

**Louisiana's *Bousillage* Tradition:
Investigation of Past Techniques
for Future Practice**

FITCH MID-CAREER GRANT FINAL REPORT



By:

Laura Ewen Blokker

Principal, Southeast Preservation

lblokker@sepreservation.com

Heather A. Knight

Adjunct Assistant Professor, Tulane School of Architecture

hknight@chauxvive.com

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On the cover: Clockwise from left, *tacheron* trampling Spanish moss into clay for *bousillage* at Green House by H. Knight; detail of *bousillage* in Estopinal House by L. Blokker; photomicrograph of Dumesnil House *bousillage* showing traces of decayed Spanish moss bark by J. Walsh.

Introduction

This report describes the work of the 2009 Fitch Mid-Career Grant funded project, “Louisiana’s *Bousillage* Tradition: Investigation of Past Techniques for Future Practice,” conducted between June 1, 2010 and May 31, 2011. The goal of this project was to gather detailed information about the historic Louisiana building technology of *bousillage* which could be used to broaden public understanding of the tradition and lead to the creation of technical guidelines for its conservation and restoration. The authors sought to achieve this through an interdisciplinary methodology incorporating collection of local knowledge, close study of building fabric, and laboratory analysis. This work was designed to build upon several years of independent research on this topic conducted by the authors. In spite of the fact that the number of documented extant *bousillage* buildings in Louisiana numbers well over a hundred and that there are without doubt countless more undocumented examples, this technology has received scarce attention from scholars and is commonly misunderstood and taken for granted.

As explained in the application for this grant,

[*bousillage* is an earthen nogging used in the timber structures of Creole and Acadian Louisiana throughout the eighteenth and nineteenth centuries. Like many construction technologies used in the Americas during the Colonial period, *bousillage* is based on a European tradition adapted to New World conditions. In this case, the influence of Native American building practices on the tradition was immediate, well documented, and enduring. In 1699, a Jesuit priest, Father Paul du Ru, recorded in his journal the manner in which the different native tribes of the Gulf South mixed the local Spanish moss with mud to make a mortar for building. From that point forward this indigenous

recipe was used for the earthen nogging in Louisiana's French Colonial, Creole, and Acadian buildings. The proliferate use of this technology throughout the area that is present-day southern and central Louisiana is remarkable when compared with the limited use of other earthen nogging methods throughout the United States. As an earthen construction technique [in North America], *bousillage* may be second only to adobe in prevalence as measured by the number of standing historic buildings in which it is found.

We embarked upon this project with the belief that the proper preservation of *bousillage* is as important as that of adobe and that a similarly in-depth knowledge of its mechanics and conservation requirements to that which exists for adobe should be developed. With this project, we have gathered some exciting new insights and have successfully moved in that direction.

Survey Work

The aim of survey work during this project was documentation of the rare surviving *bousillage* buildings east of New Orleans in St. Bernard Parish. This parish is located in the southeastern corner of the state and its fingers of land extend perilously into the Chandeleur Sound toward the diminishing Chandeleur Islands, which offer just a ribbon of buffer from the Gulf of Mexico. St. Bernard suffered greatly from the devastation delivered by Hurricane Katrina in 2005, and it was revisited by disaster of a different kind in 2010 when oil gushed into the Gulf from the Deepwater Horizon spill. Colonial settlement in this area began in the eighteenth century, and it is a historically and culturally rich landscape. Because of the threatened condition of this landscape in the face of coastal erosion and climate change, documentation of the few surviving *bousillage* buildings in St. Bernard Parish was considered a

priority. An unplanned field study of another building in western Louisiana came about as part of one of the oral history interviews. The “Green House” or Hebert House, located on the Mermentau River in the Lake Arthur vicinity of Cameron Parish is the southwesternmost extant example of *bousillage* known to the authors. Thus, through a fortuitous opportunity, documentation of both the southwesternmost and easternmost examples of *bousillage* was accomplished as part of this project.



Fig. 1: Map of primary buildings discussed in this report, by L. Blokker. Photograph of Hebert House by H. Knight, 2011. Photograph of Estopinal House by L. Blokker, 2011. Photographs of sample collection sites, Parlange Plantation, Homeplace Plantation, Mather House, Dumesnil House, and Desfossé House, by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.

Survey work in St. Bernard Parish began with an interview of local historian William Hyland. All of the historical information that follows is based on this interview, conducted April 22, 2011. Mr. Hyland's knowledge of St. Bernard Parish and Louisiana history is extensive and his assistance was invaluable to the documentation of the three extant *bousillage* buildings and the collection of information about two buildings which were destroyed during and after Hurricane Katrina. The three existing buildings are the Estopinal House, Magnolia Plantation House, and the Messa House. The demolished houses were the Rodriguez House and the San Germain House. These two houses and the Estopinal and Messa houses were all a part of the Toca Village, a settlement created by Louisiana's Spanish Colonial government for *los Isleños*, colonists from the Canary Islands. This was one of four *Isleños* settlements established between 1778 and 1783. The others were Galveztown below Baton Rouge; Valenzuela along Bayou Lafourche, below Donaldsonville; and Barataria along the Bayou des Familles. The *bousillage* houses were not completed until 1791 as documented in the Archivo General de Indias. It is very possible – even likely – that *bousillage* houses also survive in the three other settlement areas, particularly along Bayou Lafourche. This is an area for future research. Tradition states that prior to the construction of the permanent housing, the *Isleños* lived in palmetto huts. The construction of some *poteaux-en-terre* (post-in-ground) houses at Toca Village is also recorded at the St. Bernard Parish Clerk of Court. According to Mr. Hyland's account of the *Archivo General de Indias* records, construction of the *bousillage* houses for Spanish government was executed by a contractor with enslaved builders. The original St. Bernard church was also reportedly built of *bousillage* but it was replaced in 1851 due to a fire.

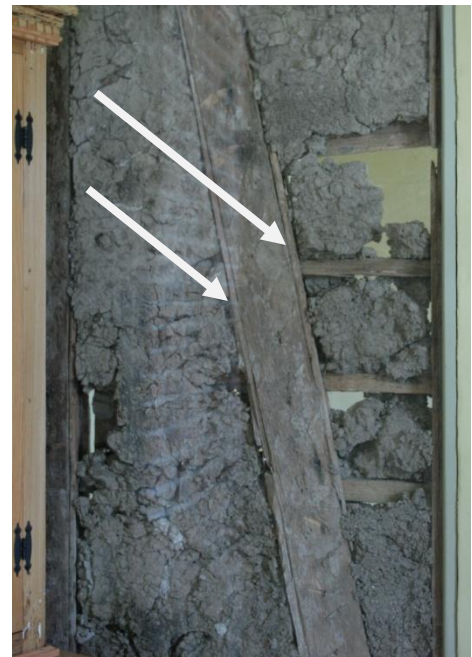
The Estopinal House was severely damaged by Hurricane Katrina and it has since been carefully restored. However, because not enough information or craftsmen skilled in

bousillage were available, the remaining original *bousillage* was preserved, but none of the losses were restored. It is a two-bay, two-room, side-gable house with an engaged porch. This form is classified as a Creole cottage. According to William Hyland, the dimensions of each room of the cottages built for the *Isleños* were typically 12' - 0" X 25' - 0". One of the original panels of *bousillage* has been covered with clear acrylic plastic sheeting so that it may be viewed and studied. This area provided an excellent opportunity to document the craft as used in the late eighteenth century within a close proximity to New Orleans; though unfortunately the encasement left no loose pieces of *bousillage* available for petrographic analysis.

The clay of the *bousillage* is of a light color typical of this southeastern area and it is mixed with a well-integrated abundance of moss. The moss appears to be cured. The work in situ demonstrates yet another variation in the post and *barreaux* arrangement that the researchers had not encountered in some forty buildings examined previously. In the Estopinal House, the *barreaux* are almost completely horizontal, which is not uncommon, but along the posts and braces on either side of the *barreaux* are attached thin strips of wood. The intention of this



Fig. 2 (above): Preserved section of *bousillage* in Estopinal House. Fig. 3 (below): Close-up of *bousillage* section showing thin strips of wood affixed to brace, indicated by arrows. Photographs by L. Blokker.



detail is uncertain, but it is possible that it was meant as extra reinforcement to keep the *barreaux* and the nogging from being able to move out of the wall. If so, it could represent an evolution of a practice in which a concave trough was hewn out of the sides of the posts and braces. This is known to have been done in Missouri where the method may have derived from the infill technique of *pierrotage* (stones and mortar) which uses no *barreaux* and would therefore require another device to keep the nogging in place.¹ The authors have not documented any example like this in Louisiana, but interviewee, Wade Lege described seeing just such a detail in an eighteenth century house near Baton Rouge. Very similar nailed strips appear in a photograph of a house with a nogging of thick riven oak slats daubed with mud and straw in Riverdale, New Jersey which appeared in a 1980 issue of the *APT Bulletin*.² According to the author of the query that accompanied the photograph, these strips served to hold the oak slats in place. As the slats in this design appear to be stacked one atop another, it is assumed that there would have been no pockets holding their ends. The query author had no information about this infill technique or even a name for it.



Fig. 4: Detail of *bousillage* with arrows indicating thin wood strips. Photograph by L. Blokker.

The Estopinal House was the only one of the three extant buildings in St. Bernard Parish in which the *bousillage* is exposed. Because of that fact and limited access, it was determined that the other two buildings would be documented simply with exterior photographs, basic

¹ Charles E. Peterson, *Colonial St. Louis: Building a Creole Capital* (Tucson: The Patrice Press, 1993), 44.

² Claire K. Tholl, "Query Re.: 'Filled Wall' Construction," *APT Bulletin* 12, no. 2 (1980): 124-126.

historical information, and locational data. Information about the two recently demolished buildings was also noted. While the lost San Germain and Rodriguez and the existing Messa and Estopinal were all two-bay, side gable cottages of the *Isleños Toca Village*, Magnolia is a seven-bay Creole plantation house with an umbrella roof. The construction date of the house is uncertain, but in 1794 the property was occupied by a Cuban-born man, Antonio Mendez, whose wife Félicité was of French descent.

On May 15, 2011, Knight travelled to the “Green House,” located near open prairie and the Lacassine National Wildlife Refuge, in Cameron Parish in the southwest corner of the state, to conduct both a *bousillage* structure survey and an oral history interview. The Hebert House or “Green House” is located on the Mermentau River, near Lake Arthur, Louisiana, and roughly at the junction of Greenhouse Lane and Highway 3056. The original owner was Alexander Hebert who married Clarisse Broussard and together had eight children. It is known locally as the “Green House,” because it is painted a deep forest green. The *bousillage* vernacular one-and-a-half story cottage was built c. 1836, in what was previously Calcasieu Parish. In the late nineteenth century, the state legislature created additional parishes in southwest Louisiana. It now falls in the boundaries of Cameron Parish, close to the Jefferson Davis Parish line. In 1997, it was added to the National Register of Historic Places.

The Acadian style cottage was built *poteaux-sur-sole*, or post-on-sill, with *bousillage-entre-poteaux*, or mud-between-posts as nogging. The *colombage* frame was hewn with an adze and finished with a hand-plane to smooth the exposed timbers. The frame is mortise and tenon with pegs. The house originally sat on cypress blocks and currently sits on treated pine blocks that rest on individual concrete pads, with a metal damp course between sill and pier. The upper floor *garçonnière*, or young men’s quarters, can be accessed through a staircase located on the

front screened-in porch. This area was locked and inaccessible during the survey. Originally, this access area would have been an open gallery. Another bed chamber was added to the southwest corner and then the remaining gallery was screened. The upper *garçonnière* with front exterior stair access and gable roof are both features of Acadian architecture.

The house is undergoing restoration, with its current phase addressing damaged sections of *bousillage* in two areas of the southeast *salle*. One lacuna is located in the rear, south interior wall under the eight-over-eight sash window. The other *bousillage* restoration is being completed on the rear interior east wall between two door openings. After its restoration, including removal of a rear 1920s addition, the house now has a rear gallery with three door openings. Originally, the cottage would have probably had two east facing windows, where the two outermost doors reside as partially evidenced in vintage on-site photographs and survey work.

The *bousillage* restoration is being undertaken by Dale Pierrottie of Lafayette. Pierrottie has over twenty years of experience in recreating *bousillage*. This will be discussed in the oral history section of the report. As a portion of the east wall was open, Knight was able to observe both original and reconstructed *barreaux* and *bousillage*. The original *barreaux* are hand-split and tapered at the ends. At 2' - 10", they are the longest *barreaux* the authors have documented anywhere. The newly constructed *barreaux* are machine sawn and uniform in appearance. They are much thinner than the original with one end tapered.



Fig. 5: Detail of original Hebert House *bousillage* and *barreau* above new *barreau*. Photograph by H. Knight.

Inactive carpenter bee holes were observed in the rear *salle*, which can be a threat to the stability of *bousillage* and adobe structures.

The original *bousillage* is light brown to pale yellow with what appears to be uncured Spanish moss. The Spanish moss is generous in portion in the salvaged original samples stored on the rear gallery. The nogging sample is more than two inches thick and finished with a lime plaster that has been painted with an inappropriate white latex paint. The plaster is flush with the framing and finished with a chair rail. This evidence accompanied with the fact that the timbers were hand-planed smooth means the timbers were purposely left exposed.

Materials Analysis

When the scope of work for this project was conceived, it was hoped that samples of *bousillage* could be sent to different labs and submitted to different forms of analysis such as soil characterization, qualitative petrography, X-ray diffraction, and quantitative analysis so that results could be compared to determine the method that produced the most useful information. However, at the outset of the project, the budget was reduced due to economic conditions and it was necessary to select a single method of analysis with the greatest promise to provide instructive findings. Petrographer John Walsh's laboratory Highbridge Materials Consulting, Inc. was selected to perform the analysis because John Walsh has a proven track record in the investigation of historic building materials and the authors have had positive experiences in working with him in the past. One limitation of Highbridge was a lack of expertise in plant fibers which was desired for analysis of the Spanish moss bound in the samples. However, multiple attempts to identify anyone with qualifications to examine the characteristics of the moss fibers in this type of building material – including inquiries with the McCrone Research

Institute for Microscopy and the College of William and Mary Center for Archaeological Research – failed. Therefore, we determined that there was no known superior alternative to John Walsh’s experience and skill as a microscopist for examination of the moss fibers and that keeping all of the analysis in the Highbridge lab would preserve the limited funds of the budget. Samples of loose retted and unretted moss were provided along with the *bousillage* samples for comparison.

Further discussion of the desired investigation of the material with John Walsh led to the conclusion that qualitative petrographic analysis would be the best starting point for examining the samples. Our top questions regarding the composition of the material regarded the inclusion of anything other than clay and Spanish moss, specifically lime or unburned oyster shell and animal hair. Although historic accounts of *bousillage* describe just a combination of Spanish moss and clay, a definition of the material that includes oyster shell or lime and deer or other animal hair has become standard; being regularly mentioned in tours of historic properties and appearing in architecture books and even Historic American Buildings Survey (HABS) drawings. While we also hoped to gain a clear picture of the mineralogical composition and particle size distribution of the clay, for which it seemed x-ray diffraction (XRD) might be most effective, it was decided that XRD would be deferred because of the restraints of the budget, and only executed if initial analysis pointed towards a great usefulness of that approach. As noted by Giacomo Chiari in his introduction to the “Materials and Craftsmanship” section of the 2000 Terra conference preprints, the analysis of clays is extremely complex and does not lend itself perfectly to XRD, which is the most common analysis approach, while a more effective technique utilizing synchrotron radiation is prohibitively expensive. In light of this he asked, “is

it really necessary to get this type of information?” We asked ourselves the same question, with the conclusion that in the context of this project, the answer was no.³

With the laboratory and the method of analysis determined, the next step was to select the best samples for study. At the outset of the project seven samples of *bousillage* were in hand. These samples were collected during a 2008 survey of *bousillage* structures by Laura Blokker, assisted by Heather Knight and Mark O’Bannon, which was made possible by the financial support of an Old Salem Architectural Fellowship. Of these, three were selected based on the amount of the material, its inclusion of sufficient Spanish moss for examination, and the ability of the three samples to represent variety in geography, age, and cultural associations. Those selected came from Homeplace Plantation, Parlange Plantation, and the Dumesnil House. Homeplace is a raised Creole plantation home constructed c. 1800 in St. Charles Parish, west of New Orleans up the Mississippi River. Parlange, like Homeplace is a Creole plantation home raised on a full-height, brick ground level (*rez-de-chausée*). It is located in Pointe Coupee Parish on the False River, northwest of Baton Rouge and is believed to have been constructed at the beginning of the nineteenth century. Both of these homes would have been erected by master builders with a crew of enslaved craftsmen of African descent. The Dumesnil House is a two-bay Acadian house resting on brick piers, which was built c. 1835. Its location in the Bayou Teche area of St. Mary Parish places it southeast of Lafayette, in the central portion of the state’s southern coast. Together, these three properties form a small triangle within the larger settlement pattern that is known as the “French Triangle of Influence.”

³ Giacomo Chiari, “Materials and Craftsmanship,” in *Terra 2000, 8th International Conference on the Study and Conservation of Earthen Architecture: Preprints* (London: James and James, 2000), 109.



Figs. 6 & 7 (left): *Bousillage* in situ at Homeplace Plantation. Photographs by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.

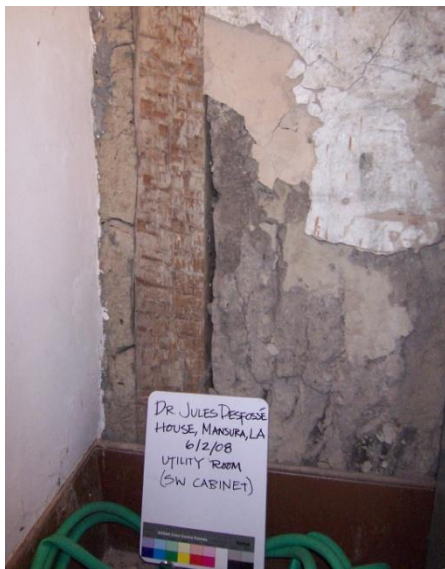


Figs. 8 & 9 (left): Loose *bousillage* at Parlange Plantation. Photographs by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.



Figs. 10 & 11 (left and above): Interior *bousillage* wall at Dumesnil House and detail of cracked *bousillage* revealed by removal of chair rail. Photographs by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.

Once these first three samples were analyzed and interviews were completed, it was determined that the cost benefit scenario for XRD would not be favorable, but that qualitative petrographic analysis of additional samples could offer further insights. Based on the same requirements of the quality of the sample and representation of variety, two more samples were selected for analysis. These were from the c. 1790 Jules Desfossé House in Mansura and the c. 1811 Mather House in Convent. Both of these buildings began as modest Creole houses which were later expanded. Mansura is in Avoyelles Parish in the center corner of the state, making the Desfossé House the most northern sample collection point. Convent sits on the east bank of the Mississippi almost midway between Baton Rouge and New Orleans.



Figs. 12 & 13 (left): *Bousillage* in situ at the Desfossé House. Photographs by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.



Figs. 14 & 15 (right): *Bousillage* in situ at Mather House. Photographs by L. Blokker, 2008, with the funding support of an Old Salem Architectural Fellowship.

The results of the qualitative analysis of the first three samples provided some interesting findings. As suspected, lime and animal hair were not found to be intentional additives in any of the samples. There was however, discovered in the Dumesnil and Parlange samples, a “very low abundance of fine-grained glass fragments that do not appear to be geological in origin.”⁴ The Dumesnil sample also contained some fine-grained particles that were interpreted as dead-burned lime. We hypothesized that these contaminants could have been created by a lime burning process on the site for the mortar required by the brickwork foundations and that they may have been introduced to the *bousillage* when it was tempered in an in-ground pit. Another possibility suggested by a segment of the interview with architect Eddie Cazayoux is that these particles were part of an ash additive. Mr. Cazayoux stated that he had been told ash was added to *bousillage* to reduce cracking. Reduction of cracking in plasters or mortars is typically achieved by slowing the curing process and a variety of materials have traditionally been used as retardants. Though ash is well-known in historic masonry as a pozzalonic additive to endow lime with hydraulicity, it is not common in vernacular earthen construction without lime. Analysis of the fourth and fifth samples aided in a comparative interpretation that suggested the glass particles were not likely to be ash, but in fact must be of a geological origins based on the striking similarity between two pairs of the samples.

The Desfossé sample was found to have a remarkably similar mineralogy to the Dumesnil sample, and likewise, the Parlange sample to the Mather sample. Although these sites are geographically dispersed, they may share a common geological development. Mather is located on the Mississippi River and Parlange, while not on the Mississippi, sits on the False River, a former part of the Mississippi that is now an oxbow lake. Meanwhile Desfossé and

⁴ John J. Walsh, “Bousillage Analysis Report” (Highbridge Consulting, Ossining, NY, 2010), 2.

Dumesnil are both sited close to bayous. We do not yet know why the Homeplace sample did not share characteristics of Parlange and Mather, as it is located on the Mississippi. Certainly, further exploration and consultation with local soil experts will help to clarify these findings and it is a topic for future work. With this additional data, Walsh concluded that the similarities of the Desfossé and Dumesnil glass particles, which he described as equidimensional, and the Parlange and Mather glass, which was shard-like were too distinct to be the coincidence of contamination. Further, he noted the absence of any truly spherical ash particles, making it unlikely that this was an additive.

A questioning of the cured/retted or uncured/unretted state of moss in *bousillage* first arose between the authors while surveying a building in which the exposed pieces of moss appeared to be unretted. This was contrary to conventional wisdom that states the moss must be retted and led us to investigate the matter in the analysis. Spanish moss is not actually a moss, but rather a bromeliad which grows in favorably warm and humid parts of the southeastern United States. The plant is found growing on trees, which it uses for support, but as an epiphyte, it absorbs its nutrients and water from the air and rainfall. It has a slender stem covered with bark and curly leaves. When it is cured, the outer bark and leaves are removed, leaving the strong black inner stem. Through a careful comparison of the retted and unretted Spanish moss samples with the fiber traces found in each of the *bousillage*, samples Walsh interpreted the Spanish moss in each of the first three samples as having been added in an uncured state. This conclusion was based on the “many occurrences of decayed bark residues as well as impressions of the outer bark imbedded in the dried clay.”⁵ In the second pair of samples, the Dumesnil moss was again interpreted as uncured, but the Desfossé moss appeared to have been cured. When

⁵ Walsh, 2.

Spanish moss is piled on the ground, it naturally begins to compost and the bark and leaves decay, so it is possible, that the piece of moss in the Desfossé sample was a naturally cured anomaly which might not represent all the moss in the building. Or, of course, it could be that it was in fact retted for the construction of this house. In either case, four out of five of the samples indicate the use of uncured moss, a fact contrary to the popular consensus about this building method.

All contemporary descriptions of the process of making *bousillage* – including those provided by each of our interviewees – state that the moss must be retted. Although methods of acquiring cured moss vary from composting in piles at home to purchasing from a moss gin, the call for retted moss is consistent. However, the use of unretted moss is specified in the most detailed known historic account of traditional *bousillage* making, a narrative of Acadian life from 1840 to 1901 known as the “Anonymous Breaux manuscript.” It states,

The *tache* is a square or round hole for making *bousillage*. The topsoil is stripped off with shovels. Then the hole is excavated with hand tools and the spoilage thrown to the side. At the bottom is laid a coating of “green” moss and layers of earth are alternated with further layers of moss. Then the whole is watered so as to soak the earth. The men called *tacherons*, bare-footed and with trouser legs turned up, descend into the *tache*, treading and crushing the mixture until it is of the consistency of mortar.⁶

If the analysis interpretation is correct that four samples used unretted moss and such a practice is corroborated by the one historic account that specifies the condition of the moss, then how has it come about that everyone believes moss used in *bousillage* must be retted? We have

⁶ George Reinecke, trans., “Early Louisiana French Life and Folklore, Excerpts from The Anonymous Breaux Manuscript,” in Louisiana’s Living Traditions, Louisiana Division of the Arts, http://www.louisiana-folklife.org/LT/Articles_Essays/the_breaux_manuscript.html (accessed September 12, 2008).

two possible explanations for this. After moss was added to the clay and wetted and then dried in the wall, the bark of the moss would decompose and all that remains visible to the naked eye in most cases is the inner shaft of the moss. In essence, the moss becomes retted in situ and anyone examining a historic building would assume it had been in that condition when mixed with the clay. In addition, it is possible that this impression would have been colored by knowledge of the moss industry that burgeoned in Louisiana during the twentieth century, in which moss was cured for use in upholstery and for other purposes. Memories of how “old timers” used to cure moss could easily attach themselves to one’s interpretation of this historic building process, but this may have led to a false understanding. Although moss was cured for home purposes prior to the twentieth century, the mass harvest and retting of the material did not occur until the 1900s, long after the peak of *bousillage* construction. Curing moss is somewhat tedious and time consuming and would have made an already laborious process even more so. Using uncured moss as described in the *Anonymous Breaux Manuscript* would be much more efficient method, so this finding could have significant practical application in restoration practice.

Interviews

Four oral history interviews were conducted under the auspices of this grant. The original scope of work for this project included the interview of craftsmen, folklorists, architects, and homeowners with *bousillage* experience. When the scope of work was revised to fit the reduced budget, we concluded that interviews would be limited to folklorists and craftspersons because we felt they would have the most information. In addition, some of their advanced ages rendered the gathering of information time sensitive. A further revision of the scope of work

was made to alleviate the Fitch Foundation Board's concerns that one of the interviews would overlap the work of a simultaneous project. After work began, it was discovered with sadness that another primary interview candidate, Earl Major, had passed away. The interviewee list was therefore revised to again include an architect and a homeowner.

Edward "Eddie" Jon Cazayoux, FAIA, was recorded on October 12, 2010 at the Pitot House on Bayou St. John in New Orleans. The Pitot House is *brique-entre-poteaux* or brick-between-post construction, and contains no *bousillage*. On November 16, 2010, Merle Donald "Don" Moe shared his experience as a *bousillage* folklife demonstrator on the grounds of Destrehan Plantation in Destrehan, the site of an eighteenth century *bousillage* Creole plantation house. Glenn Wade Lege II recounted the restoration of his *bousillage* Acadian cottage on January 3, 2011. Russell "Dale" Pierrottie, a self-taught *bousillage* sculptor, folklife demonstrator, and craftsman, was video interviewed while working at the "Green House" in Cameron Parish on May 15, 2011. Unfortunately, none of the interviewees learned *bousillage* technology directly from a seasoned practitioner.

As a native of Pointe Coupee Parish, Eddie Cazayoux grew up in an area where *bousillage* was prevalent and as an architect he has embraced such traditional "green" building technologies. His professional experience with *bousillage* includes several restoration projects and he incorporated a *bousillage* wall into the new construction of his own home. Seventy-three-year-old Don Moe is not a native of Louisiana, but was trained as a folklife demonstrator at Destrehan Plantation in 2004. To augment the knowledge he received from his predecessor, he scoured the internet for images and information on various aspects of the craft and has discovered more still through doing. Wade Lege learned the craft out of necessity, in order to restore his Acadian cottage that was moved in 2007 from the vicinity of Carencro and now

stands in the country near Abbeville. Dale Pierrottie's interest in *bousillage* began when his grandfather of Basille, Louisiana described its use in Acadian chimney building. He first had the opportunity to try the craft when he was employed to construct such a chimney for the 1986 film *Belizaire the Cajun*. To bring authenticity to this project, he began intensive *bousillage* research in archives and libraries. For the past twenty-five years, he has continued to study the technique and has learned much from hands on experience. As well as working on many restoration projects, he has created a unique art form by adapting *bousillage* to sculpture. In his interview, sixty-two-year-old Pierrottie modestly summed up his considerable knowledge stating, "People say, 'Oh you're an expert.' I go, 'No, all the experts are dead, I'm just an enthusiast who knows perhaps more than the laymen does."

All audio, with exception to Pierrottie, was recorded with a hand-held Panasonic Digital Recorder. An Olympus Digital Camera and tripod captured the Pierrottie interview and recorded his work at the "Green House." Back up audio recordings were made using the Recorder application on an iPhone. Additional short video clips were made using a Canon Digital Elph, Power Shot SD700 IS.

Collectively, the interviews provided invaluable information from several different perspectives on the mechanics of working with *bousillage*. Each interview was guided by a questionnaire created for this project. The questions covered the personal and professional background of each individual, their personal habitation experience related to *bousillage* and their hands on experience with *bousillage*. The primary aspects of *bousillage* construction that were discussed in detail are the clay, the moss, mixing techniques, consistency, and application methods. While some of the information was similar, techniques varied. A special emphasis was placed on discussion of Spanish moss because of the results of the analysis. As delineated in

the “Materials Analysis” section, four of the five samples sent to Highbridge for analysis employed uncured/unretted Spanish moss. These findings contradict popular folklore and current practice in which all Spanish moss is cured before mixing with mud.

All four interviewees called for cured Spanish moss, but how it was retted varied in description. Pierrottie’s moss for the “Green House” restoration was previously boiled for fifteen minutes to flash cure it. It was then allowed to air dry and still appeared somewhat green on site, with no black inner fibers exposed. Lege and Cazayoux purchased bales of ginned moss for their personal dwelling projects, while Pierrottie felt “ginned moss was too clean and uniform in nature.” Moe spoke of and demonstrated curing moss by a composting method. It would be wet down and flipped occasionally and wet again over six weeks, until the outer bark naturally decomposed. Pierrottie also likes this method, when the project timeline permits. David J. W. Floyd, Director of the Louisiana State University Rural Life Museum, commented in a phone interview in December 2010 that “boiling moss would have been too much trouble and that craftsmen would simply have piled it and composted it until it cured. He stated that the moss gin was not invented until the mid-nineteenth century, which is a late period in the historical use of *bousillage* construction. The author has noted that Spanish moss will self-cure in its natural environment, both on the ground and hanging in trees. Large clumps of green moss, whether deposited on the ground or in trees, will often contain an inner section of naturally cured moss. This was observed at Audubon Park in December 2010 and at the “Green House” hanging from a tree on the banks of the Mermentau River in May 2011.

The Moe interview also brought up methods of retting moss by burying in the ground and by drowning in the swamp or a local source of water. Moe seemed to be most knowledgeable in the folkways associated with harvesting and ginning Spanish moss and the industry centered

around that. He harvests Spanish moss from Destrehan Plantation and collects mud from the Mississippi River *batture*. The curing of moss is done on site via compost method. The “swamp water” curing process is described from the interview below:

They built scaffolds on a barge so they could move around. Another thing they did was when they pulled the moss off, they didn’t necessarily bring it back. They just buried it in the swamp water, and it would eventually decay itself. Then they would come back and collect it.

Moe further explained the “burial” curing method for moss:

You can dig a hole and bury it in there. [This method] gives you more surface area. Once you set it on the ground, that sets up the decay like you are composting in the garden. It works the same function. But, if you put it into a pile, and you have a large enough hole, you are going to have more surface area [for decomposition].

Moe, Lege and Pierrottie described or demonstrated loosely fluffing the moss before adding to mud. Pierrottie also explained how he sorts the moss to remove short pieces which do not hold the *torchons* (loaves of mud) together as well as long pieces. In this sorting process, twigs and other material that could cut the feet and hands of the craftspersons during tempering and application are also removed.

Two of the interviewees brought up using materials other than Spanish moss in *bousillage*. Wade Lege mentioned friends that restored their *bousillage* home using pine needles instead of Spanish moss. The house was out in the Louisiana prairie where pine trees are more prevalent. Dale Pierrottie also noted hearing of the use of pine needles, but suggested that this was probably just done in chinking, not in full wall infill. He further commented on experiments

done in the Lafayette area with byproducts from the rice industry as a substitute for moss. Both of these methods deserve additional inquiry and survey of mentioned structures. In 2008, the authors surveyed the Cook's Cabin at Oakland Plantation in Bermuda, Louisiana. The *bousillage* employed at the cabin used straw as a substitute for Spanish moss. The material resembled adobe, yet was still draped over the *rabbits* or *barreaux* in a similar manner. Such alternative fiber materials could offer another green aspect to building with mud in areas lacking ample Spanish moss by virtue of their local availability.

Lege worked with several workers from Central America for one year to restore his home and noted in the interview that they were good problem solvers and familiar with earthen architecture. He mixed his mud and moss on a table so “the work would not be back breaking.” Cazayoux and Pierrottie both employ baby pools as substitutes for pits in which to trample the mixture by foot. Tempering by foot is certain to have a considerably different effect on the consistency of the material than mixing on a table top and might affect the amount of water required and the subsequent curing and cracking. Each of the interviewees had developed slightly different methods of achieving what they felt was the right cohesion of the material before the loaves could be placed in the wall. Moe explained that when the material is first made, it will fall apart and must age for at least a day – preferably two – before it is a good consistency for using. Cazayoux noted that he worked the material wetter and let it dry a little before applying it. He also stated that he would add some extra moss to each *torchis* before placing it in the wall. Pierrottie focused on the incorporation of long pieces of moss into the mud, but used the *torchons* almost immediately after mixing.⁷

⁷ *Torchis* and *torchons* both refer to the loaves of mud and moss. Pierrottie says *torchon* while Cazayoux says *torchis*. *Baguette* is another term with the same meaning. Terminology varies somewhat by region.

Cazayoux, Lege and Pierrottie discussed the “green” qualities of *bousillage*. Lege mused on this subject:

Once you have lived in one of these [*bousillage* homes] ... it is hard to live without a thick wall, well insulated situation, because they do work really well. If I have to build, recreate something, it will be recreated with thick walls.

Bousillage is often misconstrued as insulation, when in fact it functions as thermal mass in the wall. In the 1990s, Cazayoux built one wall of his new residence with *bousillage* for its ability to retain heat or remain cold due to its thermal mass. He wanted to defy the contemporary opinion that you could not build in mass in a hot and humid climate successfully to create thermal comfort – something beautifully demonstrated by historic Creole homes. In his home *bousillage* is used in combination with a fireplace to provide comfort in winter as well as the summer. He described how the exposed *bousillage* cracks in the dry air of winter and heals itself as the humidity returns in the spring. In Louisiana’s humid weather, Cazayoux noted, the ability of *bousillage* to act as a desiccant has a very desirable impact on the indoor environment. Pierrottie termed this function “Cajun air conditioning,” explaining how moisture that is absorbed during the day is released in the lower temperatures of the evening, producing a cooling effect. He concluded that he would like to see people recognize sustainable qualities of this material for new construction as well, a sentiment the authors of this report share.

Conclusions and Future Directions

By bringing together materials analysis, building documentation, and craft practice interviews through the support of the Fitch Mid-Career Grant, we successfully created a new body of information about *bousillage* which will serve as the foundation for creating a primer on

this nearly lost building art. The observation of Spanish moss bark residues in the materials analysis is a very significant finding and something that could only be achieved through microscopic analysis; demonstrating how this was a valuable addition to field study and interviews. Field survey of buildings served the important purpose of documenting the physical evidence of this building tradition for future generations and also offered new insights. Invaluable information gained from trial and error experience was recorded by the interviews and will serve as an excellent basis for developing technical guidelines and recommendations for *bousillage* construction. Now, the insights that formerly resided within the heads and hands of a few will be able to be translated to an accessible written form to assist any conservator, architect, homeowner, student, or other person interested in this topic.

The next step in our on-going effort to create a published guide to *bousillage* will be the completion of additional interviews and analysis that will help to support or challenge the findings of this project. With this further information we will draft recommendations for materials and methodologies that we will then test with mock-ups and field trials. Field trials will allow us to observe and scrutinize the results of all the different methods suggested by our interviews, analysis, building study, and archival research. We will continue our efforts until we are able to accomplish all the work necessary to produce an informative and practical publication. Our enduring goal is not just to collect information, but to disseminate it to the public.

Glossary

barreau(x) – Fr. A small bar or stave. Used in this context to describe the wooden members which are fitted between the posts of the **colombage**, or timber frame, to support the clay and Spanish moss **bousillage** loaves. Barreaux are riven and roughly square, rectangular, or trapezoidal in section (depending upon how the fibers split) with tapered and pointed ends. They can be arranged horizontally, diagonally, or zigzaggedly. Also referred to as **bâtons** or **rabbits** in certain parts of Louisiana.

baton(s) – Fr. Stick. In this context, **barreau(x)**. Usage of this term is predominantly Cajun rather than Creole.

batture – Fr. The land between a river and a levee, which could consist of a sand-bar or mud deposits. This term is commonly used in Louisiana to refer to the sediment deposit between the Mississippi River and the levee. As the river rises and subsides seasonally, the batture becomes flooded and drained. Craftsmen would harvest sand from the batture for mortar and plaster recipes as well as clay and sand for **bousillage**, if the structure was in close proximity to the river.

brique-entre-poteaux – Fr. Brick-between-post construction, in which the brick nogging is laid between the vertical members of a timber frame.

bousillage – Fr. In the Gulf South, tempered clay and Spanish moss used as infill in **colombage** structures, as daub over the stick framework of chimneys, and occasionally as chinking. In French settlements of the Upper Mississippi River Valley and Canada, straw or hay, not Spanish moss, was used as the vegetal binder as in France. Acadian buildings of Nova Scotia also used marsh grass as the binding plant fiber. On early documents, the term appears as *bouzillé* or *bousillé*. It is uncertain when the term **bousillage** developed from *bousillé*. Also sometimes referred to as *bousillage entre poteaux* and *bousillier entre les poteaux*. In contemporary Parisian French, the verb *bousiller* means to ruin and the construction method of **bousillage** is known as **torchis**. One interviewee noted that visitors from Quebec said they use the word **bousillage** to mean making a mess.

colombage – Fr. Heavy timber-frame construction; the framing of walls infilled with **bousillage**, **pierottage**, or **briquelette-entre-poteaux**.

garçonnière – Fr. Young man's quarters. In Acadian structures the **garçonnière** was typically located in the attic. In French Creole plantation architecture, young men often had their own upper floor wing of a home. This structure was frequently separated from the main house by a gallery. Sometimes, it was a completely detached structure located off the rear of the main home.

gin – A machine that removes unwanted debris from fiber. Spanish moss is **retted** and cleaned of large debris by hand picking before it is ginned. The moss gin uses a toothed cylinder and fans to further clean it and prepare it for baling.

pierrotage – Fr. A stone and mortar infill between timber frame construction used in French settlements of the Upper Mississippi River Valley and Canada, but not along the Gulf Coast where stone is lacking.

poteaux-en-terre – Fr. Post-in-ground construction.

poteaux-sur-sole – Fr. Post-on-sill construction.

rabbit(s) – **Barreau(x)**. Term used in the Natchitoches area; of uncertain etymological development.

ret – To steep, soak, or otherwise process to separate fibers. In this context, to remove the outer bark from the inner stem of Spanish moss. var.: **retted**, **unretted**

rez-de-chaussée – Fr. The ground level of a raised building.

salle – Fr. Large general purpose room or hall.

tâche – Fr. An in-ground pit used to make **bousillage**.

tâcheron – Fr. Person who mixes **bousillage** by trampling in the **tache**.

torchis – Fr. A loaf of **bousillage**. In France, today, this is the term for **bousillage** construction. The word is believed to have derived from the resemblance of the clay and fiber wrapped around the **barreau** to a torch (Michel Lessard and Gilles Vilandré, *La maison traditionnelle au Québec*, 115). The word “torchier” is also known to have been used as early as the fourteenth century in England to refer to a dauber and the term “torching” meant the process of daubing (Tony Graham, “Wattle and Daub: Craft, Conservation, and Wiltshire Case Study,” 15). Also **torchon**.

torchon – Fr. A loaf of **bousillage**. In present day France, it is synonymous with mess like the current meaning of **bousillage** in Quebec (see **bousillage**). In seventeenth century France, a *torchon de paille* was a small bundle of straw or as much as a thatcher could lay at once (Randle Cotgrave, *A Dictionarie of the French and English Tongues*, 1611). Also **torchis**.