
LET'S TALK ABOUT CONSTRUCTION TRADITIONS IN LOUISIANA THAT TAP INTO EARTHEN ARCHITECTURE

Catalina Reyna

Universitat Politècnica de Catalunya, Barcelona, Spain
catalina.reyna@upc.edu

José Manuel Gómez-Soberón

Universitat Politècnica de Catalunya, Barcelona, Spain

María Neftalí Rojas-Valencia

Universidad Nacional Autónoma de México, Mexico City, Mexico

Abstract

There is a generalized perception that Earthen Construction is nonexistent in Louisiana and by default that modern adobe buildings are not adequate for the region, particularly in the south of the state. Changing this perception is the motivation of this work. Unearthing this history is the proposal to put in motion the transformation of this perception. This implies that the examples are there and they have been documented. This presentation brings a new perspective by highlighting constructions that date back 3,000 years ago and construction methods employed during the French and Spanish eras. The last part of the presentation will showcase some of the most prominent features of Louisiana's architecture that can beneficially be adapted to a modern adobe house. This is a qualitative analysis of the efforts to use earth as a building material via biographical research. The results of this work will only be assessed after presentations like this take place systematically and targeting wider and diverse audiences.

Keywords: Earthen Construction Louisiana, Mound Cultures, Bousillage

Introduction

This study presents some of the history of the use of earth to build in Louisiana, starting with the Native American Cultures and continuing with the colonial times when the Europeans of Spain and France had control of the area, these colonial powers brought the African culture as well. Information about each phase and influence is not equally well documented, for that reason, the different sections of this presentation are not of equal lengths.

Native American earthen building

Borders are geopolitical imaginary lines agreed upon by modern societies, Native American Civilizations may not have thrived in specific demarcations of what are today the states of the United States of America, however construction codes today are different for different states and sometimes for different Counties or Parishes as it is the case of Louisiana. For this reason, the focus of this section is about the examples of earthworks built in the state of Louisiana. As the search for the subject initiated, it was learned that the only vestige of any earth building done by the Native Americans that inhabited Louisiana prior to the contact with European Colonialism; are Mounds. In a search to investigate dating of the oldest Mound sites in the data base Mendelej on May 5 th , 2022, 19 citations were found to be relevant to accomplish this goal. These 19 articles span across 98 years from 1926 to 2020. Within this information, the Nolan site (16MA2011) in Northeastern Louisiana is the oldest Mound site, C14 dated 5200-4800 calendar years before present (ca.yr.B.P.) [1]. The next oldest reference found, is Mound A at Poverty Point, it is cited as being built ca 3261 cal.yr.B.P [2]. Louisiana's office of Tourism hostess a web site for the World Heritage Site of Poverty point, where it is described as a stunning landscape of earthen monuments built hand by hand and basketful by basketful by men and women, shaping nearly 2 million cubic yards of soil into a massive 72 foot tall mound, enormous concentric half circles and related earthworks [3] A study aligned with collaborative ideas of indigenous archaeologies that propose to center theory and practice on descendant people's lives and ways of knowing, developed research with members of a small Muskogee-identified community in the US south in which, it is suggested, that this large-scale earthworks represent a horned owl [4] Geoarchaeological investigations that measure erosion of soil formation aid to determine pace of construction and it was inferred that Mound A needed a large group of people in its construction during a short period of time. The study's argument that the Mound was constructed as part of a ritual that integrated a large population [2] Mounds are indications of Social Complexity [5] and community planning and intra-site spatial organization [6]. Of special interest for this presentation is the description of a Mound building technique that uses cane layers of some thickness in the construction of a conical Mound raised on a pyramidal platform with two terraces with evidence in 1926 that showed a total height of eight feet in Jonesville Site in Cathoula Parish [7] Another conical mound is located in Northeast Louisiana where small villages or hamlets nucleated around, were built or inhabited from 2400 to 2100 cal.yr.B.P. [8].

In Marsville, the seat of Avoyelles parish a 20 Mounds site was referenced in 1926, although the spelling used is Marchville, where the largest flat top is 12 feet high and covers 3 acres of ground [9] Two mound sites are dated between year 1300 to 1500 in Bossier Parish [10,11] In Caddo Parish two sites are cited, Belcher and Fourche Maline, in the latter, Mound 2 is described as a quadrilateral temple substructure and burial area [12, 13,14].

Besides Nolan site mentioned above, the Reno Brake and Osceola sites are in Tensas Parish. A study suggests that the latter mounds predate the appearance of an intensified food production economy [15] In Vermillion Parish, there is an important Mound Complex called Morgan site [16] The Kleinpeter site is another multi-component site located in East Baton Rouge Parish [17] within this category of multi-Mound sites is Jordan site with 7 mounds arranged around a plaza and a village that collapsed after European contact and is located in Morehouse Parish [18]. Another Parish with a Mound site is East Carrol with their Lake Providence Mounds where a recent study identified evidence of commerce

with cultures of groups that thrived in today's northern States of the USA [19]. Some of the Mound building cultures identified as possible Mound builders are the Tchefunte, Marsville, Troyville, Coles Creek, Plaquemine, Natchez and Caddoans. It was very surprising that the names of some Mound sites bare names that rarely evoke that past and its peoples, is possible to infer that naming selection is based on the current European names of the current geopolitical sites and or the names of the scholars and land owners of European descent. This is more striking when Mound site names are contrasted with names of Archeological sites in Latin America such as: Paquime, Teotihuacan, Tenochtitlan, Chichen-Itza, Tical, Machu Picchu, Coquequirao, Tiwanaku, etc. The work of scholars, has no doubt, important merit, however it is possible to propose that new research investigate innovative ways to find consensus for naming sites in a way to way to honor the Cultures that build Mounds in Louisiana.

European colonial era

During the XVI century, the first European to sail along the Gulf Coast was the Spanish explorer Alonso Álvarez de Pinera. He traveled from Florida to Veracruz and by the amount of fresh water he saw, he inferred the existence of a great river he named: "Río de Espiritu Santo" in 1519 [20] He was referring to the Mississippi River, however the first European Colonial Power to Settle in the region was the French. In the 1680s, the French sent Pierre Le Moyne, Sieur d'Iberville from La Nouvelle France (Canada) to establish a colony in the mouth of the Mississippi River [20] When these colonists arrived, there were already free blacks in the area, who spoke Spanish [20] In 1762 France gave to Spain the Louisiana Territory [20] that extended form the Gulf of Mexico to Canada between the already Spanish territories to the west from Texas to California and Florida to the East. It could be argued that these three influences: Spanish, French and African must have had impacted the building traditions of what is today Louisiana and this section is devoted to discuss that idea. Starting by the African connection, a study indicates that many of the cultural characteristics brought to the American Continent by enslaved people from African, were forgotten, suppressed, or changed by the third generation. This was purposely done, many times, to Christianize them [21]. This explanation can only make sense, considering that Africans were coming from diverse Cultures where "mud-built structures are superbly formed, highly expressive buildings with their own distinct and striking aesthetic" [22] And this was already an old tradition at the time of the Slave Trade, since archaeologists have found evidence of mud brick buildings constructed as early as ten thousand years ago in North Africa [23] A study that presented examples of the earthen heritage of the world includes the towns of Djenné in Mali and explains that it is a settlement almost entirely built of raw earth and whose Great Mosque is the world's largest mud construction [24] Inhabited since 250 B.C. [25] Another example of exceptional traditional earthen architecture, is the city of Aoulef, one of the old oasis cities of Algeria [26] And in the south of the African continent constructions of the 11 th century CE in Zimbabwe features dhaka (adobe) floors [27].

Continuing with the thesis of the Spanish construction methods that could have influenced earthen construction in Louisiana, a study identified several earthen construction techniques by sampling 618 sites throughout the Iberian Peninsula. This sample implies the vast tradition of earthen architecture in Spain. Therefore, it can be inferred that the Spanish occupation of Louisiana must have brought about, earthen construction to the area, the same study documented degradation caused by diverse

factors which this presentation argues could have also affected and caused the destruction of that heritage in Louisiana [28]. As the French, British and Spanish Periods in the South seem to have been a continued time line this section will present them as part of the European influence of Earthen Architecture in Louisiana. As an exception to the self-imposed boundary for this presentation some plantations in Alabama need to be highlighted; Rochon plantation location is described to be near the earthen ruins known as Spanish Fort and archaeology work in 1999 uncovered the foundation trenches of a Poteau-en terre ancillary building. At D’Olive plantation construction efforts that took place in the 1960’s found an abundance of colonial building materials, such as tabby and handmade bricks, dating the eighteenth century [29].

Tabby is made by burning oyster shells to create lime then mixing it with water, sand, ash and broken oyster shells used by Spanish settlers. [30] The relevance to have cited above the Alabama plantations for this presentation, is that these are only two of over 60 plantations around Mobile, and only these and two more have been excavated with archaeological interest [29] Therefore it is very possible that the ones that disappeared around the South took with them the earthen structures when they disappeared. There were 46,300 plantations in 1860 in the United States [31]

The term used above of Poteaux an Terre which translate as Posts in ground is a building method from the French Colonial Era, and described in 1966 as “until recently being employed” consisting in half-timbering and vertical posts set into the ground [32] From 1702 to 1711 the capital of the French colonial Louisiana was Mobile, therefore that is the justification of the relevancy of information from that area to be presented herein, even if only a part of the Louisiana Territory is called Louisiana State, today. Looking at an extended geography of the French era, also intensifies the influence of the Spanish building tradition, not only during the time Spain own the territory but during the French era itself as the Spanish colonial outpost at Pensacola was very close and there was a lot of interaction between them. Four relevant architectural techniques investigated by others (Maygarden, 1997, Wilson 1971, Laframboise 1975, Thurman 1984, Edwards 1988, Oszucik 1991, Peterson, 1993) used local soil. The wood used for the posts was a great variety of trees, such as mulberry, cypress, oak Eastern red cedar, described as the most durable of them all. The different features of each method and its intersections are presented in table 1[33].

	Square posts	Round stakes	Upright in a trench	Groundsill or sole plate	Sophisticated timber- framed buildings with vertical beams	Filling
Poteaux en terre						Infill the spaces between wall posts with bousillage or daub a clay mixed with straw or Spanish moss
Pieux en terre						
Poteaux sur sole						
Colombage						

Table created by the authors of this presentation from information of reference [33]

Table 1 Four construction methods of the Colonial Era in the Louisiana Territory.

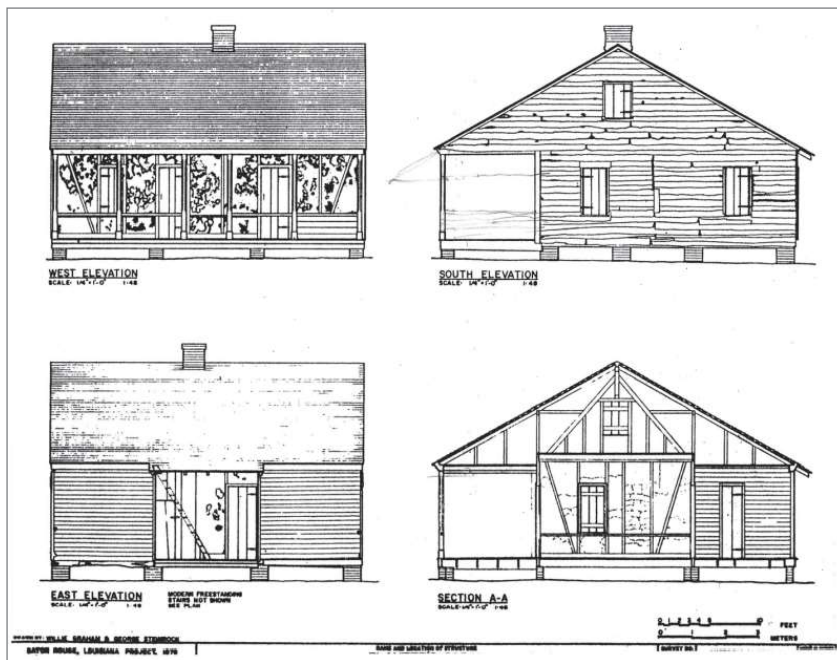


Figure 1. Leland Richardson 18 th - century bousillage planter’s cabin. Baton Rouge LA [From Ref 35].

It is also confirmed that the bousillage tempered earthen wall infill, used in French Colonial, Creole and Acadian buildings, born of Native American and French construction traditions was continuously used in Louisiana through the eighteenth and nineteenth centuries [34]

A study that traces the French vernacular architectural traditions that were implanted by the Canadians in Early Louisiana provides the recount of French missionary geographer M. François Le Marie S. J., on January 15th 1714 who indicates that walls were made of mud and white washed outside and inside, with lime locally made of oysters and other shells. This work also describes that around the year 1730 that the wall construction method called in this reference; bousillier entre les poteaux was used to build small houses in New Orleans and the surrounding areas. These European construction techniques had to be adapted to the new environment and thanks to the First Nations, they were able to find new ingredients for the traditional bousillage such as the local clays mixed with the Spanish moss binder [35]

Local architecture features compatible with earthen construction

A plan of an 18 th century bousillage cabin is the perfect didactic tool to showcase features of the Louisiana vernacular architecture that are classic and that can very well adapt to the modern earthen construction, for example with compressed earth blocks (CEB). Observing these features is a way to connect the past with the future. The Cabin shown in figure 1 has a total area in the first floor of 1074ft² (100m²) if integrating the porch into the interior space, plus a potential livable area in a second floor of 327.6ft² (30.4m²), which makes it for more than a cabin and a very adequate size that competes with today’s urban housing standards to provide comfort and that could represent a

more sustainable option if the walls use the bousillage technique or stabilized adobes or CEB, both made with local materials and the labor be provided by the home owner. The gabled roof will be ideal if extended to protect the walls from excessive rain. And popularizing this concept could help bridge the gap created by the lack of affordable housing within less privileged communities. Rescuing the legacy of the Native Americans, the building techniques of the European and the wisdom of the Africans that were brought by them.

Conclusion

The history of the Mound cultures are not fully written, more archaeological research with modern techniques will continue to provide information about the construction methods used by the first peoples of Louisiana, however there seems to exist enough evidence that they could have also built dwellings because every source consulted about the earthen construction during the Spanish and French eras, made reference to the advice provided by the natives in order to incorporate the local materials when the Europeans were recreating their techniques.

This study has also presented the idea of the same influence in the area to build with earth as a contribution of the enslaved people from Africa, which also provided their labor. The volume of standing buildings made with adobes of the Spanish Era and with the bousillage technique of the French era, is small, however there are enough documents that showed they existed.

This presentation highlights all those past traditions and it is possible that by doing so, the interest to research ways to reintroduce them in the landscape of sustainable methods in Louisiana, will grow.

References

- [1] Arco, Lee J., Katherine A. Adelsberger, Ling Yu Hung, and Tristram R. Kidder. "Alluvial Geoarchaeology of a Middle Archaic Mound Complex in the Lower Mississippi Valley, U.S.A." *Geoarchaeology* 21, no. 6 (2006). <https://doi.org/10.1002/gea.20125>.
- [2] Ortmann, Anthony L., and Tristram R. Kidder. "Building Mound A at Poverty Point, Louisiana: Monumental Public Architecture, Ritual Practice, and Implications for Hunter-Gatherer Complexity." *Geoarchaeology* 28, no. 1 (2013). <https://doi.org/10.1002/gea.21430>.
- [3] Poverty point, World Heritage Site, Consulted on May 26th, 2022. May be found at: <https://www.povertypoint.us/>
- [4] Bloch, Lee. "Oral Traditions and Mounds, Owls and Movement at Poverty Point: An Archaeological Ethnography of Multispecies Embodiments and Everyday Life." *Journal of Social Archaeology* 19, no. 3 (2019). <https://doi.org/10.1177/1469605319846985>.
- [5] "Plazas as Architecture: An Example from the Raffman Site, Northeast Louisiana." *American Antiquity* 69, no. 3 (2004). <https://doi.org/10.2307/4128404>.
- [6] Roe, L. M. "Social Complexity and Mound Ceremony in the Coles Creek Culture: Research at the Raffman Mound Center in Madison Parish, Louisiana." *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 2010.
- [7] Mound Builders in Louisiana, U.S.A., Nature Publishing Group, Page 171 July 31, 1926
- [8] Kidder, Tristram R., Lori Roe, and Timothy M. Schilling. "Early Woodland Settlement and Mound Building in the Upper Tensas Basin, Northeast Louisiana." *Southeastern Archaeology* 29, no. 1 (2010). <https://doi.org/10.1179/sea.2010.29.1.009>.

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- [9] Louisiana Mound Builders, Nature Publishing Group, Page 805 November 7, 1936
- [10] Gibson, Jon L. "Bossier Tribes, Caddo in North Louisiana's Pineywoods." Index of Texas Archaeology Open Access Grey Literature from the Lone Star State, 2005. <https://doi.org/10.21112/.ita.2005.1.13>.
- [11] Girard, Jeffery S. "Byram Ferry (16BO17): A Middle to Late Caddo Period Mound Site in the Red River Floodplain, Northwest Louisiana." Index of Texas Archaeology Open Access Grey Literature from the Lone Star State, 2007. <https://doi.org/10.21112/.ita.2007.1.18>.
- [12] Ford, James A. : "The Belcher Mound: A Stratified Caddoan Site in Caddo Parish, Louisiana. Clarence H. Webb." *American Anthropologist* 64, no. 1 (1962). <https://doi.org/10.1525/aa.1962.64.1.02a00380>.
- [14] Schambach, Frank F. "Coles Creek Culture and the Trans-Mississippi South." Index of Texas Archaeology Open Access Grey Literature from the Lone Star State, 1991. <https://doi.org/10.21112/.ita.1991.1.16>.
- [15] Kidder, Tristram R., and Gayle J. Fritz. "Subsistence and Social Change in the Lower Mississippi Valley: The Reno Brake and Osceola Sites, Louisiana." *Journal of Field Archaeology* 20, no. 3 (1993). <https://doi.org/10.1179/jfa.1993.20.3.281>.
- [16] Brown, Ian W. "The Morgan Site: An Important Coles Creek Mound Complex on the Chenier Plain of Southwest Louisiana." *North American Archaeologist* 2, no. 3 (1982). <https://doi.org/10.2190/53c0-ywxl-maa6-vnje>.
- [17] Stevenson, J. F. "Zooarchaeology of the Kleinpeter Site, 16 EBR 5. M.A. Thesis," 1992.
- [18] Kidder, Tristram R. "Excavations at the Jordan Site (16MO1), Morehouse Parish, Louisiana." *Southeastern Archaeology* 11, no. 2 (1992).
- [19] Weinstein, R., & Wells, D. (2020-01-14). The Cahokia Connection at the Lake Providence Mounds, Louisiana. In *Cahokia in Context: Hegemony and Diaspora*. : University Press of Florida. Retrieved 5 Jun. 2022, from <https://florida.universitypressscholarship.com/view/10.5744/florida/9781683400820.001.0001/u.pso-9781683400820-chapter-18>
- [20] Ned Sublette, *The World That Made New Orleans, From Spanish Silver to Congo Square*, Lawrence Hill Books, 2008, 2009, ISBN 978-1-55652-958-0
- [21] Donaldson, Gary A. "A Window on Slave Culture: Dances at Congo Square in New Orleans, 1800-1862." *The Journal of Negro History* 69, no. 2 (1984). <https://doi.org/10.2307/2717598>.
- [22] Faux, Karen. "Glorious Mud." *Practical Pre-School* 2016, no. 189 (2016). <https://doi.org/10.12968/prps.2016.189.3>.
- [23] Niroumand, Hamed, M. F. M. Zain, and Maslina Jamil. "Various Types of Earth Buildings." *Procedia - Social and Behavioral Sciences* 89 (2013). <https://doi.org/10.1016/j.sbspro.2013.08.839>.
- [24] Mutal, Sylvio. "Adobe Architecture: Past and Present." *World Heritage Review*, no. 31 (2003).
- [25] Unesco, World Heritage Convention, Old Towns of Djenné, consulted on May 24th, 2022. May be found at : <https://whc.unesco.org/en/list/116/>
- [26] Boutabba, H., M. Mili, and S. D. Boutabba. "L'architecture Domestique En Terre Entre Préservation et Modernité: Cas d'une Ville Oasienne d'Algérie 'Aoulef.'" *Journal of Materials and Environmental Science* 7, no. 10 (2016).
- [28] Mileto, Camilla, Fernando Vegas López-Manzanares, Valentina Cristini, and Lidía García Soriano. "Earthen Architecture in the Iberian Peninsula: A Portrait of Vulnerability, Sustainability and Conservation," n.d. <https://doi.org/10.1186/s43238-021-00043-9>.
- [29] Chirikure, Shadreck, Munyaradzi Manyanga, A. Mark Pollard, Foreman Bandama, Godfrey Mahachi, and Innocent Pikirayi. "Zimbabwe Culture before Mapungubwe: New Evidence from Mapela Hill, South-Western Zimbabwe." *PLoS ONE* 9, no. 10 (2014). <https://doi.org/10.1371/journal.pone.0111224>.
- [30] Tabby concrete, definition consulted on May 28 th , 2022 May be found at: https://en.wikipedia.org/wiki/Tabby_concrete

[31] National Humanities Center, Toolbox Library: Primary Resources in U.S. History & Literatures / The Making of African American Identity: Volume I, 1500-1865 / Enslavement Consulted on June 2 nd , 2022. Internet site located at: <http://nationalhumanitiescenter.org/pds/maai/enslavement/text3/text3read.htm>

[32] Kniffen, Fred, and Henry Glassie. "Building in Wood in the Eastern United States: A Time-Place Perspective." *Geographical Review* 56, no. 1 (1966). <https://doi.org/10.2307/212734>.

[33] Waselkov Gregory A, Editor, French Colonial Archaeology at Old Mobile : Selected Studies, *Historical Archaeology*, Volume 36, Number 1, 2002 Journal of the Society for Historical Archaeology, Michael Ronald L, Editor. ISSN 0440-9213

[34] Blokker, Laura Ewen, and Heather Knight. "Louisiana's Bousillage Tradition: Investigation of Past Techniques for Future Practice," 2009.

[35] Edwards, Jay. "Long Distance Implantation of Vernacular Architecture Traditions: The Canadians in Early Louisiana." *Material Culture Review* 88–89 (December 2020): 45–78. <https://doi.org/10.7202/1073852ar>.

MSc. Catalina Reyna graduated from UAM-Iztapalapa and has a master's degree from LUT in waste and water engineering. In 2021 she was accepted in the doctoral program *Tecnología de la Arquitectura, Edificación y del Urbanismo* at UPC in Barcelona to perform research related to the production and use of Compressed Earth Blocks.

Dr. José Manuel Gómez-Soberón, graduated from BUAP and has a master's degree from UNAM, specializing in construction. In 2002 he obtained a doctorate from the Polytechnic University of Catalonia (UPC). He belongs to the National System of Researchers (SNI). Since 2003 he has been part of the teaching and research staff of the UPC.

Dra. Ma. Nefalí Rojas Valencia, graduated from the UNAM, with a First Degree and a Master's Degree in Sciences and Water Resources. In 2004 she was awarded a Doctorate in Sciences and Environmental Engineering at the UAM. She belongs to the national system of investigators. Since 1993, she has been on the staff of the UNAM's Institute of Engineering.