**Supplemental Texts 1-4 for Farnsworth et al.**

**Supplemental Text 1.**

**Establishing a Context for Examining Illinois Hopewell Era Legacy Collections for Evidence of Pipestone Use and Exchange**

**Thomas E. Emerson and Kenneth B. Farnsworth**

**Research Agenda**

Since 1995 the authors have been part of a research effect to identify and characterize Midcontinental pipestone quarries and their use by Native people between about 1000 BC and AD 1700s. We have recently summarized this research in Emerson et al. 2020. One of the primarily uses of pipestones has, as the descriptor implies, been their function as Native smoking pipes, especially during Middle Woodland and Mississippian times. The geologic identification of quarry sources is essential if archaeologists are to understand patterns of exchange in the past. The failure of past researchers to “pay attention to the geology” has created totally erroneous models of past social, religious, and economic interaction.

Our published research has highlighted several high-profile examples of such faulty interpretations. For example, in the mid to late 1800s and early 1900s excavations in Ohio Hopewell mounds revealed large caches of pipes that were identified as made from local Ohio pipestone. Subsequently archaeologists across the Eastern Woodlands began to identify Hopewell pipes as made of Ohio pipestone. In the early 2000s we initiated a geological examination of these historical pipes in legacy collections from Ohio. We demonstrated, that for a century, archaeologists had misidentified the raw material and built complex models of pipe exchange hypothesizing Ohio-centric production and distribution. Emerson et al.’s (2013) analysis demonstrated that, in fact, most of the Ohio pipes were made of Illinois pipestone and catlinite and were likely manufactured in Illinois and traded/exchanged into Ohio. The local Ohio pipestone was seldom used to manufactured to create Hopewell pipes.

It was the Ohio project that led us to wonder, it the many Hopewell era pipes collected historically from Illinois sites were really of Ohio pipestone as previously thought. Investigating this question is challenging. At best, few pipes have been recovered in modern times (post-1980s) through CRM excavations or disturbances of mounds by construction or farming activities. The last Hopewell mound/village excavations in Illinois can be dated to the early 1980s as part of CRM projects. Academic excavations of Middle Woodland sites have been almost solely carried out by the Center for American Archaeology, Kampsville. These excavations also ceased about 30 years ago.

This meant that the pipes examined were part of legacy collections. Since pipes are usually found in sites as single occurrences rather than in large caches as in Ohio this has involved examining hundreds of historic records and interviewing large numbers of archaeologists, avocational archaeologists, local historical societies, and collectors to identify, locate, and examine those specimens through historic publications and documentation, and existing collections in universities, museums, libraires, church organizations, and archaeological organizations. Part of this process also involved eliminating the over 1500 historical and modern forgeries that have flooded the market claiming to have been recovered from Illinois archeological sites.

**Illinois Hopewell Project Goals**

Our Illinois research had two primary goals: 1) to document the distribution and context of Hopewell pipes to contrast with the Ohio patterns and 2) to understand what geologic sources were employed by Hopewell people in crafting of pipes. Ultimately. we identified 431 pipes with credible documentation that they had secure archaeological context. Of these, 262 exist only as historical records. We were able to physically locate and examine 169 specimens in current collections. In attempting to track historically-verified specimens with secure archaeological context we encountered over 1500 purported Hopewell pipes, many held in museum collections. Consequently, although we interviewed collectors, since they often had knowledge of historical documentation on many sites and artifacts, and examined all institutional collections and records, we limited our geologic analyses to those pipes that had a reasonable “chain-of-evidence” we could track back to known archaeological endeavors.

Before about 1970 archaeological documentation of excavation strategies, context, and curation of collections was often problematic. While we often know, from published images or reports, that a pipe was recovered from a site, or if we are lucky, a specific mound, information beyond that is usually lacking. From sites excavated prior to 1970 we only rarely have been able to locate curated notes or field records. Unfortunately, because most state institutions had little or no curation security in place, many of these artifacts excavated with reliable standards can only be documented from photographs or a written description.

**Pipes with Credible “Context”**

In Illinois, most pipes came out of the ground in the early 1900s through the 1970s. Prior to the professionalization of Illinois archaeologists in the 1960s with the first creation of Departments of Anthropology at several state universities, archaeological excavations were collaborative efforts with local “avocational” archaeologists or hired local laborers providing the excavation labor and the few regional professional archaeologists such as Fay Cooper-Cole at University of Chicago and James B. Griffin at Michigan supplying guidance. Also prominent were individuals such as Paul Titterington (an early SAA supporter) and Warren K. Moorehead (an original “signer” of SAA formation documents) who directed large mound testing projects across western Illinois and the Illinois River Valley (Baker et al. 1941; Farnsworth 2004; Griffin et al. 1970; Titterington 1935). Towards the end of this period, extensive mound excavations were carried out into the early 1970s by Gregory Perino, a self-taught archaeologist, for various institutions, but primarily for the Gilcrease Institute in Oklahoma (Farnsworth and Wiant 2006).

In summary, some Hopewell pipes in Illinois collections were the result of antiquarian-era excavations, such as those the Davenport Academy of Natural Sciences in the late 1800s, but the majority were excavated by individuals such as Titterington, Moorehead, and Perino in the first three-quarters of the twentieth-century in that ambiguous era when archaeology was just beginning to establish itself, and had taken the first steps to exclude an earlier generation of self-taught archaeologists. Given today’s expectations these excavations are lacking, but in the context of their times they were in line with archaeological standards. These historical investigations have been documented in detail in 1287 pages in two volume by Farnsworth (2004; Farnsworth and Wiant 2006). While no one would want to emulate Titterington’s or Moorehead’s field techniques, Perino’s field excavations and reporting standards far exceed those of most professionals operating in the state during this time period.

There is another minor source of pipes in collections that comes from large-scale demolition of mounds during agricultural or construction activities. Illinois is a flat “farmed” landscape – there are no areas of the state that were not historically farmed. Mounds were generally considered nuisances that interfered with mechanized farming (post ~1940s) and efforts were made, over the course of years, to plow them down to level with the rest of the fields. With the advent of powerful tractors, large moldboard plows, and chisel plows that cut as much as a meter deep, hundreds of mounds were systematically eliminated. Agriculture is the single most destructive impact on archaeological sites in Illinois but it has brought many artifacts to the surface where they are observed and collected by landowners and surface collectors, many of who are members of one of the two amateur archaeological organizations in the state. In instances where these individuals kept records or donated materials to local institutions, and where we could be assured of the reliability of documents and oral histories, these specimens became part of the analysis.

No pipes were included in our geological analysis if we could document the sites were damaged/impacted through uncontrolled digging by those seeking commercial gain. Contrary to popular opinion in the archeological community, looting of sites is not currently a significant factor in site destruction in Illinois. Even historically, agricultural practices and construction associated with economic development were the main culprits. In the thirty-five years Emerson was Chief Archaeologist for the Illinois Preservation Agency and later Illinois State Archaeologist, he encountered less than a dozen reported looting episodes, and most were failed attempts that ultimately did minimal damage to the resource. Looting has not been a significant force in Illinois since the Depression-era when mound digging was a potential source of money, especially for rural families. Based on Emerson’s work with state police, all modern examples of looting were carried out by individuals who were simultaneously engaged in poaching, crack cocaine, and meth production and sales. It was simply another source of untraceable funds that could be disposed of locally for ready cash. Since 1989 Illinois has had in place a state burial law that protects historic and precolumbian burials from disturbance (Human Skeletal Remains Protection Act, 20 ILCS 3440/, August 11, 1989)

**Pipe Access and Illustrations**

Care was taken that the platform pipes, pipe preforms, and pipe fragments incorporated in this present study had been collected from excavations and surface surveys by professional scholars practicing recovery procedures as they were understood at the time of the investigations (anthropologists, anthropologists, osteologists and historians affiliated with Illinois-area colleges [Beloit College, Wisconsin and Blackburn College, Carlinville], Illinois-area universities and university field-schools supervised by professional archaeologists [University of Illinois (Urbana), Northern Illinois University (DeKalb), and Southern Illinois University (Carbondale)], publicly funded and owned State Historical and Archaeological Sites open to public visitation (Cahokia and Albany Mounds State Parks) , museums (Field Museum in Chicago; Spurlock Museum at the University of Illinois/Urbana; Illinois State Museum, Springfield; the Nauvoo Historical Site and Museum in west-central IL; the Davenport Academy of Sciences and Museum, Davenport, IA), Regional Research Institutes [The Thomas Gilcrease Institute of Aboriginal History and Art, Tulsa OK, and the Upper Mississippi Archaeological Research Foundation, Macomb, IL], and a few smaller Illinois County Historical Societies with professional staff members, where aboriginal artifacts were curated. Following their research studies and field-schools, some of these institutions returned artifacts to the landowners, but these landowners had never offered the artifacts for sale, and readily allowed us to conduct our pipe studies at their homes. In a few cases, institutionally-curated artifacts were accidentally mislaid, stolen, or destroyed in recent years, and these were not used in our study, unless our photographic images, measurements, and PIMA scans had been had been made prior to their loss.

In addition to the institutional collections, private landowners have encountered graves, artifacts, and/or habitation site debris in association with their farming, land-management, and residential construction tasks and these were brought to the attention of professional historians and scholars. These objects often have remained with the landowners, and to our knowledge have never been offered for sale. The most important example of this was a portion of the habitation area of the Albany Mounds site, which lay outside the limits of the Albany Mounds State Park. In this case, professional staff members from the Albany museum and a Northwestern University archaeologist guided the landowners through their test-excavations of the private area of the site to learn what it contained. The most important discoveries were numbers of broken roughed-out preforms and platform-pipe preforms made of Sterling pipestone. These objects, remain in the landowner’s care, and have little monetary value never been offered for sale. Hopefully, they will be added to the Albany Mounds collections at some point (see Figure 4b-d, h). The remaining pipe preforms in Figure 4 are all are curated at professional institutions: 4a = Dickson Mounds Museum; 4e = Southern Illinois University, Carbondale;

The damaged/repaired platform pipes illustrated in Figure 5 are curated in professional IL archaeological institutional collections (the Center for American Archaeology & Illinois State Museum), except for the damaged pipe shown in Figure 5a which is a landowner/collector surface find in possession of the finder.

The pipe examples shown in Figure 3 were recovered by professional excavations sponsored and overseen by the University of Michigan Museum of Anthropology (3a), Southern Illinois University-Carbondale (3b-c), the Gilcrease Institute (3d, g), University of Illinois-Urbana (3e), Upper Mississippi Valley Research Foundation (3h), and a Naples IL resident installing a septic system (3f). Pipe 3h is curated by Upper Mississippi Archaeological Research Foundation in Macomb, IL

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The pipe examples shown in Figure “2a” are curated at Dickson Mounds Museum (upper row), Upper Mississippi Valley Research Foundation (single pipe in second row); IL State Museum (on long-term loan from private landowner); and a private landowner/farmer along the Lake Fork of the Sangamon River.

The pipe examples shown in Figure “2b” are curated at: (a-b) IL State Museum for the Center for American Archaeology; c) Upper Mississippi Valley Research Foundation; d) Center for American Archaeology Brown Co Bluffs landowner donation; e) Upper Mississippi Valley Research Foundation donation (Ray site surface); f) Dickson Mounds Museum (Clear Lake); g) Prairie du Rocher bluffbase habitation – collected by landowner/farmer; h) “Monroe County”– private collector via landowner; i) Brooks Mounds (“Knight site” south bluffs – private collector).

**Doing Hopewell Research in an Imperfect World**

Hopewell mounds and villages, because they were known to contain commercially and museum-quality artifacts, were targeted for excavations for both commercial and intellectual purposes in the nineteenth century. Discoveries like the spectacular pipe caches by Squier and Davis in the mid-1800s and their publication by Smithsonian and the mound excavations for the Bureau of American Ethnology did much to fuel these forces. Many of these mound excavations took place prior to any concept of archaeological techniques and recordation.

Working with these legacy collections brings researchers into potential variance with the SAA style Guide 1.1.8 that promotes the *“…goal of not adding commercial value to archaeological, ethnographic, or historical-period objects that (1) have been obtained without systematic descriptions of their context, (2) have been recovered in such a manner as to cause unscientific destruction of sites or monuments*…”. These conditions are presented in such value-laden judgmental terms as to make them open to a multitude of interpretations. As principles applied to modern situations (perhaps the last half-century) this guidance seems easily interpretable, however, when projected into the era of pre-scientific field procedures and prior to institutional sponsorship of excavations they would seem to preclude the study of the legacy collections that our museums and institutions so carefully curate. We suggest that the SAA guidance needs to be historically and geographically contextualized to avoid devaluing important cultural materials that reveal both the histories and stories of descendant groups.

For scholars interested in studying one of the most fascinating cultural events in Native history, they are typically faced with working their way through the remnants of a cluttered record of these early investigations, uncertain proveniences and sources, and lost materials. Most of the Hopewell history as it existed in the ground has been destroyed and is only recoverable by looking at the remnants that are recoverable from material remains in public and private collections and sparse existing historical documentation. Studying Hopewell exchange as we do takes months and years of systematic detective work – the time for shovel-work has long passed. If we hope to help in the process of bringing forward aspects of Native history, both as an archaeological endeavor and as a concern for descendent populations, these collections, even those with questionable histories, are essential part of the process.

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**Supplemental Text 2.**

**Sourcing Pipestone**

 Beginning in the mid-1990s we initiated research demonstrating, primarily through X-ray-diffraction analysis (XRD) and reflectance near-infrared spectroscopy using a portable infrared mineral analyzer (PIMA), that northern midcontinental pipestones could be identified and geologically sourced. Given pipestones’ oftentimes megascopic similarity, considerable confusion existed in the archaeological literature as to their geological sources – an example of which was manifested in the common misidentification of many red pipestones as catlinite (e.g., see Brown 1989 versus Gundersen 1993) or Sterling pipestone for Feurt Hill pipestone (e.g., Emerson et al. 2013). The ubiquity of pipes made from these regional pipestones indicate that they were important to the native inhabitants (e.g., Drooker 2021; Emerson et al. 2002, 2003; Emerson et al. 2005; Emerson et al. 2013; Emerson et al. 2021; Farnsworth et al. 2004; Hughes et al. 1998; Wisseman et al. 2012, and references therein).

 Our geological sourcing research has distinguished mineralogical markers of pipestones and variants from 10 distinct quarry formations (e.g., recently summarized in Emerson et al. 2021). Pipestone source areas of potential interest are the Feurt Hills quarries in Ohio, the Blue Hill formation in Barron County in northwestern Wisconsin, the Baraboo formation (2 variants) in Sauk and Columbia Counties in west central Wisconsin, the Sterling deposits in northern Illinois, the Pipestone National Monument catlinite (2 variants) sources in southwestern Minnesota, the Kansas drift deposits in the eastern Plains, the Missouri Cahokia flint clays from near St. Louis, and the non-argillitic Portsmouth Ohio limestone/Calcite-Cemented Claystone deposits (see Wisseman et al. 2012 for geological details). All of these sources, as well as local Illinois limestone formations and siltstones, have been suggested as potential sources for Illinois Havana Hopewell-era pipes.

Our Illinois study area includes at its northwestern edge the source-locale for Sterling pipestone (a geologically localized oolitic bertherine flint clay; Hughes et al. 1998) and evidence for a localized pipestone-artifact manufacturing region in the lower Rock River drainage and its adjacent Mississippi Valley confluence area (Figure 1). Sterling pipestone is a mineralogically unique and geologically localized light gray, to gray-green, to splotched reddish brown bertherine found *only* in near-surface Ordovician/Silurian geological deposits near Sterling, Illinois (Emerson et al. 2013; Farnsworth et al. 2004; Hughes et al. 1998).

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**Supplemental Text 3.**

**Distribution of Pipes in Mortuary Context 1**

This sample includes two floodplain mound groups, the Lawrence Gay (Perino 2006b) and Peisker mounds (Farnsworth and Wiant 2006:66-76, 95), and three bluff crest mound groups, the Pete Klunk (Perino 1968:9-124), Bedford, (Farnsworth and Wiant 2006:241-277), and Elizabeth mounds, (Charles et al. 1988) yielding 533 burials and 24 pipes. The distribution of pipes included 1 effigy and 3 plain-bowl pipes at Lawrence Gay, 1 effigy and 1 plain-bowl pipe at Peisker, 1 plain-bowl pipe at Pete Klunk, 2 effigy and 5 plain-bowl pipes at Bedford, and 2 effigy (including a toad-effigy preform) and 6 plain-bowl pipes at the Elizabeth mounds. In addition, records at the Putnam Museum in Davenport, Iowa, document the 19th-Century discovery of two additional plain-bowl pipes excavated from the Elizabeth mounds by local Pike-County antiquarian digger Wallace Parker. From the published records of the excavations at these five mound groups, a cumulative 533 Middle Woodland burials are known to have been excavated from these five mound groups, as follows:

 ***Lawrence Gay***: 10 of 11 mounds not previously pitted contained 44 Hopewellian burials;

 ***Peisker***: 3 mounds, with one previously pitted tomb, contained 76 Hopewellian burials;

 ***Pete Klunk***: 8 mounds with minimally disturbance, contained 283 Hopewellian burials;

 ***Bedford***: 5 of 16 mounds, not previously pitted, contained 56 Hopewellian burials;

 ***Elizabeth:*** 6 Middle Woodland mounds (Mound 1 and Mounds 3-7) contained 74

 Hopewellian burials *[plus a slit-trench pit containing 6 skulls].*

 From the published records of the excavations, we know the two floodplain mound groups (Lawrence Gay and Peisker), where most burials were concentrated in central log tombs, contained 120 Hopewellian burials. Two effigy platform pipes and four plain-bowl platform pipes were recovered with these burials (ca. 1 pipe for every 20 individuals). The three bluff-top mound groups included burials in log tombs and in the surrounding mound fill and contained 413 Hopewellian burials. Four effigy platform pipes and 14 plain-bowl platform pipes were recovered with these burials (ca. 1 pipe for every 23 individuals). At these five mortuary sites, the pipes were found in individual graves or log-tomb structures associated with adult burials.

**Supplemental Text Pipes 4.**

**Distribution of Pipes in Mortuary Context 2**

This pattern of pipes as mortuary accoutrements can be further illustrated by examining burials recorded by archaeologists at Illinois-area mound groups with major Havana Hopewellian components (see Asch 1976; Charles et al 1988; Farnsworth and Wiant 2006; Griffin et al. 1970; Perino 1968). The data includes 987 Middle Woodland individual burials excavated at 11 floodplain and blufftop mound groups where platform pipes were found in the lower Illinois Valley and adjacent Mississippi Valley region of west-central Illinois. Excavations at 11 sites recovered 29 platform pipes, including 9 effigy pipes and 20 plain-bowl pipes. Four platform pipes accompanied one burial -- the Gibson Mound #4 Tomb, four pipes, see Perino 2006a:397-453: Plate 5, 426-437 --, four burials had 2 platform pipes each, and two platform pipes had been placed on tomb logs, apparently not associated with any individual, perhaps, to commemorate an event. Platform pipes were buried as apparent personal possessions with only 20 of 987 individuals: just two percent of the Hopewellian individuals in the sample. If we divide these burials into subgroups based on their placement in individual mounds, 11 burials whose personal grave artifacts included platform pipes were interred in log tomb structures, while 9 burials where grave artifacts included platform pipes were found in individual graves away from the central log tombs.

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