

## Trabajo Fin de Grado

Cahokia. El Paisaje Precolombino en la Cuenca del  
Mississippi.

Cahokia. The Precolumbain Landscape of the  
Mississippi Basin

Autor/es

Daniel Herrera Russert

Director/es

Miriam García García



# CAHOKIA

## The Precolumbian Landscape of the Mississippi Basin

Daniel Herrera Russert | EINA 2017





Dedicated to Antonio Plumero and Pietari Heikurainen, for  
inspiring me to fligh higher.



00_PREFACE AND MOTIVATIONS	3
NATIVE AMERICAN LANDSCAPE	3
LANDSCAPE AS AN APPROACH	5
01_INTRODUCTION: THE MISSISSIPPI BASIN	9
THE FATHER OF WATERS	9
ANCIENT SETTLEMENT OF THE MISSISSIPPI BASIN	11
02_THE AMERICAN BOTTOM	15
THE SETTING OF THE AMERICAN BOTTOM	15
REPRESENTING THE AMERICAN BOTTOM'S MOUNDS	20
THE LANDSCAPE OF CAHOKIA	23
03_PREHISTORIC OCCUPATION OF THE AMERICAN BOTTOM	29
04_PREHISTORIC SETTLEMENT PATTERNS: THE ARCHITECTURE OF CAHOKIA	33
FIRST LEVEL: HOUSEHOLD ARCHITECTURE	34
SECOND LEVEL: MONUMENTAL ARCHITECTURE	38
NODE-BASED SETTLEMENT PATTERNS	40
05_ DEBATES ON RESILIENCE: CONCLUSIONS	43
RESILIENCE OF PREHISTORIC CAHOKIA	43
RESILIENCE DEBATES IN THE MISSISSIPPI BASIN	46
VISIONS OF A RESILIENT AMERICAN BOTTOM	48
06_BIBLIOGRAPHY	51



1. The BIA (Bureau of Indian Affairs) legally recognizes 566 tribal groups, which isn't representative of the actual number of native tribes that exist or have existed prior to European settlement and the historical processes that it triggered, such as cultural disarray, divisions, migrations or intertribal fusions.

## 00\_PREFACE AND MOTIVATIONS

### NATIVE AMERICAN LANDSCAPE

Within Europe, Spain is a country that exhibits a diverse set of climate zones and features, many of which can be found, albeit in a much larger scale, all across North America, from alpine prairies high in the mountains to deep canyons in the deserts. A radical difference at first glance however are the thousands of years of human experience and use of the land, which are more than obvious in any European country, where ecosystems and their resources have been exploited and transformed for millennia to become an active participant of human development. These elements have also played a crucial role in shaping local cultures, architectural values and vernacular interpretations of the landscape.

By these terms, in the case of modern-day North America, settlement and land usage seems to have happened without that 'ancient' connection to the environment. Native communities however have inhabited various locations of North America for thousands of years as well, communities that are nowadays represented by, in the case of the United States, a staggering 566 federally recognized modern tribal groups<sup>1</sup>, each with its own unique understanding of place and the human-nature interaction. A resulting issue in North American nations is the struggle to interpret and design architectures and places that are responsive to that millenary human experience of American landscapes, especially in light of modern-day concerns like social equality, environmental preservation, conservation of natural resources and pollution.

Spaces in which native life took place fall under the

definition of Native American architecture and landscape, in Bernard Rudofsky's words, as a 'tangible expression of a way of life', that is responsive to both the inner sociocultural environment as well as the external environment of wind and weather (Nabokov, Peter et al. 1989: 12). The subject of this essay is a retrospective revision of the historical landscape of the mound cultures of the Mississippi, a historically neglected episode in American History, which is for the most part unknown even to most modern Americans, with three goals in mind.

First of all, to present it to a European audience that may not be familiar with the singularities of the fluvial landscapes of the Mississippi Basin as well as the native responses that it naturally gave place to.

Second of all, to interpret the different elements and the historical dynamics of one of the world's great river ecosystems, and their effect on historical human settlement processes that are foreign to our European traditional understandings.

And finally to reflect upon the capability of this historically shaped landscape to adapt to long term changes, considering recent natural and cultural trends in its geographical setting.

The essay is part of a project I undertook during the final year of my Spanish Architecture bachelor's degree, which I completed in the United States at the University of Idaho, in the context of two classes on Native American Architecture and Resilient Landscape. I am grateful for the guidance of professors Dr. Anne Marshall, who introduced me to the subject of Cahokia and the Mississippian cultures, and Dr. Andrew Kliskey, who provided me with the opportunity to

**Fig. 1** Traditional depiction of Native American landscape has relied on photography as a medium of expression, amongst others. A common theme is the impressionistic juxtaposition of man set against the imposing natural features of the West. Image taken by early photographer Edward S. Curtis. *Canyon de Chelly, Navajo* (1904).

apply a landscape resilience approach to the matter.

## LANDSCAPE AS AN APPROACH

The concept of landscape has proven itself over time to be quite elusive in terms of its scope and definition. A conventional reading of the concept would be something such as 'the physical framework within which human societies exist' (Roberts 1987), or perhaps an even harsher definition would be 'Landscape = habitat + humans' (Fairbrother 1972).

A much more compelling description of what landscape is is MIT professor and landscape architect Anne Whiston Spirn's:

*An association of people and place. A dynamic partnership. A mutual shaping.*

In any case, all understandings of what a landscape is

**Fig. 1**



coincide in that its two basic elements are place and people, and because of that its study must be responsive to change over time as well as across space. The concept of historical landscape comes in as the study of the changing relationships between the environment and humankind, and how the arising transformations are the result of a natural process of mutual shaping.

*The combined works of nature and of man and are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal. (UNESCO World Heritage Convention Operation Guidelines, 1995)*

Comprehensive understandings of the historical patterns and shifts the relationship between humans and a given environment are key for designing adaptive strategies, predicting their consequences and ultimately devising frameworks for better landscape design and management. The term resilience is used to describe the degree to which a social and natural landscape can adapt to change. In pioneer of the landscape resilience concept professor C.S. Holling's words:

*Resilience is the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions. It describes the degree to which the system is capable of self-organization, learning and adaptation. (Holling, C. S. 1973)*



Fig. 2



Fig. 3

Fig. 4



**Figs. 2 and 3** Built between 1943 and 1966, the Basin Model in Clinton, Mississippi, was a large attempt to recreate the topography and hydraulic behavior of the river. The project was abandoned in 1973. Photos are old postcards from the site.

**Fig. 4** Fragment of the *Geological Investigation of the Alluvial Valley of the Lower Mississippi River* (1944), showing ancient courses of the River in a section of the Lower Mississippi Alluvial Valley.

## 01\_INTRODUCTION: THE MISSISSIPPI BASIN

### THE FATHER OF WATERS

The Mississippi river, nourishes and drains 41% of the United States' continental land (Mathur, da Cunha 2001: 14). Its landscape is one of conflict, of shifting relations between the human world and the natural, where efforts have been made historically to tame or understand the dynamics of an incredibly vast ecological system. Humans seem to have always struggled when trying to comprehend the nature of this setting, ever since the very first attempts at mapping in the early 16<sup>th</sup> century by European explorers to modern day hydrographic and urban planning.

Within the Mississippi Basin the American Bottom and the alluvial valley below St. Louis are particularly unique landscapes, where the course of the river has shifted innumerable times throughout recorded history. Seasonal floods significantly affect its shape, depth, slope, discharge, material and hydraulics (Mathur, da Cunha 2001: 3). As a result the attempts to design human settlements and their resulting interactions with such an untamable system have proven to be extremely difficult. In such a complex landscape there are many unique natural features that have evolved alongside the river, like the bayous, shifting islands, meanders, bends, deltas, etc.

Flooding is the natural process by which the river carries out these dynamics, the unpredictable behavior of course shifts and land reclaims, and their prediction is therefore the key to designing a lasting relationship between human settlement and ecological systems. The Geological Survey of 1944 (Fig. 4) is representative of the behavior of the river

Fig. 5

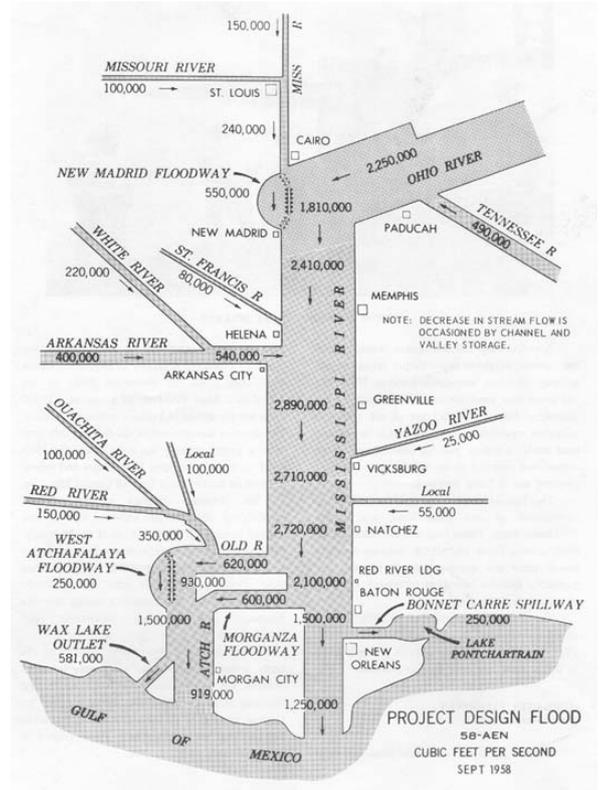
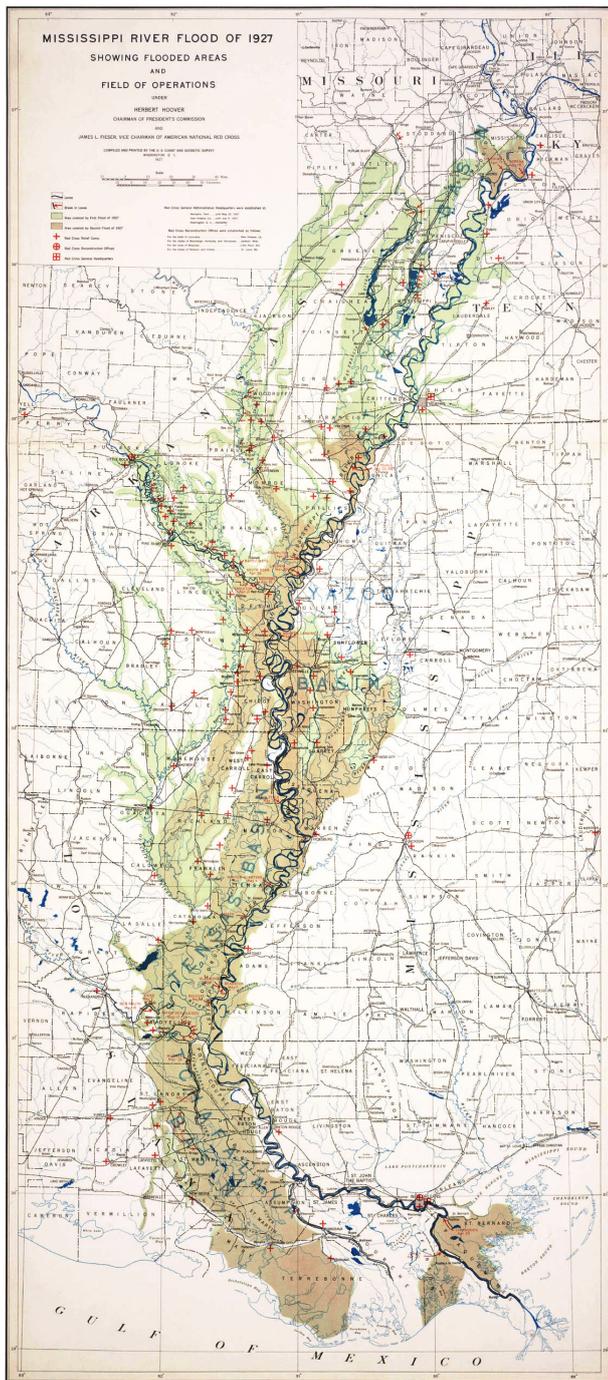


Fig. 6

**Fig. 5** Map of the Great Flood of 1927. The colored areas represent the areas that were flooded by the river and its tributaries. The most affected regions were the Lower Alluvial Valley and the Delta.

**Fig. 6** 1958 revision of the *Project Design Flood* from 1929, a conceptualized depiction of floodways in a hypothetical historical flooding event.

2. The term prehistoric denotes the period prior to written records, in most cases in Native American History, before the arrival of European settlers.

in its natural state, and at the time served as a tool to predict the consequences of large-scale flooding. As a response to the Great Mississippi Flood of 1927, the US Army Corps of Engineers developed the *Project Design Flood*, published for the first time in 1929 and reviewed periodically ever since, which depicted the hypothetical scenario of a historical flood, with its potential floodways as well as theoretical flow rates for dike and levee design.

## ANCIENT SETTLEMENT OF THE MISSISSIPPI BASIN

This set of circumstances may lead us to believe that effective management of the river, and therefore permanent settlement of the Mississippi Basin's alluvial valleys and lowlands are a relatively modern achievement, supported by modern understandings of the dynamics of the river and flood prevention strategies, and the experience of more than 200 years of modern occupation.

The complex interaction between the 'Father of Waters' and humans however is not at all a recent phenomenon. In fact, the most sophisticated urban native societies of North America flourished in the Mississippi and Ohio basins during a time span of over several thousand years. What has survived of these settlements to this day are mainly large earth mound structures found throughout a great portion of the Southeast, predominantly in clusters as part of presumable religious centers and towns.



Fig. 7

**Fig. 7** Location of native mound sites in the Southeast of the United States, from the period between BC 800 and BC 1500. Drawing from William N. Morgan's *Precolumbian Architecture in Eastern North America*.

**Fig. 8** Aerial view of Serpent Mound in Ohio, corresponding to the mound cultures of the period represented on the map above. The actual culture responsible for its construction is still unknown.

The remains, because of their number, size and diversity, provide a glimpse of the complexity of these relatively unknown prehistoric<sup>2</sup> cultures. However, it is known that they were well established since BC 2200 until the very first contact with European settlers in the early 16th century. Archaeological sites corresponding to this episode in Native American History can be found scattered all across the Southeast of the United States, generally following the paths of the main waterways, the Ohio and Mississippi, as well as some of their tributaries and areas of the East Coast. These were therefore 'river cultures', deeply tied to their fluvial context, who developed architectural solutions as well as settlement strategies that responded naturally to their circumstances.

Fig. 8



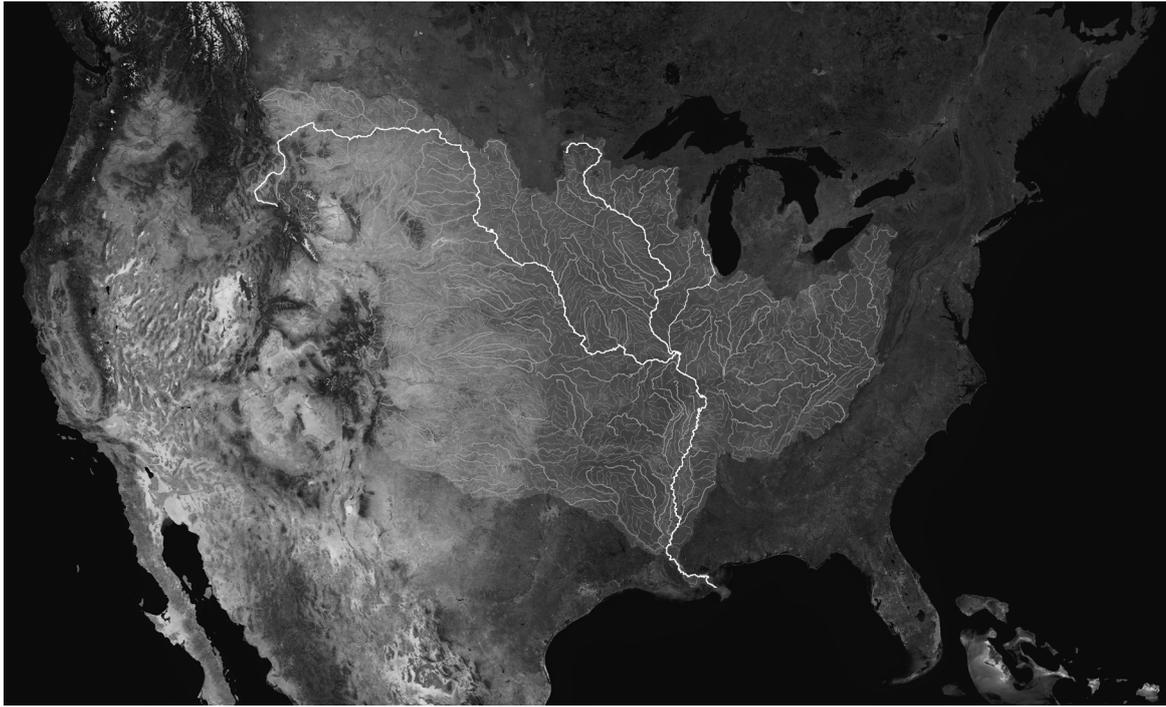


Fig. 9

Fig. 10

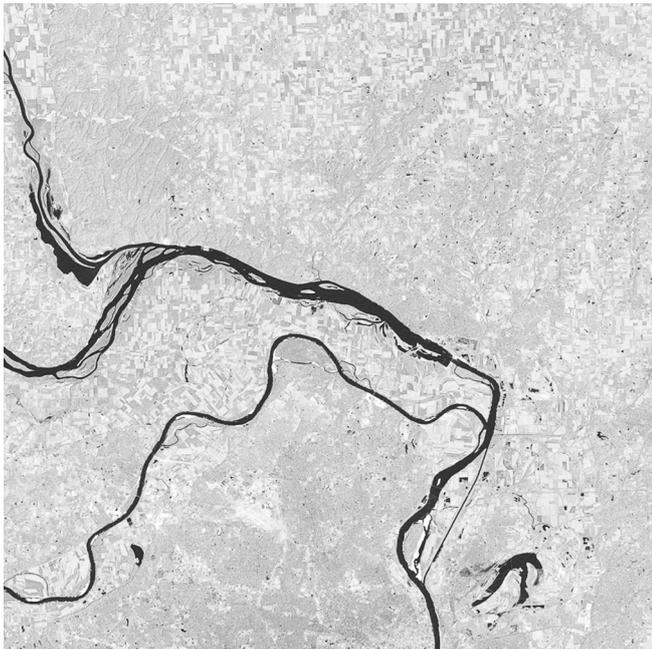


Fig. 11



**Fig. 9** Satellite view of the Mississippi Basin. The highlighted waterways are the Mississippi, Missouri and Illinois rivers. The Missouri and Illinois are two of the major tributaries of the Mississippi river, and along with the Ohio river represent the transition between the highlands of the Mississippi Valley and the beginning of the Alluvial Valley, 3rd largest watershed area in the world. Illustration by the author.

**Figs. 10 and 11** Satellite images of the confluences of the Missouri and Illinois and Mississippi in 1993, before and after that year's historical flood. The American Bottom lies in the lower right corner, protected by levees and drainage canals. Illustration by the author.

## 02\_THE AMERICAN BOTTOM

### THE SETTING OF THE AMERICAN BOTTOM

The focus of this study will be on the area known today as the American Bottom, an extension of floodplain located immediately south of the confluences of the Missouri and Illinois rivers with the Mississippi; in 19<sup>th</sup> century traveler Henry Marie Brackenridge's words, a 'tract of rich alluvion land, extending on the Mississippi, from the Kaskaskia to the Cahokia river, about eighty miles in length, and five in breadth; several hundred streams meander through it; the soil of the richest kind, and but little subject to the effects of the Mississippi floods'; 'no spot in the western country is more capable of being more highly cultivated, or of giving support to a more numerous population than this valley' (A. Dalan, Rinita et al. 2003: 3).

As a small alluvial plain, the American Bottom is interspersed with several lakes, most of them ancient meanders of the Mississippi, which along with their banks and bluffs are all reminders of the riparian nature of the setting, the natural 'transversal' transition between the river and the prairie landscape of the Midwest. But the American Bottom is also a transitional landscape along the river's axis. Its location between the confluences of the Mississippi's largest tributaries (Missouri and Illinois to the north, and Ohio approximately 200 kilometers to the south), make the American Bottom a paradigmatic 'anticipation' to what the Lower Mississippi, below the confluence with the Ohio, is in terms of watershed and flooding dynamics.

In fact, the area has been historically subject to large floods, significantly exacerbated by modern development of its tract. The first European settlements were French

colonial towns that were founded in the 17th century near the river edge, with timber production as one of their most prominent industrial activities. Heavy deforestation and alterations to the natural banks ultimately led to flooding becoming more severe in the 19th century, and in the event of the large flood of 1844, the abandonment of several of the original French colonial towns. Despite modern water contention systems, which now protect the most heavily populated section of the American Bottom, irregular shifts in the river's natural trends have led to episodes of uncontrolled flooding in the 20th century, such as the major flood of 1993.

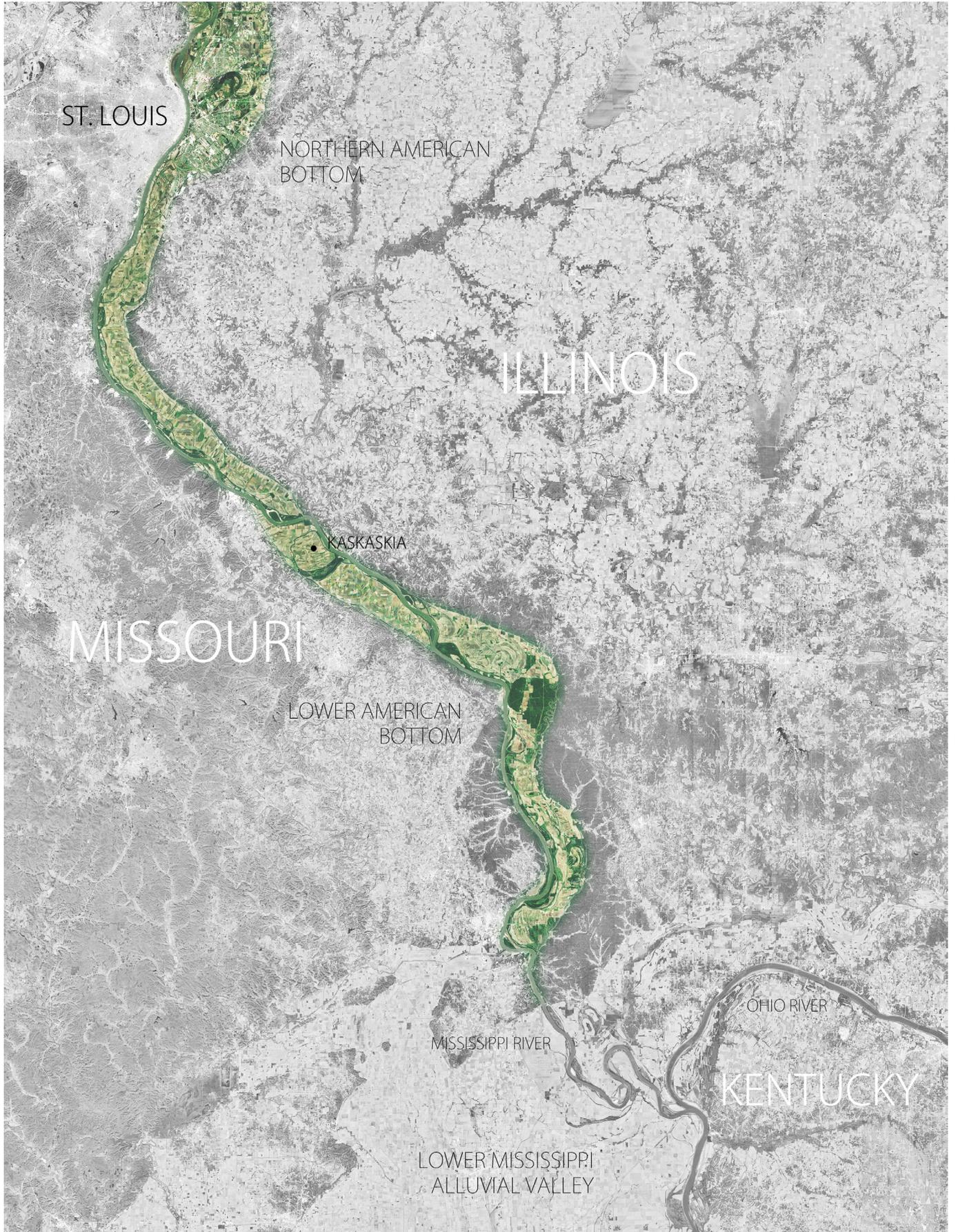
The American Bottom today, especially in its northernmost portion found within in the St. Louis metropolitan area, is still a heavily developed industrial and populated region because of its strategic location in southwestern Illinois. Historically the 'gateway to the West', St. Louis is to this day a leading transportation node as well as an industrial hub.

Fig. 12



Fig. 12 The municipality of Kaskaskia, in Illinois, located on a fluvial island near the confluence of the minor tributary river Kaskaskia, completely submerged by the Mississippi's waters in 1993.

Fig 13. Satellite image showing the extension of alluvial land corresponding to the American Bottom, from St. Louis in the North to the confluence of the Ohio in the South, about 200 kilometers away. Illustration by the author.





**Fig. 14** Site plan of the northern portion of the American Bottom. The city of St. Louis lies over the bluffs on the western side of the river. Scattered all over the floodplain are lakes, left over by the river as a result of its natural dynamics over centuries. The darker diamond-shaped figure is the Cahokia Mounds Historic Site. Other minor mound sites are represented on the map as squares, and larger sites as circles. Illustration by the author.

**Fig. 15** View of the Cahokia Mounds Historic Site facing St. Louis, from the top of Monks Mound.

Interestingly enough, human occupation of the American Bottom dates back several centuries before the arrival of the first French settlers. In Brackenridge's remarks of the area he also noted the presence of the vestiges of what is now known to be the largest assemblage of native earth structures in North America, what we today call the Cahokia<sup>3</sup> Mounds Historic Site. In his words, 'the great number of mounds, and the astonishing quantity of human bones [...] with a thousand other appearances, announce that this valley was at one period, filled with habitations and villages'. It comes to no surprise that early descriptions of the American Bottom begin with observations of the mounds, particularly Monks Mound, the largest man-made earth structure in North America, with a height of 30 meters and an overall extent of 7 hectares, which is larger

**Fig. 15**



than most Mississippian sites.

The mounds are by far the most significant manmade element in the prehistoric landscape of the American Bottom that is still present today, with the largest cluster of earthworks to be found at the central site of Cahokia, which encompasses over 120 mounds and enclosures within only 13 square kilometers. In Rinita A. Dalan's description of the Cahokian 'moundscape' she remarks that in spite of the perceivable complexities in the disposition, size and shape of these mounds, a certain human scale seems to be present in the integration of Monks Mound as the central element with the rest of the site.

## REPRESENTING THE AMERICAN BOTTOM'S MOUNDS

Understanding the way a landscape has been represented through time can provide some insight into how it has been experienced and conceptualized. The nature of the depictions of the mounds, as well as the mediums of representation, have been subject to an intriguing evolution since interest in the Cahokian moundscape began in the early 19th century.

Early representations of the landscape of the American Bottom were deeply tied to an artistic European tradition, with the subjective rationality of the observer set against the objective reality of a place. Reality is distorted in order to emphasize certain notions, such as the prominence and scale of the mounds over the rural setting of the floodplain. The shift towards a more detached perception, which coincides with the division between arts and sciences, is also noticeable as aerial photography and cartography become the dominant means of representation, in the context of archaeological, as well as geographical, focus

**Fig. 16** 1860 depiction of Monks Mound as the central attraction of the site of Cahokia. *Great Mound of Cahokia, Illinois*, by E.G. Squier. Illustration from Rinita A. Dalan et al's *Envisioning Cahokia*.

**Fig. 17** Impressionistic drawing of Monks Mound from William McAdams' *Records of Ancient Races in the Mississippi Valley* (1887).

**Fig. 18** First cartographic representation of the Cahokian mounds. *Patrick Map* (1876). Illustration from Rinita A. Dalan et al's *Envisioning Cahokia*.

3. The original toponym of the Mississippian settlement of the American Bottom is unknown. The name Cahokia was taken from a local tribal group that inhabited the area at the time of the arrival of the first European explorers.

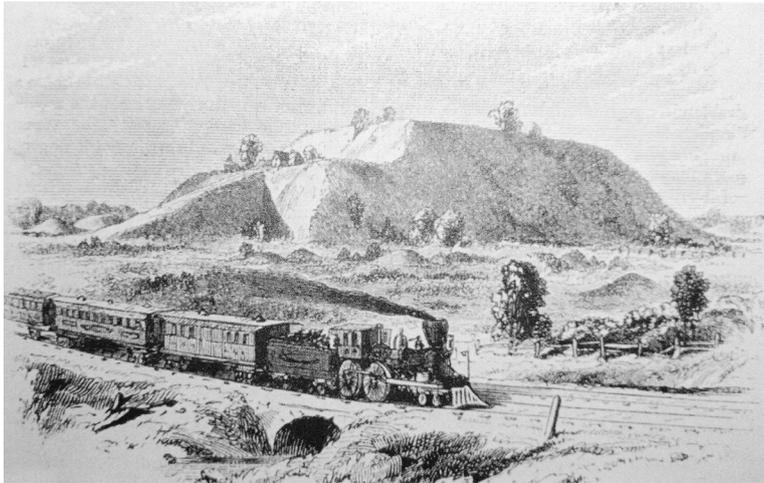
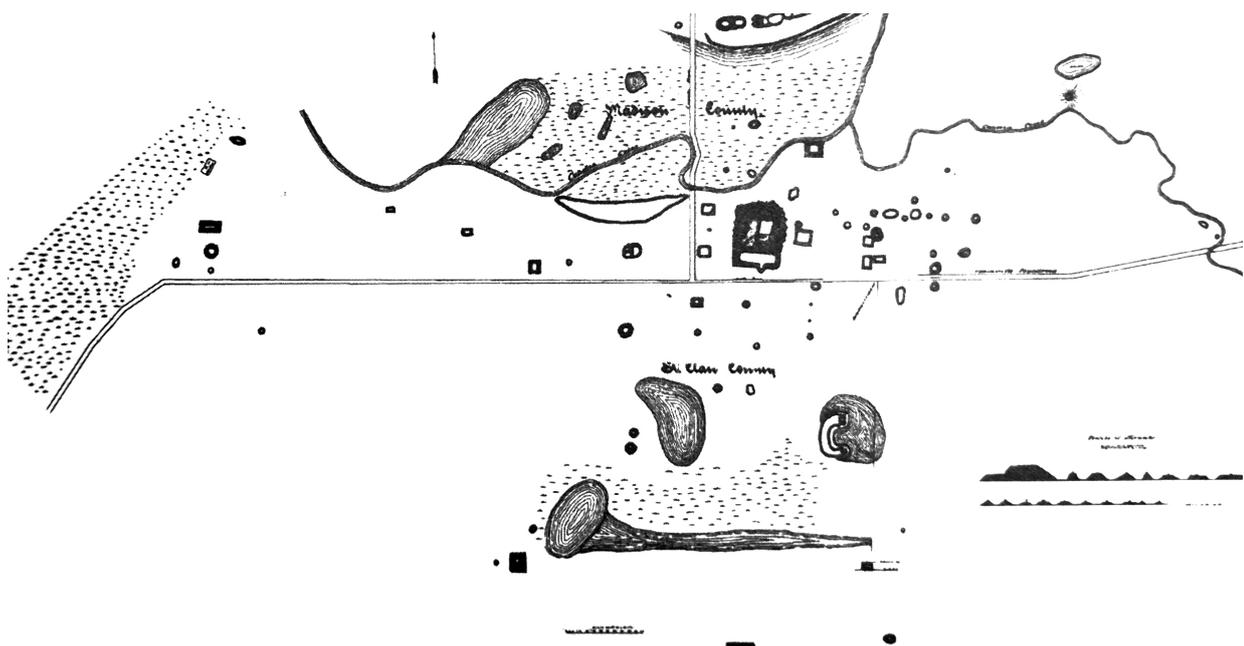


Fig. 16

Fig. 17



Fig. 18

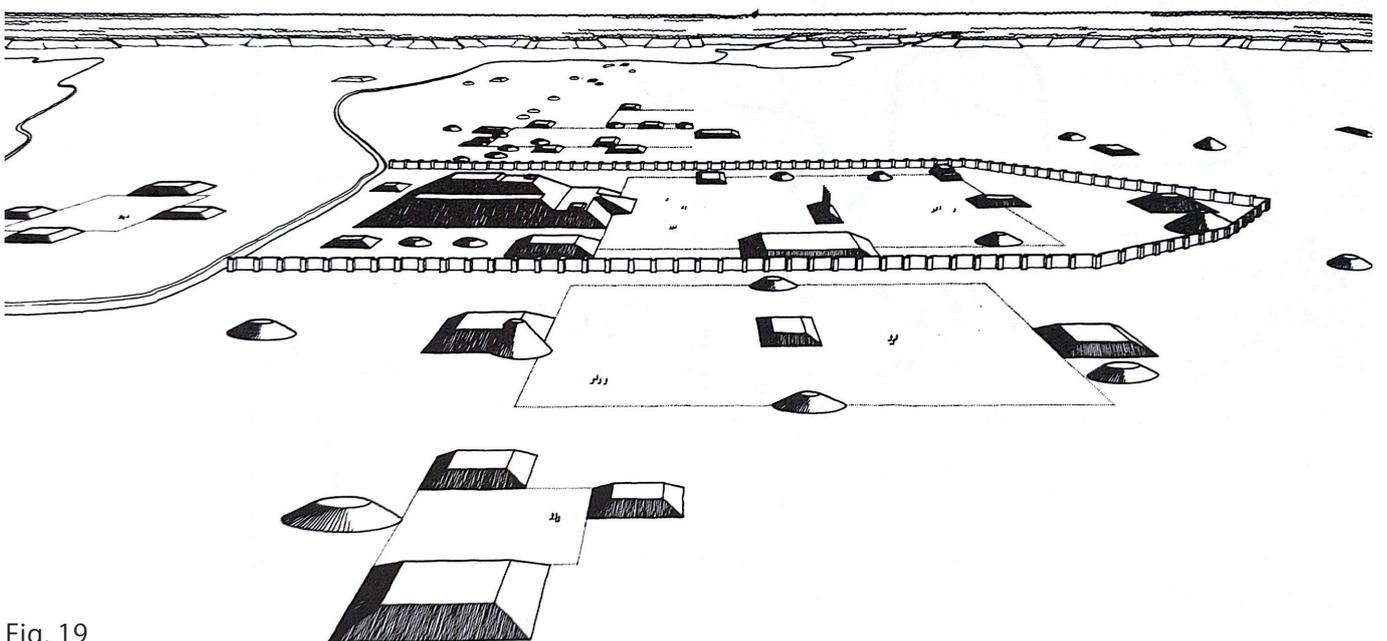


on the setting of the American Bottom.

The amorphous and rounded shapes, the result of centuries of erosion and weathering, contrast with the many theoretically geometrical modern representations and models of the site. Such is the case of architect William N. Morgan's works on *Precolumbian Architecture in Eastern North America* (1999), in which he conceptually describes all known moundsites of the Eastern United States corresponding to different periods through a use of architectural linedrawings, plan views and perspectives, without the implications of a perhaps more 'elusive' landscape approach.

A contemporary look at the moundscape of Cahokia in the state it presents today would encompass all possible approaches, regaining the human perspective and combining it with a conceptual analysis in order to attain a more comprehensive reading of the site. For example, most modern depictions from the exhibition at the interpretive museum of the Cahokia Mounds Historic Site rely on reconstructions of the prehistoric settlement of the area.

**Fig. 19** General perspective drawing of Cahokia's mounds and enclosures from William N. Morgan's *Precolumbian Architecture in Eastern North America* (1999).



**Fig. 19**

**Fig. 20** Modern artist's impression of the monumental center of Cahokia, depicting architectural elements that were built during different periods of prehistoric occupation, such as Monks Mound, the Gran Plaza and the palisade enclosure. Painting by Lloyd K. Townsend. Image from Historic Park website.

These tend to exclude items of the modern landscape, as well as representing every archaeological element that is present today on the site into one historically ambiguous rendering. For instance, archaeological studies have found that construction of Monks Mound began in the early stages of settlement of the American Bottom, whereas the palisade enclosure belongs to a latter period of decline and upheaval, circumstances that are not represented in these reconstructive drawings of the site. Nonetheless, it seems natural that artists would rely on the current image of the American Bottom for context, since the main purpose of these graphics is to convey a basic notion of the layout of the landscape with its prehistorical features without getting into the more specific cultural details.

#### THE LANDSCAPE OF CAHOKIA

The site of Cahokia strikes today as one that has been homogenized in the course of its modern exploitation and the establishment of the Historic Park (Rinita A. Dalan et al. 2015: 64). Farming development had a destructive effect

**Fig. 20**





Fig. 21

Fig. 22



Fig. 23



**Fig. 21** A snow-covered Monks Mound rises over the artificially flattened Grand Plaza in winter.

**Fig. 22** Monks Mound, offering a neatly mown grass-covered look, surrounded by farmland, modern tree masses and, right behind its northern side, the interstate 55/70 highway. Photo from Historic Park website.

**Fig. 23** General view of the Cahokia Mounds Historic Site today, the area corresponding to the Grand Plaza and the central mounds. Horseshoe lake is visible in the distance. Photo from Historic Park website.

on a significant portion of the original Mississippian mound clusters, yet the central district of Cahokia, what is now the Historic Park, still conveys basic notions of the sense of scale and the large transformations undertaken by the Mississippian people. Earth moving was one of the central activities that characterized the Cahokians' response to their environment, and as a result the prehistorical state of the landscape would have been a reflection of such activities.

The main human elements in the Cahokian landscape by these terms, both in prehistoric times and today, would be the mounds and the borrows, the latter being the pits from which earth was excavated for the construction of the mounds. The constant struggle with processes derived from their activities on the landscape, such as mound construction, land flattening, maintenance and fight against erosion, would have resulted in creating a landscape of its own, significantly different to today's moundscape. To begin with, the site would have presented itself to be quite unvegetated, especially the mounds, with a thick river earth substrate locally known as gumbo mud being present throughout most of the year (Rinita A. Dalanet al. 2015: 66). The little natural vegetation would have been a product of the regeneration dynamics of the borrow pits, as they became riparian wetlands in the context of the river's seasonal dynamics. Modern tree masses that are now found scattered all across the site were not present in Mississippian times either, as timber harvesting was an essential activity both for construction and domestic fuel. Wood supply for larger constructions, such as the central district's palisade, would have probably been brought on site from the eastern bluffs, using the natural waterways

for transportation (Rinita A. Dalan et al. 2015: 66).

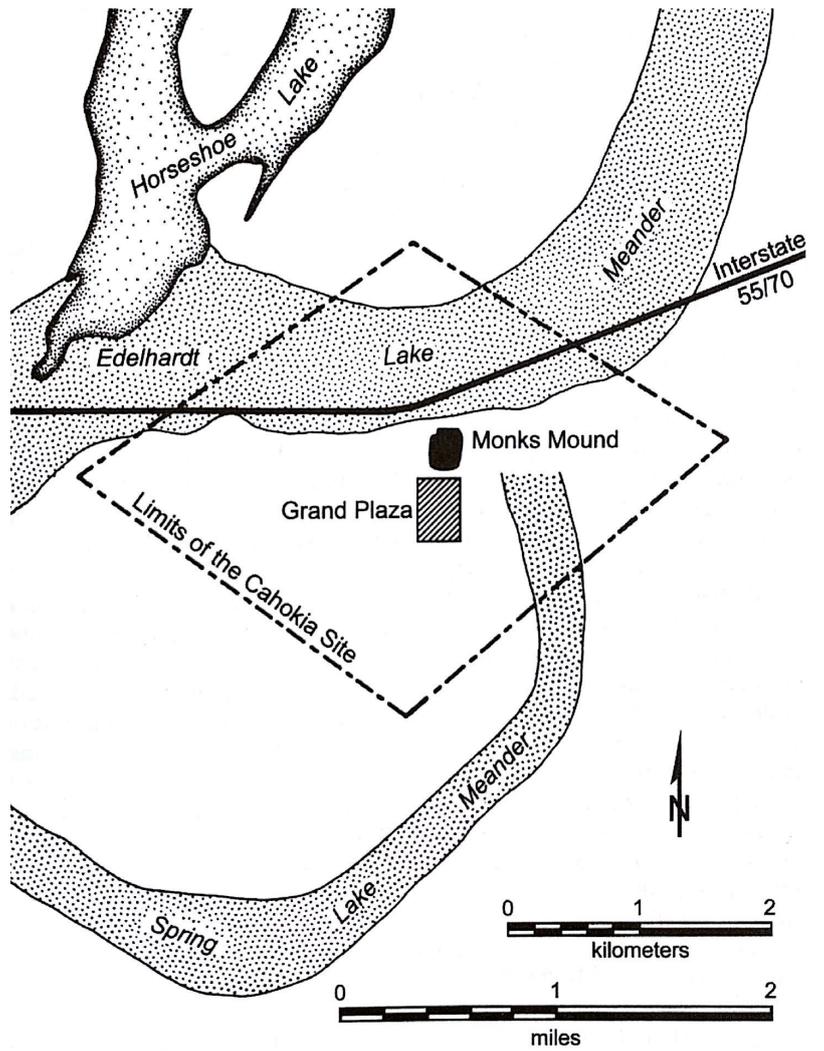
Another factor that is not present in most interpretations and depictions of prehistoric Cahokia is the extreme continental climate of the Midwest. Although milder than in more elevated locations of the prairies, the American Bottom is still subject to harsh winters and warm humid summers, which would have had an obvious impact on seasonal activities as well as the intensity of mound maintenance efforts.

The long-term changes in the behavior of the river in a backdrop such as the American Bottom had a significant role in shaping both the natural landscape as well as the human, even during the limited time span of prehistoric occupation.

Geoarchaeological surveys have shown that because the settlement of Cahokia happened over several hundred years, its growth as well as the formalization of its limits were affected by the shifts the course of the Mississippi experienced during that time. Although meander-shifting activity in the area (Horseshoe meander bow system) is relatively ancient and happened long before prehistoric occupation, in the circumstance of seasonal floods and climatic events they sometimes became active natural barriers (W. Yerkes, Richard. 1987: 34). Most of these ancient meander bows are now occupied by much smaller streams and creeks that make their way down from the eastern bluffs into the lakes and the Mississippi.

**Fig. 24** Edelhardt Lake and Spring Lake, two of the most ancient meander formations in the American Bottom, establish the natural northern and southern boundaries of the central district of Cahokia. At some point during prehistoric occupation Horseshoe Lake would have been an active waterway with connections to the main course of the Mississippi. Drawing from Rinita A. Dalan et al's *Envisioning Cahokia*.

Fig. 24



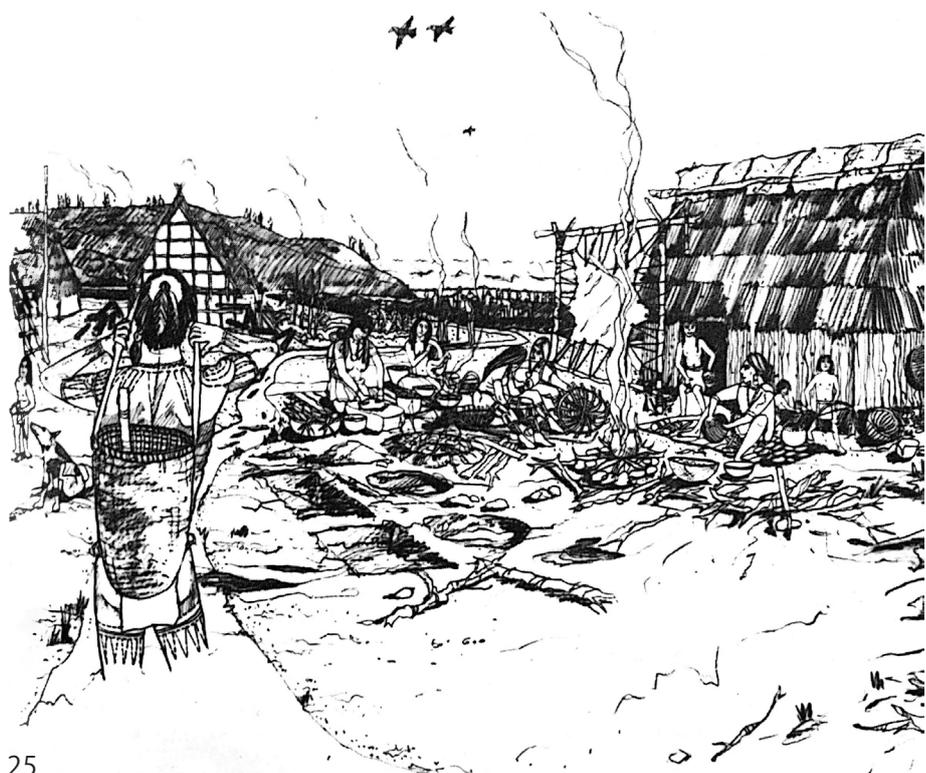


Fig. 25

**Fig. 25** An Emergent Mississippian daily scene, with Monks Mound under construction in the background and household activities taking place in the foreground. Drawing from Rinita A. Dalan et al's *Envisioning Cahokia*.

### 03\_ PREHISTORIC OCCUPATION OF THE AMERICAN BOTTOM

The historical landscape trends presented earlier are informative about the prehistoric settlement and how the inhabitants of Cahokia managed to adapt to their changing environment. This is further understood by examining the process of human occupation of the American Bottom. Because Cahokia, by far the largest mound site of the Mississippian culture, has been very thoroughly studied and excavated in the past decades, it provides a very cohesive interpretation of the design, society order and economy of the Mississippian prehistoric towns.

The settlement of Cahokia happened during the 10<sup>th</sup> century as one of the most dominant ceremonial towns of the central Mississippi River Valley, representing the greatest development of this period, with an unprecedented number of mound structures within its boundaries, including large residential and agricultural spaces, and because of its remarkable size was presumably the main ceremonial and urban center of the entire Mississippi Basin (Emerson 1997: 44).

Much archaeological work has been done focusing on different aspects of the culture, from interpreting the monumental and religious remains to understanding the daily life of peasants and their households as the most fundamental part of the economy. The mounds are by far the most noticeable remaining architectural features, and since the archaeological work began they have provided clues to construct theories of an elite-based society where

religion played a fundamental role in civic life.

The occupation of Cahokia has generally been divided by scholars into two main periods based on a number of factors, such as archaeological artifact findings, architectural attributes or noticeable shifts in social patterns. Settlement of the American Bottom began during the Emergent Mississippian period (AD 925 - 1050) in the context of the rise of the prehistorical cultures of the Mississippi Basin.

The Emergent Mississippian culture expanded across the southeast following the Mississippi river in a centralized manner. According to anthropologist Charles Hudson, 'expansion was limited on the north, east and west by climatic conditions too cold or dry for Mississippian agriculture and by decreasing availability of large areas of the necessary riverine soil' (Hudson, Charles 1976: 96). Maize agriculture played a fundamental role as the main means of subsistence, and it is believed that it was the shift towards a sedentarian lifestyle and the agricultural surplus what triggered the process of cultural expansion. The earth mound construction tradition is also deeply rooted in Emergent Mississippian times, and it is during this period that mounds, borrow pits and large plazas start to become significant features of the human-settled landscape.

The shift from this period to the Mississippian (AD 1050 - 1350) is diffuse in terms of clear cultural differences, but it's generally accepted that around AD 1050 Cahokia became the most prominent regional mound center, with a complex system of minor subcommunities organized around the main site. The Mississippian Period is generally divided into four sub-periods.

The Lohmann period (AD 1050 - 1100) represents the peak

**Fig. 26** A Sand Prairie period daily scene. The landscape shows signs of exhaustion, as environmental changes affect agricultural production and population decreases drastically. Drawing from Rinita A. Dalan et al's *Envisioning Cahokia*.

of the Mississippian culture in terms of growth, followed by the beginning of the decline during the Stirling subperiod (AD 1100 - 1200). Exhaustion of local materials as a result of more than a century of human settlement are obvious in the landscape, and large trading networks are established along the American Bottom's waterways to provide timber and other goods that are no longer available at Cahokia.

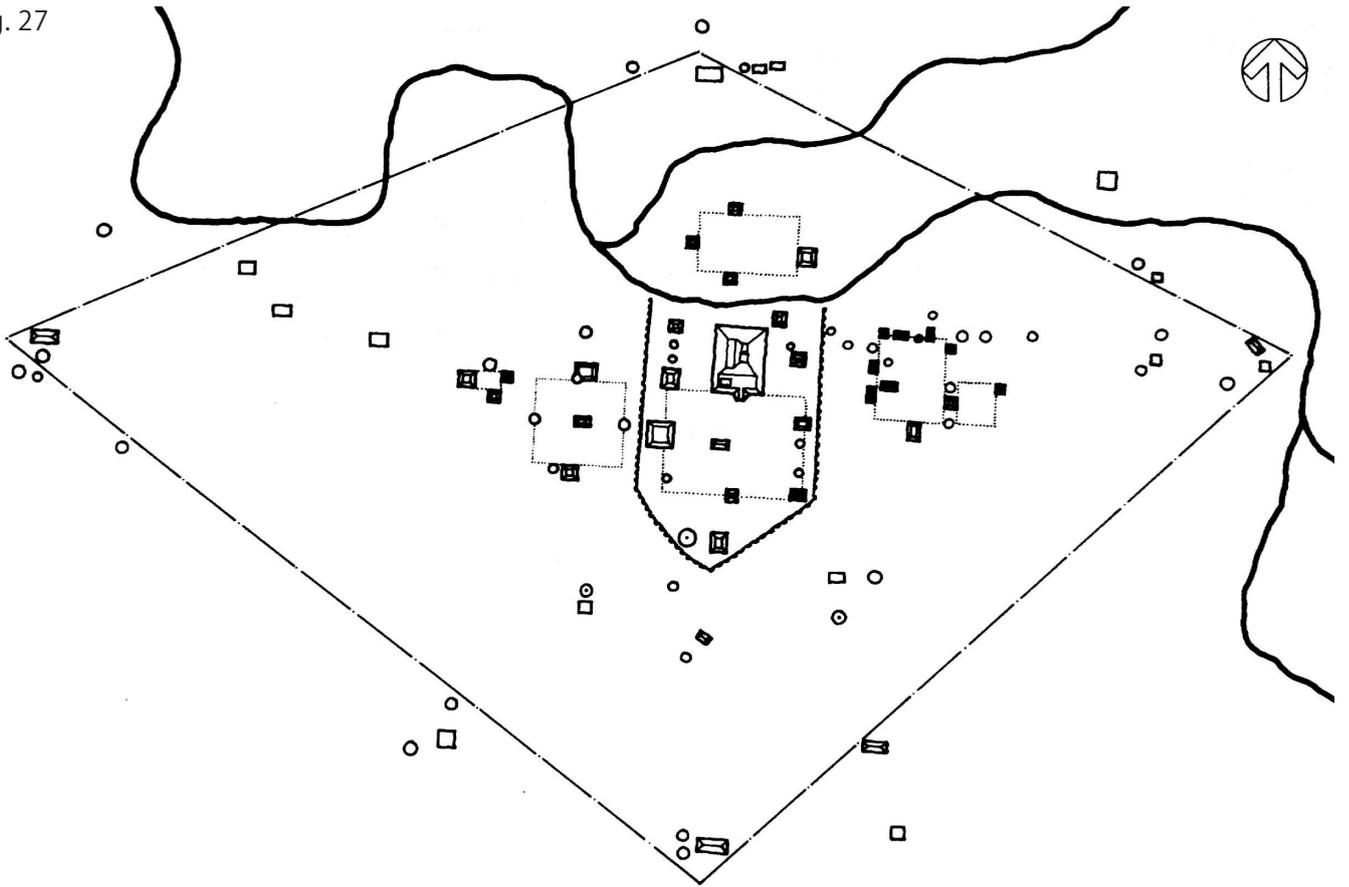
During Moorehead (AD 1200 - 1275) Cahokia's decline in the economic and sociopolitical fields were more than obvious. The decline is also noticeable as mound maintenance and construction gradually ceased. It was during this time also that the distinct palisade enclosure was built around the main center of the site, possibly as a response to factionalism or intergroup conflict.

The last period of Cahokian occupation is Sand Prairie (AD 1275 - 1350), during which very few new constructions were erected and the entire site was gradually abandoned. By the year AD 1350 permanent settlement of the American Bottom had come to an end (A. Dalan, Rinita et al. 2003: 69).



**Fig. 26**

Fig. 27



## 04\_PREHISTORIC SETTLEMENT PATTERNS: THE ARCHITECTURE OF CAHOKIA

**Fig. 27** General plan of the central mound district of Cahokia. Clusters of mound structures radiate from the main enclosure, Monks Mound and the Grand Plaza, following an orthogonal layout lined up with the north-south axis. The arrangement of mounds around open plazas establish a certain unity within and between the clusters, suggesting hierarchies and spacial organizations. Drawing from William N. Morgan's *Precolumbian Architecture in Eastern North America*.

The study of the architectural remains throughout the different periods of occupation of the American Bottom during prehistoric times is key to understanding the patterns by which the entire setting was inhabited and experienced. Cahokia's architectural order is the tangible embodiment of the native landscape values, as well as a reflection of the stratification of the Mississippian people that serves to illustrate the interactions between and within the different classes (Mehrer 1995: 25).

The smaller dwellings and production buildings represent the first level, with an apparently more primitive architecture designed by non-specialized people with the sole purpose of meeting their most basic needs. These constructions provide a very valuable insight into the pragmatics and patterns of the lower classes, as well as representing the base level of the whole economy. The identity of the archaeological remains corresponding to this order is interpreted by observing long-term trends, elements that persist throughout time and sites and which can also be observed in more modern native societies. The larger monumental works represent the second level, encompassing the palisades, open plazas and earth structures, and were presumably designed by people with special knowledge in design, and reflect the high degree of general planning of Cahokia and the clear existence of a complex society. The third level would be the planned 'high style' architecture, larger elite dwellings and ceremonial buildings, probably laid out by full-time

specialized designers.

The two first levels of architectural order, household and monumental, represent the most important in order to provide an understanding of the society as a whole and the interaction with its environment. The study of Cahokia's households and production processes also represents one of the latest phases in the excavations (Mehrer 1995: 9-12), and there is therefore ongoing debate, with many theories and models having been proposed by archaeologists. With the distinction being established between levels in the architectural remains found at Cahokia, certain models of settlement have been proposed that are based on a system of nodes. Both the general layout of Cahokia on a regional level with its surrounding rural towns, as well as the geometrical arrangement of mounds and constructions within the site of Cahokia suggest spatial organizations, symbolisms of spaces and social hierarchies (Mehrer 1995: 27).

#### FIRST LEVEL: HOUSEHOLD ARCHITECTURE

In any society, the dwelling represents the most basic social element, and also as the most basic embodiment of the environmental and vernacular values. Because of its many implications (stylistic, technical, functional, social, demographic and economic), archaeological work between sites must be compared and interrelated in order to extract conclusive notions of the relationships between the inhabitants, their spaces and ultimately other similar settlements (Mehrer 1995: 26-27).

The most basic forms of architecture in Cahokia are low class family pit-house-type dwellings, resource gathering

**Fig. 28** Julien site, one of the satellite subcommunities south of Cahokia, organized into 5 clusters of dwellings, each presumably representing a family unit and a farmstead. The whole site is covered by small earth mounds that represent the local political power. Drawing from Mark W. Meher's *Cahokia's Countryside. Household Archaeology*.

**Fig. 29** Building cluster number 3 of the Julien site. The rectangular shapes are the imprints of pit-house-type dwellings, organized around open courtyards. The rounded shapes are storage, debris and garbage pits, vestiges of diverse production-related activities. Drawing from Mark W. Meher's *Cahokia's Countryside. Household Archaeology*.

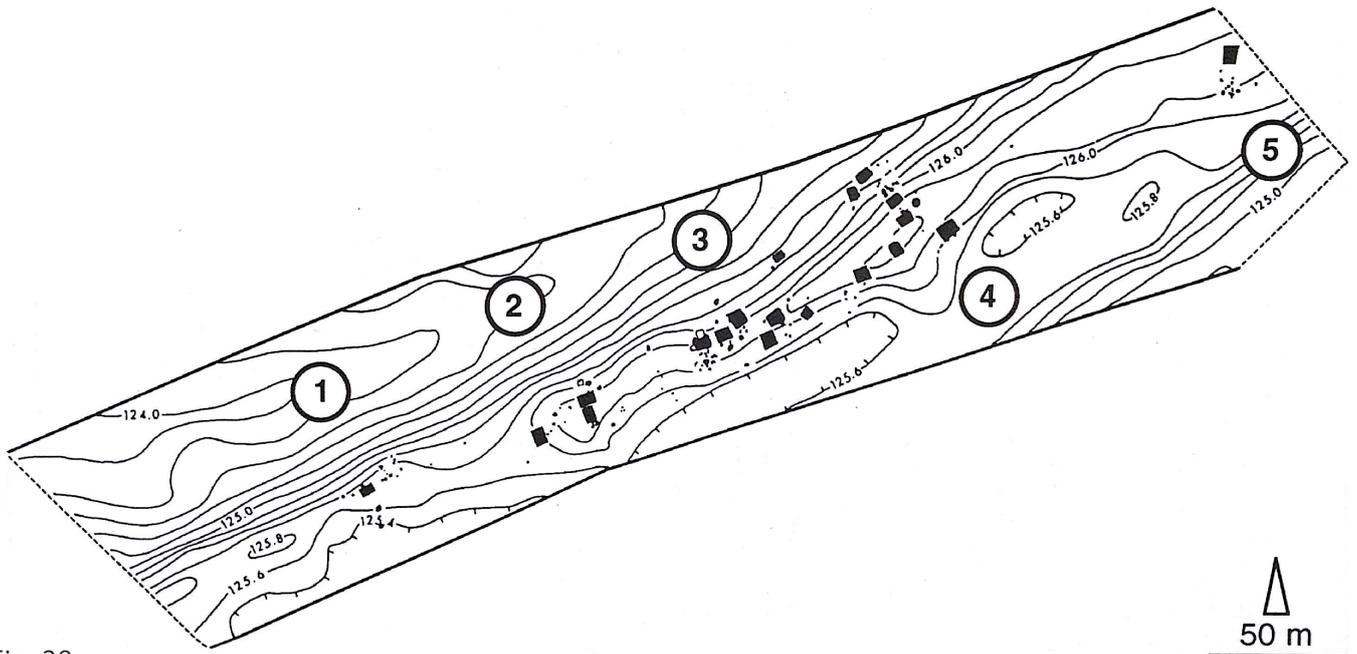


Fig. 28

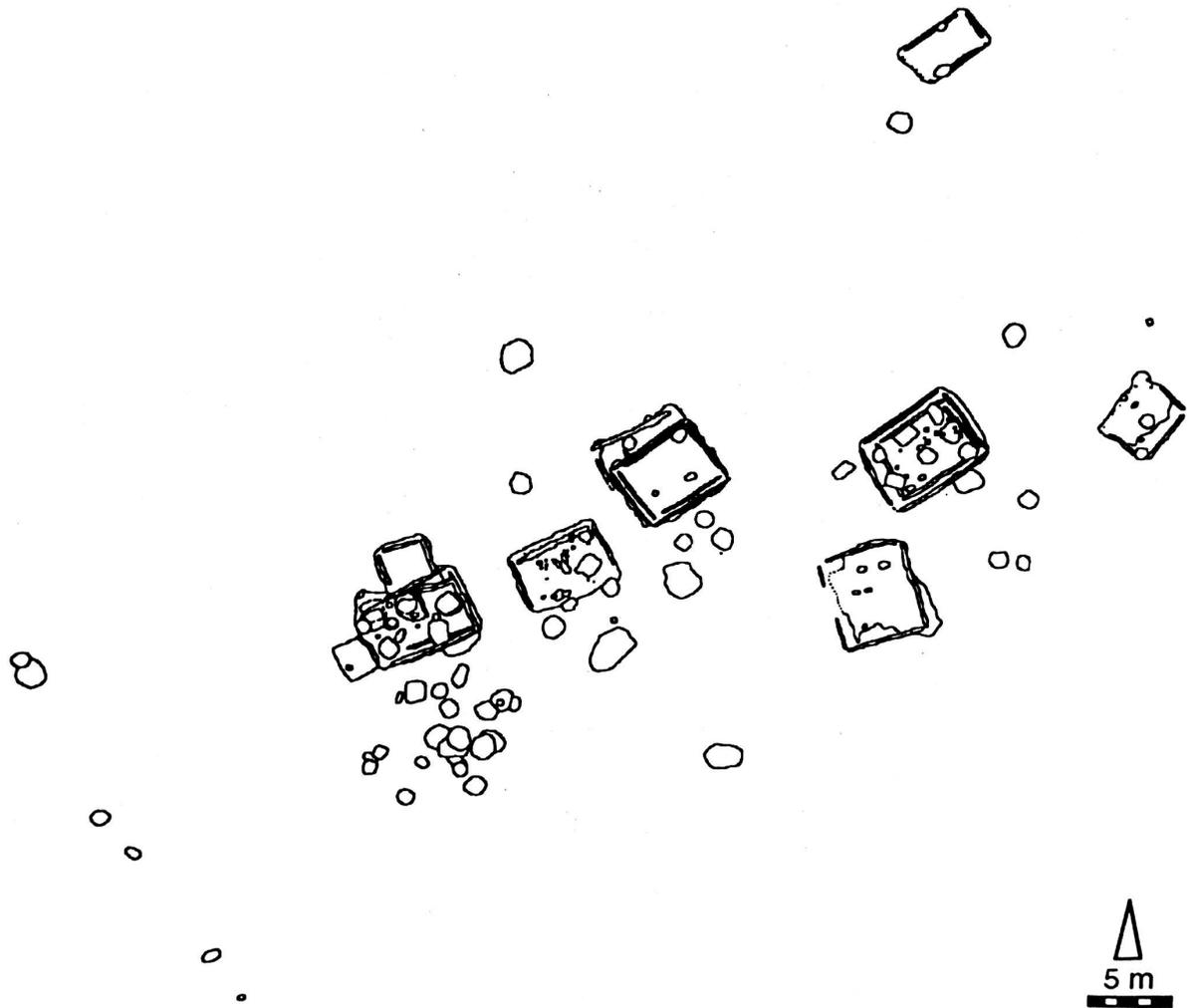


Fig. 29



Fig. 30

Fig. 31

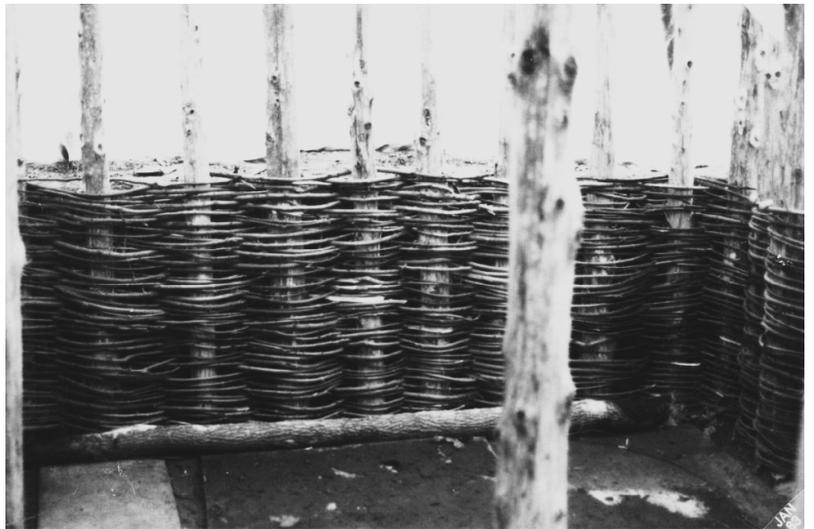


Fig. 32



**Fig. 30** Archaeological reveal of the imprint of a pit-house on a hardened layer of gumbo clay. Photo is a postcard from the site.

**Fig. 31** Reconstruction of the wall of a Cahokian pit-house based on archaeological blueprints. The materials used are all locally available, such as small timber posts for the wall structure and twigs and branches for the weaving. Photo by Larry Kinsella.

**Fig. 32** Reconstruction of the exterior of a Cahokian pit-house. The material used for the roof is thatch. Photo by Larry Kinsella.

and processing areas, storage pits, and sweat lodges amongst others, with a primary use of local materials for construction, like wood, cane, twine, thatch and mud (Mehrer 1995: 25). Because of the impermanent nature of both the constructions and the materials used little has survived for modern-day archaeologists to accurately reconstruct. However, evidence of domestic constructions and agriculturally developed land has been found in the form of waste mounds and building imprints arranged in clusters, establishing spatial relationships between them that suggest possible uses. Activity areas are characterized by archaeologists in terms of their size, feature morphology and arrangement as well as debris attributes (Mehrer 1995: 25). Certain patterns may also point towards specific daily routine events in the context of food processing or item crafting.

Archaeological remains of residential architecture from the Emergent Mississippian period have been found to be arranged into courtyard hamlets, suggesting a family unit organization. One of the traits that separates this period from the latter Mississippian is the replacement of rectangular four-pole foundations with post wall trenches, which measure around 15 - 30 cm wide and 15 - 60 cm deep, and are excavated into the floor of the foundation basin of these semi-subterranean pit-houses. Rarely do these trenches meet, and little evidence has been found of openings. It has also been theorized that these wall constructions may have been prefabricated and inserted into the trenches during construction. It is likely that these poles would have been weaved together with twigs, or clad in mats of some similar nature, although there is no evidence of daubing. A progressive increase of the overall size of residential buildings has also been observed in

the archaeological record throughout the entire span of the occupation of Cahokia, from 10 meters square during Emergent Mississippian times to almost 100 in the late Mississippian period, as well as variations in form from the most basic rectangular plan to early L-shaped buildings and T-shaped in latter times. The shapes of ceremonial and storage pits also respond to values that are common to many Native American cultures, with the square representing culture and the four cardinal directions and the circle representing the order of the natural world (A. Dalan, Rinita et al. 2003: 71-73).

## SECOND LEVEL: MONUMENTAL ARCHITECTURE

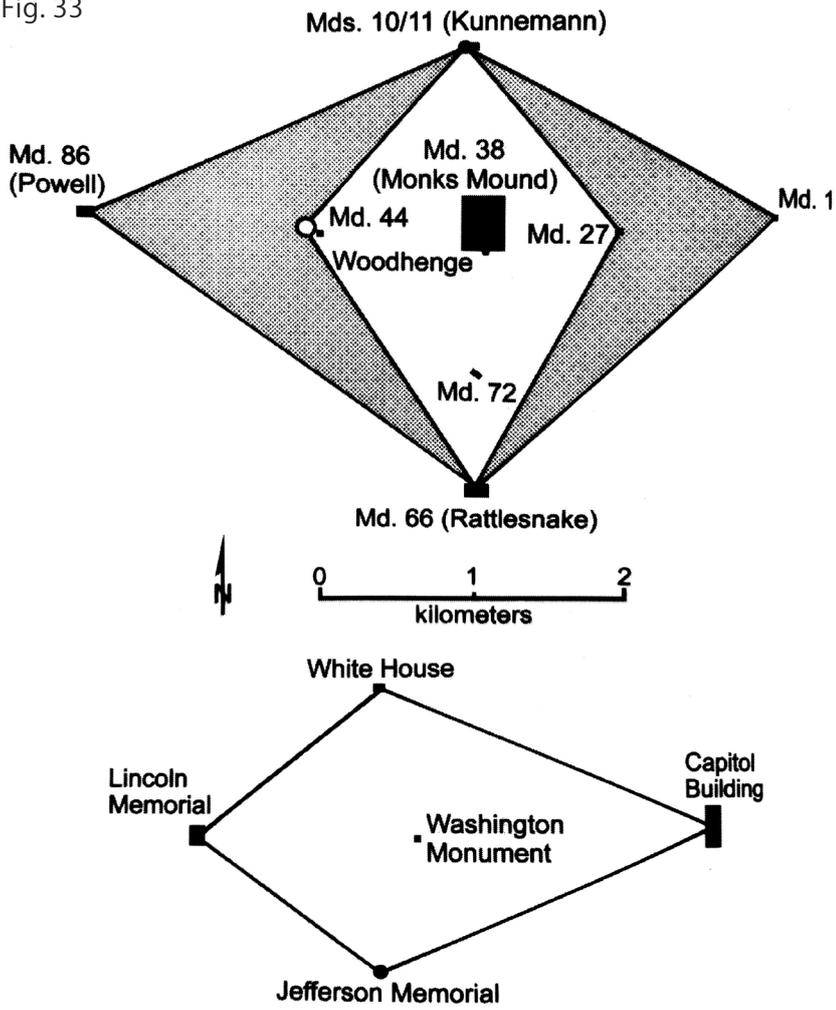
The patterns found in the monumental works manifest the presence of political power, the social and ideological control over production and development, in the case of Mississippian cultures, led by an elite that commanded other people's labor and skill to conduct large settlement and monument construction. For instance in the form of management infrastructure and storage facilities in rural production settlements about Cahokia, which may indicate the existence of a specialized sector of people in the political field, centrally located and serving as an organizational node (Emerson 1997: 36-37).

The monumental architecture of Cahokia is also a reflection of the religious power and the central role it played for the Cahokians. Such facilities would be represented for instance in the form of temple grounds, mortuary structures and priest houses.

Ceremonial works of architecture found in rural settlements therefore also provide valuable hints of

**Fig. 33** In order to highlight the monumental scale and overall organization of the central site of Cahokia, Rinita A. Dalan et al. compare it to the monumental district of downtown Washington DC. Similar devices were used, such as a central focus, verticality to create domain, cultural symbols to communicate political structure, and repetition of forms to convey cultural messages, amongst others (Rinita A. Dalan et al. 2003).

Fig. 33



organized cult surrounding the material goods, such as agricultural produce, and can help understand Cahokian religious views towards the environment's resources and production (Emerson 1997: 39).

The distribution of mounds, open plazas and borrow pits follow obvious patterns and proportions that reflect hierarchies within the site and its surrounding settlements. Planning of a large settlement is already apparent in the early times of the American Bottom's occupation, as the construction of Monks Mound and the Grand Plaza, the largest bare dirt square to date, began during this period. The amount of earth-moving and land flattening for these projects is a clear indicator of a well-established social structure and political order.

#### NODE-BASED SETTLEMENT PATTERNS

Following the node-based settlement model introduced earlier, the most accepted theories suggest that the farmstead represented the basic family unit, mostly organized in hamlets that were occupied year-round. These clusters didn't have any public or ceremonial roles, and were dependent on the village for public, religious and political integration (Emerson 1997: 70). Larger mound centers would consequently articulate the villages together, and ultimately to the large main mound enclosure of Cahokia.

Other theories propose that the hamlets were cohered with each other as highly dispersed villages associated with ceremonial nodes, which were vaguely connected to the main mound centers. In any case, the nodal-based understanding of settlement patterns would also be

**Fig. 34** Diagram showing the nodal settlement system of Cahokia and its surrounding subcommunities, with levels of settlement ranging from the family unit to the main mound center, tied together by civic nodes (mounds, ceremonial structures...). Illustration from Thomas E. Emerson's *Cahokia and the Archaeology of Power*.

applicable on a regional scale, with strategically located sites, mainly located along waterways for communication purposes, supporting the main civic center at Cahokia.

Fig. 34

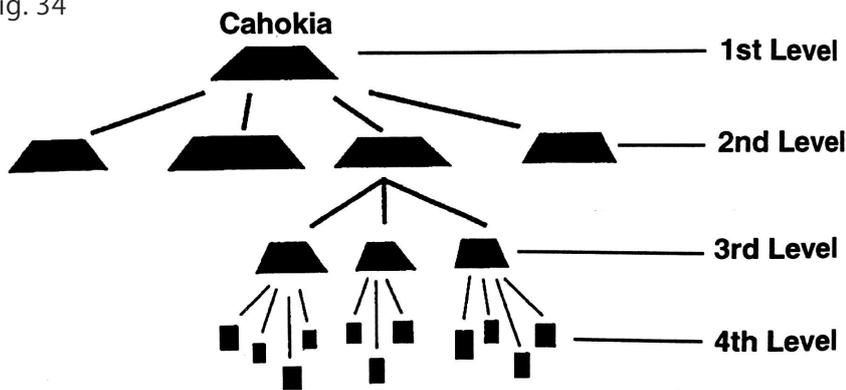


Fig. 35



**Fig. 35** Air photograph of Monks Mound in the 70s, featuring a modern suburban 'satellite community' comparable to the ones that surrounded the mound center in prehistoric times. Since the picture was taken the residential development was cleared as the Historic Park was established, along with other modern elements from the landscape. Photo from [theamericanbottom.com](http://theamericanbottom.com).

## 05\_DEBATES ON RESILIENCE: CONCLUSIONS

### RESILIENCE OF PREHISTORIC CAHOKIA

In a time of unprecedented development and use of natural resources, interpreting data and patterns corresponding to past social and ecological systems provides a long-term perspective on adaptive strategies and their consequences. (C. Grier et al. 2016).

An examination of the circumstances in which the Precolumbian mound-building peoples of the Mississippi occupied the landscape shows that their social response to the environment proved to be quite resilient, both to the natural factors as well as the resulting human transformations of the landscape. In light of today's concerns and ongoing issues, such as climate change and the consequent variations in flood frequency, intensity and predictability, the question that arises is what were the strategies that allowed the Mississippian culture to adapt to the river's constant flux and the issues that it generated.

It was mentioned above on one hand that the growth and final design of the Cahokian settlement and regional system was a gradual response to changes in the river's fluctuations, such as the reactivation of old meanders and oxbow lakes, and that had its repercussions on the following historical developments of the site.

On the other hand, it is also no coincidence that the Southeastern mound-building cultures adopted these elevated earth constructions as their staple architectural, as well as political, expression. Cultures worldwide that have had to tackle the consequences of settlement in the proximity of water masses or large waterways have

responded in similar ways to the ensuing hazards. Such is the case of the Dutch terp, an artificial earth mound built with the purpose of providing safe ground for construction in low-lying geographical areas, the oldest being at least 2000 years old and still in use today.

Another element to take into account is the historic trends that the Mississippi ecological system experienced during the time of occupation of the American Bottom. Geoarchaeological studies suggest that the region experienced an absence of large seasonal floods from AD 600 to AD 1200 (Munoz et al. 2015), which coincides with the shift towards early agricultural settlement in the floodplain and the expansion of the Emergent Mississippian culture, and ultimately the rise and decline of Cahokia. This set of circumstances triggered as a natural response the development of a very unique settlement process of the floodplain, which over time resulted into a new scene of factors that could have eventually led to the disarray of the Mississippian culture and the cease of permanent habitation.

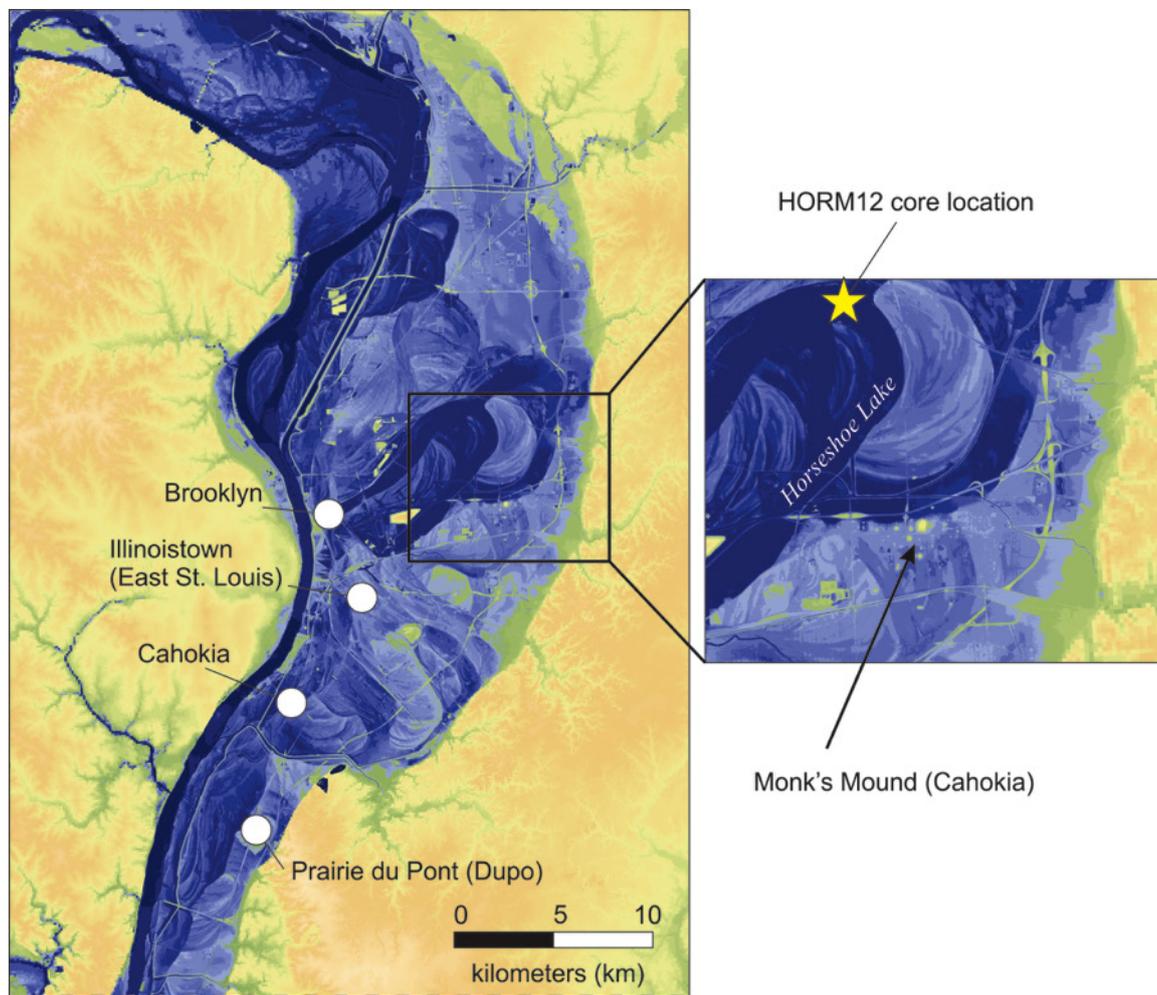
**Fig. 36** Terp mound believed to have been built during the times of Roman occupation in a low-lying coastal area of the Netherlands. Photo from werelderfgoed.nl.

**Fig. 37** Simulation of the historical flood of 1844 from E. Munoz et al.'s study. Transformation of the natural banks of the river and the decrease of natural wooded areas led the river to take over a large portion of the floodplain. It is believed that flooding of this magnitude might have happened in the late periods of Mississippian settlement.

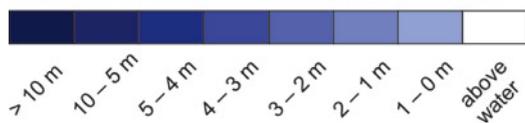
Fig. 36



Fig. 37



**June AD 1844 flood simulated inundation**



○ Historic towns described as “abandoned to the remorseless flood”

## RESILIENCE DEBATES IN THE MISSISSIPPI BASIN

The devastating effect hurricane Katrina had on Southern coastal communities, in 2005 was a decisive catalyst for the whole perspective on resilience in the geographical context of the Mississippi Basin as a whole, which questioned the adaptability of current settlement models and land management policies in light of climate change. Although the setting of the American Bottom is intrinsically inland, the debate resonates throughout the entire geographical system of the Mississippi river, and the underlying questions that it sparked are equally valid.

Consideration was given for other geographical regions facing similar issues with regard to flooding, and which through experience have historically had to develop adaptive strategies. The Dutch Dialogues are such an example of shared knowledge between countries on a common resilience matter. A combined program between the Netherlands and the United States, its goal is to share experience and elaborate strategies that will promote integrated water management and resilience, 'striving to integrate flood risk mitigation, engineering, spatial planning, urban design, environmental restoration, community amenities, and economic development'.

Another interesting Dutch contribution to the debate is the Room for the River governmental programme, whose goal according to its website is 'to give the river more room to be able to manage higher water levels'. By reserving for the river certain areas that have been proven to become active floodways during water rises, the risk of a more unpredictable impact on populated areas is significantly reduced.

**Fig. 38** Rhein river making its way through the Dutch city of Arnhem. Old fluvial courses have been kept as natural lower wetlands that can be taken over by the river in the event of a flood, as part of the Room for the River programme. Photo from the Room for the River website.

An American resilience programme that tackles a similar issue is the Changing Course Competition, which is based on the area of the Mississippi Delta and the surrounding coastal land shaped by the river. Its purpose is to design a master plan to manage the wetlands, land loss and sedimentary land formation, which are all part of the natural dynamics of the river in its terminal stage, with the goal of ensuring a coexistence between the changing natural land and populated and developed areas.

Fig. 38



## VISIONS OF A RESILIENT AMERICAN BOTTOM

Similar strategies as the ones that have been developed and implemented in the Netherlands can be adopted in more inland sections of the Mississippi Basin, such as the American Bottom, to attain a more solid settled landscape that recognizes the role of the river. An integrated reading of the landscape reaching out to knowledge from different disciplines, such as anthropology, geography or archaeology, is the most effective way of devising frameworks for better landscape interpretation and design.

Having revised the historical approaches and responses to the landscape of the Cahokians, a series of elements can also be taken into account for future development of adaptive actions.

For instance, the mounds could be introduced as an urban landscape feature in a similar way as the terps are still used today in the Netherlands, or perhaps by designing new urban developments in a way that is responsive to the lake and floodway network, green channels could be opened that would serve as flooding bypasses. Prehistorical elements like the borrow pits resulting from the extraction of earth for the new urban mound structures could also work as a floodplain level lowering device, located in areas where a compensation of the water level is more critical.

An approach to the native cultural past of the Mississippi Basin reveals that it's a fundamental component of the historical and present landscape in the broadest sense of the term, as serves as a most excellent source of knowledge for the future inhabitants of the area to implement as they adapt to the everchanging character of the Mississippi.

**Fig. 39** After the flood of 1993, a cornfield at the American Bottom lies covered in sediments. Photo by Quinta Scott.

Fig. 39





## 06\_BIBLIOGRAPHY

- A. Dalan, Rinita, R. Holley, George, I. Woods, William, W. Watters JR, Harold, A. Koepke, John. 2003. *Envisioning Cahokia, A Landscape Perspective*, edited by The Northern Illinois University Press. DeKalb, Illinois.
- B. Whiting Young, Melvin L. Fowler. 2000. *Cahokia: The Great Native American Metropolis*, edited by Chicago: University of Illinois Press, Chicago, Illinois.
- Colin Grier, Lilian Alessa, Andrew Kliskey. 2016. *Looking to the past to shape the future: addressing social-ecological change and adaptive trade-offs*, edited by Regional Environmental Change, Springer-Verlag Berlin Heidelberg, and approved December 2016.
- C. S. Holling. 1973. *Resilience and Stability of Ecological Systems*, Annual Review of Ecology and Systematics, Vol. 4 (1973), pp. 1-23.
- E. Emerson, Thomas. 1997. *Cahokia and the Archaeology of Power*, edited by The University of Alabama Press. Tuscaloosa, Alabama.
- E. Munoz, Samuel, E. Gruley, Kristine, A. Ashin Massie, David, Sissel Schroeder, Fike, W. Williams, John. *Cahokia's emergence and decline coincided with shifts of flood frequency on the Mississippi River*, edited by James A. Brown, Northwestern University, Evanston, IL, and approved April 8,

2015.

G. Kennedy, Roger. 1994. *Hidden Cities. The discovery and loss of ancient North American civilization*, edited by The Free Press. New York.

Hudson, Charles. 1976. *The Southeastern Indians*, edited by The University of Tennessee Press.

Jackson, J. B. 1984. *Discovering the Vernacular Landscape*, edited by Yale University Press, New Haven, Connecticut and London.

Mathur, Anuradha and da Cunha, Dilip. 2001. *Mississippi Floods: Designing a Shifting Landscape*, edited by Yale University Press, New Haven and London.

Nabokov, Peter, and Robert Easton. 1989. *Native American Architecture*. New York: Oxford University Press.

N. Morgan, William. 1999. *Precolumbian Architecture in Eastern North America*, edited by University Press of Florida. Gainesville. Tallahassee. Tampa. Boca Raton. Pensacola. Orlando. Miami. Jacksonville.

Roberts B.K. 1987. *Landscape Archaeology*, in *Landscape and Culture: Geographical and Archaeological Perspectives*, edited by J. M. Wagstaff, 77-95. Basil Blackwell, Oxford and New York.

Sack, R.D. 1980. *Conceptions of Space in Social Thought: A Geographic Perspective*, edited by University of Minnesota Press, Minneapolis.

Sarah E. Baires, Melissa R. Baltus, Meghan E. Buchanan. 1999. *Correlation does not equal causation: Questioning the Great Cahokia Flood*. July 21, 2015. PNAS, vol. 112, no. 29.

*Archaeology, Settlement Patterns and Social Power*,

edited by Northern Illinois University Press. DeKalb, Illinois.

W. Yerkes, Richard. 1987. *Prehistoric Life on the Mississippi Floodplain*, edited by the University of Chicago Press, Chicago and London.

#### ONLINE RESOURCES AND ILLUSTRATIONS

AHLP. "What are Historic Landscapes?" ahlp.org. <http://ahlp.org/about-the-ahlp/what-are-historic-landscapes/> (accessed June 21, 2017).

America's Wetland Foundation. "Louisiana old river control complex and Mississippi river flood protection" americaswetlandresources.com. [http://americaswetlandresources.com/background\\_facts/detailedstory/LouisianaRiverControl.html/](http://americaswetlandresources.com/background_facts/detailedstory/LouisianaRiverControl.html/) (accessed June 22, 2017).

Atlas Obscura. "The Mississippi River Basin Model" atlasobscura.com. [atlasobscura.com/places/the-mississippi-river-basin-model/](http://atlasobscura.com/places/the-mississippi-river-basin-model/) (accessed June 19, 2017).

Cahokia Mounds. "Cahokia Mounds" cahokiamounds.org. [cahokiamounds.org/](http://cahokiamounds.org/) (accessed May 8, 2017).

Changing Course. "The Place" changingcourse.us. <http://changingcourse.us/at-issue/the-place/> (accessed June 22, 2017).

Flickr. "St. Louis from Cahokia Mounds" flickr.com. [www.flickr.com/photos/tumorboy/264681408](http://www.flickr.com/photos/tumorboy/264681408) (accessed

May 8, 2017).

lchr. "Postcards for trade" lchr.org. <http://lchr.org/a/25/aq/CardsIHaveToOffer6.htm> (accessed May 8, 2017).

Life at Sea Level. "Dutch Dialogues" lifeatsealevel.org. <http://lifeatsealevel.org/> (accessed June 22, 2017).

Kinsella, Larry. "Cahokia Pit House." flintknapper.com. <http://flintknapper.com/Cahokia%20Pit%20House.htm> (accessed May 8, 2017).

Pinterest. "Serpent Mound." gr.pinterest.com. [gr.pinterest.com/pin/394346511094275448/](http://gr.pinterest.com/pin/394346511094275448/) (accessed May 30, 2017).

Quora. "Floods and Flooding: What is the best way to protect cities, towns and villages from overflowing river banks?" quora.com. [www.quora.com/Floods-and-Flooding-What-is-the-best-way-to-protect-cities-towns-and-villages-from-overflowing-river-banks](http://www.quora.com/Floods-and-Flooding-What-is-the-best-way-to-protect-cities-towns-and-villages-from-overflowing-river-banks) (accessed June 21, 2017).

Scott, Quinta "The Confluence of the Mississippi and Missouri: A Model Restoration Project." quintascott.wordpress.com. [quintascott.wordpress.com/category/flood-of-1993/](http://quintascott.wordpress.com/category/flood-of-1993/) (accessed May 30, 2017).

Ruimte voor de Rivier. "Room for the River." ruimtevoorderivier.nl. [ruimtevoorderivier.nl/english/](http://ruimtevoorderivier.nl/english/) (accessed June 22, 2017).

Colten Jennifer, Vogler, Jesse. "Significant and insignificant mounds" theamericanbottom.org. <http://www.theamericanbottom.org/itineraryTwo.htm> (accessed June 19, 2017).

Werelderfgoed. "Romeinen ook in Waddengebied"

werelderfgoed.nl. werelderfgoed.nl/nieuws/romeinen-ook-in-waddengebied (accessed June 22, 2017).

Wikimedia Commons. "File:1927 LA Flood Map.jpg" commons.wikimedia.org. [https://commons.wikimedia.org/wiki/File:1927\\_LA\\_Flood\\_Map.jpg](https://commons.wikimedia.org/wiki/File:1927_LA_Flood_Map.jpg) (accessed June 22, 2017).

Wikimedia Commons. "File:Canyon de Chelly, Navajo.jpg" commons.wikimedia.org. [https://en.wikipedia.org/wiki/File:Canyon\\_de\\_Chelly,\\_Navajo.jpg](https://en.wikipedia.org/wiki/File:Canyon_de_Chelly,_Navajo.jpg) (accessed June 19, 2017).

Wikimedia Commons. "File:Kaskaskia Island 1993 flooding.jpg" commons.wikimedia.org. commons.wikimedia.org/wiki/File:Kaskaskia\_Island\_1993\_flooding.jpg (accessed June 19, 2017).

Whiston Spirn, Anne. "Anne Whiston Spirn." [annewhistonspirn.com](http://www.annewhistonspirn.com). <http://www.annewhistonspirn.com/> (accessed June 22, 2017)

University of Minnesota "River Life Joins U of M Institute for Advanced Study" [riverlife.umn.edu](http://riverlife.umn.edu). <http://riverlife.umn.edu/2012/08/river-life-joins-u-of-m-institute-for-advanced-study/> (accessed June 20, 2017)

US Army Corps of Engineers, Mississippi Valley Division. "The Mississippi River & Tributaries Project: Controlling the Project Design Flood." [mvd.usace.army.mil/](http://mvd.usace.army.mil/). (accessed May 8, 2017).





