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**THE SAUK VALLEY
AT THE CROSSROADS OF COMMERCE & MANUFACTURING
FOR TWO MILLENNIA**

**CONTINUING THE TWO MILLENNIA-OLD TRADITION
IN COMMERCE & MANUFACTURING**

WHEN LINNEA & I WROTE THE ATTACHED MONOGRAPH, OUR OBJECTIVE WAS TO DOCUMENT THE HISTORY OF THE REGION. WE PRESENTED MANY TALKS TO LOCAL CIVIC GROUPS AND PRESENTED THE SUBJECT AT A STERLING-ROCK FALLS HISTORICAL SOCIETY MEETING. IN 2009 WE WERE INVITED SPEAKERS AT THE ANNUAL MEETING OF ILLINOIS AND IOWA ARCHEOLOGICAL SOCIETIES.

SEVERAL YEARS AGO WE REALIZED THAT OUR TWO THOUSAND-YEAR REGIONAL HISTORY IN MANUFACTURING AND COMMERCE IS ONE FACT THAT MAY BE USED IN DIFFERENTIATING US FROM MANY OTHER MIDWESTERN MANUFACTURING CENTERS OF THE LAST CENTURY. THE LAST SECTION OF OUR MONOGRAPH, BEGINNING ON PAGE 28, SUMMARIZES COMMERCIAL ACTIVITIES OF THE HOPEWELL CIVILIZATION HERE IN THE SAUK VALLEY TWO MILLENNIA AGO AND MAY STIMULATE AN INTEREST TO USE OUR HISTORY IN CELEBRATING THE REGION, PROMOTING TOURISM AND PRESENT-DAY COMMERCE.

WOLF H. KOCH

The Hopewell Civilization in the Sauk Valley

**A Description of Early Native Cultures
at the Crossroads of Manufacturing and
Commerce Two Millennia Ago**



**Wolf H. Koch, Ph.D.
Linnea K. Koch**

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**Sterling-Rock Falls Historical Society
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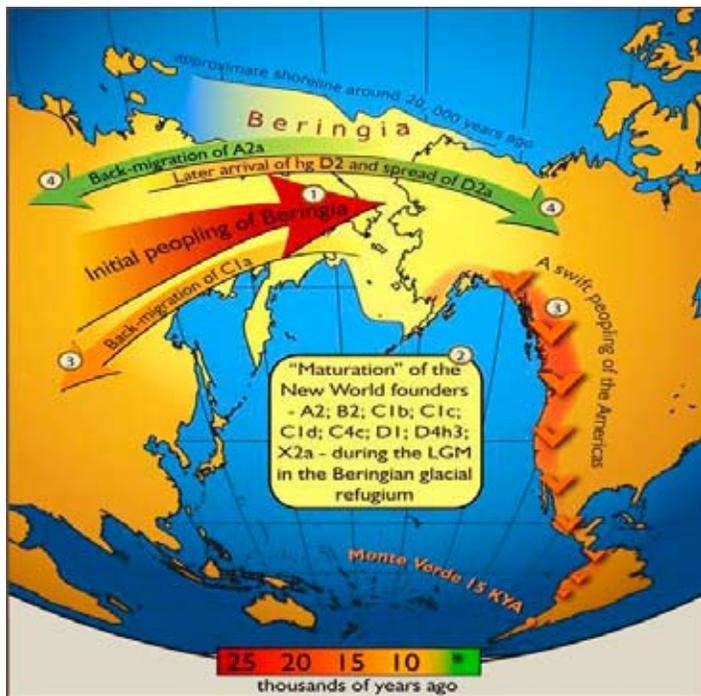
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Introduction

When we contemplate our history here in Illinois and the Midwest, we seldom consider the period before 200 years ago. After all, for most of us, our history starts with the first arrival of settlers from Europe.

After exposure to many years of movies and television programs, most people think of Native Americans in terms of the stereotypes portrayed as part of “Cowboys and Indians” mythology. Nothing is further from the truth when studying the actual lifestyles of native cultures, especially those existing here two millenia ago. There were no tipis; people lived in permanent structures in villages. Horses did not exist; they were introduced by the Spaniards long after the demise of the

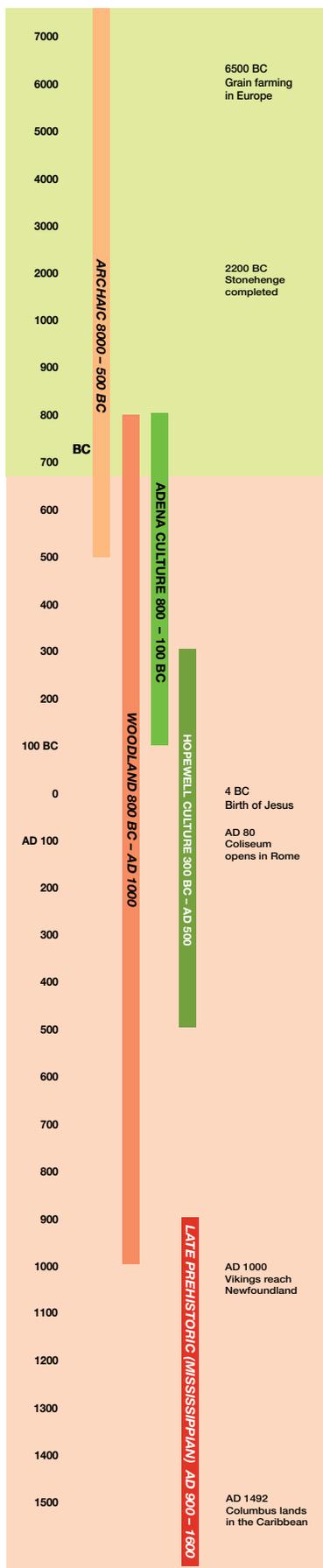


Map showing migration of humans from Asia to the Americas.
Image courtesy of Ripan Mahli, University of Illinois.

1500 years ago established a thriving civilization along the Illinois river valleys. They established permanent communities, developed manufacturing and participated in wide-ranging trade activities between the Rock River and Mississippi Valleys, in an area marked by Whiteside, Lee, Ogle and Jo Daviess counties, and the rest of the Midwest. This civilization, while centered in southeastern Ohio, established northwestern Illinois as a center for manufacturing and commerce more than two millennia, i.e. 2000 years ago!

In early 2008, the Sterling Park District and the Dillon Foundation sponsored the development of a series of three interpretive signs explaining the history of the Hopewell civilization, their customs and practices, and the significance of their presence in this area. The interpretive signs are located in Sterling’s Sinnissippi Park, among a series of 22 Hopewell burial mounds, which are listed on the National Register of Historic Places.

This booklet is meant to provide additional information about the Moundbuilders in Illinois and the significance of the Hopewell presence in Whiteside County. The authors hope that it will be of help



to students and teachers in learning about an important part of our past and provide references for those wanting to further explore the local Native American history.

This booklet is not meant to be a serious reference for professionals, but designed to encourage other amateurs to explore local history. The authors' backgrounds are in engineering and art, far removed from history, archaeology and anthropology, the primary specialties necessary to undertake an academic study of the topic. While all the material discussed in this booklet has been available from other sources, no one has suggested previously that the Hopewell presence in Northwestern Illinois, particularly in Whiteside County in the vicinity of Sterling, represented a significant concentration of manufacturing and commerce, paralleling the developments of this area during the Industrial Revolution almost two millennia later.

We would like to acknowledge the help of many individuals and organizations who have made this study possible and provided information and pictures. The document collection of the Sterling-Rock Falls Historical Society Museum provided the starting point for this work, especially the extensive documentation of earlier work by our local historian, Gunnar Benson. Our own local amateur archaeologist Doug Miller, a past president of the Illinois Archaeological Society, provided the impetus for studying the distribution of pipestone during the Hopewell era which changed our current understanding of the importance of Sterling and the surrounding area. Doug also provided pictures and artifacts to photograph. Bradly Leppard, Martha Otto and Teresa Castensen of the Ohio Historical Society provided images from the society's archives. Thomas Emerson and Kenneth Farnsworth of the University of Illinois provided images of Sterling pipestone pipes. Michael Wiant, director of the Dickson Mounds Museum contributed images of Sterling pipestone pipes, other artifacts from the Woodland period found in Northern Illinois and provided a critical review of the interpretive panels located in Sinnissippi Park. Ferrel Anderson, one of the participants of the 1961 dig and president of the Quad Cities Archaeological Society also reviewed the panel content and provided input which did not fit on the panels but is included in this booklet. Meg Bero, director of the Schingoethe Center for Native American Cultures at Aurora University, allowed us to photograph artifacts from their collection that had relevance to our study. Terence Buckaloo, director of the Sterling-Rock Falls Historical Society Museum and Jerry Glawe reviewed the manuscript and provided advice throughout the study.

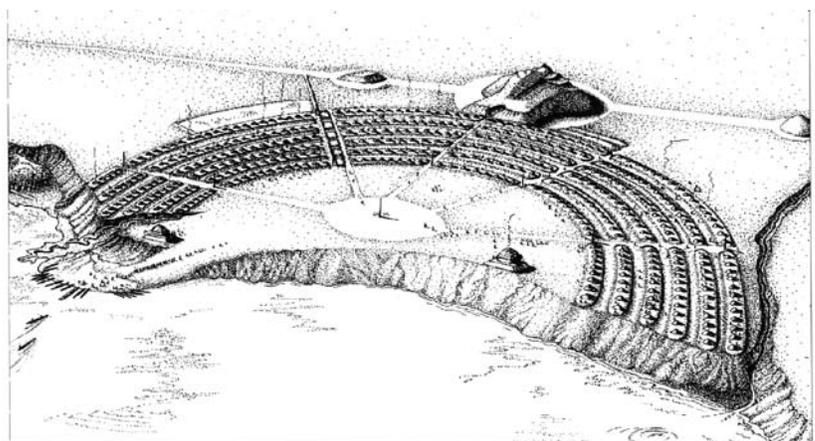
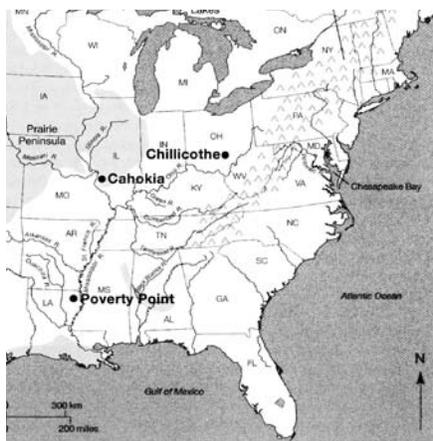
The timeline to the left shows selected world events taking place in the Western Hemisphere during the time of the Moundbuilders. Adapted from Ohio's Prehistoric Timeline: Ohio History Central, an Online Encyclopedia of Ohio History.

Early Moundbuilders

When early settlers arrived in North America, they encountered many native tribes living a mostly nomadic lifestyle. It was not until the settlers crossed the Appalachian Mountains that they discovered tens of thousands of man-made mounds along most of the rivers of the Midwest and along the Gulf Coast, with the great majority located in the Mississippi River drainage basin. While these mounds were evidence of past civilizations to some, they represented a nuisance to most settlers, especially those interested in establishing farms. In short order, many mounds were destroyed by plowing, while many others fell victim to road building and industrial expansion projects during the last 100 years. While moundbuilding cultures toiled on their construction over a period of more than 3000 years, we have managed to destroy most of their labor over a short 200 years.

It is interesting to note that native tribes of the Midwest had no direct knowledge or oral traditions of moundbuilding or the history of the ancient civilizations at the time of the arrival of the white settlers 200 years ago. The learned men of the period decided that since there was no indigenous knowledge, the mounds were built by outside visitors from long ago, possibly by Hebrews, Greeks, Persians, Romans, Vikings, Hindus or Phoenicians, or any ancient culture that had ever built mounds. The myths of a “lost race” were not corrected until the 1880s when the Smithsonian Institution published its first findings on mound explorations.

Moundbuilding traditions in the North American Midwest occurred in three distinct periods: Poverty Point between about 1500 and 700 BC, the Adena-Hopewell civilizations with population centers around Chillicothe, Ohio between about 800 BC and AD 500, and the Mississippian civilization with its largest population center at Cahokia, Illinois about AD 900–1500.



The map on the left shows the centers of civilization for the three epochs of moundbuilding. Poverty Point in current-day Louisiana, Chillicothe in Ohio and Cahokia in Illinois. The earthworks on the right were constructed about 1500 BC at Poverty Point and measure approximately one quarter of a mile across.

The Poverty Point Civilization

The first moundbuilding culture in North America developed in the lower Mississippi Valley during a time called the Late Archaic Period around 1500 BC and thrived until about 700 BC in northeastern Louisiana, about 12 miles west of the current Mississippi River, near the town of Epps.^{11,12} The culture is named after the Poverty Point Plantation, where it is located. The settlement included several mounds and semi-circular earthworks and was home to about 5000 people at about 1000 BC,



Clay cooking balls from Poverty Point.
www.geocities.com/xjpcx/Povertypointpage.html

over 3000 years ago.¹¹ It appears to have been the center of ten mound sites extending some distance east and west and south to the Mississippi delta, with most sites located between the Mississippi River and its western tributaries.

The population lived on fish, small game, nuts and may have grown sunflower, sumpweed, goosefoot, knotweed and similar plants as well as gourds and squash.¹¹

Archaeologists have found clay objects, cooking balls, stone tools and stone and clay pipes. Hot cooking balls were used at the time for heating or cooking food in

hides or baskets since clay bowls had not been developed.¹¹ The Poverty Point people traded for soapstone as far away as the Appalachian range and copper and slate from Michigan. Poverty Point stone and clay products such as cooking balls have been found as far away as Florida.

Recent exploration indicates that a mound cluster thought to be part of the Poverty Point culture may have been built several hundred years earlier. Watson Brake is located southwest of Poverty Point.⁷

While the Poverty Point mounds have been known since 1872, it was not until aerial photos taken by the Army Corps of Engineers in 1953 that archaeologists realized the true extent of the ancient villages and postulated that it would have required about twenty million 50-pound baskets of soil to construct the earthworks.¹²

Early dating of the site placed it at a time period overlapping the Adena and Hopewell, leading to the conclusion that it was a southern outpost of those civilizations.¹² This resulted in speculation that Poverty Point may have been a stopping point for a northward migrating people originating in Mexico. Today, few anthropologists and archaeologists believe that there exists a relationship among the early culture of Mexico, Poverty Point or the Adena and Hopewell.¹²

The Adena (ca. 800-100 BC)

The Adena culture flourished in southeastern Ohio and the surrounding region between about 800 to 100 BC, a period of time now considered as the Early Woodland Period. The culture extended to about 150 miles around Chillicothe, Ohio, and is named after the Adena Estate of one of Ohio's early governors when Chillicothe was the state's capitol. Compared to Late Archaic cultures, the Adena civilization depended more on domesticated crops, developed pottery, and used burial mounds for the burial of some of their dead. Like Poverty Point, people lived in permanent structures in villages.



The Adena continued to develop into a hunter-gatherer society which learned selective cultivation

Painting of the Miamisburg Mound in Montgomery County, Ohio with a view of a farm, farmyard and animals including chickens painted by Charles Sullivan, ca. 1835-1860. This painting is part of the fine art collection of the Ohio Historical Society.

of plants. Like earlier groups, they grew sunflower, sumpweed, goosefoot, knotweed and squash and supplemented those with maygrass and pigweed.⁶ As the society's reliance on agricultural products increased, so did the need for containers for cooking and storage. Thus developed the knowledge for fabricating clay pots and storage vessels, replacing the cooking balls used by earlier groups.

Most Adena mounds were conical and built for burials. While there is some variation in Adena mortuary practices, especially in the later Early Woodland Period, typical burials occurred in pits which were lined with timbers, thus approximating today's coffins. Mounds

were built over these pits with occasional additional burials at higher levels. In some instances, archaeologists discovered that the wooden structure surrounding a burial was burned prior to constructing a mound. Some larger mounds were later built over smaller adjoining ones.¹⁰ While some mounds only reached a few feet in height, others were quite large, as the Grave Creek Mound in West Virginia, which stands 70 feet tall and has a diameter of 240 feet.



Painting from the Ancient Ohio art series depicting an Early Woodland/Adena gathering at a ceremonial earthwork in the Hocking River Valley. It is part of the Ohio Historical Society's collection.



An Adena pipe from the collection of the Sterling-Rock Falls Historical Society.

mounds show a flattening of the round back portion of the skull. It is possible the reshaping of the skull was reserved for the most important Adena.⁶

The Adena participated in religious practices based on shamanism. Many mound offerings include animal masks and parts used by shamans to impersonate animal spirits. Tubular pipes may have been used to smoke hallucinogens like the very potent *nicotina rusticum*. One very special find from Ayers Mound in Kentucky includes the full shaman regalia along with a skeleton which has the front teeth removed in order to insert a modified wolf's jaw.⁶

In addition to burial mounds, the Adena built round and oval earthen enclosures of up to 500 feet in diameter. These enclosures appear to surround villages or places used for religious ceremonies. Early archaeological studies ascribed many effigy mounds found throughout the Midwest to the Adena. Current carbon-dating efforts attribute these structures to post-Hopewell groups. These effigy mounds will be discussed in a later section.

The Adena culture departed from earlier civilizations in North America in that substantial effort was devoted to making non-utilitarian objects of adornment. Personal adornments in the form of jewelry became important. The Adena pipe shown to the right is the first example showing a likeness of a full human body. The pipe has become an icon of Ohio archaeology.⁶

While the experts have differing opinions, the question of what happened to the Adena should be addressed. What is known is that Adena and Hopewell coexisted in the Ohio River Valley for several centuries; it is not clear that they were distinctively separate civilizations. It is likely that some Adena maintained their ways and eventually disappeared, while others evolved and advanced into the Hopewell with differing cultural practices and advances in tool- and weapon-making, construction and agricultural technology.



A human-effigy pipe excavated from the Adena Mound in Ross County, Ohio. It is in the archaeology collection of the Ohio Historical Society.

Early Moundbuilders in Illinois

Before and after the time of the Adena civilization in Ohio, lesser known moundbuilding groups flourished in the Upper Great Lakes region. The Red Ochre Culture has been identified as one group found in Michigan, Wisconsin, Indiana and Illinois, where sites are located in Lake and Fulton Counties. This group of people usually buried their dead in a flexed position and covered their bodies with red ochre powder. Grave mounds are usually found on sandy or gravel ridges. Differences in burials and grave goods may have reflected social status of individuals. Grave goods often included worked copper objects and large blades of chipped hornstone, a blue-gray chert.



Pottery bowl, Elizabeth site, Pike County. After shaping and smoothing the container, Native Americans often applied symbols to its exterior, such as the abstract bird symbol seen on this two-thousand-year-old bowl. In Illinois, people of the Woodland period were the first to make extensive use of pottery. The bowl is in the collection of the Illinois State Museum.

Within the upper Mississippi drainage basin, including the Illinois River, another group, the Black Sand Culture developed during the Early Woodland Period. The culture is generally identified by its pottery which included thin-walled vessels that were sand- or grit-tempered and incised with lines created by using fingernails and cord-wrapped sticks.

The Hopewell Civilization (300 BC-AD 500)

The most eloquent description of the evolution of the Hopewell civilization was written by Bradley Lepper in the recent volume *Ohio Archaeology*, where he writes: “The explosion that marked the Middle Woodland Period is seen by us as a brilliant fluorescence of art, architecture, ritual, and cosmopolitan outreach that was unparalleled in North America up to that time.” He continues to mention “beautifully crafted and included representatives and abstract compositions” in copper, clay and mica.⁶ The name Hopewell was derived from the Hopewell family farm, where today’s Hopewell Culture National Historical Park is located near Chillicothe, Ohio.

It is important to note the Hopewell name does not describe an ethnic group, rather one of similar traditions based on archaeological evidence such as artifacts and architecture.⁶ In fact, the earliest Hopewell artifacts were not found in southeastern Ohio, but in western Illinois. Research cited by Bradley Lepper indicates that the Ohio Hopewell appear to be more related to the Ohio Archaic people than to the Illinois Hopewell.⁶ An extensive Hopewell presence developed around Havana, Illinois, known as the Havana Hopewell, a group which may have been responsible for the spread of Hopewell traditions to southern Ohio.⁴⁰

Hopewell Life

While most of the authors listed in the reference section have commented on life in a Hopewell village, William Romain devoted the entire book *Mysteries of the Hopewell* to their way of life.⁹ This book does not, however, provide a description of Hopewell houses and villages. For that information, other references provide the necessary information.^{6,7} What remains today of the Hopewell civilization consists of the remnants of burial mounds and other large geometric enclosures. These earthworks were not inhabited, but used occasionally for religious ceremonies. Little has remained of villages and houses in which people lived. When the first settlers appeared in the Midwest, these had long been reclaimed by forests and prairies. While the ceremonial earthworks were often located on bluffs overlooking river valleys, villages were located closer to the water. What we know today about these villages is based on remnants of posts, now just stains in the soil. These post locations would have marked houses, usually round or elliptical, of between 12 and 40 feet in size.¹ Locations of houses often contain residue from storage pits, fire pits and cooking vessels; other post locations mark the presence of drying racks for vegetables, meat, fish and hides. House walls were covered with sticks, bark and mud and roofs were thatched. Alternative construction, especially for less permanent structures, may have included hides. Most villages were small, consisting of several houses, at best, with most sites occupying only a few acres. Based on the amount of debris found at many sites, they were occupied for short periods only, probably as seasonal hunting and fishing camps. Permanent villages may have been occupied for several years, until crops failed and the necessary items such as

firewood became scarce. At that point, a site would have been abandoned and the houses moved to a new location.



Some Middle Woodland villages consisted of a few wigwam-type houses made of a wooden pole framework and covered with woven mats. A garden of seed-bearing plants like marsh elder might have been located nearby. In the background, members of the village are involved in the construction of an earthen burial mound. The painting is in the collection of the Illinois State Museum.

While the villages were small, the Weaver site, part of the Havana Hopewell, included a village occupying about four acres. One house site has been identified and contained an oval structure about 32 feet long and 22 feet wide. In the vicinity, archaeologists discovered two buried dogs and two dog skulls in the house. The site contained a fire pit with a diameter of about four feet, surrounded by a circle of post holes. This was probably a sweat lodge. The western edge of the village contained a fire pit eight feet long and two feet wide, probably the location of a cooking basin.⁴²

While the Hopewell continued the Adena dependence on hunting, fishing and gathering of nuts and fruits, much of their subsistence was derived from crops grown in fields. Archaeological evidence suggests they grew sumpweed or marsh elder, may grass, goosefoot, knotweed, sunflowers and beans. Maize, or corn, was grown mostly for religious ceremonies rather than normal human consumption. The major change in human diets during the Middle Woodland Period occurred about 2000 years ago, when the presence of cultivated plant residue relative to nut shells increased significantly, signaling a change from gathering nuts and seeds to cultivating seeds. This marks an historic change for the Hopewell civilization, especially since other groups of people around them did not change to a diet based on agricultural products until almost 1000 years later.⁷ Other native groups around them continued living from hunting, fishing and gathering seeds, fruits and nuts.

The plummet and pendant, right, and turtle effigy, below, were found locally by Doug Miller. They are representative of what was found in the Sterling Mounds.

Lower right: An atlatl, or spear-throwing stick from the collection of Schingoethe Center for Native American Cultures, Aurora University.



Advances in pottery making during the Early Woodland Period may have promoted changes in the Hopewell diet, since people now had a method for storing and preserving foods.

In addition to abundant food, water and materials for shelter, the Scioto River Valley in southeastern Ohio provided many other resources. The Old Scioto Salt Licks had supplied salt for other local native groups and animals. An outcropping of iron oxide became a source for red ochre, a red paint used in ceremonies and burials. The Feurt Hill pipestone quarries became the source for local stone for pipes, jewelry, and other art objects. Finally, high grade flint deposits at Flint Ridge became the source for most utilitarian tools and weapons as well as ornamental objects.

Among utilitarian objects commonly found from this period are spear points, scraping and chipping tools,



Doug Miller demonstrates the use of an atlatl to throw a spear. Photo courtesy of Doug Miller.

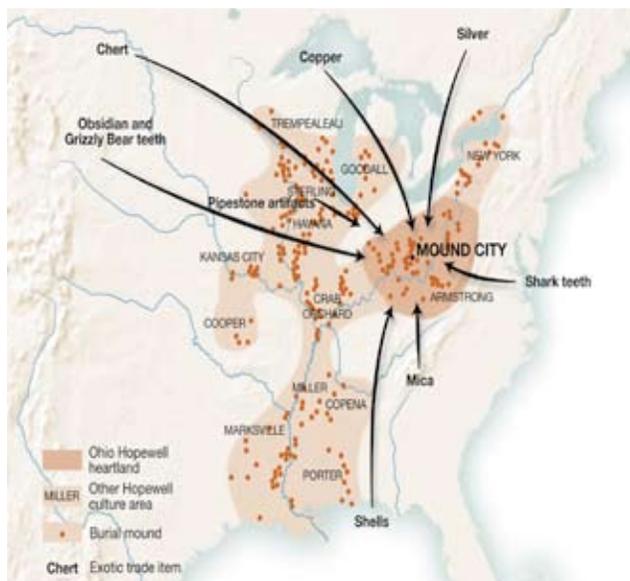
plummets, axes and celts, and banner stones. Banner stones were used to weight the throwing stick, or atlatl in order to impart additional momentum to the spear. The atlatl was the hunting weapon of choice for the period. It should be noted that bows and arrows were not introduced to the Great Lakes region until about AD 600.^{31,34} Arrows commonly found throughout the region belonged to later native tribes. While we use plummets today to assist in constructing vertical fences and walls, the Hopewell may have used them to stretch and weigh down hides during drying.

Other non-utilitarian objects commonly found include pendants and effigies. Both were often made of local stones. Finally, three types of pipes are found in Hopewell ceremonial and burial sites: tubular, platform and effigy pipes. These will be discussed later.

Hopewell artistic activities included the making of fabrics.⁶ Raw materials used were long plant fibers, rabbit and other animal fur and feathers. The Hopewell developed the knowledge to cultivate specific plants for fibers and learned when plant fibers were optimal for fabric making. While fabric remnants recovered from archaeological sites were not woven, they were braided and knotted into a wide variety of cloths from very tight structures to open laces and netting. The tight fabrics were used for burial activities such as transporting ashes, while nets may have been designed for catching birds and fish. Hopewell artisans understood coloring techniques, using a variety of natural dyes based on plant materials found in their environment.

Hopewell mortuary practices will be discussed later. However, it is appropriate to mention here that anthropologists who have studied Hopewell skeletal remains have concluded that while infant mortality may have been high when compared to present expectations, most Hopewell achieved a respectable age.⁵

The Hopewell were an egalitarian society where almost everyone was an equal. There does not appear to have been a class of high chiefs or someone with supreme authority, and status may have been based on accomplishments. While there was a group of shamans who saw after the spiritual and physical needs of the people, the extent of their leadership is not clear. In some instances, women appear to have been in leadership positions. Lepper describes one grave containing skeletons of a man and a woman side by side with the woman having significantly more exotic grave goods.⁶



The Hopewell Interaction Sphere

Development of an agricultural society enabled the Hopewell to become artists and collectors of worldly possessions. It is generally not until a civilization has met its basic subsistence needs and has idle time available, that artistic endeavors begin. With a possible surplus of

The Hopewell Interaction Sphere: Hopewell mounds and earthworks are concentrated along rivers throughout the eastern United States. The rivers facilitated trade for goods not readily available to the Hopewell in Ohio. Map adapted from a National Park Service brochure.³⁰

food, grain was available for trading. A deposit of flint at Flint Ridge, which had also been mined by previous native groups, provided vast quantities of spear points for trading. Iron oxide outcroppings near the Scioto Valley provided red ochre for ceremonies and trade. In return, the Hopewell obtained shells, alligator and shark teeth from Florida and the Gulf of Mexico, mica from Georgia and the Carolinas, copper and silver from northern Michigan, bear teeth from the Rocky Mountains, obsidian from Idaho and Wyoming, chert from the Athabasca region and pearls from the Mississippi River region as shown on the map on page 9.



Primary Hopewell groups of the Eastern United States. Map courtesy of Herb Roe, the artist.

This extensive trading network became known as the Hopewell Interaction Sphere. While the direct influence of the Hopewell, as evidenced by the presence of burial mounds, extended from New York to Kansas and Oklahoma and Wisconsin to Louisiana, an extended trading network was developed much beyond these boundaries.¹ The Hopewell appear to have acquired great quantities of these exotic materials, only to destroy them in ceremonial rituals. They may have been the first North American civilization to achieve a living standard much above simple subsistence, providing them with opportunities to acquire possessions beyond what was needed.

While most archaeology books dwell on the Hopewell's trading for exotic goods, it is possible that many of the grave goods found in burial mounds may have arrived with pilgrims. The Scioto Valley became the center of ceremonial life for many outside groups, who probably made pilgrimages to the great earthworks during appropriate solstices or lunar events. These pilgrims may have brought the exotic materials in return for hospitality and for offerings. Thus it is possible for exotic materials to have reached the center of Hopewell civilization without extensive travel by the local people, who may have been occupied with the construction of the great Hopewell monuments. It's important to note that regionally differing groups of Hopewell were united primarily in their way of life and shared religious beliefs. The map above right identifies the primary Hopewell groups.

Hopewell Culture⁹

As already noted, the Hopewell significantly advanced the state of human learning in North America. Dimensions of their major construction projects are in multiples or fractions of a primary unit of measure which is equivalent to 1053 feet. Variations of this distance show up as sides of squares, diameters of circles, length of octagon-shaped enclosures, etc. Their large structures appear as nearly perfect squares or octagons within a circle and squares outside a circle. They may have had the ability to draw and make scale models of their earthwork projects. Archaeologists have found what appear to be copper drafting templates in the form of circles, squares and straight edges.

While a primary unit of measure was 1053 feet, excavation of structures showed locations of posts placed at regular intervals of 1/500 that distance, or 2.016 feet, making that a basic unit of measure. Romain⁹ notes that a basic unit of measure was often the approximate average arm length used also

by the Mississippian period civilizations and in early 1800 by Midwest native tribes when building canoes.

The Hopewell were students of astronomy and had knowledge of solar and lunar cycles. Many of their burial mounds, earthworks and other structures, such as charnel houses, appear to be aligned to solar and lunar events. Facilities used for mortuary practices were especially aligned along a lunar axis, possibly signifying alignment with the dark night or death. Romain⁹ cites other studies which indicate that some of the major earthworks, especially the Newark earthworks, are structures marking the lunar calendar of 18.6 years.



The remnants of the Newark Earthworks are surrounded by twentieth century roads and homes. Photo by Timothy E. Black/ <http://www.octagonmoonrise.org/World%20Heritage.html>

The civilization appears to have acquired a knowledge of soil mechanics and geological formations. All major earthworks in southern Ohio were built on the middle of three river terraces found in the



Octagon Moonrise by Steven Patricia (courtesy Art Institute of Chicago) is an artist's view of the full Newark Earthworks ceremonial site.

Scioto River Valley. Even more important, all are built on Fox soils, which comprise only about five percent of the area. Fox soils are very stable and contain an optimum ratio of clay, silt and sand.⁹ It is also interesting to note that the topsoil was generally removed prior to the construction of the earthwork walls. The walls were built of very specific soils with different colors visible on the inside and outside walls. In addition, several Hopewell earthworks contain moats, some within and others outside the enclosure walls. The moat inside one of the Newark circles measured 10 feet deep and 35 feet across after almost two millennia of erosion.⁹ The human effort required for this construction is truly remarkable.

The Newark Earthworks represent ancient work on a truly monumental scale; it is the largest set of earth enclosures in the world, covering an area of about four square miles. What remains of the structure today is an octagon connecting to a circle, with the octagon enclosing 50 acres and the circle 20 acres. Originally the ceremonial site also included a circle with a diameter of 1200 feet, a somewhat smaller circle, a large octagon, an oval earthwork containing a dozen mounds and a square of 950 feet. All enclosures were connected by a series of parallel walls. The site also included several additional circular enclosures measuring between 50 and 250 feet in diameter, a number of other mounds and a 750-foot-square enclosure along with a large semi-circular earthwork on an adjacent

hill site, overlooking the main ceremonial area. This complex was built between 100 BC and AD 500 and is thought to have served as cathedral, cemetery and astronomical observatory. The archaeologist Chris Scarre included the Newark Earthworks as one of only three “wonders of the world” in North America in his 1999 book *Seventy Wonders of the Ancient World*.

In addition to constructing large earth enclosures, the Hopewell built the first roadway in North America. They constructed a straight roadway of almost 60 miles between the Newark earthworks and those outside Chillicothe, Ohio. The road was contained by parallel walls on either side and may have been paved with bricks made from sun-dried clay. This road preceded those of the Anasazi and Maya by more than a century.^{5,9,36}

Hopewell Religious Practices

As already noted, the Hopewell Civilization is thought to have been an egalitarian society where everyone was essentially equal. An exception was a group of medicine men or shamans, who provided the connection or path to the otherworld. While the Hopewell may have been the first North American group to live beyond a mere subsistence level, much, if not all of their extra efforts were devoted to religious and associated ceremonial activities.

Achievements by the Hopewell architects and builders have already been discussed. Anthropologists have suggested that the geometric shape of earthworks have symbolic meanings in the Hopewell religious activities. Square enclosures represent the sky. Mounds guarding the entrances to these enclosures contain no burials or offerings and are empty. They served a similar purpose as guard towers do for medieval castles. Round enclosures represent the earth and mounds within the circle are effigies of mountains. Burial mounds within either geometric form return the dead to the creation of the Hopewell world.⁹ Romain further explains how these early concepts relate to mythology of current native people.⁹



Painting from the Ancient Ohio art series depicting a Middle Woodland Hopewell shaman ministering to an ill clan member near the Stubbs Earthworks in southwestern Ohio. It is part of the Ohio Historical Society's collection.

There is a strong probability that octagon-shaped earthworks, one in Newark, the other close to Chillicothe, represent the eight lunar phases during the monthly lunar cycle. Since the octagons are attached to circular enclosures, they may represent an association between earth and moon.⁹

Anthropologists suggest that the great earthworks were used for renewal ceremonies. Existing facilities were abandoned over time and new ones built, often in close proximity until about AD 500, when construction of new earthworks ceased.⁹

Why southern Ohio became the epicenter of Hopewell civilization is not known. It may have been the emergence of a particular visionary leader, as in most of the world's

This tiny—it's less than one inch tall—2,000-year-old clay figurine is one example of many human figurines made by Native American artisans during the Middle Woodland period. Figurines are often the only clues to the appearance of ancient Native Americans. This seated pottery figurine was found at the Smiling Dan site, Scott County, Illinois. It is in the collection of the Illinois State Museum.



religions. What is known is that southern Ohio mounds contain significantly more and exotic grave goods and offerings than any other Hopewell location. The area appears to have the central ceremonial facilities to which many Hopewell made pilgrimages, often traveling long distances. When we consider that the Hopewell lived in relatively small villages, probably occupied by single extended families, the great ceremonial earthworks were a sharp contrast. Accommodating large crowds of pilgrims must have strained the local surroundings when providing food and shelter.

Artifacts recovered from various mounds indicate the presence of shamans in the Hopewell society and the practice of human sacrifice. One figurine depicts a shaman dressed in a bear skin holding a human head. Other artifacts include a copper bear headdress and several copper headdresses in the form of deer antlers.

Shamans were herbalists who assisted the sick and provided a conduit to the otherworld. They assumed the shapes of deer, bear, and other animals and through altered states of consciousness communicated with that animal's spirit in the otherworld. Renewal ceremonies were conducted by giving thanks for successful harvests and hunts in order to improve the following harvest and praying to plant and animal spirits.

An altered state of consciousness was probably achieved by smoking. While we have ample evidence of smoking, archaeologists have not found the residue of tobacco. There is historical evidence however, that a very strong tobacco, *nicotina rustica* was available and cultivated during the Hopewell period. Compared to today's *nicotina tabacum*, the *rustica* variety contains five times the amount of nicotine and is capable of stupefying the user. Today, the *rustica* variety is used in organic insecticides.

In their quest to communicate with and possibly join the otherworld, Hopewell appear to have ingested poisonous and hallucinogenic plants. Based on offerings and grave goods, the poisonous *amanita muscaria* or magic mushroom may have been used. It grows throughout North America east of the Rocky Mountains. An effigy wand depicting an *amanita muscaria* was found at Mound City in Chillicothe. Other mushroom shapes made from copper were found in mounds containing altars. Eating a magic mushroom would certainly have assisted a trip to the otherworld.

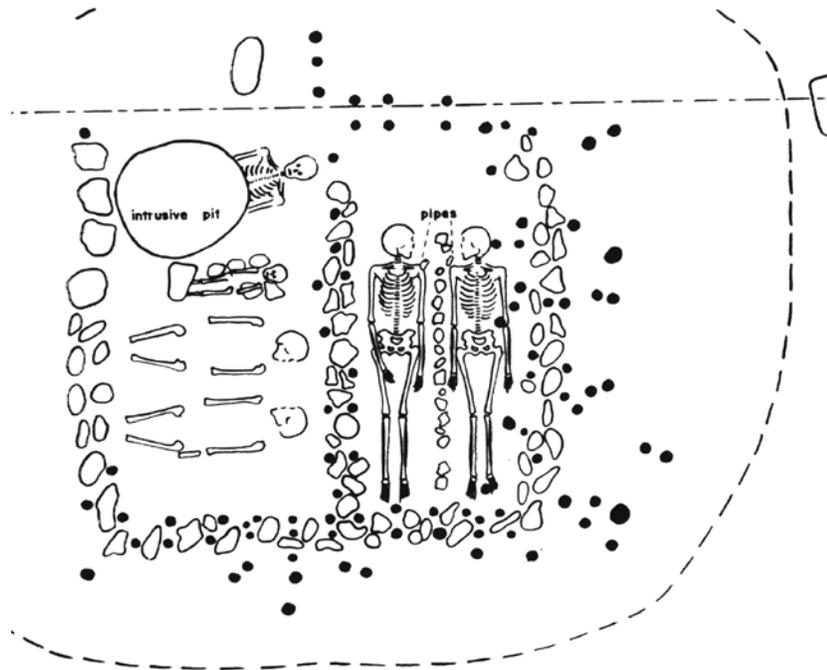
Hopewell Mortuary Practices

Burials varied within the Hopewell civilization. Some burials were individual, others in groups or family units. The great majority of remains found have been dismembered and cremated. The cremated remains were often placed on sheets of mica and sprinkled with ochre. Some mounds excavated have contained upwards of 200 individual remains, one is estimated to have contained 375 remains. Some individuals were buried with grave goods, others with none.⁹

Considering the construction of burial mounds and the extent of some grave goods, it is apparent that the Hopewell expended tremendous effort on mortuary practices. At Mound City and Tremper Mound in Ohio, about 200 and 136 intricately carved pipes were found, respectively, all of them broken. Other mounds contained more than 8000 flint disks or 5000 crushed shell beads packaged in a buckskin bag. Another large offering contained more than 19,000 perforated pearls plus 66 copper celts. Celts are axes of stone or metal without perforations or grooves. Since copper is relatively soft, copper tools were used for ceremonies, not normal work.⁹ Some objects were wrapped prior to burial. Copper axes and breast plates found in burial mounds appear to have been wrapped in textiles, sometimes materials made from fibers or rabbit fur.⁷

While there are many accounts of exploring various burial mounds throughout the Hopewell region, we will illustrate the makeup of mounds with examples from the Havana Hopewell culture and the Sterling mounds.

Mound F907 of the Weaver site north of Havana, IL was about 1.5 feet high and 40 feet in diameter when it was surveyed in 1939. Local owners remembered it to be about 4 feet high prior to cultivation. The top soil layer of the mound contained pieces of pottery and a clay fireplace from the Mississippian period. Burials were found in a crypt which had been constructed from logs in a rectangular pit. Six extended burials were side by side with two additional burials of disarticulated bones at each end. Large logs had covered the crypt prior to mound construction. The crypt contained pottery sherds, a river clam shell, some sharpened beaver teeth and a platform pipe made



The drawing above shows the inside of a typical Hopewell burial mound. Mound F234, of the Weaver site on the Illinois River is part of the Havana Hopewell civilization near the Dickson Mounds State Historic Site. Diagram courtesy of the Illinois State Museum, Scientific Papers, VII(2), 1961.

from limestone.⁴²

Mound F234, also part of the northern mound group at the Weaver site, located just south of F907 is located in a less accessible area and was disturbed only by an intrusive pit. The crypt was lined with a double row of posts and enclosed by limestone and shale slabs. It contained two chambers, one

with two extended skeletons, the other with four: three adults and one child, all facing towards the north. The chamber with four bodies contained no grave goods; they were possibly removed by the previous dig. The corners of the crypt contained bone pins which may have been used to hold down mats or fur liners for the floor of the burial site. The northern chamber contained two platform pipes carved from a “mottled gray-green pipestone.” One pipe was carved in the shape of an animal, either a dog or a raccoon; the other depicted the head of a Carolina parakeet, a now extinct species. While the researchers at the dig site assumed that the pipes came from Ohio, it is more probable from their description that they originated around Sterling. Both show the advanced state of stone carving of the period. On the northerly edge of the mound, archaeologists located a clay-lined crematorium facing in the north–south direction, about 11 feet long and 18 inches wide. While crematoria are often found close to Ohio burial mounds, they are relatively rare in Illinois sites. The diagram on page 14 shows the layout of the burial chambers in mound F234.⁴²

While the focus of the researchers has been on burial mounds, the majority of Hopewell were buried in individual graves without grave goods along bluffs overlooking valleys. Children were interred with or near parents except for very young infants who had no status in the Hopewell civilization and whose bodies were often discarded when they died. It appears that based on burials there was a group of individuals who enjoyed a special status.¹

Detailed descriptions of excavating several burial mounds located in Sterling and the surrounding region have been provided by W. C. Holbrook at two meetings published in 1879 by the Davenport Academy of Natural Sciences, now the Putnam Museum.²⁶ His findings were summarized in the 1877 published *History of Whiteside County* and retold by Gunnar Benson in a 1972 paper now available on the Website of the Sterling-Rock Falls Historical Society.¹⁸ Mr. Benson quotes Bert Wilson, the author of the 1877 county history on two of the Sterling mounds:

“...In May, 1877, Mr. Holbrook examined a number of mounds above the Catholic cemetery, in the vicinity of Sterling, one of which was a large mound, one of a number in a row parallel with the river. On moving the clay it was found that this mound contained a Dolmen built of flat pieces of fossiliferous limestone. The stones used were quite large. The wall was a right angled parallelogram, twelve feet long and five wide, the foundation laid upon clay, the wall built in an artistic manner, no cement having been used. The inner surface was smooth and even, although the stones were unhewn. The inside of the Dolmen revealed fragments of eight skeletons, the bones badly decomposed. Apparently the bodies were cast into the sepulcher promiscuously. The skulls found indicated that this people were acquainted with the division of surgery known as “trepanning” -- i.e., removing portions of the bones of the skull, or portions of other bones. A thigh bone that had been fractured was found replaced and united in a manner that would do honor to a surgeon of the present day. With the skulls were found a plummet, fossils which are not found in this locality, finely black polished pebbles, and a number of large teeth. In another mound was found an altar of burned rock, oval in shape, long diameter six feet, short diameter four and a half feet. The altar was of fossiliferous limestone. Over the mounds were found a vegetable growth of from one to ten feet and a decayed stump of a hickory tree, about twelve inches in diameter. On and about the altars were usually found charcoal and charred remains of human beings; also evidence of great and continued heat. At Sterling the indications are that the body was placed upon the clay, covered with black loam and a great fire built over the whole. After the fire the mound was raised. This is indicated by the thick strata of charcoal and ashes found. As a rule the remains unearthed furnish unsatisfactory evidence. Great numbers of perfect molar teeth are exhumed, thus certifying that pre historic man was unacquainted with the pangs of the toothache. In the Sterling mounds were found stone scrapers, but very rude in design and execution. Fragments of pottery were found, also implements made from the antlers of the elk and deer. At Sterling

is a work that many judges pronounce a fortress. The two embankments are parallel, four rods apart, direction east and west. The south embankment has two gateways. The north embankment is sixteen rods long and has two gateways. The construction indicates knowledge of the cardinal points of the compass. This people evidently had a practical acquaintance with astronomy, as the North Star appears to have been a governing point with them.

“The moundbuilders wore cloth, and dressed the hides of animals, carved rude ornaments and engraved characters upon stone; ate food from earthen dishes, and worshiped at altars erected upon high hills and in low valleys. There is abundant reason for believing that human sacrifice was common with them. Trepanned skulls are frequently met with on opening mounds, evidence being presented that the operation was made prior to death. The superstition of the moundbuilders seems analogous to that of the South Sea Islanders and tribes of savages of the present day who trepan for vertigo, neuralgia, etc., believing that these complaints are demons in the head that should be let out. Metal was worked in an imperfect manner by the people. Galena was a prominent ornament. Mr. J. M. Williamson, of Ustick, says these charms are found in the northwestern part of the county. Copper was apparently the king of metals among the moundbuilders. Anatomically considered the moundbuilders were no larger nor stronger than the men of the present day. Their skulls differ widely from the Indian or Caucasian and have been thus described: “The frontal bone recedes backwards from a prominent superciliary ridge, leaving no forehead, or rather the eye looks out from under the frontal plate, very similar to a turtle shell, and no more elevated.” Their jaws were protruding, prominent and wide. The evidence is that the moundbuilders were a half civilized agricultural people, prominently differing from the Indians in manner of burial and habits of life...”

It should be noted that the above quote includes reference to a “rod,” a distance measure no longer in use. A “rod” equals 16.5 feet or five meters.

In addition to his description of the two Sterling burial mounds, Holbrook documented other studies of Hopewell sites near Como, Albany and Clyde Townships. At Clyde, he found two stone altars buried about a foot below the surface, several hundred feet from Rock Creek. The altars showed heavy use as evidenced by layers of charcoal and ashes. They were circular and oval, in excess of six feet diameter and a foot thick. There was no evidence of skeletal remains or mounds. The land owner claimed that no mounds existed prior to cultivation. Based on the Sterling evidence of remains disintegrating when exposed to air, it is possible that human remains at these altars had long disappeared.

Gunnar Benson also mentions an additional exploration of the Sterling mounds as reported in *The Sterling Gazette* on May 18, 1878³⁸:

“Visit to the Moundbuilders”

“On Tuesday afternoon (May 14), Rev. J. E. Goodhue, Col. Wilson, Drs. Everett and Gillespie, and Messrs. Beck, Powell and Enderton, of the Sterling Scientific Club, made an investigation of two of the mounds which lie near the residence of Mr. Clark Powell, on the farm of Mr. Landis. These mounds are quite numerous in this vicinity, and are of various shapes and sizes, being composed of soil similar to that on which they are built.

“The first mound visited lies very near the fence of the Catholic cemetery, and is one of the largest of the group, its long diameter running east and west. Starting on the north and south sides, a trench three and a half feet wide and from four to eight feet deep was dug through the center of the mound. This was carried about two feet below the surrounding surface, on the supposition that the moundbuilders buried their dead a short distance below the earth before erecting their mounds over them. The excavation of the first trench yielded nothing but a few flints. Side trenches were then dug from the center, east and west, which resulted in exhuming in the west one of numerous pieces of pottery, which seemed to give evidence of having been wrapped in cloth before being baked; parts of a skull, several finger bones,

numerous teeth, and a flint or so. No charcoal was found in this mound.

“Leaving part of the company to fill up the hole which had been excavated, and which, by the way, showed the proficiency with which scientists can handle a shovel, the rest proceeded to a smaller mound which lay near the river bank, and proceeded to business. This mound had evidently been used as an altar or funeral pyre, as there was every evidence of a fire having been built upon a rudely constructed stone altar. The bodies, it would seem, had been placed on the ground, an altar of stone reared over them, and on this the fire was built, as quite an amount of charcoal was found mixed in among the rocks. The rocks used in building the altar were of a sandstone formation, and similar in structure to the Dixon stone. Over the altar there had grown a tree which had lived and died, its roots running down among the stones, and one of them going entirely through a skull found among the bones below the altar.

“The number of bones found in this mound was quite large, but the majority of them were too soft to retain their shape on handling. The skull referred to was taken out with great care, but was found to consist of only portions of the frontal, parietal and occipital bones. Attached to the frontal bone on the right side was the superior bone, which forms the cavity of the eye. From this it was ascertained that the skull was of a very low type, there being scarcely any forehead at all, the head sloping back to the crown from a point about half an inch above the eyes. Portions of the upper jaw containing teeth were found under the skull, and the entire under jaw near it. The under jaw is large and massive, and is longer and of sharper curve at the chin than the same bones at the present day. The teeth were in a remarkable state of preservation, the crowns of most of them having been worn down until they were slightly hollowed and very smooth, indicating that the food used by these people was very hard. None of the teeth presented evidences of ante mortem decay either in the crown or roots, many of the latter being long enough for canine teeth. Pieces of the pelvis of three different persons were exhumed, all showing a good degree of preservation. These bones seem to indicate that the pelvis of these ancient people were smaller and more massive than those of the people of our day. The ends of most of the long bones were well preserved, while the shafts, as a rule, had become so softened that they fractured and crumbled upon touching them. The bones of the forearm were found entire, but no trace existed of those of the wrist or feet. A number of finger bones, as well as several vertebrae and pieces of ribs, were found lying under the skull. The temporal bone of one skull containing the internal ear was found in such good condition as to show the openings through which all the vessels and nerves pass to this organ.

“Time only permitted the opening of two mounds, but it is the intention of the society to make another visit to them at an early day, when something more may be developed in this direction. The relics obtained by the society can be seen at Drs. Everett and Gillespie’s office, among the other curiosities which the club has collected since its organization.”



This turtle shell bowl from the Neteler site in Mason County, Illinois is in the collection of the Illinois State Museum.

Post-Hopewell Moundbuilders

Late Woodland Period (AD 500-1000)

The development of post-Hopewell civilizations appear to have taken a somewhat divergent path between the Ohio and Scioto Valley groups and those located in the Illinois River Valley. By about AD 400 Ohio people moved into larger, more permanent villages and began to rely more heavily on agriculture. No new earthworks were built and the ceremonial life, that is the large ceremonies attended by countless visitors, ceased. Along with the lack of outside visitors, exotic goods disappeared, as did the once flourishing arts. As the population and villages grew, competition for farmland increased. Villages began protecting themselves by building walls and moats and cooperation among villages ceased. As the need for food increased, natives changed their habitat by burning forests in order to increase agricultural land.^{5,6}



This painting from the Ancient Ohio art series depicts a Late Woodland village along the Scioto River in central Ohio. It is part of the Ohio Historical Society's collection.

Civilization in Ohio changed much more quickly than during the evolution from Early to Middle Woodland cultures. Villages became larger than 10 acres and housed more than extended family, often reaching over 100 in population. Homes became larger and contained a central hearth for cooking. Ceremonies at the earthworks, which had been shared among villages and many outsiders, began to take place at the village square and were shared only by fellow villagers. Neighboring villages became competitors and with closer cooperation within the community, villages took on a tribal identity. Some previously cultivated seeds were forgotten and villages concentrated on growing maygrass, squash and corn. After AD 900, squash and corn (maize) became the dominant crops.

While artistic endeavors disappeared, common objects became utilitarian again. Pottery became plain, with jars having thinner walls and larger openings. Carved platform pipes disappeared and were replaced with plain pipes made from limestone or sandstone.^{5,6,7}

Probably the most significant changes occurred with the introduction of the bow and arrow around AD 600 in the upper Midwest, reaching the Ohio Valley somewhat later.³¹ While the atlatl had considerable momentum due to its size and weight, it operated at a relatively low speed and required the user to stand upright exposing himself to potential danger. The arrow reached much higher speeds and allowed for better penetration of the point. It could be shot from various positions, protecting the hunter or warrior, who could carry many arrows and fire them at short intervals.

Burial customs became more variable, the dead were buried extended, bundled or cremated. During winter they were buried in shallow graves in refuse piles. Some groups started using existing Hopewell mounds to bury their dead in intrusive graves. Others covered their dead with low stone



Chunkey (also known as chunky, chenko, tchung-kee or the hoop and stick game) is a game of Native American origin. The illustration by Herb Roe of a chunkey player is based on a Mississippian gorget (pendant) design.

mounds. In Illinois, the Late Woodland Period resulted in additional changes. Local cultures regressed to a hunter–gatherer mode and de-emphasized agriculture. Trade which had been common in the Hopewell Interaction Sphere disappeared and pottery lost its ornamentation but picked up legs and raised corners for better handling. Arrow points were made from flint or deer antler; bone was fabricated into fish hooks, and disks made from stone or pottery appeared to have been used for an early form of gambling. Many of the Illinois post-Hopewell burials consisted of mass cremations, with remains interred in shallow pits covered with stone. Many of the stone slabs used for covering burial pits were exposed to large fires in the pit before covering them with soil. Burial mounds were usually less than one foot high.¹ It is quite possible that remains found by Mr. Holbrook close to the Rock Creek and identified as Hopewell altars, may have been Late Woodland burial sites.

Late Prehistoric Period (AD 900–1500)

The Late Prehistoric Period, also considered the Mississippian Period in Illinois, spanned the period AD 900–1500. During this time, large population centers with new cultures evolved in Ohio and Illinois, experiencing a resurgence of moundbuilding with some of the new mounds reaching world-class proportions. Like the Hopewell before them, Native Americans of the Mississippian Culture were not a single distinct ethnic group, but the cultural traditions of the period were embraced by people from several different linguistic groups covering the Ohio, Mississippi, Missouri, Arkansas and Tennessee River Valleys.¹ Archaeological evidence suggests a massive shift towards agriculture, specifically maize crops. This renewed emphasis on crop production enabled the population to grow and emerge into major population centers.

During this period, native people all over the Midwest started constructing effigy mounds, mounds in the shape of animals which were only a few feet tall. The largest of these is the Serpent Mound, located in southern Ohio. It is 1348 feet long with the serpent’s head pointing towards the summer solstice. Closer to our region, downtown Rockford has remnants of an effigy mound adjacent to the

Serpent Mound is one of the largest effigy mounds from the post-Hopewell civilization in Ohio.



Beattie Mounds group. More imposing mounds may be found at Effigy Mounds National Monument at Marquette, Iowa. The mounds were built for ceremonies and could be constructed with minimal effort compared to large burial mounds. Older archaeology studies classify these mounds as belonging to the Hopewell or Adena civilizations partly because they are often in the vicinity of much older mounds. Recent carbon dating of Serpent Mound, as well as other effigy mounds, place them into the Late Prehistoric Period.⁶

It appears that life during this period centered around cultivating and consuming maize. While hunting and fishing still provided sources of food, recent studies of skeletal remains from the period showed that the major caloric intake consisted of carbohydrates consistent with a corn-based agriculture. This resulted in some unexpected conditions when compared to the Hopewell period. Life expectancies dropped, skeletons show signs of malnourishment and disease consistent with vitamin and nutrient deficiency. There is evidence that tribes in Ohio were raising turkeys at the time. Remains from Sun Watch Village, a large Ohio village, show that more than half of the skeletons were children under six years and few remains were from people over 35 years old. The stone residue from corn grinding resulted in dental problems. Finally, skeletons also show the effects of the more efficient bow and arrow: Many deaths appear to be the result of arrow injuries.⁶

The Cahokia Civilization⁸



This drawing of Cahokia by William R. Iseminger shows the city about AD 1150. It was the largest population center in North America until early 1800. At its peak it surpassed the population of most European cities. The painting is courtesy of the Cahokia Mounds Museum Society.

The pinnacle of civilization during the Late Prehistoric Period was reached in southwestern Illinois at Cahokia, across the Mississippi from St. Louis. Here a village started in the Mississippi River Bottoms during the Late Woodland Period and reached a population of about 1000 around AD 1000. During the next 150 years the village was rebuilt and grew into a metropolis of about 20,000, surrounded by an agricultural infrastructure of many villages which may have housed an additional 10,000 people. While there are differing estimates for the population of Cahokia, the smallest number we found is 15,000 with upper estimates of 38,000.¹¹ It was the largest population center in North America until the early 1800s and at its peak surpassed the population of most European cities.

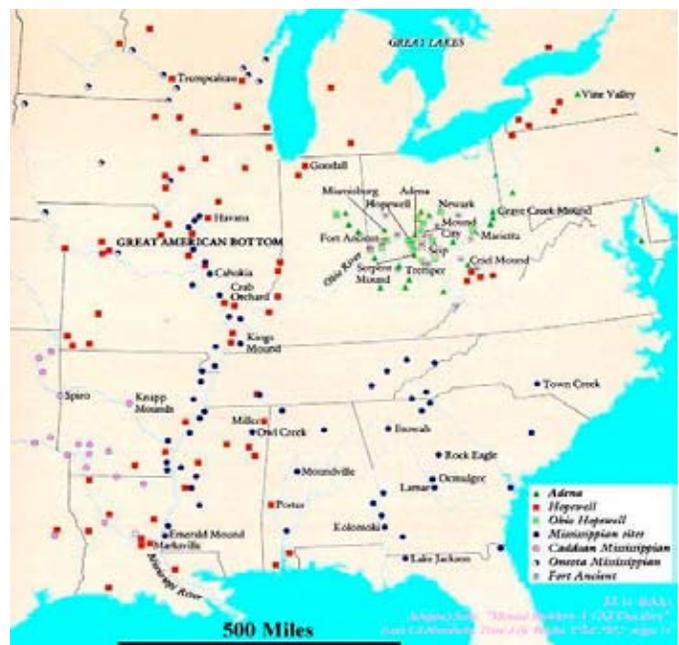


This painting shows an artist's rendering of life in Cahokia. Inhabitants are working at their everyday tasks. The painting is courtesy of the Cahokia Mounds Museum Society.

Mounds in the city serve three purposes. The largest and tallest contained houses of the chief and on a lower level, houses of his lieutenants; smaller mounds held temples and were used for ceremonies, with others used for burials. Archaeologists discovered that structures on the mounds may have been destroyed periodically, the height of the mound increased, and houses and temples rebuilt. The largest of the mounds, Monks Mound, was 100 feet tall, 1000 feet long, 700 feet wide and covered 15 acres.¹¹ It is the largest earthen mound worldwide and is estimated to contain 1.5 million tons of earth, exceeding the Egyptian pyramids in overall volume. The Cahokia complex covers almost six square miles and contains 120 mounds. The central square, Monks Mound and 16 other mounds were enclosed later by a wooden palisade with watchtowers located at 200-foot intervals. It has been estimated that the palisade required 20,000 tree trunks.¹¹ Another grouping of 45 mounds is located near East St. Louis.

About 1000 feet west of Monks Mound was a 410-foot-diameter circle of 48 large posts considered to be the “American Woodhenge.”¹¹ The circle was built over older structures and provided a calendar showing solstices, equinoxes and possibly lunar alignments. Just north of the woodhenge circle, archaeologists found the second largest building at Cahokia; the largest was located on Monks Mound.¹¹

Archaeologists have made a very interesting discovery regarding life in Cahokia: a garbage pit 150 feet long, 60 feet wide and 10 feet deep. Analyzing its contents, which were remarkably well preserved, researchers concluded that enormous feasts were conducted regularly, possibly at harvest time, by thousands of people. Remains were later



Map of the Moundbuilder Civilizations in the United States.



Primary Mississippian Cultures of the Eastern United States. Map courtesy of Herb Roe, the artist.

they were built for protection from the surrounding area. It has been thought that the surrounding farm communities may have become disenchanted with the ruling class in Cahokia and started to revolt. Archaeologists have found burned farming villages dating to the time that the palisade was built. While the nobles were protected by a tall wall, farmers, on whose labors the city depended, were leaving. The population started to decline about 1150 AD and two hundred years later, the greatest city in North America stood empty and moundbuilding ceased.

The name Cahokia comes from the Cahokia tribe of the Illiniwek confederacy. The Cahokia arrived in the area around 1600 and occupied the mounds when the first European settlers arrived.

Where Did They Go?

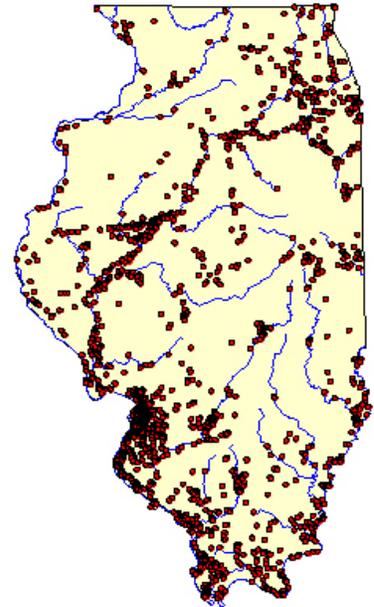
The mystery of what happened to the Mississippians has not been explained until recently. Most history books discuss a mysterious disappearance, possibly caused by food shortages and civil unrest. The problem in sorting out answers is that early or contemporary native civilizations had no written language. History was maintained through oral traditions of telling legends. When the first settlers arrived and saw the impressive monuments from past civilizations, they discovered that the indigenous tribes of the Midwest had no oral traditions about moundbuilding.

We have found one early reference from 1968 offering a reasonable explanation to the disappearance. Publications from the Ohio State Historical Society during recent years have re-examined and re-affirmed this theory:^{5,6,12} John Heckewelder, a Moravian missionary, lived with the Delaware for a period of about 30 years after 1772. In 1819, he published a book about his time

deposited in these pits, the pits covered, and the mounds enlarged for the next feast.¹¹ It would be interesting to note the reactions to our garbage by future generations in another millennia.

Like the Hopewell, the Cahokians exerted significant influence on the surrounding tribes and achieved dominance over other villages throughout the Midwest. Illinois was home to a large concentration of Mississippian period communities.

Researchers have evaluated the palisade and watchtowers built through the middle of the city, protecting the inner plaza and mounds, and concluded that

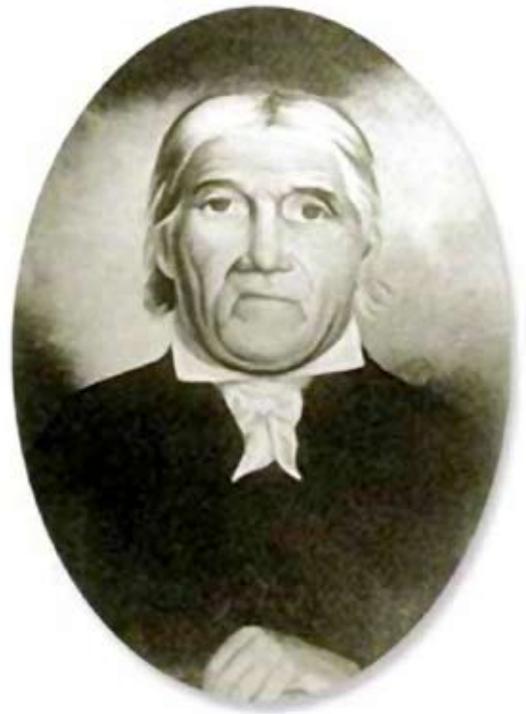


Map of Illinois showing locations of Late Prehistoric or Mississippian sites. Courtesy of the Illinois State Museum.

with the Delaware and recounted their oral traditions. The legend tells of the Lenni-Lenape, as they called themselves, migrating eastward across the Mississippi. Here their scouts encountered a tribe of tall people that they called Akkegewu or Tellegewi, who lived in large cities close to the river. While the chief of the Tellegewi granted the Lenni-Lenape safe passage through his region, he later changed his mind and attacked them. A war lasting several generations ensued with the Lenni-Lenape winning and vanquishing the Tellegewi. Over time, the Lenni-Lenape moved east through the Ohio Valley towards the Atlantic Coast.

It is important to note that John Heckewelder's experience and the documentation of the legends took place before settlers moved into the moundbuilder regions of the Midwestern river valleys. He was documenting oral traditions, not trying to solve the mystery of who built the mounds.

While we have found many other explanations as to who the moundbuilders were in published books and in online searches, Heckewelder's diary appears to be the most plausible and is the explanation accepted by the Ohio State Historical Society. The Illinois State Museum sites at Cahokia and Dickson Mound still claim in their displays and publications that we have no answer to the mysterious disappearance of the moundbuilders. *Thirty Thousand Miles with John Heckewelder*, edited by Paul Wallace offers more insight into his life and documentation. It was published by the University of Pittsburgh in 1958.



Above: A portrait of John Heckewelder, who lived with the Delaware Indians for about 30 years. Source: www.ohiohistorycentral.org/entry.php?rec=184

The Hopewell in the Sauk Valley

Exploration of the Sterling Mound group and other events and studies have been reported in numerous news accounts and studies for more than 130 years.^{13,17,18,20,21,24,25,35,37,38,39} Today, the grouping consists of 22 mounds located on a bluff along the Rock River in what is now Sinnissippi Park. In 1961, the Illinois Archaeological Survey registered the presence of at least 25 mounds.



Jim Pilgrim, Gunnar Benson, Dr. Elaine Bluhm and Lloyd Casey, Jr. examine artifacts uncovered during the 1961 excavation at Sinnissippi Park. Photo courtesy of the Sterling Park District.

Earlier, Richard Snodgrass from the University of Chicago surveyed the Sterling area for Hopewell remains in 1932.³⁷ His report accounted for about 107 mounds in Whiteside County, 80 in the Albany area (now known to have more than 96 mounds) and 19–22 mounds at the Sinnissippi site. His survey also mentioned two village sites, one below the Sinnissippi site. It is interesting to note that Snodgrass interviewed two individuals who had taken part in the 1878 excavations by Mr. Holbrook 55 years earlier. The survey includes mention of four mounds at Avenue G bridge with an adjacent village.

During July 1961 a team of six archaeologists assisted by local amateur archaeologists, including Gunnar Benson, and Ferrel Anderson of Augustana College also investigated a Hopewell village site in the bayou below the mounds. While the team leader, Dr. Elaine Bluhm, never completed the documentation of the exploration, our local Historical Society president, Gunnar Benson, reported in *The Sterling Gazette* on July 28, 1961:^{17,18}

“On Monday and Tuesday of this week, the north bank of the Sinnissippi Bayou was the scene of some very interesting activity on the part of a crew from the Illinois Archaeological Survey. This crew of six, under the direction of Dr. Elaine Bluhm of the Illinois Archaeological Survey and the University of Illinois, has been doing considerable digging in the Rock River Valley area between the Mississippi River and Sterling. Most of their work has had to do with investigating prehistoric Indian village sites.

“At the old Sinnissippi village site, which lies along the north bank of the bayou and is believed to have extended south to the bank of the river in the days before there were any back waters as now caused by the two dams, four test squares were run and produced considerable material of interest to the survey group.

“Story of Civilization”

“These test squares are five feet square and are taken down at six inch levels, each level being carefully screened for artifacts and other material which helps to reconstruct the story of civilization which roamed these parts hundreds and thousands of years ago. A carefully written report is kept of the findings at each level. Soil samples are also taken and these in turn reveal much to the archaeologist.

“Permission having been obtained from the Sterling Park Board to dig at the Sinnissippi site, the crew began the work on Monday morning. Two local young men, John Washburne and Lloyd Casey, Jr., who have done considerable work in this field, were also present and helped with the digging. Others who helped were Jim Pilgrim of Clinton, Iowa, past president of the

Iowa Archaeological Society, David and Dan Casey, and Gunnar Benson, president of the local historical society.

“Great care is taken in removing the dirt from the test square, lest some valuable artifact be broken in its removal. Though spades are used in the digging, bones and other objects are carefully uncovered with small hand picks and other small tools. When something interesting shows up in the pit, it is not unusual to use a paint brush to sweep the dirt from the object so that a better idea of its nature may be had and to determine how best to remove it from the earth.

“Find Fired Rock”

“A number of interesting finds were made in the Sinnissippi diggings. A great deal of fired rock was found, the limestone being quite red from having been burned in the fires of these early Indians. Some good sized pieces of charcoal were also scattered throughout the soil.

“Many different kinds of bones were uncovered. These included a number of animal and fish bones. A good quantity of shells were found belonging to the turtle, mussel and snail group, some of the shells being in whole condition.

“Arrowheads representing different prehistoric cultures were found. One point in particular was representative of an early dweller in these parts. A very fine bone harpoon hook was uncovered by John Washburne and Mike Hoffman at a level of two feet below the surface. They also found a pendant made of turtle shell, as well as a number of crude stone tools.

“The first day’s diggings yielded a fine stone gorget (pendant). It had been highly polished and had two holes drilled in it so that it might be strung and hung around the neck. A partially broken bone awl was found on Tuesday, the long pointed end being intact. Several other awls of various kinds, and spear points and hooks of different varieties were uncovered.

“Scattered throughout the test pits were literally hundreds of pieces of pottery, some quite small and others of such size that decorative designs could readily be detected. Some of these pieces will be matched and glued together to produce larger pieces of the pottery which will tell a great deal about the culture of these early peoples.

“Dr. Bluhm was much pleased with the results of the diggings in Sterling, and would have liked to have continued the work here if time had permitted. A complete record of the work will be made and she has promised to supply the Sterling-Rock Falls Historical Society with a copy of the report when it is finished. Dr. Bluhm visited the local museum on Tuesday and complimented the Historical Society on the fine collection of Indian artifacts on display. She will do what she can to help the society to build an exhibit relating to the prehistoric culture of this area. She was also happy to find in the society’s Rare Book Room some good newspaper records of the opening of the burial mounds in Sinnissippi and other parts of the county in 1877 and 1878.

“Members of the Sterling-Rock Falls Historical Society have been much interested in learning more about the earliest inhabitants of this area, and were very happy when they learned that the Illinois Archaeological Survey would spend some time in Sterling this year. It is hoped that they will return and do more toward reconstructing the story of the past.

“Assisting Dr. Bluhm as regular members of her crew were Mike Hoffman of Harvard University, Peggy Hoffman of Boston University, Jerrel and Ferrel Anderson of Augustana College and Carolyn Sands of the University of Illinois.”

Gunnar’s 1972 report concluded that: “Dr. Bluhm and her team agreed that the evidence uncovered in the 1961 Sinnissippi dig indicated at least two periods of civilization in this area. Material



Left: Members of the 1961 Sinnissippi Park “dig.” Back row from left: Mike Hoffman, Gunnar Benson, Ferrel and Jerrel Anderson, John Washburne, Lloyd Casey, Jr., David Casey. Front row from left: Dr. Elaine Bluhm, Peggy Hoffman, Carolyn Sands, Denny Casey. Not pictured is Jim Pilgrim.



Below left: Gunnar Benson and Peggy Hoffman search screened soil for artifacts from a test square. Photos courtesy of the Sterling Park District.

found at the top levels of their excavation dated back about two thousand years and no doubt belonged to the moundbuilders. Deeper digging brought up evidence of an earlier civilization, perhaps about four thousand years ago.”¹⁸

It appears that materials collected from this dig have been warehoused at the University of Illinois’ Department of Anthropology along with material from several other explorations in this area. A 1963 dig of a village site near Como established the site as belonging to the Mississippian period. This exploration was also documented by Gunnar Benson, while all materials were moved to the University.^{13,18}

A year later, in May 1964, a Hopewell village was discovered during earthmoving operations at the Stier site in the Elkhorn Creek area about two miles west of Sterling. While the Illinois Archaeological Survey participated in the ensuing exploration and removed all recovered artifacts, our local historian, Gunnar Benson, reported on the dig:¹⁸

“Uncover Indian Skeletons During Road Construction”

“Heavy equipment operators employed by V. H. Lawrence and Sons Construction Company, Rock Falls, while acquiring fill dirt for the new McCue Road project northwest of Sterling, Friday unearthed an old Indian burial ground at the crest of a small, natural hill located adjacent to the new roadbed.

“A clause in the contract of landowner Herbert Stier indicates that if any relics were uncovered by the local construction company, work in that area would stop immediately.

“The skeletons, from 12 to 15 of them at the present time, were located from 1½ to 2 feet below the surface of the ground.

“James Anderson, a member of the Illinois Archaeological Society using University of Illinois equipment, arrived in Sterling last weekend to begin work in the burial grounds in the attempted removal and preservation of the human bones.

“He said that the skeletons are extremely old as indicated by the powderiness of the bones. He declined to estimate the name of the tribe or the approximate year the Indians were buried.

“The site was apparently an old burial ground, not a village site, as very few relics in addition to the bones were discovered.

“The natural hill, about 10 to 15 feet high, measures about 50 by 70 feet. Since the skeletons were found only just under the surface of the ground, Anderson said he does not believe he will find any more by digging deeper.

“The remains of an animal were also discovered; however Anderson as yet has not been able to identify it.”

The Sterling Gazette, May 21, 1964 also provided a brief summary of the investigation:¹⁸

“Find Ancient Indian City at Sterling”

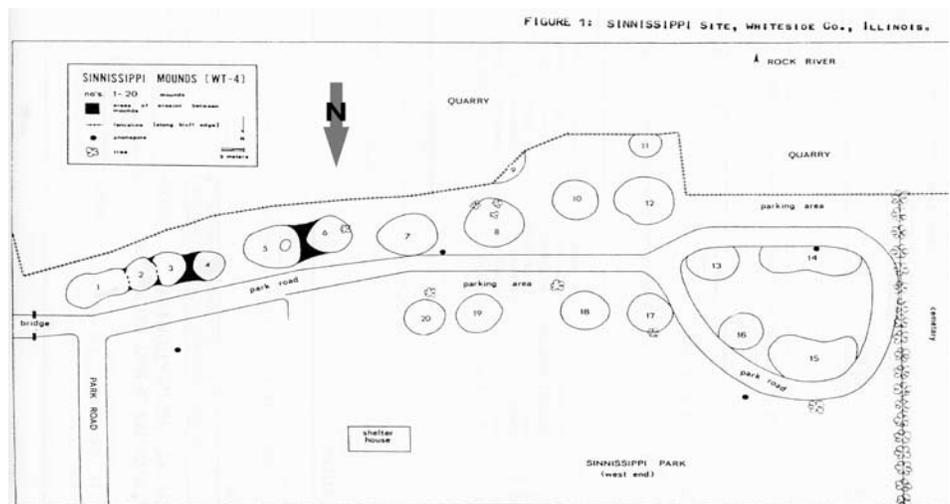
“Workmen of V. H. Lawrence and Sons Excavating Company uncovered an Indian village on the Freeby estate Saturday while removing dirt for the McCue Road improvement project.

“Since Monday, Jim Anderson of the Illinois Archaeological Survey has been working in the area. He has uncovered 12 burial sites. He says indications are that it was a village site. The burial sites were in a 50 by 70 foot area.

“The culture apparently is older than one uncovered in the Como area about a year ago, Anderson said. He added that the new village probably predates Christ.

“The site is about two miles west of Sterling.”

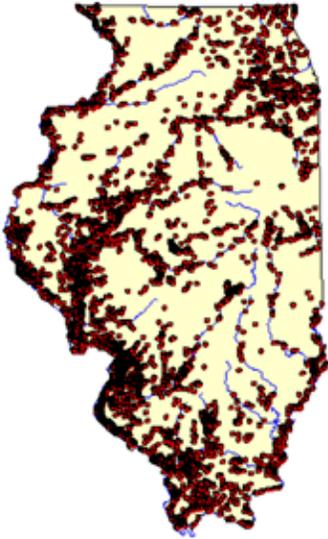
In 1966, the Sterling Park District decided to commemorate the Sinnissippi Park mounds with a sign designed by Barbara Williams, a student at Sterling High School. About 10 years later, the Park District together with the Sterling-Rock Falls Historical Society started work on documenting the significance of the Hopewell mound group, hoping to achieve registry in the National Register of Historic Places. In 1979, the Sinnissippi Park Indian Mounds were officially listed in the National Register of Historic Places. For the next two decades few activities highlighted the Hopewell heritage, until a local amateur archaeologist, Doug Miller, established a link between Sterling area manufacturing of stone implements made from local stone and their trading throughout the Hopewell Interaction Sphere.



The two maps to the left show (in brown) the areas where Hopewell mounds are located and villages have been found in Sterling. On the upper left is the Sinnissippi Park site and on the lower left is the Avenue G site.

The map above right shows the location of the mounds in Sinnissippi Park. Additional mounds were located beyond the bluff, before quarrying took place in the early 1900s.

Hopewell Commerce in the Sauk Valley



Map of Illinois showing locations of the known Middle Woodland or Hopewell sites. Courtesy of the Illinois State Museum.

While we have noted that the Hopewell civilization was active throughout Illinois, it is interesting to note that our state has more than 7700 known Woodland period sites.²³ Many of these are located in Whiteside County, including the Albany Mounds group which has more than 96 mounds and is one of the largest Hopewell mound groups in Illinois and the Hopewell civilization.

We have mentioned in this booklet that the Hopewells favored the green stones from the Feurt Hill quarries in the vicinity of Chillicothe; there were, however, other stone quarries in use during various times. Throughout the time native civilizations made and used stone objects, they developed quarries for suitable raw materials. Pipestone National Monument in Minnesota is a quarry for red catlinite and has been in continuous use for more than 10,000 years. Other quarries such as Fuert Hill, one in Missouri and two in Wisconsin and one in Sterling were in use sporadically.⁴¹

Our own local amateur archaeologist, Doug Miller, has cataloged local Hopewell sites for many years. He summarized his finding in a guest column written for *Prairie Advocate* in 1999 and wrote:^{14,15,16}

“One other important trade item of this time was the material called pipestone or more specifically, flint clay. Most people are familiar with the red catlinite from Minnesota but during this time a green pipestone from Illinois and Ohio was used.

“Because the Ohio source of flint clay had been known and documented for many years, nearly all green pipestone artifacts found throughout the Midwest were thought to be of the Ohio material. If this were the case, the trade of this Ohio pipestone would be one of the most prolific trade routes in the Midwest. Artifacts such as gorgets, pendants, plummets and pipes made of the green material have been found throughout the Mississippi Valley and its tributaries.

“While surface collecting and mapping sites in northwestern Illinois, I encountered many sites in relative close proximity to one another which produced worked green pipestone debutage or refuse. This seemed odd to me for material which was supposedly mined in Ohio. Why would Native Americans bring the raw material to these obscure sites in northern Illinois before working it into finished pieces? Why not finish the piece in Ohio and then trade it to these satellite sites? There would be less weight, less effort. These questions have led me to believe that we have a source closer to home.

“But old theories die hard. Not many of the old school archaeologists were eager to believe in this new theory. It took several years of mapping and cataloguing raw material and artifact finds before there was enough professional interest to follow up with more research. When X-ray diffraction analysis of the northern Illinois material was



The otter effigy pipe was found at the Ethel Wilson site in White County, Illinois. Courtesy of the Illinois State Museum.

compared to the Ohio material it was found that they, indeed, were different animals of the same color.

“Many artifacts collected in the Midwest were tested with renewed interest and nearly all were discovered to be made of the Illinois material and the Ohio material appeared to have traveled a short distance in comparison. New distribution routes and theories have come to light through this discovery. One of the ancient quarry sites was actually found in 1997 to help support these theories.”

By the time he wrote for *The Prairie Advocate*, Doug Miller had been widely recognized for his work and had been elected president of the Illinois Archaeological Society. He also spoke to the Sterling-Rock Falls Historical Society in November of 1999 and summarized his findings on Hopewell artifacts.²⁵ His work provided the impetus for the academic community to study the origin of pipestone artifacts. A report of his work was featured in the April 2001 issue of the *Central States Archaeological Journal*.²⁹

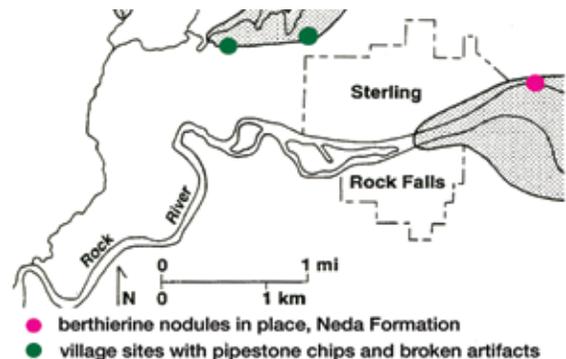


This copper bead necklace from the Hannah site in Peoria County may have been traded from Michigan. Courtesy of the Illinois State Museum.

While X-ray diffraction had been used to analyze pipestone for some years, since 1999, experts from the University of Illinois, the Illinois State Geological Survey and the Illinois Department of Transportation used a Portable Infrared Mineral Analyzer, or PIMA, to determine the mineral composition of pipestone artifacts. The work demonstrated that stone originating from different areas of the Midwest, has a distinctly different mineral composition. Of specific interest to this region is the fact that our local pipestone contains the minerals berthierine and boehmite, neither of which is present in stone from the Ohio quarry.²⁴

During the last decade, many Hopewell pipestone artifacts have been analyzed. Of particular interest is the spectacular group of 106 pipes found in southwest Ohio's Tremper Mound. While these pipes were claimed to have been made from Ohio Fuert Hill stone, PIMA analysis determined that more than 80% of the effigy pipes and 50% of the platform pipes were made from Sterling pipestone.²² Tremper Mound is located almost 400 miles from Sterling. To date, the work done by the University of Illinois team of analyzing stone artifacts with PIMA has resulted in more than 50 publications and presentations.

What makes the Sterling area special is the presence of one of the only two known domestic deposits of berthierine flint clay, an ancient mineral formed before the evolution of plant life on earth. The movement of glaciers during the last ice age exposed the local clay strata in what is called the Neda Formation, a geological formation that is more than 400 million years old. For anyone interested in exploring the geological studies of this region, a paper by Randall Hughes and coworkers published in 1998 in *Geoarchaeology* may be a good starting point.²⁴ Hughes' paper cites the location of two local pipestone deposits, one in Sterling, the other to the south of the city. A map in his paper (right) locates the berthierine nodules to the east of Sterling along the Route 2 corridor.²⁴

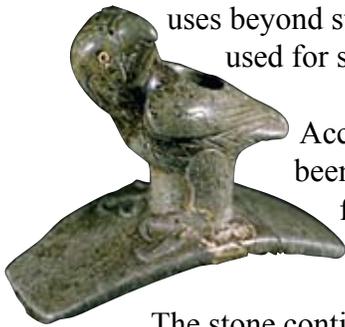


The map above in Randall Hughes' paper²⁴ notes the location of a Sterling pipestone quarry.

The drills to the right are reproductions of the type used by the Hopewell to drill holes through stone for pendants and pipes. Drills courtesy of Schingoethe Center for Native American Cultures, Aurora University.



The work of Doug Miller has located many Hopewell sites with remnants of manufacturing debris throughout Whiteside County. Two of them are located by Hughes' map north of Sterling along Elkhorn Creek, one at the Albany site, as well as another, the Gast Farm site, close to the Quad Cities. At these sites, raw flint clay, or pipestone, was transformed into pipes, plummets, banner stones, gorgets, boat stones and chunky stones, which were used in an early form of gambling. Among pipes, archaeologists have recovered tubular pipes and platform pipes, some of which were intricately carved into animal shapes, or effigies, hence the name effigy pipe. Plummets in this area appeared to have had additional uses beyond stretching of animal skins. They were also used for stretching nets to capture fish and waterfowl.



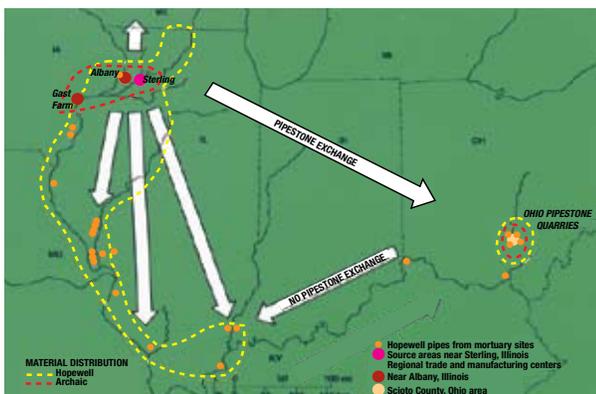
According to Hughes, the local flint clays have been quarried by earlier civilizations in Sterling for over 5000 years, more than 3000 years before the Hopewell made this region a center for manufacturing and trading.

The stone continued to be quarried here sporadically until shortly after the arrival of the first settlers. However, it was only during the Hopewell era that the green stone was the material of choice for utilitarian as well as ornamental and ceremonial objects.²⁷

Examples of various types of pipes, on top is a tubular pipe from Doug Miller's collection, below it is a platform pipe and to the far left is an effigy/platform pipe. The two green pipes are made of Sterling pipestone and were found in Tremper Mound in Ohio. They are at the Ohio Historical Society Museum in Columbus and were studied there through the courtesy of Curator Martha Otto. Photos by Ken Farnsworth, Illinois Transportation Archaeological Program (ITARP), University of Illinois.

Compared to today's trends of changing styles over very short time periods, it is remarkable that objects made from Sterling stone enjoyed immense popularity and were traded over a large area for several centuries, long before the advent of modern transportation and distribution. The accompanying map shows the major trading routes of goods manufactured in this area based on analyzing available artifacts. It is based on publications and presentations made by the PIMA team.^{27,41} The map summarizes the recent changes that have taken place in our knowledge about the Hopewell Interaction Sphere: Very few utilitarian and ceremonial Hopewell objects made from Ohio pipestone

were ever traded much outside a 50-mile radius surrounding Chillicothe, while goods made from stone quarried in Sterling and manufactured in the villages surrounding Sterling were traded throughout the Interaction Sphere. Two millennia ago, Sterling and the surrounding area were truly at the crossroads of ancient manufacturing and trade.



The Pipestone Trade Map is adapted from T. Emerson, et al., Midwest Archaeological Conference, St. Louis, MO, October, 2004.

Postscript

Since writing the contents of this booklet, we have traveled to the Effigy Mounds National Monument in northeastern Iowa in early November 2008 and learned additional historical theories which may differentiate the Woodland Period People of Illinois and Wisconsin from those in Ohio. While there, we purchased the book *Indian Mounds of Wisconsin* by R. Birmingham and L. Eisenberg, published by the University of Wisconsin Press in 2000. Both authors work for the Wisconsin Historical Society, with R. Birmingham serving as the State Archaeologist.

In describing Hopewell era funeral practices in this area, the authors speculate that the bodies of the deceased were often buried locally and the remains reburied later in mounds during elaborate ceremonies in 8-12 year cycles. Many bodies may have been reburied at the same time in covered burial pits which were then covered with earth to form mounds.

Southern Wisconsin appears to have become the center of effigy mound construction during the late Woodland Period. Estimates of effigy mounds in the region range upward of 12,000, with many of them constructed along the headwaters of the Rock River between suburban Milwaukee and Madison. Unlike Ohio effigy mounds, four out of five Wisconsin mounds may have been used for burials, with the deceased buried in the vicinity of the head or the heart of the animal depicted by the mound.

Finally, the book presents the idea that two of the current native tribes of Wisconsin may be descendants of the moundbuilders. Based on oral traditions, as well as archaeological and anthropological interpretations, the Ho-Chunk and Oneota may be heirs to moundbuilding traditions.

As we pointed out in the introduction to the booklet, it is not meant to be an all-inclusive treatise on the subject, but provide guidance to local educators covering native history of the Rock River Valley. There are many additional references and diverging opinions on the interpretation of available remnants of this past chapter in the regional history.

Wolf and Linnea Koch
December, 2008

Appendix A

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Appendix B

Woodland Period Food Sources

A group of plants that were used by early native groups has been called the Eastern Agricultural Complex and formed the basis of agriculture in the eastern regions of North America north of Mexico. These plants included squash (*Cucurbita pepo*) as well as the lesser-known little barley (*Hordeum pusillum*), goosefoot or lambsquarter (*Chenopodium bushianum*), erect knotweed (*Polygonum erectum*), maygrass (*Phalaris caroliniana*) sumpweed or marshelder (*Iva annua*), and sunflower (*Helianthus annuus*).

Of these plants, sunflower and sumpweed have edible seeds rich in oil, erect knotweed has starchy seeds, maygrass and little barley are grasses that yield grains that may be ground to make flour, and goosefoot is a leafy vegetable related to spinach. The squash that was originally part of the complex was raised for edible seeds and to produce small containers (as with gourds), not for the thick flesh that is associated with modern varieties of squash.

Displacement of most of the Eastern Agricultural Complex plants by maize-based agriculture, though a slow process, was ultimately so thorough that most of these plants are no longer under cultivation at all. Indeed, a number of them (such as little barley) are regarded as pests by modern farmers.

Plants:



goosefoot or lamb's quarter
Chenopodium bushianum
Photo by Jim Pisarowicz.



little barley
Hordeum pusillum
Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1989. Midwest wetland flora: Field office illustrated guide to plant species. Midwest National Technical Center, Lincoln.



knotweed
Polygonum arenastrum
Photo by Gordon Leppig & Andrea J. Pickart.



marshelder or sumpweed
Iva annua
Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1989. Midwest wetland flora: Field office illustrated guide to plant species. Midwest National Technical Center, Lincoln.



maygrass
Phalaris caroliniana
Larry Allain @ USDA-NRCS PLANTS Database.



pigweed
Amaranthus cruentus



squash (finger-leaved gourd)
Cucurbita foetidissima



sunflower
Helianthus
Thomas G. Barnes @ USDA-NRCS PLANTS Database / Barnes, T.G., and S.W. Francis. 2004. *Wildflowers and ferns of Kentucky*. University Press of Kentucky.



giant ragweed
Ambrosia trifida
Photo by Susan Sweeney.



purslane
Portulaca oleracea
Photo by Ethel Aardvark.

Fruit:



grape
Vitis
Ted Bodner @ USDA-NRCS PLANTS Database / Miller, J.H. and K.V. Miller. 2005. *Forest plants of the southeast and their wildlife uses*. University of Georgia Press, Athens.



sumac
Rhus
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blackberry
Rubus alumnus
Photo by L.H. Bailey.



elderberry
Sambucus canadensis
Photo by R. Bolli



plum or wild black cherry
Prunus
Larry Allain @ USDA-NRCS PLANTS Database.



persimmon
Diospyros virginiana
R.A. Howard @ USDA-NRCS PLANTS Database.



choke cherry
Prunus virginiana
National Park Service—Wind Cave National Park.



black cherry
Prunus serotina
Elaine Haug @ USDA-NRCS PLANTS Database.

Nuts:



groundnut

Apios americana

Thomas G. Barnes @ USDA-NRCS PLANTS Database / Barnes, T.G., & S.W. Francis. 2004. Wildflowers & ferns of Kentucky. University Press of Kentucky.



hazelnut

Corylus americana

Sally and Andy Wasowski, Lady Bird Johnson Wildflower Center.



hickory

Carya



black walnut

Juglans nigra

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pecan

Carya illinoensis

Larry Allain @ USDA-NRCS PLANTS Database.

Ceremonial:



magic mushroom

amanita muscaria

Photo by Fred Stevens.



tobacco

nicotina rustica

