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Chapter 4

Revealing Ritual Landscapes at the Hopewell Mound Group

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Hopewell archaeology in the early twenty-first century is radically transforming our vision of the monumental mounds and earthwork enclosures of the Ohio Valley. It is increasingly apparent that the mounds and earthworks—the above-ground architectural features—are only one aspect of the ritual landscapes at these great centers. The recent availability of hardware and software capable of conducting landscape-scale geophysical survey is demonstrating that the vast spaces *between the monuments* were filled with wooden architecture: wooden post circles and roofed buildings devoted to a range of public ritual and ceremony.

The monumental mounds and earthworks at the Hopewell Mound Group (33RO27) have attracted attention since the dawn of American archaeology in the early nineteenth century. By the early twentieth century, mound excavations there revealed a dazzling array of exquisitely crafted and symbolically charged objects fashioned from exotic raw materials drawn from distant locations scattered over half the continent. Archaeologists soon recognized this site as the most flamboyant expression of a newly defined "Hopewell culture." Yet attention remained narrowly focused on mounds and mortuary contexts, ignoring the vast spaces in-between. Agricultural plowing steadily eroded the above-grade features. Today, most visitors experience the site as a featureless plain.

However, recent landscape-scale geomagnetic surveys demonstrate that many plowed-down mounds and earthworks retain considerable subsurface integrity, and the spaces between the monuments are filled with a host of magnetic anomalies. This chapter describes three seasons of ground-truth excavations focused on these anomalies between the mounds. One of these is a gigantic pit feature with an estimated volume approaching 15 cubic meters, apparently a borrow pit where distinctive sands were quarried. Another of these is the *Great Circle*, a circular earthwork nearly 120 meters in diameter thought to have been entirely obliterated by plowing before 1891. Our excavations revealed that the plowed-down earthwork was flanked on the exterior by a deep ditch, and bordered on the interior by a row of huge wooden posts—an enormous Hopewell woodhenge, interpreted here as a World Center shrine. Four outsized pits at the center of the circle likely served as earth ovens capable of provisioning large gatherings. A causeway across the encircling ditch is aligned to the summer solstice sunset, perhaps a clue to the timing of these grand feasts. These recent investigations are revealing ritual landscapes at the Hopewell Mound Group on a scale heretofore unheralded.

THE HOPEWELL MOUND GROUP LANDSCAPE

The Hopewell Mound Group is located near the center of the remarkable concentration of monumental earthworks surrounding the Scioto River-Paint Creek confluence in south-central Ohio. More than two dozen major mound-and-earthwork complexes are located within a 30 km radius of the confluence. Travelers have long noted the picturesque beauty of the natural setting here. A journey down the Scioto from the north leads through gently rolling glacial Till Plains into the unglaciated and deeply dissected Allegheny Plateau. Here the broad valleys of the Scioto River and Paint Creek are flanked by low hills blanketed in mixed hardwood forests. Both major streams are underfit within broad floodplains flanked by well-defined Pleistocene outwash terraces and low hills formed by ice-contact features and the Appalachian foothills (Thornberry-Erlich 2013).

The Hopewell Mound Group itself is located along a small tributary stream—North Fork Paint Creek—about 20 kilometers northwest of the Scioto-Paint Creek confluence. This location may seem somewhat marginal, but the North Fork corridor is a landscape laden with monumental architecture. A short journey upstream from the mouth of North Fork passes several major complexes including the Junction Group, Steel Earthworks, Anderson Works, Hopewell Mound Group, and Frankfort Works. We have no clear understanding of how these constructions relate

to one another in time, but we can be certain that as each of these works was built and used, the North Fork landscape became increasingly enmeshed in webs of meaning, memory, and the power of the past (Ingold 1993; Osborne 2014; Pauketat 2012). The North Fork and the Hopewell Mound Group may have stood at the geographic and symbolic center of one of three regional communities, the other two being centered in the Scioto Valley and the Paint Creek Valley, respectively (Ruby et al. 2005; Carr 2005b). In fact, the Hopewell Mound Group appears to have served a special role as a central burial place for the most prestigious individuals drawn from each of the three regional communities, evidence of a tripartite alliance materialized by burying their most honored dead together (Carr 2005b).

The Hopewell Mound Group (Figure 1) stands apart from all other Hopewellian centers in the number and monumental scale of its mounds and earthworks, and in the richness, diversity, and high aesthetic quality of the offerings its builders left there (Greber and Ruhl 2000; Seeman 1979b). Its great size and complexity attracted scientific attention early in the nineteenth century, and the site figures prominently in the founding literature of Americanist archaeology (Atwater 1820; Squier and Davis 1848). This is the largest of all the lowland enclosures. A ditch-and-bank almost four kilometers long defines the Great Enclosure: an irregular parallelogram encompassing almost 50 ha (Figure 1). The main body of the enclosure lies on a high flat glacial outwash terrace overlooking the active floodplain of North Fork. The north wall of the enclosure ascends a natural bank some 10 m high to the crest of a glacial moraine. A geometrically perfect square encloses another seven hectares adjacent to the eastern wall of the Great Enclosure. The square is aligned across its diagonal to the winter solstice sunrise (Romain 2015). Almost 40 mounds are scattered in and around the earthwork, including the largest Ohio Hopewell mound ever built: Mound 25 (labeled as "Effigy" in Figure 1). This huge, three-lobed mound was 150 m long, 55 m wide, nine meters tall, and surrounded by a D-shaped ditch-and-bank enclosure. The earliest maps of the site depict the Great Circle, measuring about 120 meters in diameter, just east of Mound 25 (Figure 1). This circle was the focus of geomagnetic surveys and ground-truth excavations from 2012–2016, which are discussed at length below.

Warren King Moorehead's expedition here in 1891–1892 led to the definition of the "Hopewell Culture" and revealed some of the essential characteristics of Hopewellian ceremonialism (Moorehead 1892, 1893, 1897, 1922). The World's Columbian Exposition was held in Chicago in 1893 to celebrate the 400th anniversary of Christopher Columbus' arrival in the New World. Harvard University professor Frederick Ward Putnam (Chief of the Exposition's Department of

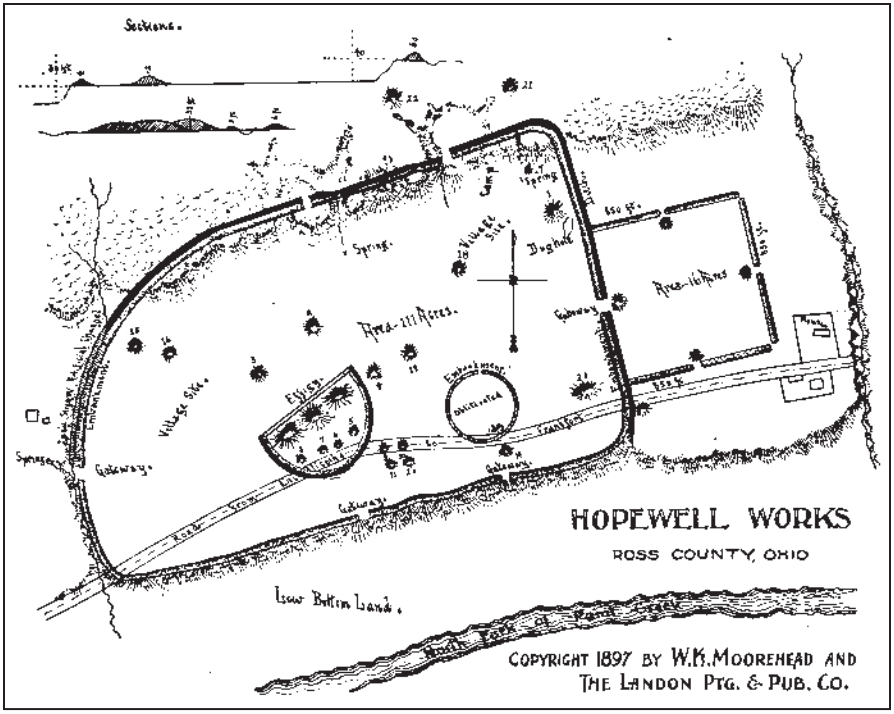

Figure 1. Warren K. Moorehead's plan of the Hopewell Mound Group (Moorehead 1897: Figure 1)

Anthropology) assigned Moorehead the task of collecting archeological materials capable of showcasing to the world the richness of precolumbian Native American cultures. With Squier and Davis's *Ancient Monuments of the Mississippi Valley* as his guidebook, Moorehead led his field party to the great mound and earthwork complex located on M.C. Hopewell's farm just west of Chillicothe, Ohio. Moorehead opened many of the mounds and discovered a dazzling array of symbolically-charged objects crafted of exotic raw materials including copper, mica, marine shell, and obsidian. Many reflected the highest level of skill and artistry, of the sort that can only be acquired through studied practice and long apprenticeship. The number, variety, and quality of Hopewellian goods and raw materials recovered here remains unmatched to this day. The contexts in which Moorehead found these objects define some of the essential characteristics of Hopewellian ceremonialism. He found some placed with human burials, apparently as personal possessions, or elements of sumptuous regalia marking social roles, or perhaps as

props or costumes used in ritual dramas (Carr and Novotny 2015). But he found most of these objects burned and broken, in large deposits placed in or near carefully prepared and intensely burned clay basins or altars (Greber 1996; Seeman and Greber 1991). Later, and more careful, excavations under the direction of Henry C. Shetrone revealed that the burials, altars, and deposits were arrayed on the prepared floors of wooden buildings (Shetrone 1926, 1930). These great timber halls were eventually dismantled and covered by the earthen mounds that stand witness today. William C. Mills used Moorehead's discoveries here to formally define the "Hopewell Culture" in 1906: "…for my convenience I have designated this culture the Hopewell Culture, taking the articles secured by Prof. Moorehead from the Hopewell Mounds as the type" (1906:136; see also Shetrone 1920).

The growth and professionalization of American archaeology in the decades immediately before and after WWII generated a tremendous body of new data from mound and habitation site excavations across eastern North America. By the early 1960s, Hopewell was widely understood, not as a *culture* in the sense of a distinct society together with its own language, customs, and technology, but rather as an *interaction sphere*: a mortuary or religious complex that crosscut and influenced several distinct societies during the Middle Woodland period, each rooted in different regional cultural traditions tied to the major river valleys of eastern North America (Caldwell 1964; Prufer 1964, 1965; Seeman 1979b, 2004; Struever 1964). Surprisingly though, fieldwork in Ohio played virtually no role in this growing understanding of the Hopewellian phenomenon. Shetrone's excavations at Hopewell Mound Group and Seip Earthworks in the 1920s were the last field investigations at any of the great Ohio earthwork centers for more than 50 years.

THE LANDSCAPE "BETWEEN THE MONUMENTS"

Olaf Prufer revolutionized Ohio Hopewell archaeology in the 1960s when he approached the field with an anthropological research agenda far broader than the essentially antiquarian interests that motivated Atwater, Squier and Davis, Moorehead, and Shetrone. Prufer turned attention away from an exclusive focus on the mounds and mortuary activities and sought a more holistic understanding of the articulation between the mortuary-ceremonial sphere and the total cultural system, including the domestic economy (see Prufer 1961, 1964, 1965, 1997). Prufer focused attention on one of the most vexing problems in Ohio Hopewell archaeology—the search for the everyday habitations of the earthwork builders. Seemingly ordinary or commonplace debris—fragments of pottery, broken stone tools, burned soil,

etc.—had been noted in the open spaces inside several enclosures, and in mound and embankment fill, especially at Hopewell Mound Group and Seip Earthworks. Most of the early observers interpreted this straightforwardly as village debris, and often viewed the surrounding enclosures as defensive fortifications (Atwater 1820; Moorehead 1892:509, 511, 1893:4, 1897:119, 1922:86; Shetrone 1926: Map of the Hopewell Group, 109–112, 126; Shetrone and Greenman 1931:359; Squier and Davis 1848:29). But by the early 1960s, a number of Fort Ancient sedentary farming villages (ca. AD 1050–1650) had been excavated, and it was clear that none of the Hopewellian debris scatters at the great earthwork centers was comparable in scale to these Late Prehistoric villages. Instead, Prufer noted:

> . . . such remains are extremely skimpy, strongly suggesting very temporary encampment of very small size, presumably connected with either the construction of the mounds and earthworks or with the holding of momentary ceremonials at these sacred localities . . . . I suggest that it reflects a settlement pattern similar to the classic Mesoamerican situation of the vacant ceremonial centers—semi-permanent shifting agricultural village type [Prufer 1964:70–71].

Prufer's subsequent regional surveys and McGraw site excavations supported his model (Prufer 1965, 1975).

Mark Seeman ushered in a new era of fieldwork at Hopewell Mound Group in 1978, seeking in part to test Prufer's model. Seeman conducted systematic surface surveys over 178 ha of plowed fields in and around the enclosure. Most evidence of Hopewellian utilization of the area was concentrated inside the enclosure, and these activities seemed to be related to specialized activities (e.g., crafting in obsidian and crystal quartz) rather than domestic settlement. He found no evidence for anything approaching a nucleated village in or near the enclosure (Seeman 1981). Similar investigations by William Dancey and National Park Service archaeologists in the 1990s produced comparable results (Burks and Pederson Weinberger 2006; Dancey 1996; Sieg and Burks 2010).

Jennifer Pederson Weinberger followed up on these field studies with a landscape-scale investigation of the inter-mound space guided by a rigorous and systematic sampling strategy including geophysical remote sensing (Pederson Weinberger 2006, 2009). She focused on 18 randomly selected 40 x 40 m study blocks. These represent a 10% sample of the non-mound space within the enclosure. Each block was subjected to magnetic and electrical resistance surveys, systematic shovel-testing, and selected geophysical anomalies were excavated. Magnetic survey near the center of the Great Enclosure (Block 87) led to the unexpected

discovery of a previously undocumented earthwork feature: a ditched enclosure 30 m in diameter, 2.5 m wide, 20 cm deep, with a gateway opening to the east. This was the first indication that geophysical surveys would revolutionize our understanding of Hopewell Mound Group, revealing ritual landscapes in the spaces between the known monuments.

Elsewhere, Pederson Weinberger found no evidence of long-term or large-scale habitation during the Middle Woodland period. The two best candidates were the so-called Western Village and Eastern Village identified by earlier investigators as potential habitation areas (see the areas Moorehead labeled "Village Site" in Figure 1). Block 10 coincided with the Western Village. A few Hopewellian diagnostics including bladelets, quartz crystals, and obsidian were recovered in this area, but later diagnostics were present as well. Two refuse-filled cooking pits were excavated in Block 10, and both returned radiocarbon dates from the Late Woodland/Late Prehistoric era (ca. 1000 BP). Two other radiocarbon-dated pit features in the central (Block 124) and southwestern (Block 28) portions of the site returned pre-Hopewell dates (ca. 2300–2600 BP).

Block 23 intersected the northwest quadrant of the Great Circle, and Pederson Weinberger recorded relatively high debris densities here, as well as a large number of geophysical anomalies. But, as will be seen, her 40 x 40 m study unit was simply too small to allow her to recognize the significance of these finds. This became apparent only in light of the landscape-scale geophysical surveys reported below.

Only one location (Block 167) produced evidence of sustained Middle Woodland period activities associated with subsurface facilities. Here a large oval pit was associated with several postholes and a possible structure floor up to four meters across. The pit fill included four bladelets, one biface, four utilized flakes, cut mica, chert debitage, undecorated ceramics, and fire-cracked rock. One of the associated postholes was dated to 1770±70 BP (Pederson Weinberger 2006:168). She concluded that evidence for Middle Woodland activities inside the Great Enclosure was limited to ceremonial activities, craft manufacture, or short-term habitation.

Recent investigations focused on two localities just outside the Great Enclosure shed further light on the nature of the activities conducted in and around the earthworks. Cut bank erosion along the meandering course of North Fork Paint Creek prompted salvage investigations at the Riverbank Site (33Ro1059) about 225 meters southeast of the Square Enclosure in 2004–2006 (Bauermeister 2006, 2010). Remote sensing and limited excavations exposed several pit features containing evidence of food preparation and consumption in association with special-

ized assemblages that suggest these activities were conducted in connection with ritual observances, feasting, and craft activities. Two pit features (F7 and F8) had clear Hopewellian associations. In addition to significant quantities of burned bone and shell, the pits contained bladelets, mica fragments, several polished bone tools, and three small, specialized tetrapodal ceramic vessels (the two pits are linked by cross-mends from one of these vessels). Radiocarbon dating confirms the Hopewellian association (see Bauermeister 2010:47; Lynott 2014).

A small non-mound occupation ("Datum H") located about 300 meters northeast of the Great Enclosure was the subject of intensive geophysical investigations (magnetometry and magnetic susceptibility), artifact distributional studies, and limited test excavations during the summer of 2012 (Pacheco et al. 2012). This area had apparently never been plowed and the archeological deposits demonstrated remarkable integrity. Collected artifacts included more than 250 Ohio Hopewell bladelets, a few bladelet cores, ceramics, projectile points, a few flecks of mica, a gorget fragment, and a possible obsidian biface fragment. Subsurface features included earth ovens, basins, and post molds. The researchers concluded that, "Although artifact analyses and ethnobotanical analyses are yet to be completed, the distribution patterns, magnetometry data, small site size, and types of artifacts recovered hint that the Ohio Hopewell occupation at Datum H represents a locus of crafting activities" (Pacheco et al. 2012).

THE GEOPHYSICAL REVOLUTION IN HOPEWELL ARCHAEOLOGY

As a result of these investigations at Hopewell Mound Group and other sites, the dawn of the twenty-first century witnessed the emergence of new, more richly contextualized understandings of the monumental components of the Ohio Hopewell archaeological record. The nineteenth-century view that earthworks represented fortified towns interspersed with funerary monuments had largely been dispelled. Instead, several researchers interpreted un-mounded archaeological deposits in and around the earthworks as the specialized occupations of religious practitioners or site caretakers (Prufer 1964, 1965), or of craft specialists producing the socially valued goods and ritual paraphernalia necessary for Hopewell ceremonialism (Baby and Langlois 1979; Pacheco et al. 2012; Spielmann 2008, 2009, 2013). Others saw these remains as the archaeological signatures of periodic social gatherings of varied sizes and purposes, including mortuary ritual, feasting, dancing, gaming, gambling, courting, marriage, adoption, and world renewal ritual (Brown 2013; Burks and Pederson Weinberger 2006; Byers 2004,

2011; Carr 2005a; Carr et al. 2005; DeBoer 1997; DeBoer and Blitz 1991; Pederson Weinberger 2006; Pacheco 1996; Riordan 2015; Seeman 1979a; Smith 1992).

However, many of these interpretations still rest on precious little empirical data, and the task of locating and investigating the archaeological contexts that might help to test these ideas remains a daunting one. This is an especially vexing problem at the largest mound and earthwork complexes where the inter-mound spaces within the enclosures may approach 50 ha, let alone the immediate environs which might harbor relevant activity areas. But the recent availability of geophysical remote sensing instruments capable of surveying these complexes on a truly landscape-scale is opening a new avenue of attack on the problem (Kvamme 2003). Landscape-scale geophysics will provide us our best guide yet to the targeted excavations that will be necessary to resolve these vexing questions of chronology and function.

Archaeological applications of geophysical remote sensing constitute one of the most significant advances in Middle Woodland research, and in Ohio Hopewell archaeology in particular (see Wright 2016 for a review). N'omi Greber pioneered the application of geophysical techniques to Ohio Hopewell sites at Seip Earthworks in 1979–1980, and implemented a long-term program of geophysics and ground truth excavations at High Bank Works (Greber 1981; Greber and Shane 2009). Mark Lynott and John Weymouth executed the first landscape-scale magnetic survey of an Ohio Hopewell earthwork at Hopeton Earthworks beginning in 2001. Over the course of five years, they surveyed 27 ha at a data density of about 5 readings per meter along transects spaced at 1 m intervals. For the first time, the entire layout of an earthwork complex was recorded with high accuracy and precision, together with the interiors of the enclosures and portions of the surrounding landscape. The magnetic surveys guided test excavations that helped define the nature and chronology of earthwork construction at Hopeton, and in one instance led to the discovery of an unusual patterned deposit of cut mica and ceramic vessel fragments in a pit located just outside one of the enclosure gateways (Lynott 2014; Lynott and Mandel 2009; Spielmann 2009; Weymouth 2005; Weymouth et al. 2009).

Jarrod Burks extended geomagnetic surveys of Ohio Hopewell earthworks to a wide range of sites, and he was the first to take advantage of the availability of multi-probe magnetometer arrays to increase survey speed and data density. In addition to improving on the accuracy of nineteenth-century earthwork maps, his surveys demonstrated that the Ohio enclosure sites are more numerous, more complex, and more varied than previously known. And with a discovery that presages the work reported here at Hopewell Mound Group, Burks revealed an un-mounded ritual

feature complex—the Moorehead Circle—inside the hilltop enclosure at Fort Ancient (Burks 2010, 2014; Burks and Cook 2011; Riordan 2015, this volume).

These successes led the National Park Service to commission a large-scale, high-resolution magnetic gradient survey of the Hopewell Mound Group in 2012–2013 (Burks 2013). About 50% of the 57 ha complex was surveyed along transects spaced at 50 cm intervals. A bewildering array of intact subsurface archaeological features were detected, even where no hint of such features is expressed at the surface.

In 2015, Hopewell Culture National Historical Park forged an international partnership with the German Archaeological Institute, Bournemouth University, SENSYS Sensorik and Systemtechnologie GmbH, and Ohio Valley Archaeology, Inc., to extend these landscape-scale geomagnetic surveys over an even larger area, and at greater spatial resolution. This partnership launched a new technological era in archaeomagnetic prospection in North America: the survey at Hopewell Mound Group marks the first application here of a vehicle-towed, 16-probe magnetometer array with built-in real-time GPS positioning capability (Komp et al., this volume). Over the course of two weeks, the team surveyed more than 60 ha at Hopewell Mound Group. The probes are spaced at 25 cm intervals and collect data at a frequency of 100 Hz. After processing, the resulting magnetogram has a resolution of approximately 100 readings per m^2. This survey effectively covered the entire area within and surrounding the Great Enclosure and the Square Enclosure, and constitutes one of the largest archaeomagnetic data sets in North America.

At the broadest scale, the magnetic survey detected all of the major features depicted on the 1848 Squier and Davis map, including many features that have no remaining topographic expression today, such as the Square Enclosure, the large D-shaped enclosure surrounding Mound 25, and many of the smaller mounds. New details of size, shape, and internal structure are evident in many of the previously known features, and several newly discovered architectural features are revealed (Komp et al. 2016; Messal 2016). Two particularly interesting features documented in the magnetic surveys were the focus of targeted ground-truth excavations in 2014–2016: the North Gate Borrow Pits and the Great Circle.

NORTH GATE BORROW PITS

Ground-truth excavations in 2015 focused on a cluster of four very large magnetic anomalies located just outside the central gate in the north wall of the Square Enclosure (Figure 2). The north wall of the Square Enclosure is well defined in the magnetogram west of the central gate, but more difficult to trace to the east. The

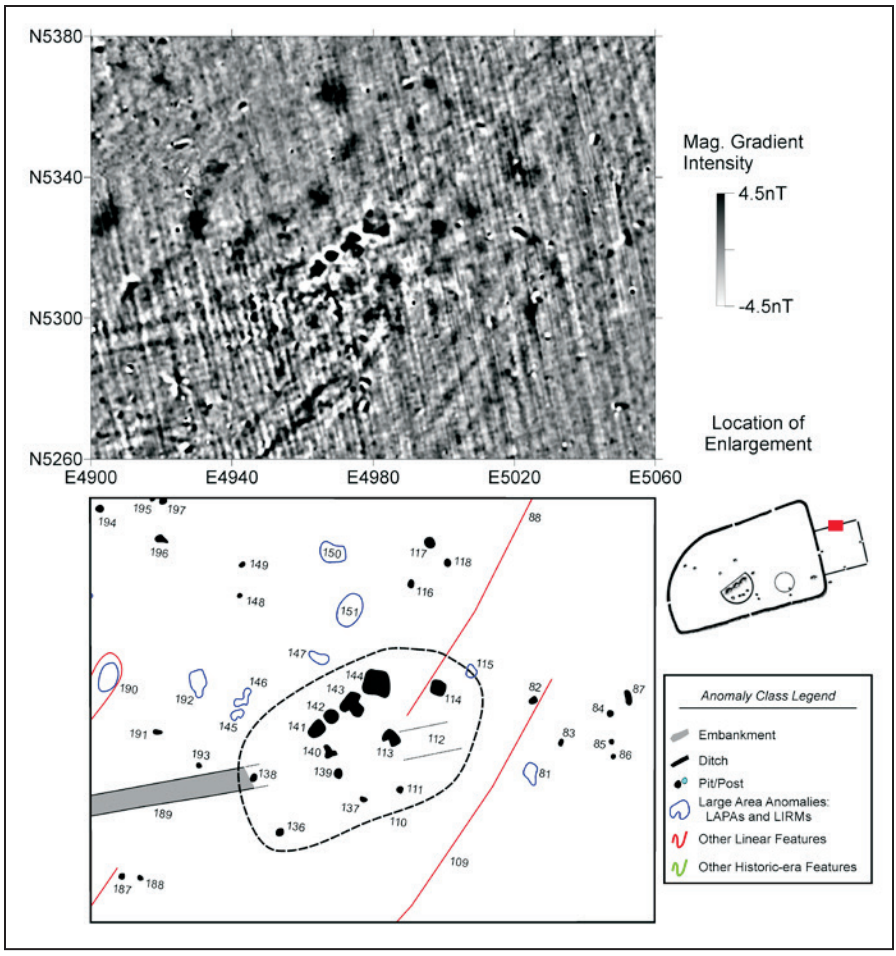

Figure 2. Magnetic gradient survey results and interpretation focused on the North Gate Borrow Pits. (Figure modified from Burks 2013: Figure 23)

north wall of the Square Enclosure crosses a low ridge trending southwest-to-northeast across the Circleville Outwash terrace that underlies the main body of the earthworks (see Thornberry-Erlich 2013; Burks 2013: Figure 15). Anomalies 141–144 are arranged in a line trending down the north slope of this low ridge. The anomalies all display a distinctive magnetic signature characterized by a strongly positive core surrounded by a halo of negative readings. The positive regions range from about four to six meters across. Burks recognized this signature as similar to

the large pit filled with heated soil at the heart of the Moorehead Circle at Fort Ancient; and to a set of anomalies detected at an early Fort Ancient village in southwest Ohio that were later shown to be burned houses set in shallow basins (Burks 2013; Cook et al. 2015; Riordan 2015, this volume).

With these expectations in mind, we opened a block excavation seven meters long and seven meters wide over Anomaly 141, and eventually exposed a seven m long profile across the center of the anomaly along the north-south axis. Figure 3 shows this profile at a depth of 1.3 m. The lowest unit (Zone I) is a C-horizon glacial outwash deposit consisting of a very fine-grained, homogeneous gray sand. Above this is another C-horizon outwash deposit (Zone II), a coarse sand and gravel. The anomaly itself (Zone III) proved to be an artificial excavation that removed the natural A- and B-horizon soils over the entire block to a depth of about 40 centimeters. This excavation was deeper in the center, forming a broad pit more than five meters square that penetrated the underlying outwash deposits to a depth of more than one meter. The pit was backfilled with a deposit of clay loam soils, including a few scattered flint artifact inclusions. Virtually all the artifacts recovered were limited to a 20–30 cm thick midden lens (Zone IV) on top of this backfill deposit. All the deposits are truncated by a modern plow zone (Zone V).

This anomaly is interpreted here as a borrow pit, where something close to 15 cubic meters of sand and gravel were removed for use elsewhere. The pit was dug to more than a meter deep in places. There were no artifacts, charcoal, or signs of weathering at the base of the pit. Nor was there evidence for any sort of compaction or intentional lining. The borrow pit seems to have been quickly backfilled with culturally sterile A- and B-horizon soils. A shallow depression remained in the center and was filled in with organic sediments and a few artifacts. All of the diagnostics we recovered in this capping deposit were Hopewell in age—including a single Hopewell cross-hatched rim, and four Flint Ridge prismatic bladelets. This establishes a *terminus ante quem* for the backfill deposit. The total assemblage from the capping midden deposit included 26 sherds from five grit-tempered vessels, four prismatic bladelets, one scraper, one core, and 38 pieces of lithic debitage.

Archaeologists have paid scant attention to these elements of the Hopewellian built environment. Squier and Davis noted the presence of "borrow pits" or "dug holes" in association with several of the major Hopewellian mound and earthwork complexes. At first glance, it seems obvious that these simply served as sources for earth used in mound and wall construction. But a closer look raises questions that demand further explanation. There is a clear mismatch in scale between the volume

Figure 3. Seven-meter long east wall profile across Anomaly 141, North Gate Borrow Pit. (NPS Photo/ Timothy Everhart)

of these excavations and that of the nearby mounds and earthworks. The pits account for only a fraction of the required fills. Furthermore, in most cases the pits are not uniformly distributed among the adjacent constructions, as one might expect if principles of least effort were the most powerful determinants of their location.

Borrow pit features are relatively numerous at Mound City, Seip, Baum, Frankfort, and High Bank Works but still fall far short of the volume required to account for the mounded constructions. The pits are fairly uniformly distributed at Mound City, but at these other sites the pits are clustered in particular areas within the larger complexes. For example, at the tripartite Seip Earthworks, the pits are clustered adjacent to the wall forming the Great Circle (Komp et al., this volume); at Baum, the pits cluster along the wall forming the smaller circle. In all these cases, the pits are located exclusively outside of the enclosures. At Liberty Earthworks, a series of dug holes are clustered near the center of the complex, both inside and outside of the enclosures. At the Fort Ancient hilltop enclosure, numerous ditches (linear) and ponds (round to oval) are widely distributed adjacent to the enclosure walls, on the interior side. These artificial excavations are rare at other major earthworks including Hopeton, Hopewell, and Seal (see Squier and Davis 1848:Plates

VII, X, XVI, XVII, XIX, XX, XXI, XXIV). Clearly, multiple factors influenced the builders in determining the form and location of these excavations.

Archaeologists have subjected these features to extended investigations only at Mound City and Fort Ancient. At Mound City, geophysical studies and excavations in two of the borrow pits found evidence of intentionally emplaced clay linings at their bases, leading to the conclusion that these represent formal architectural elements in the cultural landscape, perhaps intended to serve as water features (Benson 2009; Brown 2012; Lynott 2014; Schneider et al. 2016). At Fort Ancient, several of the ditches and ponds are lined with sand and gravel and surrounded by limestone pavements. Some of these pavements are associated with cooking and heating features and are littered with faunal material, pottery sherds, flint debitage and tools, and burnt clay and charcoal. Connolly concluded that these are precisely constructed features that functioned as water reservoirs; focal points for activities associated with the use of the earthworks; and, when paired with gateways, as elements of an architectural design that forced people entering or exiting the enclosure to pass symbolically over or through water (Connolly 1996: 96–121). It is worth noting in connection with this last observation that two of these so-called borrow pits flank each of the gateways in the Mound City enclosure wall. It should also be noted here that at least two enclosures of the ditch-and-bank type (Shriver Circle and Hopewell Mound Group) have been tested and found to have intentionally placed clay linings at the base of their associated ditches (Lynott 2006, 2014:224; Picklesimer et al. 2006).

The North Gate Borrow Pits at Hopewell Mound Group were rapidly backfilled soon after excavation, so these at least did not function as enduring architectural features in the built landscape. Perhaps these did function simply as sources of construction materials. We know from the excavations by Squier and Davis, Moorehead, Mills, and Shetrone that Scioto Hopewell people frequently used carefully selected sands and gravels as construction materials. In fact, Squier and Davis used the presence of sand strata capping successive construction stages within mounds as one of the defining attributes of their class of "Altar or Sacrificial Mounds," and they cite Mounds 2 and 9 at Hopewell Mound Group as specific examples (Squier and Davis 1848:143–160). These excavation reports frequently mention the use of sand mixed with puddled clay to form substructure floors, and all of the largest mounds were mantled with a final stratum composed of distinctive gravels or cobbles. The deposit of fine gray sand (Zone 1) encountered at the base of our excavation units is quite distinctive in its texture and uniformity, and has not to my

knowledge been found in any other area of the site. It may well be that the earthwork builders discovered this unusual deposit and quarried it for use elsewhere.

THE GREAT CIRCLE

The Great Circle was the focus of ground-truth excavations in 2014 and 2016. Atwater's map depicts the Great Circle as a large circular embankment and exterior ditch 25 rods in diameter (ca. 125 m). A single mound is shown inside the southern half of the enclosure (Atwater 1820). Squier and Davis mapped the Great Circle a quarter-century later. They describe the feature as a "perfect circle, three hundred and fifty feet in diameter, bounded by a single slight wall, with a gateway opening to the west" (Squier and Davis 1848:27, Plate X). Their map depicts the circle as an embankment without an adjacent ditch, and differs from the text in showing a gateway to the north rather than to the west. A mound (Mound 12) appears inside the southeast quadrant of the circle near the embankment, and another (Mound 14) appears a few meters south of the circle (there is no indication that either of these mounds were investigated by Squier and Davis, Moorehead, or Shetrone). When Moorehead arrived in 1891, he reported that the feature had been entirely obliterated by plowing (Moorehead 1897).

The magnetic signature of the Great Circle is particularly well-defined in the recent surveys (Figure 4). A highly magnetic ring, 2.6 m wide, forms a geometrically perfect circle with an inside diameter of 114 m, enclosing an area of 1.02 ha. Two distinct gaps, each 12 m wide, open to the northwest and northeast. These gaps are likely mirrored by others opening to the southwest and southeast; the southwestern gap is clearly evident but the other is obscured by modern disturbances. Paralleling the inside edge of the ring at a distance of 4.7 m are a series of individual circular anomalies, each about 1.3 meters in diameter. These are regularly spaced at three-meter intervals along the eastern half of the circle, but are less regularly spaced along the western half. It seems likely this row of anomalies was originally continuous, but the pattern is marred by modern disturbances, or some of the missing anomalies may not be highly magnetic. A faint halo of negative magnetic values occupies the space between the highly magnetic ring and the row of individual anomalies. It is interrupted opposite the gaps in the magnetic ring. This likely represents the embankment mapped by the early observers (Burks 2013). Four large circular anomalies, each about 2.7 meters in diameter, are clustered around the geometric center of the circle.

Ground-truth excavations by the National Park Service in 2014 focused on the northeast quadrant of the circle. These investigations involved three opera-

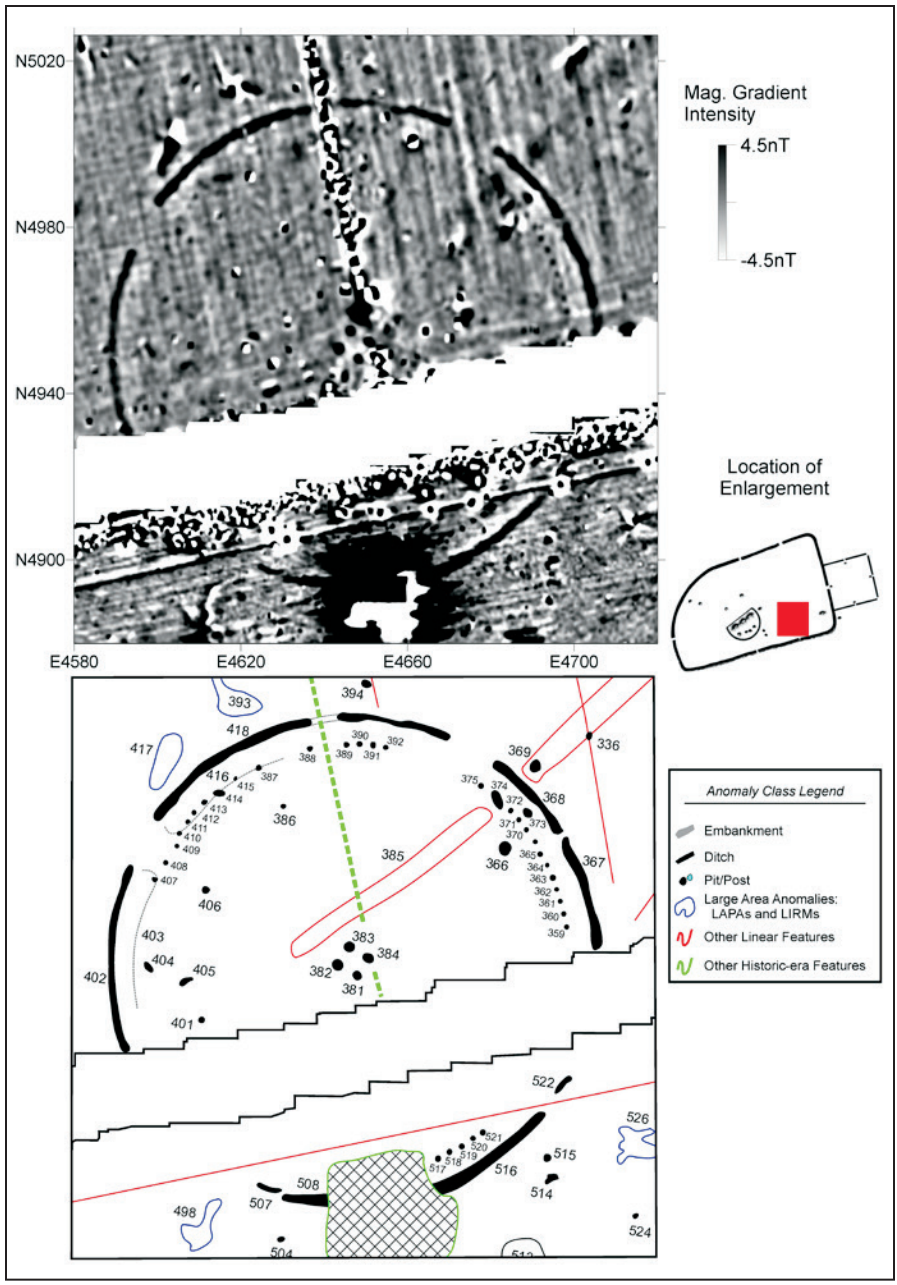

Figure 4. Magnetic gradient survey results and interpretation focused on the Great Circle. (Figure modified from Burks 2013: Figure 18)

tions. First, we sampled artifacts in the plow zone using 50x50 cm, screened samples (6.35 mm mesh). Second, we opened a 4.5 x 9 m block excavation to expose and profile two of the individual anomalies ringing the circle (Anomalies 363 and 364). Third, we extended a 1 x 10 m long trench across the outer ring anomaly (Anomaly 367; anomaly numbers assigned in Burks 2013).

A total of 49 plow zone samples were recovered at 10 m intervals over a 60 x 60 m area spanning both the interior and exterior of the northeast quarter of the enclosure. These samples produced only 121 pieces of chert debitage, 10 chert tools or tool fragments, 3 grit-tempered sherds, and 10 historic-period artifacts (fire-cracked rock is not tallied here). The only diagnostic tool was a single Flint Ridge lamellar bladelet. The average density, 2.73 artifacts per test unit, is far below the 7.0 artifacts per unit observed in the Block 10 Western Village samples which likely relate to post-Hopewellian occupations (Pederson Weinberger 2006:Table 7; fire-cracked rock is excluded from the density calculations reported here). But this density is double the overall average Pederson Weinberger observed across the site (mean = 1.35, std = 1.54), and it is comparable to the density she observed in Block 23 (2.44 artifacts/unit), which sampled the northwest quadrant of the Great Circle and represented the highest density observed outside of Block 10 (Pederson Weinberger 2006: Table 7). By this measure, the Great Circle was among the most *active* areas inside the Great Enclosure.[1]

Anomalies 363 and 364 are circular in plan and spaced 4.5 m apart on center. Both features were cross-sectioned and the fill from the south halves was screened through 6.35 mm mesh; flotation samples were collected from both halves of each feature. Both features display similar profiles (Figure 5). Both features were excavated into glacial outwash deposits: a gravelly clay loam B-horizon extending to about 55 centimeters below surface, overlying a C-horizon composed of unconsolidated sands and gravels. Both features are relatively straight-sided, 65 to 75 cm in diameter, and 100 to 120 cm deep below ground surface. They each have at least three distinct fills: a 10 cm thick lens of smooth clay loam at the base (Zone I); a 15 to 20 cm thick lens of gravelly clay loam with occasional cobbles above this (Zone II); and an upper fill of silty clay loam with a few cobble inclusions (Zone III). No artifacts were recovered from the screened fills. We processed 123 liters of soil by flotation from both features yielding only 193 fragments of wood charcoal weighing 190 mg, and just three seeds from Anomaly 363: 1 *Verbascum* spp., 1 *Chenopodium* spp. (wild form), 1 *Phalaris caroliniana* (maygrass; Weiland 2015). The maygrass likely represents a cultivated food plant, as it is outside of its wild range at this location.

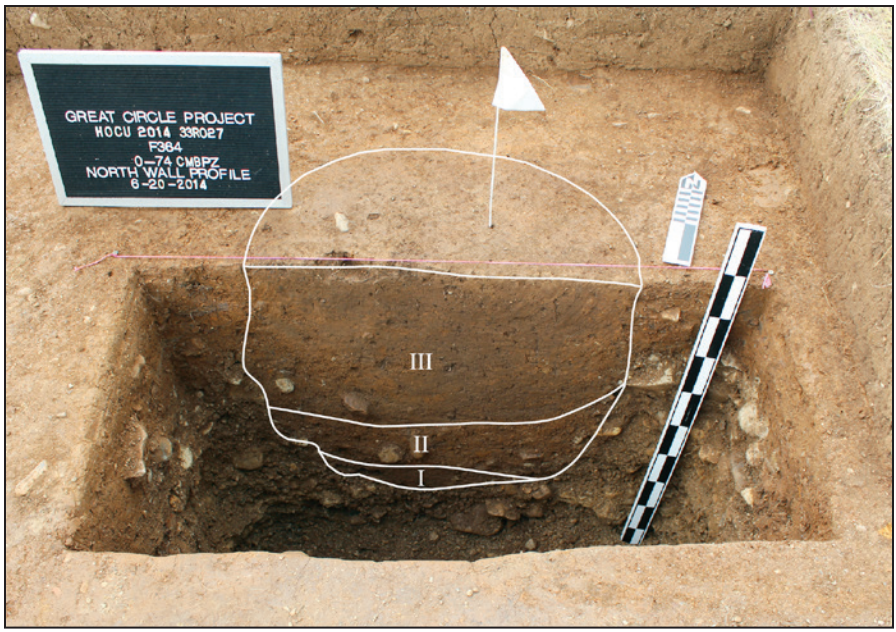

Figure 5. North wall profile across Anomaly 364 showing three stratified fill zones. (NPS Photo/ Timothy Everhart)

Anomalies 363 and 364 are interpreted here as postholes, that is, pits dug to hold wooden posts that were later removed. Several attributes support this interpretation: the features have stratified secondary fills; small bits of charcoal are randomly distributed throughout the fills; the fills are otherwise culturally sterile; a detailed examination of the feature profiles reveals some evidence of undercutting near the top in each that may represent damage caused by rocking the post during extraction; and there is no evidence of primary fills (packing or chinking)—if originally present, these would be unlikely to survive extraction. It is not clear whether the stratified fills represent episodes of reuse, or simply a single refilling using soils of slightly different color and texture (Riordan 2015; Kennedy and Carter 2015).

Several rules of thumb can be used to reverse engineer an estimate of the height of a pole supported in one of these post pits. In general, a fence post should be buried to one-third its length; a utility pole should be buried to 10% of its length, plus 60 cm (2 ft). So, a post pit 120 cm deep might support a pole ranging from 3.6 to 5.9 m in length (roughly 2.4 m to 4.7 m tall above ground).

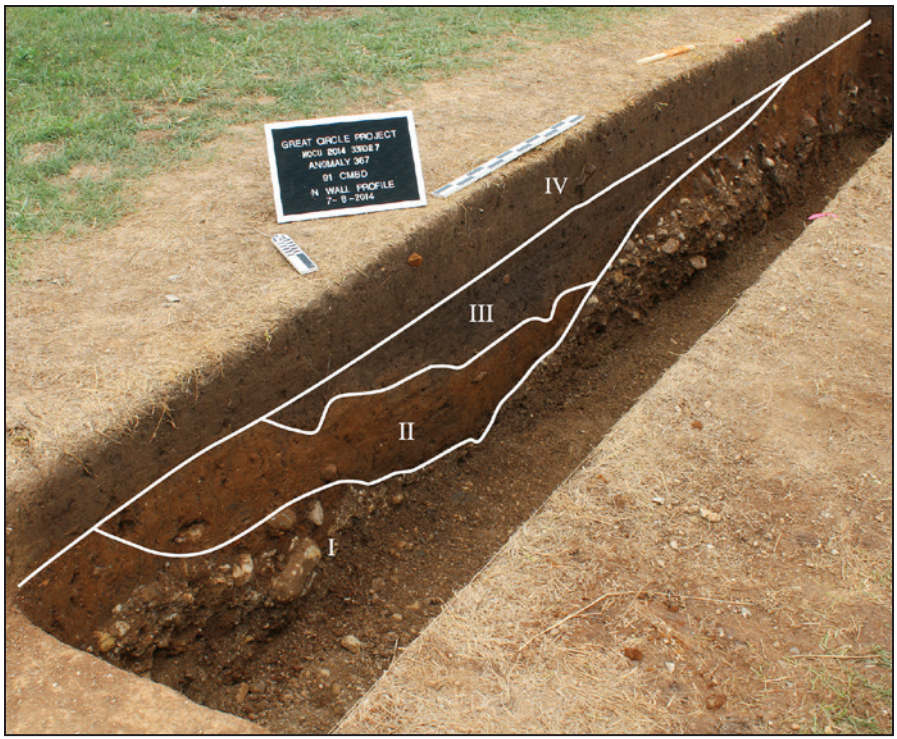

Figure 6. Six-meter-long north wall profile across Anomaly 367, stretching from the interior (left) to the exterior (right) of the Great Circle. (NPS Photo/ Timothy Everhart)

Figure 6 shows a six-meter-long profile across Anomaly 367, stretching from the interior (left) to the exterior (right) of the circle. The feature proved to be a ditch about 3.8 meters wide at the base of the plow zone, excavated through B- and C-horizon glacial outwash deposits (Zone I) to a depth of 90 cm below surface. There are two cultural fill zones in the ditch. The lower zone (Zone II) is a lens of silty clay loam up to 20 cm thick lining the bottom and inside edge of the ditch. It is truncated by the modern plow zone on the inside edge. It is quite distinct from the gravelly B-horizon subsoils in the local area in having only a few pebble and cobble inclusions. This zone is overlain by a dark, organic buried A-horizon (Zone III) composed of silty clay loam and extending from about 30 to 60 centimeters below surface. All fill was screened using 6.35 mm mesh. Ninety percent (n=60) of the artifact assemblage was recovered from Zone III: including one Flint Ridge lamellar blade; seven grit-tempered undecorated body sherds; four pieces of

unidentifiable animal bone; and one ground stone celt with a heavily battered bit. The remainder of the assemblage consists of seven pieces of chert debitage from Zone II. Forty liters of fill were processed by flotation but yielded no charred material (Weiland 2015).

Anomaly 367 is interpreted here as a broad ditch excavated nearly one meter deep into the underlying glacial outwash deposits (Zone I). Silty clay loam soils (Zone II) were then placed on the base and inside edge of the ditch. These may represent the basal deposits of the embankment that once flanked the ditch on the interior side, now entirely plowed away. A-horizon soils (Zone III) formed in place on this surface as vegetation, eroding sediments, and a sparse artifact assemblage accumulated in the bottom of the ditch.

Ground-truth excavations in 2016 focused on one of the four large circular anomalies clustered around the center of the circle. One falls in each quadrant, quartering the circle. We investigated the eastern anomaly (Anomaly 384; Figure 4). We exposed the feature in a 4 x 4 m block unit and excavated the southwest and northeast quarters, screening all fill through 6.35 mm mesh. Figure 7 shows the north profile of the southwest quarter. The feature is a steep-sided, round-bottomed pit, 2.8 m in diameter, excavated to a depth of 1.7 m below surface into glacial outwash sands and gravels (Zone I). The fill is stratified. The base of the pit (Zone II) contains a lens of carbon-stained rocks that displayed cracking and chalky surfaces indicative of heat alteration, interspersed with large pieces of charcoal and carbon-stained and oxidized soil. This is capped by a thick lens of gravelly clay with a few charcoal flecks (Zone III). The final fill (Zone IV) contains dark, organic soils with a deposit of thermally altered rock, charcoal, and oxidized soil at the base. The interface between Zone III and IV is hardened and reddened by in situ burning. A few large rocks (~10 cm diameter) lined the mouth of the pit. Very few artifacts were recovered from the screened fill: just 11 pieces of chert debitage; and one Flint Ridge lamellar blade fragment from Zone IV. Paleoethnobotanical analysis is in a preliminary stage, but has resulted in the identification of economically important *Hordeum pusillum* (little barley) seeds, likely a cultigen (Weiland et al. 2017). Four little barley seeds from the base of the pit were submitted for AMS dating and returned a conventional radiocarbon age of 1770 +/- 30 BP (Beta-458128, δ13C = -24.5‰) and a two-sigma calibrated date range of AD 139 to 334).

Anomaly 384 is interpreted here as a large earth oven facility. Alston Thoms and colleagues provide archaeological expectations for identifying and interpreting various types of hot-rock cooking facilities based on ethnographic, archaeo-

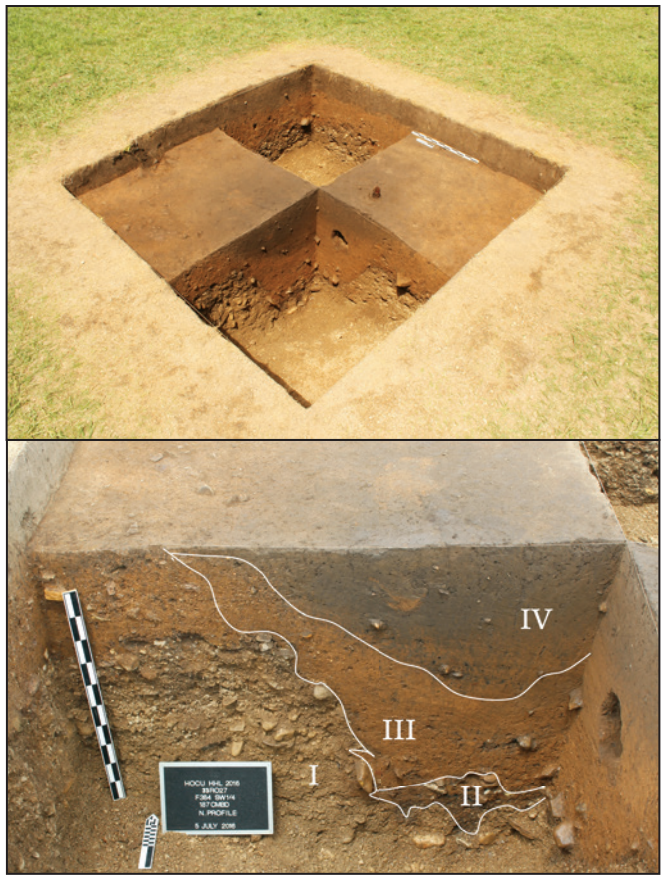

Figure 7. Two views of Anomaly 384: top, view from the southwest showing the full 4 x 4m block excavation after quartering the anomaly; bottom, detail of north wall profile, southwest quarter. (NPS Photo/ Timothy Everhart)

logical, and experimental data (Black and Thoms 2014; Thoms 2008, 2009). The thermodynamic advantage provided by hot-rock cookery lies in the fact that rocks can store and release heat over long periods of time. This not only conserves fuel, but makes possible a variety of specialized cooking systems including earth ovens; steaming-pits; stone-boiling in pits or containers; and surface-fired hot-rock griddles. A variety of factors including food composition, labor and fuel availability, number of consumers, and timing of consumption, will influence the choice of cooking system in particular cases (Wandsnider 1997). Each of these cooking

systems leaves behind tell-tale signatures that one can use to deduce the function of archaeological features (see esp. Thoms 2008:Table 4), though re-use and issues of equifinality can complicate the interpretation.

Anomaly 384 conforms most closely to the expected archaeological correlates of an earth oven. Heating element remnants are the most telling attributes. Closely spaced and relatively large heat-altered rocks overlying charred plant remains, ash, and carbon-stained and oxidized basal sediments are the hallmarks of intact earth oven heating elements. These are often disturbed by reuse episodes, especially in large ovens because the energy investment in preparing the excavation and gathering suitable rocks creates an incentive for reuse. With good preservation, large pieces of charcoal, soot, and carbon-staining are to be expected because a reducing atmosphere is created when the oven is sealed during cooking and incompletely combusted fuel is smothered.

Anomaly 384 displays remnants of at least two in situ heating elements. The burned deposits at the base of Zone II represent an initial use episode; the essentially sterile deposits in Zone III represent a partial backfilling of the oven; and the burned deposits at the base of Zone IV represent a final use episode. Portions of the heating element were apparently cleaned out after each use episode, as the total amount of heat-altered rock remaining in the oven pit was less than might be expected for intact heating elements. When an oven pit is reused, the heating element is typically rebuilt, discarding those stones that are too small or heavily fractured to effectively store heat. This usually results in piles or scatters of spent cooking stones surrounding the oven pit, often accumulating into substantial burned-rock middens. This is apparently not the case at Anomaly 384. Other than the few large rocks found near the mouth of the pit, we found no remarkable concentrations of fire-cracked rocks near the anomaly. It seems the builders took some care to dispose of the spent heating element remnants at another location.

Anomaly 384 is among the largest and deepest oven pits recorded in Black and Thoms' (2014) review. Many oven pits are shallow basins, although some are deep, steep-sided pits. Oven pit size is correlated with the size of the food load. The size of the food load is in turn related to the inherent bulk and quantity of the food being processed. If the food is intended for immediate consumption, the size of the food load should be closely related to the number of consumers. This relationship may be less direct if the food load is being processed for storage (Wandsnider 1997).

Anomaly 384 is clearly outsized in comparison to other excavated Middle Woodland earth ovens in the region (e.g., Pacheco et al. 2009a, 2009b, 2012, this

volume). It seems clear this feature was designed for bulk-processing or communal scale cooking, as opposed to a family-sized facility (Black and Thoms 2014:209). We found little direct evidence for the particular foods being processed in this facility. In a broad survey of pit-hearth cooking worldwide, Wandsnider (1997) found earth ovens most often served as specialized plant-processing facilities, especially for the mass-processing of inulin-rich roots, bulbs and tubers, and lipid-rich nuts. However, earth ovens are also associated with meat processing under certain circumstances, particularly "(1) when presented with a large quantity of fatty meat or (2) when hosting a feast in which large numbers of people are to be fed" (Wandsnider 1997:21). Pit-roasting is an efficient means of cooking large or fatty cuts of meat because heating causes fat to disperse and quickly transfer heat through the tissues, denaturing muscle protein and rendering it more chewable. "It is not surprising, then, that large aggregations of people and roasts of fatty meats are often associated" (Wandsnider 1997:14).

SUMMARY

Our geophysical investigations and ground-truth excavations contribute to an interpretation of the Great Circle as a monumental Hopewellian woodhenge: an enormous wooden post circle composed of nearly 100 substantial timbers, flanked by an earthen bank and causewayed ditch (see Ghose 2014). At the center were four communal-sized earth ovens capable of serving sizable aggregations of people. The post circle itself was ultimately decommissioned and deconstructed after one or more episodes of use. This would have been an imposing edifice in the landscape, even at the Hopewell Mound Group, amidst some of the most awe-inspiring architectural wonders of the Hopewell world.

COMPARISONS AND CONTEXTS

A growing body of evidence suggests that wooden post circles are an ancient and enduring element in the ritual landscape of American Indian peoples in eastern North America, built and used almost 4000 years ago at Poverty Point, 2000 years ago during the Adena and Hopewell episodes, 1000 years ago at Cahokia, and yet today in contemporary Sun Dance ceremonials. The following section presents some comparisons and contexts in an effort to better understand the place of the Great Circle in the ritual landscapes of Native America.

Sacred Circles. Small circular enclosures or "sacred circles" are the most common type of earthen enclosure in the Ohio Valley. Most of these are ditch-

and-bank constructions. Many encircle mounds, and some are known to enclose wooden post circles (discussed more fully below). The Great Circle stands out from the class in both size and form. Jefferies et al. (2013) compiled size information for 171 small circular earthworks in Ohio, West Virginia, Kentucky, and Indiana. Almost all of these (87%) enclose less than 0.5 ha, and only five of these enclosures, including the Great Circle, enclose more than 1.0 ha (median = .16 ha). In terms of form, the Great Circle's exterior ditch is very unusual; these are almost invariably found interior to the embankments. Further, most sacred circles have a single gateway or causeway opening to the east; the presence of three, or more probably, four causeways at the Great Circle is perhaps unique (Jefferies et al. 2013; Squier and Davis 1848:8–9, 47–49; Wright 1990).

William Romain (2014, 2015:249) was quick to recognize the significance of the orientation of the Great Circle causeways. The northwest causeway is aligned to the summer solstice sunset, and the northeast and southwest causeways are located along an alignment precisely orthogonal to the solstice alignment. If the Great Circle was the focus of large-scale gatherings and feasting, then this is perhaps an important clue to the timing of these events.

Furthermore, Romain discovered that the inside edge of the ditch circumscribes a square that is 80.61 m on a side, almost exactly one-quarter of the *Hopewell Measurement Unit* (HMU), 321.26 m (1054 ft). This relationship links the Great Circle to at least five other earthworks whose circles share a diameter of 1 HMU (Newark's Observatory Circle, Circleville, Hopeton, High Bank, and Seal), and a host of others that incorporate sub-multiples of the HMU in their design.

Hopewellian Post Circles. At least two, and perhaps three other wooden post circles have been documented in Hopewellian contexts. At the Stubbs Earthworks complex in the Little Miami River Valley near Cincinnati, Ohio, salvage excavations exposed a "Great Post Circle" associated with a plowed-down embankment. The circle was 73 m in diameter, composed of 172 large (ca. 45 cm diameter, 72 cm deep) postholes spaced at 1.4 m intervals. The posts had been removed and the postholes refilled. Radiocarbon dating suggests the structure was dismantled as much as 1800 years ago. Little in the way of artifacts or features was found to shed light on the function of the structure (Cowan and Sunderhaus 2001; Rippl 2009).

Geophysical surveys and excavations recently disclosed a complex circular ritual enclosure—the Moorehead Circle—at the famous Ohio Hopewell hilltop enclosure of Fort Ancient. The outer ring of the enclosure is about 60 meters in diameter and marked by at least three concentric rows of large vertical wooden

posts. The center of the enclosure is marked by a four-meter diameter deposit of red soil (probably intensely heated) surrounded by an apron of ash and charcoal containing deposits of broken ceramics. A large, possibly roofed building with multiple superimposed floors is located inside the enclosure (Riordan 2015, this volume). The southwestern portion of the enclosure includes a remarkably complex series of parallel gravel-filled trenches, perhaps intended to promote drainage. A limestone pavement is found at the entrance to the enclosure on the southwest side. Radiocarbon dates suggest the complex was in use about 1850 years ago (Burks 2014; Miller 2014; Riordan 2011, 2015).

The purpose for which the Moorehead Circle was built and used remains elusive. Multiple floors, refilled postholes, and superimposed features speak to a complicated history of use and reuse. Broken pottery, animal bone, and stone tools and debitage are associated with the Moorehead Circle enclosure but to date there is no direct evidence of human remains or other indications that the rituals conducted there were related to mortuary activities. At the end of its use life the feature was carefully dismantled and capped with a layer of gravel (Riordan 2015). Ohio Hopewell peoples used a similar gravel mantle to cover the location of several rectangular buildings at the Seip Earthworks. These were initially thought to serve as craft houses or workshops for the production of ritual paraphernalia associated with the use of the mounds and earthworks (Baby and Langlois 1979). However, a recent reanalysis concludes that the bulk of the artifacts supporting the original interpretation were in fact included in a shallow mantle of soil that was deposited over the structures after they had been dismantled and taken out of use (Greber 2009). Greber and the other contributors to the reanalysis conclude that these were clearly special structures as evidenced by the care with which they were decommissioned and mantled with soil, but they cannot be identified as workshops. This decommissioning and mantling may be similar to that seen at the Moorehead Circle at Fort Ancient.

Final mention should be made of a possible Hopewellian post circle in association with these rectangular buildings at Seip Earthworks. Burks and Greber (2009) suggested that several large rock-capped or rock-filled pits originally identified as subfloor features associated with Structures 4, 6, and 7 may instead represent large postholes. More recently, Spielmann and Burks (2011) suggested these may represent the remains of a wooden post circle about 30 meters in diameter, either predating or postdating the rectangular structures. Subsequent radar survey and test excavations identified more large rock-filled pits, lending support to the

idea that these represent the remains of a post circle, later decommissioned and backfilled with soil and cobbles.

Poverty Point. Poverty Point is a singular mound and earthwork complex built between 3100–3700 years ago along the Mississippi River in northeast Louisiana. The site is remarkable for its monumental scale: the site includes six concentric semi-elliptical earthen ridges with an outer diameter of 1.14 km surrounding an inner plaza, plus four mounds—one of these is the second largest earthen mound in North America. Of particular interest here is the presence in the plaza of twenty-five to thirty large ring-shaped magnetic anomalies ranging from 25 m to 65 m in diameter. Test excavations reveal these represent patterns of postholes up to 65 cm in diameter and up to 2.7 m deep. The posts were apparently pulled and filled with nearly sterile soil. Overlapping patterns suggest these post circles may have been temporary structures built and rebuilt at the same location (Greenlee 2012).

Adena Paired-Post Circles. Postholes arranged in a distinctive paired-post pattern were discovered beneath several Kentucky mounds at least as early as William Webb's WPA-era excavations in the 1930s and '40s. These came to be identified as defining characteristics of the *Adena Culture* (Webb et al. 1941, 1943, 1945; also see Henry 2009). Historically, these were interpreted as domestic structures, the homes of important persons later honored with burial in the overlying mounds. R. Berle Clay and Mark Seeman dismantled this interpretation and demonstrated instead that these were likely un-roofed structures serving ritual functions (Clay 1986, 1987; Seeman 1986; also see Zink 2009). Clay argues many of these circular ritual spaces changed in function over time. Many may have been built as ritual enclosures entirely unrelated to mortuary activities, yet later some of these spaces were capped by burial mounds. Clay (1987:54) suggests some of these circular enclosures may have functioned in multi-stage funerary rites in which the dead were first exposed in circular enclosures, the remains later dispersed or buried elsewhere. However, Purtill et al. (2014) recently argued there is very little direct evidence that these structures were in any way connected to mortuary activities. In fact, many of these paired-post structures occur as open-air structures entirely unrelated to mounds, earthworks and mortuary activities. Instead, these structures may have played a role in non-mortuary ritual related to feasting, rites of passage, or world renewal ceremonies. Artifacts and features are rarely associated with these structures: "Such factors suggest that the attendant activities were either passive, involving few durable materials, or, more probably, active but with great care taken to remove associated items upon ritual completion" (Purtill et al. 2014:76).

Cahokia. The significance of post circles in the ancient history of Native North America first came to prominence with Warren Wittry's accidental discovery of an arc of large postholes during salvage excavations at Cahokia Mounds State Historic Site in the early 1960s. This soon became known as the *American Woodhenge* due to the outward similarities to ancient Old World henges. The posts were set as much as 120 cm deep suggesting they stood as much as six meters tall. One post, broken and preserved in place, provides evidence that the circle was constructed using red cedar, a wood sacred to many American Indian tribes. At least five overlapping post circles ranging from 73 to 145 m in diameter have been identified at this location to date. The structures seem to have functioned to track the cyclical movements of the sun and moon. All were likely constructed between 750 and 850 years ago (Wittry 1969, 1996).

Sun Dance Lodges. Robert Hall points out:

> There has never been a ceremony precisely called the Sun Dance. The name is a convenience that historians, travelers, and ethnologists have fallen back upon to refer broadly to a range of midsummer tribal ceremonies common in the short-grass Plains of the United States and Canada, which usually took place within a circular enclosure [often a wooden post circle] at the center of which was a pole [Hall 1997:19–20].

The Sun Dance is mentioned here only in passing, and only to note that the use of wooden post circles as a context for a wide range of ritual practices persisted into the post-contact era and thrives today in contemporary American Indian ceremonial life.

DISCUSSION

The foregoing review is by no means exhaustive but does serve to give a sense of the long history and significance of post circles in many American Indian cultures in eastern North America. I do not mean to imply these are all linked in a unitary, unbroken, and unchanging historical tradition; but there may well be strains of a deep-rooted theme playing beneath these variations. In general, these structures seem to have served ceremonial purposes and are spatially and functionally separated from everyday domestic and residential activities. There is little direct evidence these structures are immediately related to mortuary or funerary activities (e.g., the preparation, burial or commemoration of the dead). The Cahokian examples seem to have served calendrical purposes. There is little direct evidence in the form of securely associated features or artifacts to suggest how or

why the other Poverty Point, Adena, or Hopewell post circles were used. The features and artifacts associated with the Moorehead Circle offer the greatest potential for interpretation, but the sheer complexity of the area and the limited excavation to date constrain our understanding. Research to date does suggest we should perhaps be looking toward feasting, rites of passage, or world renewal ceremonies as interpretive possibilities.

Feasting has long been a focus of anthropological inquiry, owing to the power of feasts as social tools that can be manipulated to bring about widely divergent ends. Feasts can be used:

> . . . as mechanisms for leveling or for accumulating wealth and power; as devices for aggregating dispersed populations or for reaffirming social distance in concentrated populations; as ploys for promoting solidarity or for surfacing festering divisions; as forums for accentuating or for easing rites of passage; as contests in which an often ineffable "prestige" is accrued; and as the classic arenas in which otherwise latent worldviews are exposed and dramatized (DeBoer 2001:215).

Several studies have pointed to feasting as one of the activities hosted at the great Ohio Hopewell earthwork complexes (Carr 2005a; DeBoer 1997; DeBoer and Blitz 1991; Greber 2009; Pacheco 1996; Seeman 1979a; Smith 1992; Spielmann 2002; also see Knight 2001 and Wright 2016 for reviews of feasting in the Middle Woodland Southeast). The grand scale of the Great Circle and its apparent central focus on feasting speaks to the importance of these activities at Hopewell Mound Group.

The manner in which the causeways and four central pit features divide the Great Circle into four quarters surrounding a central axis conjures up a host of associations in American Indian cosmology. All across North America and Mesoamerica the quartered circle motif is a cosmogram symbolic of the four-directional universe and the sacred center; the earth; the womb; the cosmic center to which the winds blow; the four seasons and cyclical time; and much more (Hall 1997:98–101). The heat, smoke, and vapors of the earth oven or steaming-pit surrounded by a circular frame bring to mind the sweat lodge and its further associations with transformation, the earth, the womb, birth, and renewal (Hall 1997:17–23, 124–131).

Robert Hall has described a class of ritual structures that may be called "world center shrines" (Hall 1985, 1996). These are shrines—places for prayer—built to symbolize the world center or earth navel, the place where the four quarters of the Middle World come together with the Above World and the Below World in many American Indian cosmologies. As one example, he describes a world center shrine on the 11,561 ft summit of Chicoma Mountain, New Mexico. Chicoma Mountain

is the highest peak in the Jemez Mountains, overlooking the Rio Grande Valley and a series of pueblo communities to the east and south. An oval arrangement of stones surrounds a wet depression symbolic of the "Waters of the World." Several stone-lined paths ("Rain Roads") radiate outward toward the Rio Grande pueblos below. Nearby, a peeled spruce pole supported by a stone cairn symbolizes the center of the world. Alfonso Ortiz (San Juan Pueblo) describes the shrine's function: "It functions as a sacred center in two respects. First, it is a point at which one may communicate with the spiritual underworld and second, it serves to gather in blessings from the three world levels and directs them, through the open end, to the Tewa villages" (Ortiz 1969:14, cited in Hall 1985; see also Hall 1996:122).

The Chicoma Mountain shrine may be conceived as a series of overlapping *keyhole*-shaped shrines that serve to gather and direct cosmic powers and blessings outward toward the Rio Grande pueblos. Alternatively, the *rain roads* may be conceived as paths leading toward the earth navel. Similarly, keyhole-shaped earth altars are a feature of Plains Indian ceremonialism, including examples from the Omaha, Pawnee, Cheyenne and Arapaho. In each case, the altars are symbolic of places where one might access the blessings of nature or the wisdom of elders in the spirit world (Hall 1985:185–186).

The concept of the world center shrine offers a powerful metaphor for understanding the form and purpose of the Great Circle: as a colossal cosmogram; a place for prayer where the powers or blessings of the setting solstice sun might be captured or channeled; or a sacred center where one might communicate with the powers of the four quarters, the Upper World, and the Lower World.

CONCLUSION

This is an exciting time in Hopewell archaeology. For the first time, the scale of our methods is beginning to match the scale of the Hopewell landscapes we are trying to understand. We are beginning to see these landscapes in a new light, through a new lens. The discovery of the North Gate Borrow Pits gives new insight into the sources of the raw materials likely used in mound construction and fosters a new appreciation of the degree to which the earthwork builders modified and sculpted the landscape surrounding the mounds and earthworks.

Our recent investigations support the interpretation that the great Ohio Hopewell earthwork complexes must be regarded as much more than just mortuary facilities. The recent investigations at the Great Circle reveal a monumental architectural feature with no direct association with mortuary activities. Instead,

we see a ritual facility built to a scale capable of accommodating, or indeed impressing, very large gatherings. The presence of at least one, and likely four, very large earth oven cooking facilities at the center of the Great Circle suggests that feasts and feasting were central to the purpose of the structure. The alignment of the northwest causeway to the summer solstice sunset suggests the timing of some such gatherings, and suggests one purpose of some such gatherings may have been to capture, channel, or offer praise or thanks to the power manifested in the Sun.

NOTES

1. Burks and Pederson Weinberger (2006) report debris densities from a shovel-test survey of the "Eastern Village," an area inside the northeast corner of the Great Enclosure identified as a village occupation by Squier and Davis (1848), Moorehead (1922), and Shetrone (1926). Their Nonmound Cluster 3 produced an average density of 4.12 artifacts/test unit (excluding fire-cracked rock), suggesting a more intensive occupation here. But using their Cluster Relative Density (CRD) index to account for the size of the area tested, the number of tests, and the total number of artifacts found, the densities for the two areas are more comparable: Great Circle (CRD = 3.01); Nonmound Cluster 3 (CRD = 2.97; again, excluding fire-cracked rock).

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