 as well as on pages 35 of his 1926 report. The individual was extended on the back with the head toward the northwest. No copper artifacts were reported with Burial 9 although small copper stained areas are observable on the left side of the body of the mandible and the right parietal. The copper staining may be the result of association with a small piece of copper that was missed at excavation or completely oxidized in the burial environment. Shetrone estimated that the individual of Burial 4 was a “young adult” at the time of death.

The Standardized Osteological Database (SOD) number 150127 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between forty-five and fifty-five years. Pelvic indicators of sex and prominence of the supraorbital tori suggest that this individual is male.
Shetrone’s Mound 7:

The human remains recovered from Mound 7 of Hopewell Mound Group are described in Shetrone’s field notes of 6/26/23, 6/27/23, 7/7/23, 7/9/23, and 7/10/23 as well as on pages 36-38 of Shetrone (1926). The mound had been disturbed prior to Shetrone’s work by previous exploration (northern one-third of the mound) and by the building of a railroad (southern one-third of the mound). The central portion of the mound was under a road which was temporarily rerouted so that Shetrone could explore the remainder of the mound. The former locations of three human burials which had probably been disturbed as during the construction of the railroad were located by Shetrone (“The locations of these graves were readily apparent to our Survey…” (Shetrone, 1926 p. 37)). Shetrone indicates that someone had cut into the central portion of the mound on the south side from the railroad grade. Remains of the individuals interred in these graves had been thrown back into the cut. Some remains had been left in situ, but most had been redeposited. Osteological analyses of the human remains from Mound 7 in the collections of the Ohio Historical Society indicate that at least four individuals are represented.

Burial described in Field Notes of 6/26/23, 6/27/23, and 7/7/23:

The first burial mentioned by Shetrone (field notes of 6/26/23, 6/27/23, and 7/7/23) was recovered in parts on two different days. Part of the postcranial skeleton, which had been disturbed and thrown back in the grave, was recovered on either June 26 or June 27, 1923. The skull and several other elements were recovered on July 7, 1923. The set of remains present in the collections of the Ohio Historical Society that match Shetrone’s description of this burial for state of preservation, color, cultural modification,
and femur length is cataloged under the number 283/416 and was assigned the Standardized Osteological Database number 150137. The bones are labeled “283/416” and “283/MD7.” A cranium and most of the larger elements of the postcranial skeleton are present. Teeth 1-3, 5, 9-12, and 14-16 are present. The mandible and mandibular teeth are not present. Teeth missing from the maxillae were lost postmortem.

The fact that the skeleton had been disturbed and that some elements of the skeleton were recovered more than a week after other elements, renders the idea that only one person is represented suspect. Shetrone speculates that the skull had been culturally modified and might represent a trophy skull (see below) instead of being part of the individual represented by the postcranial skeleton. However, cranial and postcranial age indicators are consistent with each other and skeletal observations provide no evidence to support the idea that two people are represented.

Shetrone does not mention whether the burial was extended upon the back like most of the other burials of Hopewell Mound Group, but he indicates that the head was oriented toward the northwest.

Copper staining is present on the frontal, zygomatics, maxillae, temporals, and sphenoid. Shetrone mentioned in the field notes of 7/7/23 that most of the cranium and the mandible were heavily copper stained. The mandible mentioned by Shetrone is not present. Two mandibles are present in the OHS collection of material from Mound 7 (SOD 150139 and 150140) but neither are copper stained and neither fit with the cranium of 150137. An unsuccessful attempt was made to identify copper stained mandibles of unknown provenience in the OHS collections from Hopewell Mound Group and match one to 150137.
Shetrone makes the following observation in the field notes of 7/7/23:

“The skull and lower jaw, lying 20 inches above the floor in the disturbed earth incident to the digging back (northward) by the railroad construction survey, were intact, with the exception of the greater part of the occiput of the skull, which was found lower down toward the floor. This occipital portion presents an unusual and interesting feature, in that it appears to have been roughly cut from the skull, and the edges of both parts somewhat smoothed off. Whether or not this is true will require more careful examination.”

Upon observation of the cranium it is clear that most of the occipital had become detached from the rest of the cranium at some point. A gap of missing bone exists roughly following the left occipito-mastoid and lamboidal sutures to a point at about the center of the right lamboidal suture. The result is that it looks like a large letter “C” was removed from the back of the cranium roughly following suture lines. The preservation of the occipital area is poor and the margins of missing bone are not sharp or straight and do not appear to have been cut. Whether this is because there was no cutting or because the cut margins became blunted by deterioration of the bone is not clear. Some cut marks are observable on the ectocranial surface surrounding the altered occipital area, but these are few in number. Where there is no gap of missing bone between the altered margins of bone, the occipital was reattached to the rest of the cranium with glue at some point in the past. A conservative conclusion is that the occipital was broken and some of the
fragments were not recovered. Other examples of culturally modified bone from the Hopewell Mound Group exhibit cut margins that are much different in character than the margins described above.

Age at death estimated via principal components analysis of two indicators is between twenty-five and thirty-five years. Pelvic and cranial indicators of sex suggest that this individual is female.

Miscellaneous Remains:

Several sets remains are documented in Shetrone’s field notes of 7/7/23, 7/9/23, and 7/10/23. These include a femur and “orbital bone,” scattered bones, and a right lower leg.

A set of commingled remains is present in the collections of the Ohio Historical Society. The bones are labeled “283/416” and “283/M7.” Standardized Osteological Database numbers 150139-150142 have been assigned to this material. Two mandibles, the maxillae of an individual, and numerous additional cranial and postcranial elements are present. At least two individuals are represented based on the presence of two mandibles. All of the remains are from adults. The individual represented by maxillae is likely to have been a female based on discriminant function analysis of dental metrics.

An inconsistency is noticeable between the material represented in the commingled set and the scattered remains described by Shetrone. Shetrone mentions that most of these bones were copper stained (Field Notes of 7/9/23). Copper stains are not observable on most of the elements represented under the SOD numbers 150137-150142.
Third Burial:

In the field notes of July 10, 1923 Shetrone describes what he calls the third of the three skeletons discovered in Mound 7:

“Only parts of the third skeleton were found, and these were in poor or broken condition. Many pieces of skull, small to large were found, two of which (fragments of an inch or more across and apparently corresponding to the posterior corners of parietal bones) are drilled with neat holes about 1/8 inch in diameter, but whether these are parts of the skulls of burials in the mound or portions of skull-bone ornaments, is undetermined.”

The remains of this skull include a partial cranium and partial mandible. Teeth 1-6, 9-21, 27, and 29-32 are present. Of the teeth that are not present, 7, 8, 22, and 28 were lost postmortem. The alveolar bone associated with the other missing teeth is missing as well rendering the timing of the loss of the teeth relative to death uncertain. The cranium and mandible have been consolidated. Both the cranium and the mandible are labeled “283/394” which corresponds with the Ohio Historical Society accession record for the “Trophy” skull of Mound 7 at the Hopewell Mound Group. Four drillings are observable:

1) On the midline of the frontal 21.3 mm from Bregma (Diameter = 2 mm)
2) On the midline of the frontal 12 mm from Bregma (Diameter = 3 mm)
3) In the sagittal suture 24.1 mm from Bregma (Diameter = 4.6 mm)
4) On the left parietal 10.5 mm from the sagittal suture and 37.4 mm from Bregma (Diameter = 2.5 mm)
The drilling measurements were taken on the ectocranial surface and distances were measured to the approximate center of the drillings. There are several cut marks on the right parietal posterior to the area opposite the posterior-most drilled hole and 10-15 mm from the sagittal suture.

Shetrone mentions this “Trophy” in his field notes of 7/10/23 as well as on page 38 of his 1926 report. The Standardized Osteological Database (SOD) number 150138 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Discriminant function analysis based on dental metrics indicates that this skull is that of a male.
Shetrone’s Mound 11:

Two sets of cremated remains were encountered by Shetrone in Mound 11. They are described in Shetrone’s report (1926, p.40) as well as in the Field Notes of 8/23/22 and 8/26/22. One cremation was scattered around and above a feature called a “round altar” by Shetrone (1926) who cites Squier and Davis for coining the term. This deposit was situated between the center of the mound and the north margin. The other cremation was discovered on the south side of the mound. Shetrone describes this material as the remains of an adult which were associated with a crematory basin. The remains had been only partially burned and Shetrone notes “the vertebrae and pelvis were in situ.”

Neither cremation has been located in the collections from Mound 11 of the Ohio Historical Society and no catalog records for the material exist.
Shetrone’s Mound 17:

Two bone fragment yielding deposits were discovered by Shetrone in Mound 17. The first deposit encountered is described in the Field Notes of 4/15/24 and 4/16/24 as associated with the basin and numerous artifacts of Cache 1. Shetrone describes the bones as follows:

“Considerable amount of bone fragments intermixed, not yet determined whether or not human…”

This material has not been located in the collections from Mound 17 of the Ohio Historical Society and no catalog records for the material exist.

Another bone containing deposit is described in the Field Notes of 7/23/24 and on pages 47-49 of Shetrone’s report (1926). This deposit, called “Cache 2” by Shetrone, included a basin richly supplied with artifacts. Shetrone notes the following on 7/23/24:

“There were a great number of bone fragments, few of which appear to be human; however, several fragments of human skull were found, yet the deposit, as in the case of Number 1, does not appear to have included a human cremation.”

A set of bone fragments labeled “283” and “283/ charred human bone possibly Md. 17, “Cache 2” is present in the collections of the Ohio Historical Society. Standardized Osteological Database number 150157 was assigned to this material. Most of the bones are human but an element from a bear is present as well. At least one adult individual is represented, however eight middle hand phalanges representing two people of different size are present.
The skull fragments described by Shetrone are not present, but there are several fragments of other bones that could be mistaken for skull fragments. In addition, the fragments are copper stained, but do not appear to be burned. No copper artifacts are reported to have been present in Cache 2.
Shetrone’s Mound 20:

Three sets of human remains, two of them cremated, from Mound 20 are described by Shetrone (1926, p.52-53; Field Notes of 6/27/24). The first set of remains encountered is a “coarsely cremated” individual. The second set, an inhumation, is an “elderly adult” extended on the back with the head toward the Northeast (as described in Shetrone, 1926) or Northwest (as described in the Field Notes). Shetrone mentioned that the bones of this individual were not well preserved. The third set of human remains, a cremated adult, was scattered next to the inhumation from the neck area to the knee area.

None of this material was located in the collections of the Ohio Historical Society from Hopewell Mound Group. No catalog record of them exists.
Shetrone’s Mound 23:

Two sets of human remains, one of them cremated, were encountered by Shetrone in Mound 23. These are described in Shetrone’s report (Shetrone, 1926, p. 54) and in Shetrone’s Field Notes of 7/3/24. The first remains encountered were the cremated ones. Shetrone does not offer a description of these. The second set is an uncremated, middle-aged adult, extended on the back, with the head toward the southwest. Shetrone notes that these bones were those of a small person based on the length of the femur which was less than fourteen inches.

Neither of these sets of remains was located in the collections of the Ohio Historical Society from Hopewell Mound Group. No catalog record of them exists.
Shetrone’s Mound 24:

Seven sets of human remains, one of them an inhumation, were encountered by Shetrone in Mound 24. None of these sets of remains were located in the collections of the Ohio Historical Society from Hopewell Mound Group. No catalog record of them exists.

Shetrone mentions the first five sets of remains in his report (Shetrone, 1926, p. 56) and all seven sets in the Field Notes of 9/2/22. The first three sets of remains encountered were cremations, presumably all adults, located in the south side of the mound. The fourth and fifth sets, an inhumation and a partial cremation, were likely to be one individual according the Shetrone. The inhumation included bones of the pelvis and legs while the partial cremation included bones of the upper body. The sixth burial is a cremation near the center of the mound that had been disturbed prior to Shetrone’s exploration. A seventh burial, another partial cremation, was encountered near the northern part of the mound. Shetrone indicates that this individual was an adult.
Shetrone’s Mound 25:

**Burial 1:**

Burial 1 is an individual inhumation. The remains of the individual of Mound 25 Burial 1 include sections of the midshaft of both tibiae and both femora. The bones are labeled “283/439” which is the Ohio Historical Society’s catalog number for Burial 1 of Mound 25.

Shetrone mentions Burial 1 in his field notes of 8/13/23 as well as on pages 61 and 62 of his 1926 report. The individual was extended on the back with the head toward the Northeast and was four and a half feet above the mound floor. Shetrone indicates that the individual was an adult at the time of death and that the bones were not well preserved.

The Standardized Osteological Database (SOD) number 150153 was assigned to the remains which are part of the collections of the Ohio Historical Society. Examination of the bones failed to yield a more specific estimation of age than that made by Shetrone. The remains lacked indicators of sex.

**Burial 2:**

Burial 2 described by Shetrone as “partly burned and very badly decayed” (Shetrone Field Notes of 8/13/23). A set of remains is present in the collections of the Ohio Historical Society that is listed in an old file of burial information (author unknown) as Burial 2A Mound 25. However the bones of this burial are labeled with the catalog number “283/432” which is described in the catalog as “Skeleton, unidentified, possibly Hopewell.” The remains of the individual include partial femora, complete tibiae, and the right fibula. The skeletal elements do not match Shetrone’s description of Burial 2 in
that they are not burned and are not poorly preserved. Shetrone mentions Burial 1 in his field notes of 8/13/23 as well as on pages 61 and 62 of his 1926 report. According to Shetrone, the individual “lay transversely at the feet of number 1.” Shetrone indicates that the individual was an adult.

The Standardized Osteological Database (SOD) number 150145 was assigned to the remains described above which are part of the collections of the Ohio Historical Society, but may not actually be the remains of Burial 2 Mound 25. Examination of the bones failed to yield a more specific estimation of age than that made by Shetrone. The remains lacked indicators of sex.

Burial 3:

Burial 3 is described by Shetrone in his report of 1926 as well as in the Field Notes of 8/13/23. According to Shetrone the burial is an adult inhumation located six feet above the mound floor, presumably extended on the back as almost all inhumations of the Hopewell Mound Group were, and oriented with the head to the Northeast.

Burial 3 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 4:

Burial 4 is described by Shetrone in his report of 1926 on page 63 as well as in the Field Notes of 8/13/23. According to Shetrone the burial is an adult cremation (“coarsely burned”), located on the mound floor. Burial 4 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 5:

Burial 5 is described by Shetrone in his report of 1926 on page 63 as well as in the Field Notes of 8/15/23. According to Shetrone the burial is an inhumation located five and a half feet above the mound floor. Shetrone reports that Burial 5 had been disturbed by the plow and was not well preserved.

Burial 5 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 6:

Burial 6 is a double inhumation with Burial 7. The remains in the collections of the Ohio Historical Society that are labeled as Mound 25 Burial 6 include an almost complete cranium and mandible and a partial postcranial skeleton. All of the teeth are present except the maxillary third molars which were lost postmortem. The bones of Burial 6 have been consolidated. The cranium and mandible are labeled “283/91” which is listed in the catalog of the Ohio Historical Society as Burial 6 Mound 25. Some postcranial elements bear the label “283/443” which also refers to Burial 6 Mound 25 in the catalog.

Shetrone mentions Burial 6 in his field notes of 8/16/23 as well as on pages 63-65 of his 1926 report. The individual was extended on the back on the mound floor with the head toward the southwest. The bones have been consolidated and a restoration was made with some sort of putty-like material to the posterior aspect of the ascending ramus of the left side of the mandible. Several extra bones that duplicate elements of Burial 6 are present.
Copper staining is present around the nasal aperture, on the right gonial angle, the left inferior body of the mandible, all vertebral neural arches, one left rib fragment and one unsideable rib fragment, the posterior aspect of both ilia, the posterior aspect of the sacrum, posterior femoral diaphyses near midshaft, the proximal epiphysis of the right fibula, and posterior aspects of both scapula. These stains correspond well with the placement of copper artifacts with the body in the grave. Of note is the inclusion of conjoined, conical, copper nostril inserts which Shetrone refers to as an “artificial copper nose.” The inserts were located in the nasal aperture. Only two other similar examples are known to exist, one from Burial 7 Mound 25 of the Hopewell Mound Group and the other from Seip. Cut marks are present on one right rib fragment, three left rib fragments, and on the left innominate near the supero-medial border of the obturator foramen.

Shetrone estimated that the individual of Burial 6 was a young adult at the time of death and described the individual as being of “unprecedented massiveness and strength of build.”

The Standardized Osteological Database (SOD) number 150165 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Sex is likely to have been male based on numerous pelvic and cranial indicators of sex.
Burial 7:

Burial 7 is a double inhumation with Burial 6. The remains in the collections of the Ohio Historical Society that are labeled as Mound 25 Burial 7 include an almost complete cranium and mandible and a partial postcranial skeleton. All of the teeth are present except 9, 13, and 16 which were lost postmortem. The bones of Burial 7 have been consolidated. The cranium is labeled “283,” the mandible is labeled “283/92,” and the postcranial remains are labeled “283/444.” These numbers correspond to numbers in the catalog of the Ohio Historical Society for Burial 7 Mound 25.

Shetrone mentions Burial 7 in his field notes of 8/16/23 as well as on pages 65 and 66 of his 1926 report. The individual was extended on the back on the mound floor with the head toward the southwest. The bones have been consolidated. Shetrone reported that the bones were “fairly well preserved” at the time he discovered them.

Copper staining is present on the maxillae around the nasal aperture, both nasal bones, the right temporal line, around the foramen magnum on the endocranial and ectocranial surfaces, the medial surfaces of both ascending rami of the mandible, the neural arches of the cervical and thoracic vertebrae, the posterior aspect of the right ulna, the posterior diaphysis and both epiphyses of the right radius, the posterior aspect of the right humerus, the distal epiphysis of the left radius, the left metacarpals, all carpals except the right hamate, posterior aspects of both ischia, inferior posterior aspects of the ilia, the posterior aspect of the proximal epiphysis of the right femur, the posterior aspect of the right femur near the knee joint, the superolateral surface of the left talus, the posterior aspect of the proximal epiphyses of both tibiae, and on the plantar surfaces of the metatarsals. These stains correspond well with the placement of copper artifacts with
the body in the grave. Of note is the inclusion of conjoined, conical, copper nostril inserts which Shetrone refers to as an “artificial copper nose.” The inserts were located in the nasal aperture. Only two other similar examples are known to exist, one from Burial 6 Mound 25 of the Hopewell Mound Group and the other from Seip.

There is another set of postcranial remains in the OHS collections that is labeled “283/444.” The copper staining pattern on the set described here as Burial 7 shows better correspondence with Shetrone’s description of the placement of copper artifacts included in the grave than does the alternate set.

Cut marks are present on the cranium near the temporal lines, the ventral surface of the right scapula near the axial border, one right and one left rib fragment, and on the posterior border of the lateral surface of the left mandibular ramus.

Shetrone estimated that the individual of Burial 7 was a young adult female and described the individual as being of “medium height and build.”

The Standardized Osteological Database (SOD) number 150166 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Sex is likely to have been female based on numerous pelvic and cranial indicators of sex.
Burial 8:

Burial 8 is described by Shetrone in his report of 1926 on page 66 as well as in the Field Notes of 8/16/23. According to Shetrone the burial is a cremation. The collections of the Ohio Historical Society include human remains labeled as Burial 8 Mound 25. However, the material does not fit Shetrone’s description of Burial 8 by virtue of the fact that it represents at least three subadults and one adult, none of whom have been cremated.

Burial 8 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 9:

Shetrone describes Burial 9 on page 67 of his report (Shetrone, 1926) and in the field notes of 8/25/23. The burial is an individual adult inhumation, extended on the back with the head oriented toward the southeast.

There are five sets of remains in the collections of the Ohio Historical Society cataloged as Burial 9 (283/420) or as “possibly” Burial 9 (283/425 and 283/426). This material represents at least three individuals and includes one skull, one cranium, one mandible, one set of postcranial remains, and one cremation. The material securely cataloged as Burial 9 (not including the material cataloged as “possibly” Burial 9) includes the cremation and the set of postcranial remains. Since Shetrone described Burial 9 as an inhumation, it seems most likely that the postcranial set of remains is from Burial 9. The Standardized Osteological Database number 150218 was assigned to the postcranial remains thought to be from Burial 9 Mound 25.
The postcranial remains thought to be Burial 9 are labeled “283/420” and “B9 MD25.” A partial postcranial skeleton is present. It is consistent in degree of preservation with Shetrone’s observation that Burial 9 was “utterly decayed” at the time he discovered it. Copper staining is present on the axial border of the right scapula and on the right fourth metacarpal. Shetrone indicates that Burial 9 included no artifacts. The source of the copper staining could be the inclusion of copper objects that were overlooked at the time of excavation or that had completely oxidized. Alternatively, the copper stained elements may belong to a different skeleton or this set of postcranial remains may not be Burial 9.

No age indicators are present, so an age estimate more specific than Shetrone’s cannot be rendered. Sex indicators are similarly scarce thus sex is unknown.

Burial 10:

Burial 10 is an individual inhumation. The remains of the individual of Mound 25 Burial 10 include a fragment of the left temporal, partial maxillae, a mandible fragment, and several fragments of cervical and thoracic vertebrae. Teeth 1-6, 8-15, 22-25, 31 and 32 are present. The missing teeth were lost postmortem or are missing along with their associated alveolar bone rendering the timing of their loss relative to death unknown. The bones are labeled “283/407” which is the Ohio Historical Society’s catalog number for Burial 10 of Mound 25.

Shetrone mentions Burial 10 in his field notes of 8/30/23 as well as on pages 67 and 68 of his 1926 report. The individual was extended on the back with the head toward the southeast. Shetrone indicates that the individual was an adult at the time of death and that the bones were not well preserved.
The Standardized Osteological Database (SOD) number 150123 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age estimated via seriation of maxillary dentition is estimated to be between thirty-six and forty years. The remains lacked indicators of sex.

**Burial 11:**

Burial 11 is an individual inhumation. The remains of the individual of Mound 25 Burial 11 include a fragmentary cranium, partial mandible, several elements of the hand, the axis, and the femora, tibiae and right fibula. Teeth 1-5, 12-16, 18-23, and 29-32 are present. All missing teeth were lost postmortem except 27 and 28 which are also missing their associated alveolar bone rendering the timing of their loss relative to death unknown. The bones are labeled “283/423” and “B11 Md 25.”

Shetrone mentions Burial 11 in his field notes of 9/1/23 as well as on pages 68-70 of his 1926 report. The individual was extended on the back with the head toward the south. According to Shetrone the skeleton was in “poor condition.” Shetrone estimated that the individual of Burial 11 was as middle-aged adult at the time of death.

Copper staining is present on left hand elements which is consistent with the location in the grave of copper ear ornaments.

The Standardized Osteological Database (SOD) number 150213 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Sex, estimated using seriated comparison with crania from individuals with unambiguous skeletal sex indicators, is likely to be male.
Burial 12:

Burial 12 is an individual inhumation. The remains of the individual of Mound 25 Burial 12 include a partial skull and several fragments of cervical and thoracic vertebrae including the atlas. All teeth are present except 11 which was lost postmortem. A supernumerary tooth is present lingual to tooth 10 and the alveolus of 11. The bones are labeled “283/405” which is the Ohio Historical Society catalog number corresponding to Burial 12 of Mound 25.

Shetrone mentions Burial 12 in his field notes of 9/3/23 as well as on page 72 of his 1926 report. Upon its discovery the burial was described as poorly preserved and the skull as crushed. The presence of a supernumerary tooth was noted by Shetrone, but he indicates in the field notes that it was “located within the inner angle formed by the canine and first pre-molar teeth, inferior maxillary, right side.” However, the one noted above is on the left side. It seems likely that Shetrone mistakenly thought he was looking at the mandible. The term “inferior maxillary” may refer to the mandible. Shetrone estimated that the individual of Burial 12 was as “an adult in early middle life.”

The Standardized Osteological Database (SOD) number 150124 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty-five and thirty-five years. Discriminant function analysis based on dental metrics indicates that this skeleton is that of a female. The individual’s small supraorbital ridges support this sex assignment.
Burial 13:

Burial 13 is an individual inhumation. The remains of the individual of Mound 25 Burial 13 include a partial cranium, the right clavicle, one thoracic vertebrae fragment, and metacarpals 2-4 of the left hand. No teeth are present. The bones are labeled “BL13 MD 25” and “283/403” which is the Ohio Historical Society catalog number corresponding to Burial 13 of Mound 25.

Shetrone mentions Burial 13 in his field notes of 9/4/23 as well as on pages 72 and 74 of his 1926 report. The individual was oriented with the head “about 10 degrees east of south” and was not well preserved. Shetrone estimated that the individual of Burial 13 was a young adult of “less than average height.”

The Standardized Osteological Database (SOD) number 150119 was assigned to the remains which are part of the collections of the Ohio Historical Society. No age indicators are present, so an age estimate more specific than Shetrone’s cannot be rendered. Cranial indicators of sex suggest that this individual is female.

Drilled Human Phalanx Discovered on July 16, 1924:

In his field notes of July 16, 1924 Shetrone describes a deposit of charred material that included burned wood and other organics as well as imitation bear teeth, fragments of animal jaws, beads, flint artifacts, eagle claws and human bone. The human bone included several skull fragments and a human hand phalanx with two perforations.

A perforated first proximal human phalanx of the hand was located in the collections of the Ohio Historical Society. Although the bone is not labeled it fits Shetrone's description and was in storage with other objects from the Hopewell Mound Group.
The catalog records of the Ohio Historical Society indicate that the phalanx Shetrone collected from Mound 25 of the Hopewell Mound Group was assigned the catalog number A283/190. The Standardized Osteological Database number 150173 and the catalog number A283/783 were recently assigned to the phalanx found in the collections.

The bone appears to have been burned and is greyish white in color, though not calcined. Two complete perforations are present, both of which have apertures on the dorsal and palmer aspects of the bone. One perforation is located near the distal end of the bone and is 1.4 mm in diameter. The other perforation is located near the proximal end of the bone and in 1.95 mm in diameter. Damage, postmortem in origin, has occurred to the bone adjacent to both perforations causing trabeculae to be exposed.

The phalanx appears to have belonged to someone who had reached skeletal maturity as the proximal epiphysis had united with the diaphysis. The sex of the individual is unknown.

**Burial 14:**

Burial 14 is described by Shetrone in his report of 1926 on page 77 as well as in the Field Notes of 7/19/24. According to Shetrone, the burial is a cremation. Burial 14 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

**Burial 15:**

There are two sets of remains in the collections of the Ohio Historical Society with catalog numbers that refer to Burial 15 Mound 25. One is cataloged under the number 283/399 and has been assigned the Standardized Osteological Database number
150131. The other has the catalog number 283/414 and the SOD number 150132. Comparison of the remains with field photographs of Burial 15 provided no definitive conclusion regarding which skeleton is actually Burial 15.

Shetrone describes Burial 15 in his report (Shetrone, 1926 p. 78) and in Field Notes of 7/22/24. The burial is an individual inhumation extended on the back with the head oriented toward the northeast. By Shetrone’s estimation the individual was a young adult female.

The skeleton cataloged as 283/399 is labeled “283/399” and “BL 15 Md 25.” A mostly complete skull and fragmentary postcranial skeleton are present and have been consolidated. All teeth are present except 10-13, 16, 24, and 25. All missing teeth were lost postmortem. Pelvic and cranial morphology indicate that this individual was female. Serial comparison of the cranium with other crania supports the assignment of sex. Age at death estimated via principal components analysis of five indicators is between twenty and thirty years.

The skeleton cataloged as 283/414 is labeled “283/414” and “BL15 Md 25.” A partial cranium, largely complete mandible, and most of the postcranial skeleton are present. Teeth 2-8, 13-15, 17-24, and 27-32 are present. Missing teeth were lost postmortem with the exception of 9 which is missing the associated alveolar bone thus rendering the timing of the loss relative to death unknown. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Pelvic and cranial traits indicate that this person was female. The sex assignment is supported by the diameter of the head of the femur.
Burial 16:

Burial 16 is an individual inhumation. The remains of the individual of Mound 25 Burial 16 include a largely complete cranium, a complete mandible, and a partial atlas. All teeth are present except 9, 12, 22, 25, 26, and 29 which were lost postmortem. The bones are labeled “16 Md 25” and “283/406” which is the Ohio Historical Society catalog number corresponding to Burial 16 of Mound 25.

Shetrone mentions Burial 16 in his field notes of 7/25/24 as well as on page 78 of his 1926 report. The individual was extended on the back and oriented with the head toward the northeast and was not well preserved. Shetrone estimated that the individual of Burial 16 was as “young adult or almost adult youth.”

The Standardized Osteological Database (SOD) number 150122 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty and thirty years. Cranial indicators of sex suggest that this individual is female.

Burial 17:

Burial 17 is described by Shetrone in his report of 1926 on page 78 as well as in the Field Notes of 7/26/24. According to Shetrone, the burial is a cremation. Burial 17 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 18:

Burial 18 is described by Shetrone in his report of 1926 on page 79 as well as in the Field Notes of 7/29/24. According to Shetrone, the burial is a cremation. Burial 18 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 19:

Burial 19 is described by Shetrone in his report of 1926 on page 79 as well as in the Field Notes of 7/30/24. According to Shetrone, the burial is a cremation. Burial 19 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 20:

Burial 20 is described by Shetrone in his report of 1926 on page 79 as well as in the Field Notes of 7/30/24. According to Shetrone, the burial is a cremation but “the bones were rather coarser than usual, particularly those of the femur and pelvis which were but slightly burned.”

There are cremated and partially cremated remains in the collections of the Ohio Historical Society in three boxes labeled “Hopewell Mound 25 Burial 20 Cremation.” These are part of a larger set of cremated material (n = 6 boxes) that until recently had been on loan from the Ohio Historical Society to the University of Kentucky Museum of Anthropology. It is not known whether all of the cremated material in the larger set is from Burial 20. Lowthert (1993) examined the material in one of the three boxes labeled as Burial 20 and reports that at least three adults (based on the presence of six femoral heads) and one subadult (based on a cranial fragment) are represented.
There was no record of Burial 20 in the catalog of the Ohio Historical Society until 8/12/99 when the number 283/1000 was assigned during a recent inventory of the collection.

**Burial 21:**

Burial 21 is described by Shetrone in his report of 1926 on page 79 as well as in the Field Notes of 7/31/24. According to Shetrone the burial is an inhumation that was “extremely poorly preserved, the bones being little more than streaks of dust. Shetrone reports that Burial 21 was an adult, extended on the back with the head oriented toward the east.

Burial 21 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

**Burial 22-A:**

Burial 22-A is part of a double inhumation with Burial 22-B of Mound 25. The remains of the individual of Burial 22-A include a mostly complete cranium and mandible and a partial postcranial skeleton. All teeth are present except 10, 11, 23, 25, and 26 which were lost postmortem. The bones were conserved with a consolidant at some point in the past. They are labeled “283/392” which corresponds with the Ohio Historical Society catalog entry for Burial 22-A of Mound 25.

Copper staining is present on the lateral surface of the right ascending ramus of the mandible, the right glenoid fossa, the right zygomatic root, the right external auditory meatus, the left side of the frontal crest, the right iliac crest from the anterior iliac spine to slightly past the iliac tubercle, the lateral surfaces of the distal half of the diaphysis of the right ulna and the distal articular surface, the posterior aspect of the right radius, and the
dorsal surface of the right second and third metacarpals. Copper artifacts roughly corresponding in placement to the copper staining on the skeletal remains were recovered by Shetrone.

A red stain is present on the right maxilla extending from the nasal aperture inferiorly onto the anterior maxillary dentition. The stain extends left of the midline onto the left maxilla but is not as dark in this area. The mandible exhibits a similar red stain in the area of the mental eminence and left inferior border of the body and in the right extramolar sulcus. The left femur has a trace of red stain on the anterior aspect of the base of the greater trochanter and on the neck adjacent to the supero-anterior aspect of the greater trochanter. Shetrone notes the red stain in the field notes of 8/2/24:

“…male skeleton had small amount of red pigment at mouth, staining teeth, chin and some of the beads around the neck.”

Cut marks are present near the posterior border of the right mandibular ascending ramus midway between the area where the condyle would be if present and the gonial angle, on both parietals near the sagittal suture, and on the antero-medial aspect of the diaphysis of the left tibia.

The cranium of Burial 22-A is one of the few artificially deformed crania found at the Hopewell Mound Group. The cranium exhibits parallelo-fronto-occipital deformation.

Shetrone mentions Burial 22-A in his field notes of 8/1/24 as well as on pages 79-81 of his 1926 report. The individual was extended on the back with the head toward the southwest. Shetrone indicates that the individual was a young male of “medium size” and that the skeletons were in poor condition at the time of their discovery.
The Standardized Osteological Database (SOD) number 150061 was assigned to the remains which are part of the collections of the Ohio Historical Society. Another set of human remains in the collection of the Ohio Historical Society bears the label 283/392 but the elements present duplicate those of 150061 and differ in color, size and morphology from 150061. The material included under 150061 is thought to be Burial 22-A based on comparison to the description of the burial in the field notes, comparison to photographs, and copper stain pattern. Age at death of Burial 22-A, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Pelvic and cranial indicators of sex support Shetrone’s assessment that Burial 22-A is a male.

**Burial 22-B:**

Burial 22-B is part of a double inhumation with Burial 22-A of Mound 25. The remains of the individual of Burial 22-B include a mostly complete cranium and mandible and a partial postcranial skeleton. All teeth are present except 10, 24-27, and 29. The alveolar bone surround 10 is missing rendering an estimation of the timing of its loss relative to death unobtainable. All other missing teeth were lost postmortem. The bones are labeled “283/393” which corresponds with the Ohio Historical Society catalog entry for Burial 22-A of Mound 25 and “B22b M25.” The cranium bears labels of other skeletons as well, however comparison of the cranium with field photographs of the skeleton confirm that it belongs to Burial 22-B.

Copper staining is present on the distal diaphysis of the left ulna presumably from the copper plate Shetrone describes at the right side of the chest of the male skeleton (Burial 22-A) which was in very close proximity to Burial 22-B.
Shetrone mentions Burial 22-A in his field notes of 8/1/24 as well as on page 79 of his 1926 report. The individual was extended on the back with the head toward the southwest. Shetrone indicates that the individual was a young female of “medium size” and that the skeletons were in poor condition at the time of their discovery.

The Standardized Osteological Database (SOD) numbers 150062 and 150063 were assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 22-B, estimated via principal components analysis of two indicators, is between twenty-five and thirty-five years. Pelvic and cranial indicators of sex as well as femoral head diameter support Shetrone’s assessment that Burial 22-B is a female.

Burial 23 “Southern-most”:

Burial 23 “Southern-most” is part of a double inhumation with Burial 23 “Northern-most” of Mound 25. The remains of the individual of Burial 23 “Southern-most” include a mostly complete cranium and mandible and several elements of the postcranial skeleton. All teeth are present except 1, 16, 20, 24, 25, 29, 30, and 32. The alveolar bone surrounding 1 and 16 is missing rendering an estimation of the timing of loss of these teeth relative to death unobtainable. Teeth 20, 29, 30, and 32 were lost before death. Teeth 24 and 25 were lost postmortem. The bones are labeled “283/B23 Md25” and “283/421” which corresponds with the Ohio Historical Society catalog entry for Burial 23 of Mound 25.
The “Southern-most” and “Northern-most” skeletons of Burial 23 were distinguishable from each other based on copper stain pattern (or lack thereof) and by comparison to a photograph taken of the material in situ. Several elements that could not be ascribed with certainty were recorded under the Standardized Osteological Database number 150211.

Copper staining is present on the right parietal, right side of the frontal, the crowns and roots of teeth 17-22, the roots of 23, 26, 27, and 28, the crown of tooth 31, the lingual surface of the mandible adjacent to the alveoli of tooth 24 and 25, the right clavicle, and the volar surface of one proximal hand phalanx. This pattern of copper staining is consistent with the locations of copper burial accompaniments described by Shetrone.

Shetrone mentions Burial 23 “Southern-most” in his field notes of 8/2/24 as well as on page 81 of his 1926 report. The individual was extended on the back with the head toward the west. Shetrone indicates that the individual was an adult and that the skeletons were in poor condition at the time of their discovery.

The Standardized Osteological Database (SOD) number 150209 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 23 “Southern-most,” estimated via principal components analysis of two indicators, is between forty-five and fifty-five years. Cranial indicators of sex suggest that the individual was male.
Burial 23 “Northern-most”:

Burial 23 “Northern-most” is part of a double inhumation with Burial 23 “Southern-most” of Mound 25. The remains of the individual of Burial 23 “Northern-most” include a partial cranium and mandible and several fragmentary elements of the postcranial skeleton. Teeth 9-15, 17-22, 26, 30, and 31 are present. The alveolar bone surrounding 1-8, 27-29, and 32 is missing rendering an estimation of the timing of their loss relative to death unobtainable. Tooth 16 was lost before death. All other missing teeth were lost postmortem. The bones are labeled “283/B23 Md25” and “283/421” which corresponds with the Ohio Historical Society catalog entry for Burial 23 “Southern-most” of Mound 25. The “Southern-most” and “Northern-most” skeletons of Burial 23 were distinguishable from each other based on copper stain pattern (or lack thereof) and by comparison to a photograph taken of the material in situ. Several elements that could not be ascribed with certainty were recorded under the Standardized Osteological Database number 150211.

Copper staining is not present on any of the elements of Burial 23 “Northern-most.” This is consistent with Shetrone’s description of the burial accompaniments which did not include copper artifacts.

Shetrone mentions Burial 23 “Northern-most” in his field notes of 8/2/24 as well as on page 81 of his 1926 report. The individual was extended on the back with the head toward the west. Shetrone indicates that the individual was an adult and that the skeletons were in poor condition at the time of their discovery.

The Standardized Osteological Database (SOD) number 150210 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death
of Burial 23 “Northern-most,” estimated via principal components analysis of two indicators, is between forty and fifty years. Discriminant function analysis based on dental metrics indicates that this skeleton is that of a female. Cranial indicators of sex support this sex assignment.

Burial 24:

Burial 24 is an individual inhumation. The remains thought to be those of the individual from Mound 25 Burial 24 include a partial cranium and mandible, and a partial postcranial skeleton. The bones have been consolidated. Teeth 7, 10, 11, 24, and 25 were lost postmortem. All other teeth are present. The cranium is labeled “283/B24 M25” and “283/411” which corresponds to the catalog record of the Ohio Historical Society for Burial 24 of Mound 25. The mandible and maxillae each bear the label “283/410” and “B24 M24.” The number 283/410 refers to Burial 24 of Mound 24 at Hopewell Mound Group. However, Shetrone does not mention a Burial 24 from Mound 24 in his field notes or in his report (Shetrone, 1926). The cranium, mandible and maxilla thought to belong to Burial 24 belong to a single individual. Perhaps a mistake in labeling the bones was made and the Mound 24 attribution is erroneous.

Copper staining is present on the frontal and parietals near bregma, the left mastoid process, the left mandibular condyle, and on the only two vertebral neural arch fragments that are present (one thoracic arch and one lumbar arch). The pattern of copper staining on the skeleton roughly corresponds with the locations of copper artifacts in the grave as reported by Shetrone.

Shetrone mentions Burial 24 in his field notes of 8/5/24 as well as on pages 82 and 83 of his 1926 report. The individual was extended on the back and oriented with the
head toward the southwest. Shetrone reports that the bones were not well preserved. Shetrone estimated that the individual of Burial 24 was a middle-aged adult male.

The Standardized Osteological Database (SOD) number 150128 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 24, estimated via principal components analysis of two indicators, is between forty and fifty years. Cranial and pelvic indicators of sex agree with Shetrone’s conclusion that the individual was male.

**Burial 25:**

Burial 25 is an individual inhumation. The remains of the individual from Mound 25 Burial 25 include a partial cranium, nearly complete mandible, and a partial postcranial skeleton. Several duplicate human bones and one non-human bone fragment are present.

All teeth are present except 8 and 9 which were lost postmortem. The cranium bears two labels: “Burial 45 Md 25” and “Burial 25 Md 25.” The Burial 45 label has been marked through. Most elements are labeled “283/404” which corresponds to the catalog record of the Ohio Historical Society for Burial 25 of Mound 25. Postmortem breakage patterns of the cranium are consistent with those observable in a field photograph of Burial 25 in situ.

Copper staining is present on left mastoid process. This roughly corresponds with the locations of copper artifacts in the grave as reported by Shetrone. Numerous cut marks are present on both femoral diaphyses. Some are clearly postmortem damage.

Shetrone mentions Burial 25 in his field notes of 8/8/24 as well as on pages 83 and 84 of his 1926 report. The individual was extended on the back and oriented with the
head toward the southwest. Shetrone reports that the bones were “moderately well preserved, skull and teeth well formed and shapely.” Shetrone estimated that the individual of Burial 25 was a young adult male.

The Standardized Osteological Database (SOD) number 150121 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 25, estimated via principal components analysis of two indicators, is between thirty and thirty-five years. Cranial and pelvic indicators of sex agree with Shetrone’s conclusion that the individual was male.

**Burial 26:**

Burial 26 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/11/24. According to Shetrone, the burial is a cremated adult and was under a small primary mound with Burials 27, 30, 31, and 32. Burial 26 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

**Burial 27:**

Burial 27 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/12/24. According to Shetrone, the burial is a cremation and was under a small primary mound with Burials 26, 30, 31, and 32. Burial 27 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 28:

Burial 28 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/12/24. According to Shetrone, the burial is a cremation. Burial 28 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 29:

Burial 29 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/14/24. According to Shetrone, the burial is a cremation. Burial 29 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 30:

Burial 30 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/15/24. According to Shetrone, the burial is a cremation and was under a small primary mound with Burials 26, 27, 31, and 32. Burial 30 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 31:

Burial 31 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/18/24. In the Field Notes, Shetrone mistakenly calls this material uncremated but also refers to it as a cremation. It is called a cremation in Shetrone’s report (Shetrone, 1926). According to Shetrone, the burial was under a small primary mound with Burials 26, 27, 30, and 32. Burial 31 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 32:

Burial 32 is described by Shetrone in his report of 1926 on page 84 as well as in the Field Notes of 8/18/24. According to Shetrone, the burial is a cremation and was under a small primary mound with Burials 26, 27, 30, and 31. Burial 32 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 33:

Burial 33 is described by Shetrone in his report of 1926 on page 87 as well as in the Field Notes of 8/22/24. According to Shetrone the burial is an inhumation that was disturbed prior to his discovery of it. The head and upper body had been previously removed and only the legs and feet remained. Shetrone reports that Burial 33 was an adult. Burial 33 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 34:

Burial 34 is an individual inhumation accompanied by associated culturally modified human remains. The culturally modified human remains include an additional skull called a “trophy” by Shetrone (1926, p. 88) and culturally modified human maxillae that Shetrone describes as having been an ornament suspended from the neck of the main interment. The remains of the main interment of Mound 25 Burial 34 present in the collections of the Ohio Historical Society are limited to a partial cranium, a nearly complete mandible and part of the right ilium. Teeth 12-15, 18, 19, 21, 27, and 30-32 are present. Several of the missing teeth were lost postmortem and several were lost while the person was still alive.
The bones are labeled “B34 Md 25” and “283/402.” Ohio Historical Society catalog records indicate that 283/402 is Burial 34 Mound 25 of Hopewell Mound Group. Copper staining is present on the medial and lateral aspects of the ascending rami of the mandible, the right lacrimal, right greater wing of the sphenoid, and inferior aspect of the right zygomatic process. Shetrone does not report any copper artifacts near the right side of the skull although there were four copper ear spools between the skull of the main interment and the “trophy” skull. However, the “trophy” skull was to the left of the main interment.

Shetrone mentions Burial 34 in his field notes of 8/27/24 as well as on pages 87-89 of his 1926 report. The individual was extended on the back with the head toward the north and was on the mound floor. The bones were not well preserved according to Shetrone. Shetrone estimated that the individual was a middle aged adult of medium height and size.

The Standardized Osteological Database (SOD) number 150117 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 34, estimated via principal components analysis of two indicators, is between forty-five and fifty-five years. Discriminant function analysis based on dental metrics indicates that this skeleton is that of a male.

**Burial 34 “Trophy:”**

Burial 34 “Trophy” is a skull which was located in the grave feature of Burial 34. The remains of Burial 34 “Trophy” include a partial cranium and partial mandible. Teeth 5, 11, and 14-16 are present. Much of the alveolar bone associated with the missing teeth is also missing rendering an estimation of the timing of the loss of the teeth relative to the
time of death unobtainable. Teeth 10, 12, 13, 18, and 32 were lost postmortem. The skull is labeled “B34 M25” and “283/401” which corresponds with the Ohio Historical Society catalog record for the “Trophy” skull with Burial 34 Mound 25. Copper staining is not observable. Numerous fine cut marks are present near both temporal lines just posterior to the coronal suture.

Shetrone mentions Burial 34 “Trophy” in his field notes of 8/27/24 as well as on page 88 of his 1926 report. The skull was on the floor of the mound to the left of the skull of the main interment. Shetrone estimated that the individual was a middle-aged adult.

The Standardized Osteological Database (SOD) number 150118 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between thirty-five and forty-five years. Cranial indicators of sex suggest that this individual was male.

**Burial 34 Culturally Modified Maxillae:**

The culturally modified human maxillae include the maxillary dentition and some of the associated alveolar bone (Figure 5). The bone is labeled “283/237” which corresponds to the records in the Ohio Historical Society’s catalog for the modified human maxillae from Burial 34. The alveolar processes have been detached from the rest of the maxillae and smoothed, probably from grinding, so all that remains are the teeth and enough alveolar bone to hold the teeth in anatomical position. Cross sections of tooth roots and exposed trabecular bone are visible on the superior surface of the maxillae where grinding and perhaps cutting has removed tooth root apices and the adjacent bone at a level just inferior to the root apices. The palatal processes and palatine bones are not present. Numerous, very tiny striations are visible on almost all surfaces of the alveolar
bone and on the buccal aspects of the posterior teeth and tooth roots. These seem to occur as groupings of parallel striations that likely represent grinding.

Five drillings are present:

1) A drilling is present on the lingual aspect of the alveolus between the right first and second molars. The opposite end of the drilling is located on the superior aspect of the alveolar process just anterior to the ground root apex of the lingual root of tooth 2. Both apertures measure 3.4 mm in diameter.

2) A drilling (3.4 mm in diameter) is present between the lingual aspect of the alveolus between the right anterior premolar and the adjacent canine. The opposite end of the drilling is on the labial side of the arch between the roots of the same teeth (5.0 mm in diameter).

3) A drilling is present on the lingual aspect of the arch between the central incisors (2.5 mm in diameter). The opposite end of the drilling is on the labial aspect of the arch between the roots of the same teeth (3.9 mm in diameter).

4) A drilling is present on the lingual aspect of the arch between the left canine and the adjacent anterior premolar (4.5 mm in diameter). The opposite end of the drilling is on the labial side of the arch between the roots of the same teeth (4.0 mm in diameter).

5) A drilling is present on the inferior aspect of the alveolar bone just distal to the left third molar (3.0 mm in diameter). The opposite end of the drilling is posterior to the lingual root of the left third molar on the superior aspect of the alveolus (3.2 mm in diameter).
All drillings have been filled with a white or off-white fibrous material that appears under 10X magnification to be cotton or something similar. This may have been done during the course of curating and exhibiting the piece to make the drillings visible.

This artifact was probably manufactured using fresh or green bone as a raw material. There are three pieces of evidence that suggest that the bone was green:

1) Some of the ground off tooth roots extend slightly beyond the margin of the surrounding ground bone. This suggests that the periodontal ligament may have been present and taking up space at the time the grinding was done. Once the ligament decomposed a very small space was left allowing the tooth to settle further into the alveolus and for the exposed root, apex removed by grinding, to extend slightly past the level of the surrounding ground bone.

2) The margins of the drillings are very sharp. Dry bone is more brittle than green bone due to the loss of collagen to decomposition. Brittle bone would be expected to chip or flake when worked.

3) The bone that was left after the modification is thin and fragile in some places. Presumably some soft tissue was present that helped hold the piece together and keep the teeth in their sockets during manufacture and during the use life of the artifact.

Shetrone mentions this artifact in his field notes of 8/27/24 as well as on page 89 of his 1926 report:

“…on the chest was a fine shield-shape copper plate; just above this plate, where it had been suspended from the neck, was an ornament made from the upper jaw of a human being in early adult life…”

279
The Standardized Osteological Database (SOD) number 150120 was assigned to the piece which is part of the collections of the Ohio Historical Society. Age estimated via seriation of maxillary dentition is estimated to be between twenty-one and twenty-five years. Discriminant function analysis based on dental metrics indicates that the individual was a male.

Figure 5: Culturally Modified Maxillae of Burial 34 Mound 25 Hopewell Mound Group (Inferior view on left, superior view on right; OHS Standardized Osteological Database number 150120)
Burial 35:

Burial 35 is an individual inhumation accompanied by an additional skull called a “trophy” by Shetrone (1926, p. 89) which was to the left of the skull of the main interment. There is a skeleton in the collections of the Ohio Historical Society labeled “B35 Md25” and “283/422.” Ohio Historical Society catalog records indicate that 283/422 is Burial 35 Mound 25 of Hopewell Mound Group. The skeleton does not seem consistent with in situ photographs of the skeleton taken in the field. The state of preservation of the skeleton, though not excellent, seems better than that described by Shetrone (Field Notes 8/29/24):

“The skeleton, as has been the case with most of those in this section of the mound, was extremely badly decayed, the bones being little more than streaks of decomposed matter.”

In addition, copper staining is not present although Shetrone reports that numerous copper artifacts were associated with the skeleton. The skeleton was compared to field photographs of Burial 34 Mound 25 which was located very close to Burial 35 in order to rule out the remains having been switched. The skeleton labeled as Burial 35 was not consistent with the photograph of Burial 34.

The remains of the individual labeled as Mound 25 Burial 35 include a partial cranium, partial mandible and a partial postcranial skeleton. Teeth 6, 8-10, 13, 21, 23-26, and 29 are missing. All were lost postmortem except perhaps in the case of the mandibular anterior teeth for which the alveolar bone is missing too rendering an estimation of the timing of their loss relative to death impossible.
Shetrone mentions Burial 35 in his field notes of 8/29/24 as well as on pages 89 and 90 of his 1926 report. The individual was extended on the back with the head toward the northwest. Shetrone estimated that the individual was a middle-aged adult of medium size.

The Standardized Osteological Database (SOD) number 150212 was assigned to the remains which are labeled as Burial 35. Age at death of Burial 35, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Pelvic and cranial indicators of sex suggest that the individual was male.

**Burial 35 “Trophy:”**

The “trophy” skull that accompanied Burial 35 Mound 25 is described by Shetrone in his report of 1926 on page 89 as well as in the Field Notes of 8/29/24. According to Shetrone the skull was about 15 inches to the left of the skull of the main interment. The skull was crushed, but Shetrone noted in the Field Notes that he thought it was in good enough condition that its sex could eventually be determined. Shetrone reports that the “trophy” was a middle-aged adult. The “trophy” skull of Burial 35 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

**Burial 36:**

Burial 36 is described by Shetrone in his report of 1926 on page 90 as well as in the Field Notes of 8/29/24. According to Shetrone, the burial is a cremation. Burial 36 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 37:

Burial 37 is described by Shetrone in his report of 1926 on page 90 as well as in the Field Notes of 8/29/24. According to Shetrone, the burial is a cremation and was near the left knee of Burial 35 on the same platform. Burial 37 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 38:

Burial 38 is described by Shetrone in his report of 1926 on page 90 as well as in the Field Notes of 8/29/24. According to Shetrone, the burial is a cremation. Burial 38 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 39:

Burial 39 is described by Shetrone in his report of 1926 on pages 90 and 92 as well as in the Field Notes of 8/30/24. According to Shetrone, the burial is a cremated adult. Burial 39 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 40:

Burial 40 is described by Shetrone in his report of 1926 on page 92 as well as in the Field Notes of 9/29/24. According to Shetrone, the burial is an inhumation and the individual was a middle aged adult male of medium size. The skeleton was extended on the back “a trifle north of east” (Shetrone, Field Notes 9/2/24). The bones are described as poorly preserved and the field notes mention that the skull was saved. Nonetheless, Burial 40 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 41:

Burial 41 is the only triple interment reported by Shetrone from Hopewell Mound Group. Five individuals are actually represented by skeletal remains as a “trophy” skull and culturally modified jaws were present with three extended individuals.

Burial 41 Skeleton 1:

Skeleton 1 is represented in the collections of the Ohio Historical Society by a complete mandible. The bone is labeled “283/391” which corresponds with the catalog entry for Skeleton 1 of Burial 41 Mound 25 in the records of the Ohio Historical Society. It is believed to be the mandible of Skeleton 1 based on the description in Shetrone’s Field Notes of 9/4/24:

…rear molar lower right jaw curiously impacted…”

There are three mandibles labeled “283/391” in the collections of the Ohio Historical Society. Of these, only one has a right rear molar (tooth 32) which fits Shetrone’s description.
Teeth 17, 21-26, and 29-32 are present. Teeth 18-20 were lost before death while 27 and 28 were lost postmortem. Shetrone mentions Burial 41 Skeleton 1 in his field notes of 9/4/24 as well as on pages 92 and 93 of his 1926 report. The individual was on the mound floor extended on the back on the south side of the grave with the head toward the east. According to Shetrone the skeleton was not in good condition, but the skull and several other bones were saved. Shetrone estimated that the individual of Burial 41 Skeleton 1 was a middle-aged male.

Cut marks are present in the form of fine striations on the left body of the mandible between the mental foramen and the ascending ramus, on the labial aspect of the mental symphysis, on the right body of the mandible, buccal aspect near teeth 29 and 30, on the right side just anterior to the lateral aspect of the gonial angle near the inferior border of the body, and on the posterior border of the of both ascending rami.

The Standardized Osteological Database (SOD) number 150058 was assigned to the mandible. Age at death, estimated via seriation of mandibular dentition, is between forty-one and forty-five years. Discriminant function analysis based on dental metrics indicates that this mandible is that of a female.

**Burial 41 Skeleton 2:**

Skeleton 2 is represented in the collections of the Ohio Historical Society by a partial cranium, partial mandible, and a partial postcranial skeleton. Teeth 1-6, 17-20, and 27-32 are present. Alveolar bone associated with all missing teeth except 21 and 26 is also missing rendering the timing of their loss relative to death unknown. Teeth 21 and 26 were lost postmortem.
The bone is labeled “B41 M25” and “283/409” which corresponds with the Ohio Historical Society’s catalog entry for Skeleton 2 of Burial 41 Mound 25. The bones have been consolidated.

Shetrone mentions Burial 41 Skeleton 2 in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The individual was on the mound floor extended on the back with the head toward the east. According to Shetrone the skeleton was not in good condition. Shetrone estimated that the individual of Burial 41 Skeleton 2 was a young adult (less than twenty-five years) female.

The Standardized Osteological Database (SOD) number 150053 was assigned to the mandible. Age at death, estimated via principal components analysis of two indicators, is between thirty and forty years. Cranial indicators of sex supported a relatively small femoral head diameter suggest that the individual is female.

**Burial 41 Skeleton 3:**

Skeleton 3 is represented in the collections of the Ohio Historical Society by a partial cranium, partial mandible, and a partial postcranial skeleton. Teeth 1-11, 14-16, 17-19, 21, 25, 26, and 28-32 are present. Alveolar bone associated with tooth 23 is also missing rendering the timing of its loss relative to death unknown. All other missing teeth were lost postmortem. The bone is labeled “283/408” which corresponds with the Ohio Historical Society’s catalog entry for Skeleton 3 of Burial 41 Mound 25.

Cut marks are present on the right mandibular ramus just anterior to the condyle and on the superior aspect of the exterior surface of the right mandibular ramus.
Shetrone mentions Burial 41 Skeleton 3 in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The individual was on the mound floor extended on the back with the head toward the east. Shetrone estimated that the individual of Burial 41 Skeleton 2 was a middle-aged adult female.

The Standardized Osteological Database (SOD) number 150057 was assigned to the skeleton. Age at death, estimated via principal components analysis of two indicators, is between forty and fifty years. Pelvic and cranial indicators of sex supported a relatively small femoral head diameter suggest that the individual is female.

**Burial 41 “Trophy” Skull:**

Burial 41 “Trophy” is a skull which was located in the grave feature of Burial 41 “…to the left and a little above the skull of the central skeleton…” (Shetrone, Field Notes 9/4/24). The remains of Burial 41 “Trophy” include a partial cranium and partial mandible that have been consolidated (Figure 6). All teeth except 1, 2, and 9, which were lost before death, are present. The skull is labeled “B41 M25” and “283/391” and the mandible is labeled “283/409.” The number listed in the catalog of the Ohio Historical Society for the “trophy” skull of Burial 41 is 283/273. However, there are no remains in the OHS collections bearing this number. In addition, the skull described herein fits Shetrone’s description of the “trophy” skull of Burial 41 in that it has been drilled through the occipital and the mandibular left third molar is rotated mesiolingually.

Copper staining is not observable, though there is a pinkish-red stain on the inferior surfaces of both palatine processes. Numerous fine cut marks are present near both squamosal sutures, on the occipital near both occipito-mastoid sutures, on the frontal near the temporal lines, on the medial and lateral surfaces of the right ascending ramus of
the mandible, on the medial surface of the left ascending ramus of the mandible, and on the labial surfaces of the crowns of teeth 6-8, 10, and 11 parallel to the long axis of the tooth.

Two drillings are present. One drilling is located posterior to the right mastoid process in the temporo-occipital suture (in the same place as the mastoid foramen which can be observed to emerge on the endocranial surface near the endocranial aspect of the drilling). The other drilling is located on the midline of the occipital just inferior to the external occipital protuberance. The drillings have a sharp, continuous margin which suggests that they were made when the bone was fresh or green. Dry bone is more friable than green bone and more likely to chip or flake when drilled.

Shetrone mentions Burial 41 “Trophy” in his field notes of 9/4/24 as well as on page 93 of his 1926 report. The skull was on the floor of the mound to the left and a little above the skull of the main interment. Shetrone estimated that the individual was a middle-aged adult.

The Standardized Osteological Database (SOD) number 150056 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty-five and thirty-five years. Cranial indicators of sex suggest that this individual was male.
Figure 6: Culturally Modified Cranium of Burial 41 Mound 25 Hopewell Mound Group (Oblique inferior view; OHS Standardized Osteological Database number 150056)
Burial 41 Culturally Modified Jaws:

The culturally modified human maxillae and mandible present in Burial 41 include a nearly complete mandible and the alveolar and palatine processes of the maxillae (Figures 7 and 8). The area where the palatine bones should be has been filled in with an unknown material. The right coronoid process of the mandible and the alveolar bone associated with the anterior mandibular teeth have been similarly restored. These are cosmetic alterations done in the museum. All teeth except 1 and 32 are present. The alveolar bone associated with tooth 1 is missing as well as the tooth rendering an estimate of the timing of the loss relative to death unobtainable. A radiograph of the mandible shows that tooth 32 is congenitally missing.

The alveolar and palatine processes have been roughly detached from the rest of the maxillae. Exposed trabeculae, labial aspects of the roots of the anterior teeth, and the superior surfaces of the palatine processes are visible from a superior view. The margins of bone remaining after detachment of the alveolar and palatine processes from the rest of the maxillae are irregular as though the detachment process involved breaking instead of cutting. Fine cut marks are present on the buccal and lingual aspects of the maxillary alveolar bone adjacent to teeth 14-16. The mandible is covered with numerous fine striations. These are located mainly on the lingual and buccal (or labial) surfaces of the mandibular body from the canines back and on all surfaces of both rami excluding the articular surfaces of the condyles. Four drillings are present on the maxillae. Given the symmetrical placement of drillings it is likely that there were four on the mandible as well, although one is in an area that is missing and has been reconstructed.
Maxillary Drillings:

1) A drilling is present approximately in the center of the palatine process of the right maxilla creating an opening to the floor of the nasal cavity. Both apertures measure 4.2 mm in diameter.

2) A drilling is present approximately in the center of the palatine process of the left maxilla creating an opening to the floor of the nasal cavity. Both apertures measure 4.2 mm in diameter.

3) A drilling is present on the labial aspect of the alveolar bone associated with tooth 2. The opposite end of the drilling is located on the buccal aspect of the alveolar bone associated with tooth 2. Both apertures measure 4.2 mm in diameter.

4) A drilling is present on the labial aspect of the alveolar bone associated with teeth 15 and 16. The opposite end of the drilling is located superior to the root apices of tooth 16. The drilling impinges on the roots of tooth 16 and is angled. Both apertures measure 4.2 mm in diameter.

Mandibular Drillings:

1) A drilling is present on the left coronoid process. The lateral aspect of the drilling is beveled such that two diameter measurements are necessary: one for the outer rim of the bevel (7.6 mm) and one for the diameter of the aperture (3.3 mm).

2) A drilling is present on the left mandibular body near the gonial angle. The maximum measurement of the outer diameter of the bevel is 9.6 mm (the bevel is not perfectly circular). The diameter of the aperture is 4.0 mm.
3) A reconstructed drilling is present in the restored area of the right coronoid process. The outer rim of the reconstructed drilling is 4.8 mm in diameter. The aperture is 2.8 mm.

4) A drilling is present on the right mandibular body near the gonial angle. The maximum measurement of the outer diameter of the bevel is 10.9 mm (the bevel is not perfectly circular). The diameter of the aperture is 4.0 mm.

This artifact was probably manufactured using fresh or green bone as a raw material. The drillings have a sharp, continuous margin which suggests that they were made when the bone was fresh or green. Dry bone is more friable than green bone and more likely to chip or flake when drilled. In addition, presumably some soft tissue was present that helped keep the teeth in their sockets during manufacture and during the use life of the artifact.

Shetrone mentions these artifacts in his field notes of 9/4/24 as well as on page 93 of his 1926 report. He estimates that the individual from whom the jaws came was in early adulthood or late adolescence. The jaws are described by Shetrone as having been on the mound floor about halfway between the humeri of skeletons 1 and 2 of Burial 41. The Standardized Osteological Database (SOD) number 150172 was assigned to the jaws which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between fifteen and twenty years. Sex is unknown.
Figure 7: Culturally Modified Mandible of Burial 41 Mound 25 Hopewell Mound Group (Oblique left lateral view; hatching represents reconstructed portions; OHS Standardized Osteological Database number 150172)
Burial 42:

Burial 42 is an individual inhumation. The remains include a largely complete cranium, a complete mandible, and partial postcranial remains. All teeth are present except 5, 9, 24, and 26 all of which were lost postmortem. The bones are labeled “B42a Md 25” and “283/400” which is the Ohio Historical Society catalog number corresponding to Burial 42 of Mound 25. It is not known what the “a” in the label refers
to. The bones have been consolidated. Cut marks are present on both femur diaphyses, anterior aspects, just superior to estimated midshaft and are oriented perpendicular to the long axis of the bone.

Shetrone mentions Burial 42 in his field notes of 9/5/24 as well as on pages 93 and 94 of his 1926 report. The individual was extended on the back on the mound floor and oriented with the head toward the southwest. Shetrone estimated that the individual of Burial 42 was as “young adult.”

The Standardized Osteological Database (SOD) number 150116 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death estimated via principal components analysis of two indicators is between twenty-five and thirty-five years. Pelvic and cranial indicators of sex suggest that this individual is female.

**Burial 43:**

Burial 43 is described by Shetrone in his report of 1926 on page 94 as well as in the Field Notes of 9/5/24. According to Shetrone, the grave contained the remains of a cremated adult female and a cremated child which had been commingled. He speculates, based on the presence of large and small versions of similar artifacts, that a mother and child are present. Burial 43 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
**Burial 44:**

Burial 44 is described by Shetrone in his report of 1926 on page 94 as well as in the Field Notes of 9/9/24. According to Shetrone, the burial is a cremated adult. Burial 44 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

**Burial 45:**

Burial 45 is an inhumation which shared a grave with the cremated individual of Burial 46 Mound 25. The remains of the individual from Mound 25 Burial 45 include a partial cranium, nearly complete mandible, and a partial postcranial skeleton. Several duplicate human bones are present. Teeth 1-6, 11, 17-19, 21, 22, and 27-31 are present. All missing teeth were lost postmortem except 14 which was lost antemortem and 15 and 16 which are also missing their associated alveolar bone rendering an estimate of the timing of their loss relative to death unobtainable. The skull bears two labels: “283/B42b M25” and “283/398.” Postcranial remains are labeled “283/398.” The skeleton better fits the description in Shetrone’s field notes (Shetrone 9/10/24) for burial 45 than for burial 42. The label “283/398” corresponds to the catalog record of the Ohio Historical Society for Burial 45 of Mound 25.

Shetrone mentions Burial 45 in his field notes of 9/10/24 as well as on page 95 of his 1926 report. The individual was poorly preserved and extended on the back with the cremated remains of Burial 46 spread along the individual’s right side from elbow to knee. Shetrone estimated that the individual of Burial 25 was an “extremely massively built” male past middle life.
The Standardized Osteological Database (SOD) number 150115 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 45, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Cranial and pelvic indicators of sex agree with Shetrone’s conclusion that the individual was male.

Burial 46:

Burial 46 is described by Shetrone in his report of 1926 on pages 94 and 95 as well as in the Field Notes of 9/10/24. According to Shetrone, the burial is a cremated adult that was spread along the right side of Burial 45 (an extended inhumation) from elbow to knee. Burial 46 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 47:

Burial 47 is part of a double inhumation which included a “northern” and a “southern” skeleton. The remains of only one of these individuals are present in the collections of the Ohio Historical Society and it is not clear which skeleton it is. The individual of Mound 25 Burial 47 which is observable includes only partial right and left femora and a partial right humerus. The bones are labeled “283/441” which corresponds to the Ohio Historical Society catalog record for Burial 47 of Mound 25.

Shetrone mentions Burial 47 in his field notes of 9/11/24 as well as on pages 95-97 of his 1926 report. The individuals were extended on the back with the heads toward the west. Shetrone estimated that both individuals were adults and that the northern skeleton was that of an older adult male.
The Standardized Osteological Database (SOD) number 150126 was assigned to the remains of the individual that is observable which are part of the collections of the Ohio Historical Society. The individual appears to be an adult based on size and completeness of fusion of the right femoral head to the femoral diaphysis.

Sex indicators are not present, however the femoral circumference at a point estimated to be midshaft is 95 mm which is consistent with the femoral midshaft circumference of a male (Black, 1978).
Shetrone’s Mound 26:

Shetrone refers to Mound 26 in his Field Notes of 9/7/22-9/16/22, 6/18/23-6/22/23, and 9/10/23. In the Field Notes he mistakenly writes Mound 27 when he is describing Mound 26. The same is true in the Ohio Historical Society’s catalog record of objects numbered 283/8 to 283/41. Based on Shetrone’s descriptions of both mounds and the number of burials that were recovered from each, the following burials are likely to have been from Mound 26 even though Shetrone may refer to them as having been recovered from Mound 27 in places throughout the Field Notes. A description of the exploration of the real Mound 27 is found in the Field Notes of 4/14/24.

Burial 1:

Burial 1 of Mound 26 is described by Shetrone in his report of 1926 on page 103 as well as in the Field Notes of 9/7/22. According to Shetrone, the burial is a cremation which was on the mound floor. Burial 1 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 2:

Burial 2 is described by Shetrone in his report of 1926 on page 103 as well as in the Field Notes of 9/7/22. According to Shetrone the burial is an inhumation that was extended on the back on the mound floor. Shetrone reports that Burial 2 was a young adult that was poorly preserved. Burial 2 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.
Burial 3:

Burial 3 of Mound 26 is described by Shetrone in his report of 1926 on page 103 as well as in the Field Notes of 9/7/22. According to Shetrone, the burial is a cremation which was on the mound floor. Burial 3 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 4:

Burial 4 is described by Shetrone in his report of 1926 on page 103 as well as in the Field Notes of 9/8/22. According to Shetrone the burial is a poorly preserved inhumation that was extended on the back with the head oriented toward the southeast. Shetrone reports that Burial 4 was an adult. Burial 4 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 5:

Burial 5 is an individual inhumation. The individual of Mound 26 Burial 5 includes a complete right femur, partial left femur, nearly complete left tibia, and nearly complete left humerus. The bones are labeled “283/446” which corresponds to the Ohio Historical Society catalog record for Burial 5 of Mound 26.

Shetrone mentions Burial 5 in his field notes of 9/12/22 and 9/16/22 as well as on page 103 of his 1926 report. The individual was extended on the back with the head toward the southeast. Shetrone estimated that the individual was an adult of “medium size” which was poorly preserved.

The Standardized Osteological Database (SOD) number 150170 was assigned to the remains which are part of the collections of the Ohio Historical Society. The
individual appears to be an adult based on size and completeness of fusion of all observable epiphyses. Sex, based on femoral and humeral head diameters, is male.

**Burial 6:**

Burial 6 is an individual inhumation accompanied by an additional skull called a “trophy” by Shetrone (1926, p. 104). The remains of the individual of Mound 26 Burial 6 include a partial cranium, mandible, and postcranial skeleton. All teeth except 1, 7, 8, 13, and 32 are present. Teeth 7, 8, and 13 were lost postmortem. Tooth 32 was lost prior to death. The timing of the loss of tooth 1 is unknown because the associated alveolar bone is missing as well. The bones of the skull are labeled “B6 Md26,” and “283/15.” The postcranial elements are labeled “283/442.” Ohio Historical Society accession records indicate that 283/442 is Burial 6 Mound 26 of Hopewell Mound Group and “283/15” refers to the skull of Burial 6 in the accession record.

Copper staining is present on the frontal, posterior surfaces of the ilia, ischia, and pubes, anterior and posterior surfaces of the proximal portions of the femora, and on the posterior diaphyses of both femora but extending most of the way down the diaphysis on the left femur. The pattern of copper staining is consistent with the locations in the grave of copper artifacts.

Shetrone mentions Burial 6 in his field notes of 9/13/22 as well as on pages 103 and 104 of his 1926 report. The individual was extended on the back with the limbs “akimbo” according to Shetrone. The head was oriented toward the east Shetrone estimated that the individual was a middle-aged adult male.
The Standardized Osteological Database (SOD) number 150164 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 6, estimated via principal components analysis of two indicators, is between thirty-five and forty-five years. Cranial and pelvic indicators of sex agree with Shetrone’s conclusion that the individual was male.

**Burial 6 “Trophy:”**

Burial 6 “Trophy” is a skull which was located in the grave feature of Burial 6 to the left of the skull of Burial 6. The catalog records of the Ohio Historical society indicate that the “trophy” skull of burial 6 was assigned the number 283/16. There are four teeth in the collections of the Ohio Historical Society which are labeled “B6 M26.” These teeth either duplicate teeth of Burial 6 or do not fit into the appropriate alveolus of Burial 6. In addition, they exhibit less attrition that the teeth of Burial 6. One of the teeth is labeled “283/416 B6 Md26.” The number 283/416 corresponds to skeletal material from Mound 7 of Hopewell Mound Group. It is unlikely that the four teeth belong to the main interment of Burial 6, however it is not clear that the four teeth are from the “trophy” skull of Burial 6.

Shetrone mentions Burial 6 “Trophy” in his field notes of 9/13/22 as well as on page 104 of his 1926 report. Shetrone estimated that the individual was an adult in his or her mid-twenties at the time of death.
Burial 7:

Burial 7 is described by Shetrone in his report of 1926 on page 105 as well as in the Field Notes of 9/14/22. According to Shetrone the burial is a poorly preserved inhumation. Shetrone reports that Burial 7 was a middle-aged adult. Burial 7 was not located in the collections of the Ohio Historical Society and there is no catalog record of it in the OHS files.

Burial 8:

Burial 8 of Mound 26 is not on the map in Shetrone’s report of Mound 26 (Shetrone, 1926, p. 102) nor is it mentioned in the text of the report. However, an eighth burial is mentioned in the Field Notes of 9/10/23. According to Shetrone it is an inhumation, extended on the back with the head oriented toward the northeast. In the Field Notes of 9/10/23 Shetrone describes the individual as “a youth of about 10 years.” A listing of burials recovered in during the 1922 and 1923 field seasons at Hopewell Mound Group in the records of the Ohio Historical Society (Old Typed Catalog, p. 245) under the erroneous heading (because Mound 27 was explored in 1924 and yielded only one burial) “Mound No. 27 (1922)” includes Burial 8 but indicates it is an eighteen-year old. No catalog number is listed for Burial 8 of Mound 26.

There is no material in the collections of the Ohio Historical Society labeled as Burial 8 of Mound 26.
Shetrone’s Mound 27:

Burial 1:

Burial 1 is an individual inhumation. The remains of the individual of Mound 27 Burial 1 include a partial cranium, nearly complete mandible, and partial postcranial remains. Teeth 6, 10-13, 17, 18, 21, 25, and 30-32 are present. Of the teeth that are missing all but 1-3, 14-16, 20, and 25 were lost postmortem. The alveolar bone associated with the other teeth is missing rendering an assessment of the timing of their loss relative to death impossible. The bones are labeled “B1 M 27” and “283/390” which is the Ohio Historical Society catalog number corresponding to Burial 1 of Mound 27. The skeleton is not well preserved and several duplicate or non-congruous elements are present.

Shetrone mentions Burial 1 in his field notes of 4/14/24 as well as on pages 107 and 108 of his 1926 report. The individual was extended on the back on the mound floor. The head was oriented toward the north. The material was not well preserved at the time Shetrone encountered it. Shetrone estimated that the individual of Burial 1 was a young adult of medium size.

The Standardized Osteological Database (SOD) number 150107 was assigned to the remains which are part of the collections of the Ohio Historical Society. Age at death of Burial 1, estimated via principal components analysis of two indicators, is between thirty and thirty-five years. Discriminant function analysis of dental metrics indicate that this individual was female ($F_{approx} = .94$).
APPENDIX F

TABLE 43

HUMAN REMAINS FROM H. C. SHETRONE’S
AND W. K. MOOREHEAD’S
INVESTIGATIONS OF THE HOPEWELL MOUND GROUP
<table>
<thead>
<tr>
<th>ID#</th>
<th>Mound</th>
<th>Burial</th>
<th>Age Estimate from Field Notes or reports</th>
<th>Skeletal age at death</th>
<th>Method(s) used to estimate age</th>
<th>Sex</th>
<th>Method(s) used to assign sex</th>
<th>Type</th>
<th>Status / Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>150108</td>
<td>2</td>
<td>1</td>
<td>Adult; 25 years or less</td>
<td>30-40 yrs.</td>
<td>PC (1, 2)</td>
<td>M</td>
<td>2, 3, 5, 6, 7, 8, 10</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150168</td>
<td>2</td>
<td>2</td>
<td>Young adult; less than 20 yrs.</td>
<td>14-19 yrs.</td>
<td>8</td>
<td>M</td>
<td>11,12</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150109</td>
<td>2</td>
<td>3</td>
<td>Young adult</td>
<td>20-25 yrs.</td>
<td>PC (1, 2)</td>
<td>F</td>
<td>4, 5, 6, 8, 9, 11, 12, 13</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150112</td>
<td>2</td>
<td>4</td>
<td>Young adult</td>
<td>20-25 yrs.</td>
<td>PC (1, 2)</td>
<td>F</td>
<td>4, 6, 8, 11, 12</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150215</td>
<td>2</td>
<td>5</td>
<td>Young adult</td>
<td>35-45 yrs.</td>
<td>PC (1, 2)</td>
<td>M</td>
<td>8, 13</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150214</td>
<td>2</td>
<td>5</td>
<td>Old Adult</td>
<td>24-49 yrs.</td>
<td>6, 7</td>
<td>F</td>
<td>8, 9, 11</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
<td>NL/HCS</td>
</tr>
<tr>
<td>3</td>
<td>237</td>
<td></td>
<td>Adult?</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td></td>
<td>NL/WKM</td>
</tr>
<tr>
<td>3</td>
<td>237</td>
<td></td>
<td>Adult?</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
<td>I</td>
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<td>NL/HCS</td>
</tr>
<tr>
<td>150135</td>
<td>4</td>
<td>2</td>
<td>2 or more adults</td>
<td>7</td>
<td>F</td>
<td>8, 9</td>
<td>B</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150136</td>
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<td>2</td>
<td>2 or more adults</td>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150134</td>
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<td>2 or more adults</td>
<td>50+ yrs.</td>
<td>2</td>
<td></td>
<td>B</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150133</td>
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<td>2 or more adults</td>
<td>20-35 yrs.</td>
<td>3, 4</td>
<td></td>
<td>B</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150129</td>
<td>4</td>
<td>3</td>
<td>Young Adult</td>
<td>25-35 yrs.</td>
<td>PC (1, 2)</td>
<td>M</td>
<td>1, 4, 5, 6, 7, 8, 11</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150143</td>
<td>4</td>
<td>4</td>
<td>Young adult</td>
<td>40-45 yrs.</td>
<td>PC (1, 2)</td>
<td>I</td>
<td>I</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150025</td>
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<td>5</td>
<td>Young adult</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td>NL/HCS</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td></td>
<td>Child about 6 yrs.</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td>NL/HCS</td>
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</tr>
<tr>
<td>150026</td>
<td>4</td>
<td>7</td>
<td>Adult</td>
<td>8, 9, 10</td>
<td></td>
<td></td>
<td>C</td>
<td>L/HCS</td>
<td></td>
</tr>
<tr>
<td>150127</td>
<td>4</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>150137</td>
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<td>9</td>
<td>Young Adult</td>
<td>45-55 yrs.</td>
<td>PC (2, 7)</td>
<td>M</td>
<td>4, 5, 6, 8</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150138</td>
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<td>1</td>
<td></td>
<td>25-35 yrs.</td>
<td>PC (1, 7)</td>
<td>F</td>
<td>1-10</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>150138</td>
<td>7</td>
<td>3</td>
<td></td>
<td>20-30 yrs.</td>
<td>PC (1, 2)</td>
<td>M</td>
<td>14 (F&lt;sub&gt;approx&lt;/sub&gt; = 1.04</td>
<td>I</td>
<td>L/HCS</td>
</tr>
<tr>
<td>8</td>
<td>239</td>
<td></td>
<td>Adult?</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td>NL/WKM</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>240</td>
<td>241</td>
<td>Adult?</td>
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Table 43. Human Remains from H.C. Shetrone's and W.K. Moorehead's Investigations of Hopewell Mound Group (note key on following page)
Key to Table 43:

1 Culturally modified human remains
2 Age estimation methods:
   1 = seriation of maxillary dentition
   2 = seriation of mandibular dentition
   3 = seriation of auricular surfaces of the ilium
   4 = metamorphosis of the auricular surface of the ilium
   5 = seriation of pubic symphyses
   6 = metamorphosis of the pubic symphysis
   7 = degree of ectocranial suture closure
   8 = skeletal maturation (epiphyseal fusion)
   9 = dental development
   10 = adults distinguished from subadults by size or robusticity
   11 = diaphyseal length
   PC = denotes that age was estimated via principal components analysis of the indicators listed.
3 M = male; F = female
4 Sex assignment methods
   1 = presence/absence of the ventral arc: present = female; absent = male
   2 = presence/absence of the subpubic concavity: present = female; absent = male
   3 = breadth of the ischiopubic ramus: narrow = female; broad = male
   4 = width of the sciatic notch: 1 = female; 2 -5 = male
   5 = condition of the sacroiliac articulation: raised = female; flat = male
   6 = presence/absence of the preauricular sulcus: present (1-5) = female; absent (0) = male
   7 = breadth of the subpubic angle: broad = female; narrow = male
   8 = robusticity of the supraorbital tori: 1 or 2 = female; 4 or 5 = male
   9 = robusticity of the mastoid processes: 1 or 2 = female; 4 or 5 = male
   10 = robusticity of the nuchal crest: 1 or 2 = female; 4 or 5 = male
   11 = diameter of the femoral head: < 43.5 mm = female; > 46.5 mm = male
   12 = diameter of the humeral head: < 43 mm = female; > 47 mm = male
   13 = seriation of cranial robusticity
   14 = discriminant function calculated using dental metrics.
5 I = inhumation
   C = cremation
   PC = partial cremation
   B = bundle
6 L = located
   NL = not located
7 HCS = Henry Clyde Shetrone
   WKW = Warren King Moorehead
APPENDIX G

AGE ESTIMATION RESULTS OF
CULTURALLY MODIFIED HUMAN REMAINS
FROM THE HOPEWELL MOUND GROUP
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Table 44. Age estimates of culturally modified human remains from Hopewell Mound Group (Note key on following page)
Key to Table 44:

1 Age estimation methods:
   1 = seriation of maxillary dentition
   2 = seriation of mandibular dentition
   3 = seriation of auricular surfaces of the ilium
   4 = metamorphosis of the auricular surface of the ilium
   5 = seriation of pubic symphyses
   6 = metamorphosis of the pubic symphysis
   7 = degree of ectocranial suture closure
   8 = skeletal maturation (epiphyseal fusion)
   9 = dental development
  10 = adults distinguished from subadults by size or robusticity
  11 = diaphyseal length
PC = denotes that age was estimated via principal components analysis of the indicators listed.
Figure 9. Age distribution of culturally modified human remains from the Hopewell Mound Group
APPENDIX H

SEX ASSIGNMENT RESULTS OF
CULTURALLY MODIFIED HUMAN REMAINS
FROM THE HOPEWELL MOUND GROUP
<table>
<thead>
<tr>
<th>ID#</th>
<th>Mound</th>
<th>Burial</th>
<th>Sex reported in Field Notes or reports</th>
<th>Sex assignment from skeleton</th>
<th>Method(s) used to assign sex</th>
<th>Status</th>
<th>Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>150215</td>
<td>2</td>
<td>5</td>
<td>Male</td>
<td>Male</td>
<td>8, 13</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>not located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150138</td>
<td>7</td>
<td></td>
<td>Male</td>
<td></td>
<td>14 (F_{approx} = 1.04)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>56033</td>
<td>18</td>
<td>181</td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56034-1</td>
<td>18</td>
<td>181</td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56034-2</td>
<td>18</td>
<td>181</td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56034-3</td>
<td>18</td>
<td>181</td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56034-4</td>
<td>18</td>
<td>181</td>
<td>Male</td>
<td></td>
<td>14 (F_{approx} = 0.51)</td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56064</td>
<td>23</td>
<td>213</td>
<td>Female</td>
<td></td>
<td>14 (F_{approx} = 0.87)</td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>238</td>
<td></td>
<td></td>
<td></td>
<td>not located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>56068</td>
<td>24</td>
<td>192</td>
<td>Female</td>
<td>8, 9, 10, 13</td>
<td></td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td>150173</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150120</td>
<td>25</td>
<td>34</td>
<td>Male</td>
<td></td>
<td>14 (F_{approx} = 1.0)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150118</td>
<td>25</td>
<td>34</td>
<td>Male</td>
<td>8, 10</td>
<td></td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td>not located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150056</td>
<td>25</td>
<td>41</td>
<td>Male</td>
<td>8, 9, 10</td>
<td></td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150172</td>
<td>25</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>not located</td>
<td>Shetrone</td>
</tr>
</tbody>
</table>

Table 45. Sex assignment of culturally modified human remains from the Hopewell Mound Group (Note key on following page)
Key to Table 45:

1 Sex assignment methods
   1 = presence/absence of the ventral arc: present = female; absent = male
   2 = presence/absence of the subpubic concavity: present = female; absent = male
   3 = breadth of the ischiopubic ramus: narrow = female; broad = male
   4 = width of the sciatic notch: 1 = female; 2 -5 = male
   5 = condition of the sacroiliac articulation: raised = female; flat = male
   6 = presence/absence of the preauricular sulcus: present (1-5) = female; absent (0) = male
   7 = breadth of the subpubic angle: broad = female; narrow = male
   8 = robusticity of the supraorbital tori: 1 or 2 = female; 4 or 5 = male
   9 = robusticity of the mastoid processes: 1 or 2 = female; 4 or 5 = male
  10 = robusticity of the nuchal crest: 1 or 2 = female; 4 or 5 = male
  11 = diameter of the femoral head: < 43.5 mm = female; > 46.5 mm = male
  12 = diameter of the humeral head: < 43 mm = female; > 47 mm = male
  13 = seriation of cranial robusticity
  14 = discriminant function calculated using dental metrics.
Figure 10. Sex distribution of culturally modified human remains from the Hopewell Mound Group
APPENDIX I

AGE ESTIMATION RESULTS

OF INDIVIDUALS INTERRED WITH

CULTURALLY MODIFIED HUMAN REMAINS

AT THE HOPEWELL MOUND GROUP
<table>
<thead>
<tr>
<th>ID#</th>
<th>Mound</th>
<th>Burial</th>
<th>Age reported in Field Notes or reports</th>
<th>Skeletal age at death</th>
<th>Method(s) used to estimate age¹</th>
<th>Status</th>
<th>Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>150214</td>
<td>2</td>
<td>5</td>
<td>Old Adult</td>
<td>24-49 yrs.</td>
<td>6, 7</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>Adult?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41618</td>
<td>18</td>
<td>181</td>
<td>Adult?</td>
<td>40-50 yrs.</td>
<td>PC (1, 2)</td>
<td>located</td>
<td>Moorehead</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>213</td>
<td>Adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40173</td>
<td>24</td>
<td>191</td>
<td>Adult</td>
<td>10</td>
<td>located</td>
<td></td>
<td>Moorehead</td>
</tr>
<tr>
<td>150117</td>
<td>25</td>
<td>34</td>
<td>Middle adult</td>
<td>45-55 yrs.</td>
<td>PC (2, 7)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150212</td>
<td>25</td>
<td>35</td>
<td>Middle adult</td>
<td>35-45 yrs.</td>
<td>PC (1, 2)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150058</td>
<td>25</td>
<td>41-1</td>
<td>Middle adult</td>
<td>41-45 yrs.</td>
<td>2</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150053</td>
<td>25</td>
<td>41-2</td>
<td>Young adult (less than 25 yrs)</td>
<td>30-40 yrs.</td>
<td>PC (1, 2)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150057</td>
<td>25</td>
<td>41-3</td>
<td>Middle adult</td>
<td>40-50 yrs.</td>
<td>PC (1, 2)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150164</td>
<td>26</td>
<td>6</td>
<td>Middle adult</td>
<td>35-45 yrs.</td>
<td>PC (1, 2)</td>
<td>located</td>
<td>Shetrone</td>
</tr>
</tbody>
</table>

Table 46. Age estimates of individuals interred with culturally modified human remains from the Hopewell Mound Group (Note key on following page)
Key to Table 46:

1 Age estimation methods:
   1 = seriation of maxillary dentition
   2 = seriation of mandibular dentition
   3 = seriation of auricular surfaces of the ilium
   4 = metamorphosis of the auricular surface of the ilium
   5 = seriation of pubic symphyses
   6 = metamorphosis of the pubic symphysis
   7 = degree of ectocranial suture closure
   8 = skeletal maturation (epiphyseal fusion)
   9 = dental development
  10 = adults distinguished from subadults by size or robusticity
  11 = diaphyseal length
PC = denotes that age was estimated via principal components analysis of the indicators listed.
Figure 11. Age distribution of individuals interred with culturally modified human remains at the Hopewell Mound Group.
APPENDIX J

SEX ASSIGNMENT RESULTS OF
INDIVIDUALS INTERRED WITH
CULTURALLY MODIFIED HUMAN REMAINS
AT THE HOPEWELL MOUND GROUP
<table>
<thead>
<tr>
<th>ID#</th>
<th>Mound</th>
<th>Burial</th>
<th>Sex reported in Field Notes or reports</th>
<th>Sex assignment from skeleton</th>
<th>Method(s) used to assign sex[^1]</th>
<th>Status</th>
<th>Investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>150214</td>
<td>2</td>
<td>5</td>
<td>Male</td>
<td>Female</td>
<td>8, 9, 11</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>not located</td>
<td></td>
<td></td>
<td></td>
<td>Moorehead</td>
</tr>
<tr>
<td>41618</td>
<td>18</td>
<td>181</td>
<td>Male</td>
<td>8, 9, 11, 13</td>
<td>located</td>
<td></td>
<td>Moorehead</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>213</td>
<td>not located</td>
<td></td>
<td></td>
<td></td>
<td>Moorehead</td>
</tr>
<tr>
<td>40173</td>
<td>24</td>
<td>191</td>
<td>located</td>
<td></td>
<td></td>
<td></td>
<td>Moorehead</td>
</tr>
<tr>
<td>150117</td>
<td>25</td>
<td>34</td>
<td>Male</td>
<td>14 (F_{approx} = .42)</td>
<td>located</td>
<td></td>
<td>Shetrone</td>
</tr>
<tr>
<td>150212</td>
<td>25</td>
<td>35</td>
<td>Male</td>
<td>4, 8, 10</td>
<td>located</td>
<td></td>
<td>Shetrone</td>
</tr>
<tr>
<td>150058</td>
<td>25</td>
<td>41-1</td>
<td>Male</td>
<td>Female</td>
<td>14</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150053</td>
<td>25</td>
<td>41-2</td>
<td>Female</td>
<td>Female</td>
<td>8, 9, 10, 11</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150057</td>
<td>25</td>
<td>41-3</td>
<td>Female</td>
<td>Female</td>
<td>4, 9, 10, 11</td>
<td>located</td>
<td>Shetrone</td>
</tr>
<tr>
<td>150164</td>
<td>26</td>
<td>6</td>
<td>Male</td>
<td>Male</td>
<td>1-5, 7, 11, 12, 13</td>
<td>located</td>
<td>Shetrone</td>
</tr>
</tbody>
</table>

[^1]: \( F_{approx} \)

Table 47. Sex assignment of individuals interred with culturally modified human remains from the Hopewell Mound Group (Note key on following page)
Key to Table 47:

1Sex assignment methods
   1 = presence/absence of the ventral arc: present = female; absent = male
   2 = presence/absence of the subpubic concavity: present = female; absent = male
   3 = breadth of the ischiopubic ramus: narrow = female; broad = male
   4 = width of the sciatic notch: 1 = female; 2-5 = male
   5 = condition of the sacroiliac articulation: raised = female; flat = male
   6 = presence/absence of the preauricular sulcus: present (1-5) = female; absent (0) = male
   7 = breadth of the subpubic angle: broad = female; narrow = male
   8 = robusticity of the supraorbital tori: 1 or 2 = female; 4 or 5 = male
   9 = robusticity of the mastoid processes: 1 or 2 = female; 4 or 5 = male
  10 = robusticity of the nuchal crest: 1 or 2 = female; 4 or 5 = male
  11 = diameter of the femoral head: < 43.5 mm = female; > 46.5 mm = male
  12 = diameter of the humeral head: < 43 mm = female; > 47 mm = male
  13 = seriation of cranial robusticity
  14 = discriminant function calculated using dental metrics.
Figure 12. Sex distribution of individuals interred with culturally modified human remains at the Hopewell Mound Group


Moorehead WK (1891) Account of explorations at Hopewell Group, Ohio for Department of Ethnology, W.C.E. Field notes on file, Field Museum of Natural History, Chicago.


Shetrone HC (1922-1925) The Hopewell Group. Field notes on file at the Ohio Historical Society Department of Archaeology, Columbus, Ohio.


