

## **ABSTRACT**

Title of Document:                    DIRT CHEAP: THE GARDENDALE  
EXPERIMENT AND RAMMED EARTH  
HOME CONSTRUCTION IN THE UNITED  
STATES

Jennifer Lynn Carpenter, Master of Arts, 2010

Directed By:                         Donald Linebaugh, Ph.D., Director, Historic  
Preservation Program

This work addresses an understudied and little appreciated construction type—rammed earth—and argues that understanding its history helps us better evaluate the relationship between our built environment and cultural values. Historically, rammed earth has expressed itself as an economical do-it-yourself project for farmers, enthusiasts, and environmentalists. It has also been understood as a way to correct social ills, minimize financial difficulties, and remedy overabundances of labor. During the Great Depression, these factors came together and pushed the federal government to experiment with the technique, erecting seven rammed earth homes as part of the Resettlement Administration's Gardendale Homestead north of Birmingham, Alabama. They remained an experiment, as a true federal rammed earth initiative never fully developed.

Gardendale thus provides an example of an alternative building technology that has not received wide cultural acceptance in the United States, despite a history that reaches back to the 19<sup>th</sup> century. This reluctance to adopt rammed earth could be attributed to the groups that have utilized the technique, who until recently, were considered marginal. Documenting and preserving Gardendale's extant rammed earth homes is necessary because of their unique construction type and the story they tell about our nation and the way we live. Moreover, the successes and failures of Gardendale provide context for rammed earth's latest reincarnation within the current green building movement.

**DIRT CHEAP: THE GARDENDALE EXPERIMENT AND RAMMED  
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By

Jennifer Lynn Carpenter

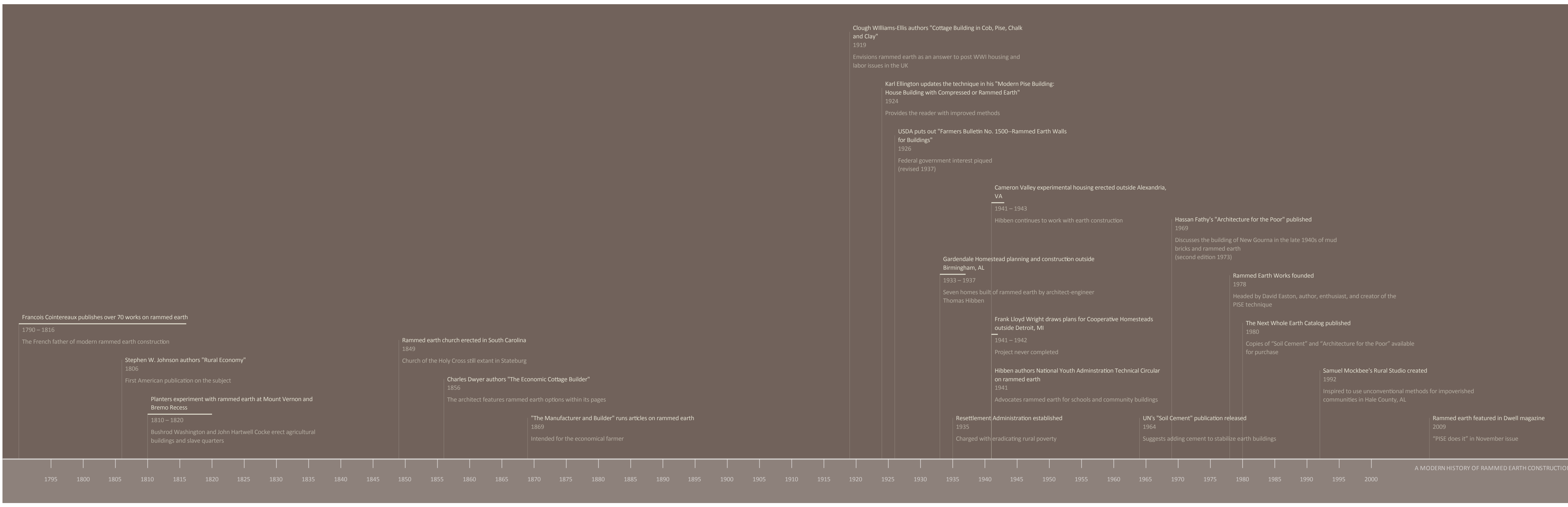
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Francois Cointereaux publishes over 70 works on rammed earth

1790 – 1816

The French father of modern rammed earth construction

Stephen W. Johnson authors "Rural Economy"

1806

First American publication on the subject

Planters experiment with rammed earth at Mount Vernon and Bremo Recess

1810 – 1820

Bushrod Washington and John Hartwell Cocke erect agricultural buildings and slave quarters

Rammed earth church erected in South Carolina

1849

Church of the Holy Cross still extant in Stateburg

Charles Dwyer authors "The Economic Cottage Builder"

1856

The architect features rammed earth options within its pages

"The Manufacturer and Builder" runs articles on rammed earth

1869

Intended for the economical farmer

Clough Williams-Ellis authors "Cottage Building in Cob, Pise, Chalk and Clay"

1919

Envisions rammed earth as an answer to post WWI housing and labor issues in the UK

Karl Ellington updates the technique in his "Modern Pise Building: House Building with Compressed or Rammed Earth"

1924

Provides the reader with improved methods

USDA puts out "Farmers Bulletin No. 1500--Rammed Earth Walls for Buildings"

1926

Federal government interest piqued (revised 1937)

Cameron Valley experimental housing erected outside Alexandria, VA

1941 – 1943

Hibben continues to work with earth construction

Hassan Fathy's "Architecture for the Poor" published

1969

Discusses the building of New Gourna in the late 1940s of mud bricks and rammed earth (second edition 1973)

Gardendale Homestead planning and construction outside Birmingham, AL

1933 – 1937

Seven homes built of rammed earth by architect-engineer Thomas Hibben

Frank Lloyd Wright draws plans for Cooperative Homesteads outside Detroit, MI

1941 – 1942

Project never completed

Hibben authors National Youth Administration Technical Circular on rammed earth

1941

Advocates rammed earth for schools and community buildings

Rammed Earth Works founded

1978

Headed by David Easton, author, enthusiast, and creator of the PISE technique

The Next Whole Earth Catalog published

1980

Copies of "Soil Cement" and "Architecture for the Poor" available for purchase

Samuel Mockbee's Rural Studio created

1992

Inspired to use unconventional methods for impoverished communities in Hale County, AL

UN's "Soil Cement" publication released

1964

Suggests adding cement to stabilize earth buildings

Resettlement Administration established

1935

Charged with eradicating rural poverty

Rammed earth featured in Dwell magazine

2009

"PISE does it" in November issue

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*Tamped earth, a construction method as old as the history of building itself, is being utilized by the Resettlement Administration at its Gardendale Homesteads project to provide houses that are durable, cool, attractive and what is most significant – “dirt cheap.”*

From “Success! County Homes Built ‘Dirt Cheap!’”  
Birmingham Post Herald July 14, 1936

## **Chapter 1: Introduction**

Fourteen miles north of Birmingham in Jefferson County, Alabama, lies Gardendale-Mount Olive, one of four resettlement homesteads built in the area by the federal government during the Great Depression.<sup>1</sup> Administered by the Resettlement Agency (later the Farm Security Administration), resettlement homesteads were housing communities where selected applicants rented their homes from the government at a reduced rate with the option to purchase at a later date.<sup>2</sup> At Gardendale, impoverished rural families and urban white-collar workers desiring to “get back to the land”<sup>3</sup> were given the opportunity to relocate just outside one of Alabama’s largest cities and support themselves through a combination of industrial work and subsistence farming.<sup>4</sup> Gardendale was one of several resettlement homesteads throughout the nation; at 512 acres, it was comprised of 75 homes and a local store.<sup>5</sup> What makes this resettlement homestead even more interesting is the fact that it was also the site of a ‘secret’ government experiment in an alternative building technology. Located at the back of the community, separate from the dominant wood frame structures, stand seven one-story rammed earth homes. These ‘mud homes,’ designed and built by architect-engineer Thomas Hibben, are the only remaining rammed earth features built by the government and are wonderful examples of New

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<sup>1</sup> Roach, “Rammed Earth Houses in Mount Olive,” 36.

<sup>2</sup> Hunter, “Rammed Earth Houses: An American Vision in the New Deal,” 6.

<sup>3</sup> Roach, “Rammed Earth Houses in Mount Olive,” 38.

<sup>4</sup> Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.

White, *The Birmingham District: An Industrial History and Guide*, 299.

<sup>5</sup> Roach, “Rammed Earth Houses in Mount Olive,” 37.

Deal era architecture. These modest one-story structures recall the early international and modern styles' streamlined, clean sensibilities.

In addition to their architectural uniqueness, some of Gardendale's rammed earth homes are still occupied by their original families, second or third generation homesteaders who recall an initial reluctance to live in houses made of compacted earth. Mrs. Clarice Fuller remembers her family worrying that their house would wash away with the first rain.<sup>6</sup> Peggy Sutterlin, whose husband Jerry grew up in one of the homes, said, "I expected dirt floors, a 'poor house.'"<sup>7</sup> Gardendale's rammed earth homes have also attracted a fair amount of attention; Indian Prime Minister Jawaharlal Nehru visited the site in 1951,<sup>8</sup> local publications have featured the homes, and earth-building enthusiasts cite Gardendale as a successful example of the durability and sustainability of the technique.<sup>9</sup> But despite their history and architectural distinctiveness, Gardendale's rammed earth homes have not as of this writing been formally recognized by any landmark or preservation organization, including the National Register of Historic Places.<sup>10</sup>

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<sup>6</sup> Ibid., 93.

<sup>7</sup> Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.

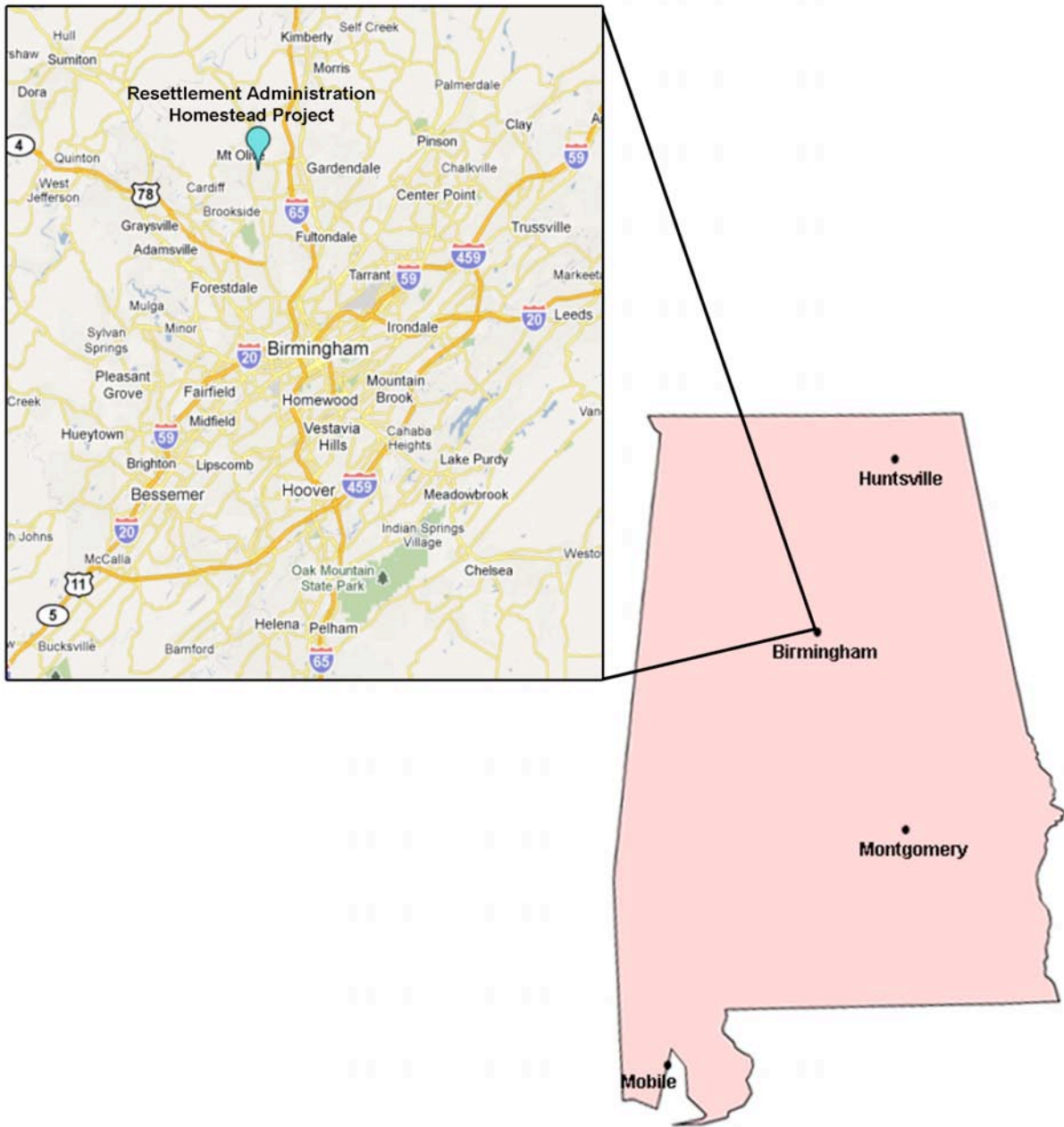
<sup>8</sup> Roach, "Rammed Earth Houses in Mount Olive," 42.

<sup>9</sup> Rael, *Earth Architecture*, 48.

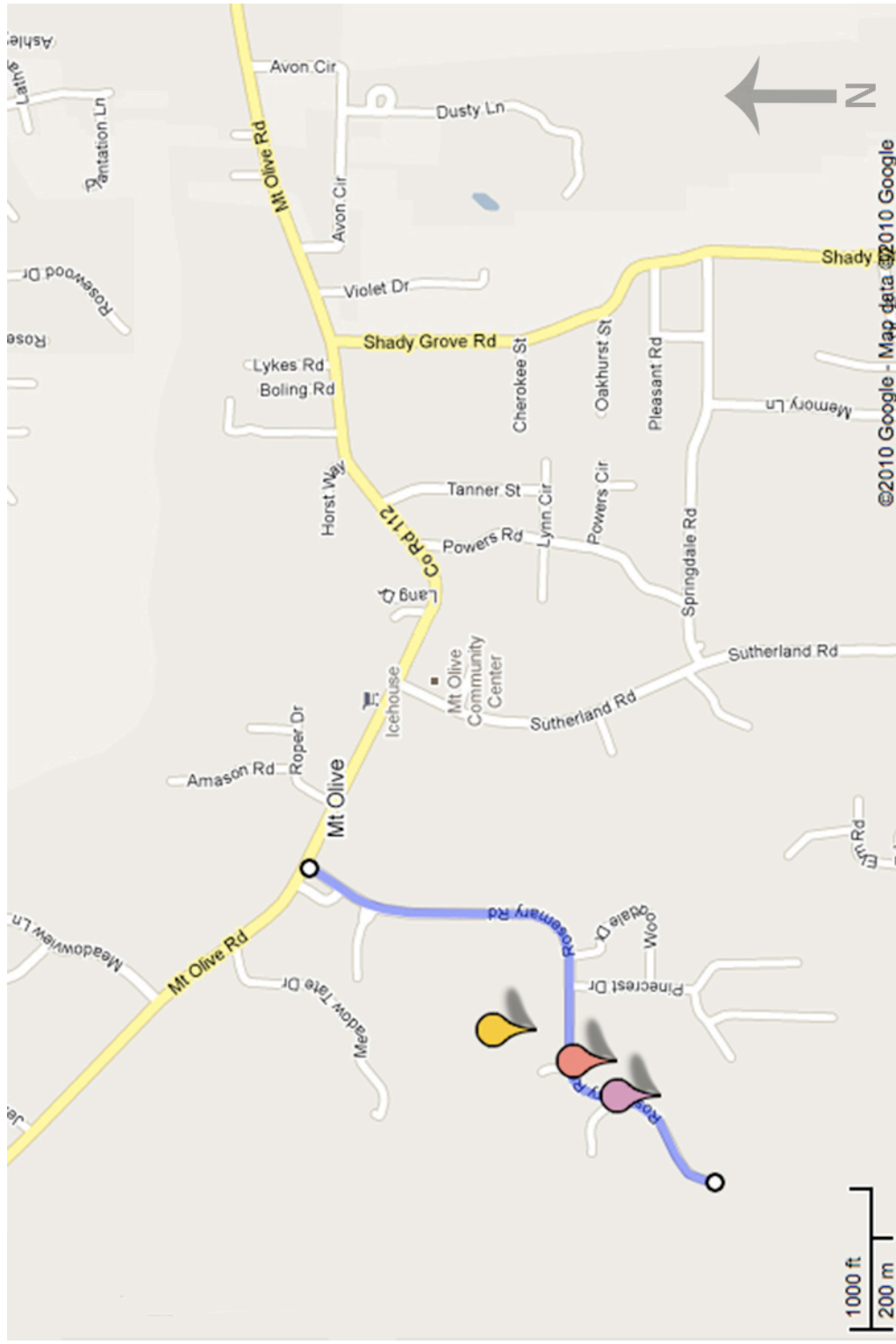
Easton, *The Rammed Earth House*, 17.

*Rammed Earth History*, <http://www.adobe-home.com>.

<sup>10</sup> Wofford and Enzweiler, Alabama Historical Commission, in email conversation with the author, 2010.



**Figure 1.** Alabama map with inset showing distance between Gardendale/Mount Olive and Birmingham (image from Google Maps).



**Figure 2.** Map of Gardendale showing location of rammed earth homes along Rosemary Road (*image from Google Maps*).





**Figure 3.** One of Gardendale/Mount Olive's rammed earth homes, located at 5271 Rosemary Road.



**Figure 4.** Front entrance and porch of 5271 Rosemary Road (*photographs courtesy of Gwendolyn Fernandez. Used with permission.*)





**Figure 5.** Entrance and porch view of 5271 Rosemary Road.



**Figure 6.** Side view of 5291 Rosemary Road (*photographs courtesy of Gwendolyn Fernandez. Used with permission.*)



The case for the preservation of Gardendale's mud homes extends beyond their New Deal connection, as they are part of a larger narrative of rammed earth home construction within the United States. Dating back to the early 19<sup>th</sup> century, the technique has experienced a series of three waves, ebbing in and out of popularity and our cultural consciousness.<sup>11</sup> Farmers, plantation owners, bureaucrats, famous architects, and enthusiasts have all experimented with rammed earth, incorporating various themes of economy, efficiency, do-it-yourself-ness, environmental stewardship, and social responsibility into their work. The method has also been tied to different social groups throughout time. For example, in the 18<sup>th</sup> century rammed earth was primarily an agricultural endeavor, used for plantation buildings and slave housing. In the 20<sup>th</sup> century during the New Deal, the Resettlement Agency explored rammed earth at Gardendale, looking to provide cheap but durable housing for the poor. The agency soon came under fire; critics called the homesteads un-American, socialist, and communist. Beginning in the 1960s and 1970s, rammed earth was resurrected by hippie and counterculture groups. Collectively, these groups—slaves, the poor, socialists, and hippies—have existed on the edges of society. Their connection to rammed earth means two things: first, that rammed earth has been typically associated with marginal groups because it has been understood as a cheap and less progressive building technique, and second, that rammed earth's association with these groups has relegated it to a similar peripheral realm.

What particularly distinguishes Gardendale within this narrative is the fact that it is the only remaining rammed earth feature ever built by the federal government. It was part of the second wave of rammed earth history in the first half

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<sup>11</sup> Easton, *The Rammed Earth House*, 11.

of the 20<sup>th</sup> century, or what author David Easton calls a rammed earth renaissance.

During this period,

Not only did the Department of Agriculture promote building with rammed earth through the distribution of Farmers' Bulletin No. 1500, but also research projects were undertaken and numerous papers published by engineers, scientists, and other professionals at colleges and universities around the country. These academic reports led in turn to further experimentation and implementation on part of the general public...A review of the *Reader's Guide to Periodical Literature* reveals more than one hundred articles printed in both trade journals and popular magazines during the period from 1926 to 1950.<sup>12</sup>

Moreover, preserving Gardendale's rammed earth homes is important because they are living laboratories. Studying, documenting, and conserving the homes provides us with a window into the early days of alternative building methods explored during the 20<sup>th</sup> century. Such insight can help us determine whether or not rammed earth housing is in fact as sustainable as its advocates claim; it can also help us improve on the technology and technique. Rammed earth has recently taken on a 'green' hue, becoming recognized as a way to build new homes with a minimal environmental impact. Contrary to the association of rammed earth with those on the edges of society, the method has now become a fashionable choice for the well to do and environmentally conscious. This shift is significant because it departs from historical precedent; rammed earth is now understood without its lengthy history. Divorcing the building method from its history erases centuries of housing efforts and the stories of the groups that employed the method. Preserving Gardendale's homes thus becomes even more important, in order to ensure that the full history of rammed earth is acknowledged as the technique moves into the 21<sup>st</sup>-century.

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<sup>12</sup> Ibid., 16.



**Figure 7.** Façade of rammed earth house at 5350 Rosemary Road.



**Figure 8.** Rear of rammed earth house featured in June 2009 *Birmingham News* article (photographs courtesy of Gwendolyn Fernandez. Used with permission).

Focusing on the Gardendale “experiment,” this study will engage the history and themes associated with rammed earth home construction in the United States, providing a better sense of Gardendale’s place within this understudied and little appreciated construction type. After briefly explaining the rammed earth technique and reviewing several centuries of historical precedent in Chapters 2 and 3, I will examine why the government decided to experiment with, and ultimately abandon, a rammed earth initiative in Chapter 4. This trial included work both by agricultural bureaucracies like the USDA and the New Deal’s Resettlement Agency, from which Gardendale was born. In Chapter 5, I will explore the method’s latest reincarnation, begat as part of the environmental movement of the late 1960s and early 1970s and existing today as a niche market. Chapter 6 describes the economic, cultural, and environmental themes linked to rammed earth, both throughout time and specifically at Gardendale. I will also lay out arguments for the preservation of the community’s rammed earth homes, suggesting how it is best qualified for listing on the National Register and offering other conservation approaches to consider. Overall, I argue that understanding the history of rammed earth home construction helps us better evaluate the relationship between our cultural values and the built environment. In a nation where McMansions and green buildings happily coexist, the story of the Gardendale experiment not only highlights a unique community worth preserving, but asks us to think about the way we live and the resources we use in the process.

## **Chapter 2: Rammed Earth 101**

While this study will not focus on the technical aspects of rammed earth home construction or preservation, a brief discussion of the technique is necessary. Similar to adobe, wattle and daub, and cob, rammed earth (also called *pisé de terre* or *pisé*) is an earth-based building technology that dates back thousands of years.<sup>13</sup> Such building methods often developed in response to environmental and climatic conditions; for example, adobe works well in dry, hot climates with clay-based soils. Unlike adobe, rammed earth can be built year round in different environments with various soil mixes.<sup>14</sup> One of the most famous early examples of rammed earth is the Alhambra in Granada, Spain built by the Moors in the 13<sup>th</sup> and 14<sup>th</sup> centuries.<sup>15</sup> Several of St. Augustine, Florida's earliest structures were built out of a compacted mixture of earth and ground seashells called tabby (or *tapia* in Spanish).<sup>16</sup> There are also numerous examples of rammed earth farm buildings throughout Europe, as well as Australia.<sup>17</sup>

Rammed earth is damp soil placed into forms and tamped down until well compacted. Historically, the forms (usually wooden and called “shuttering”) were erected on site and workmen dumped a few inches of damp dirt mixed with sand, clay, or other stabilizers into the form. Using a hand-held tamping device, they

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<sup>13</sup> Williams-Ellis, *Cottage Building in Cob, Pisé, Chalk and Clay*, 58.

The word *pisé* comes from the Latin word *Pisare*, which meant “to pound.” Later known as *pisey*, the term has been found in French documents dating from the 16<sup>th</sup> century (Cellaruro and Richaud, “Thomas Jefferson and Francois Cointereaux, Professor of Rural Architecture in Revolutionary Paris,” 173).

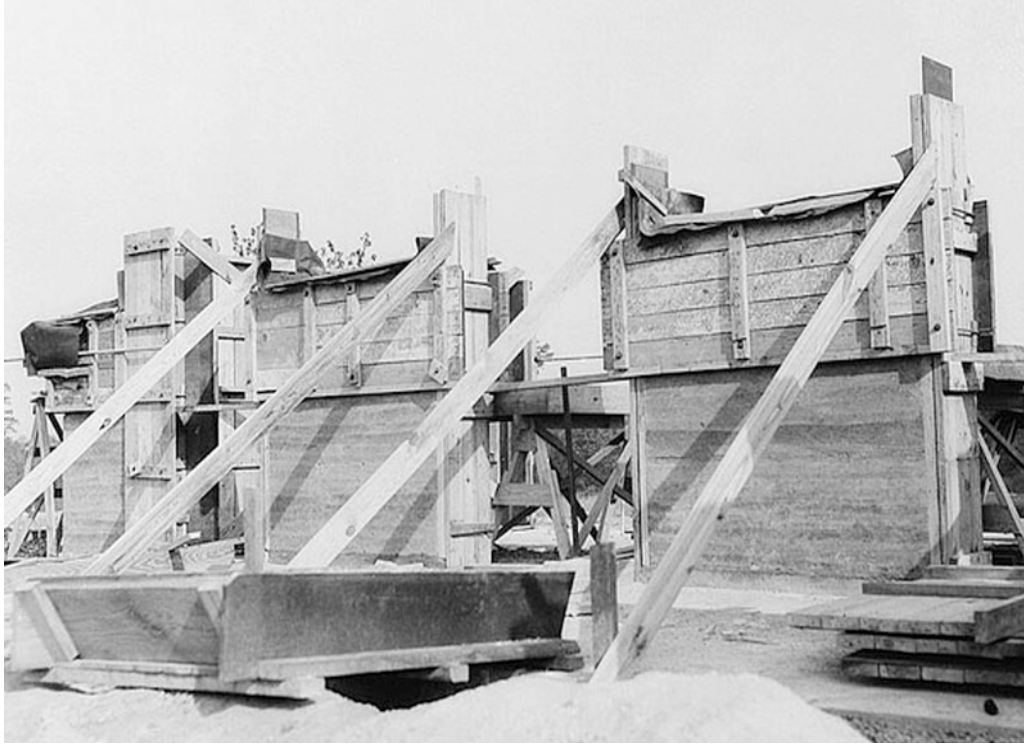
<sup>14</sup> Easton, *The Rammed Earth House*, 10.

<sup>15</sup> *Ibid.*, 6.

<sup>16</sup> *Ibid.*, 9.

<sup>17</sup> *Ibid.*, 6.

Ellington, *Modern Pisé Buildings: House Building with Compressed or Rammed Earth*, 54-95.



**Figure 9.** Erected shuttering for the rammed earth homes at Gardendale.



**Figure 10.** Workmen adding rammed earth layers to a wall at Gardendale  
*(photographs from the Library of Congress, Prints and Photographs Division).*





**Figure 11.** Workman tamping damp earth at Gardendale.

**Figure 12.** Workmen removing wooden shuttering from completed wall section  
*(photographs from the Library of Congress, Prints and Photographs Division).*



pounded away at the dirt until it was firm. More dirt was then added on top and the process began again. Walls were built in sections in this manner; when the wall's desired height was reached, the forms were removed for the wall to cure. The curing process could take months and years, but once the walls were fully dry, they were hard like concrete. Sometimes the walls were treated with lime or plaster to keep water out. Today, the dirt is often stabilized with Portland cement and the method has improved; for example, the shuttering is now composed of steel frame and plywood, and pneumatic machines do the tamping work.<sup>18</sup> Another method erects open-sided formwork and pneumatically impacts the dirt into it with large hoses (more information on modern rammed earth construction can be found in Chapter 5).

In addition to its durability, rammed earth is renowned for its thermal insulation benefits, as the thickness of the walls keeps warmth in and cold out (or vice versa). Rammed earth stores and emits direct radiant energy, keeping the temperature inside comfortable.<sup>19</sup> As Gardendale resident John Cousins stated, "They're not hard to heat in the winter and they're easy to cool in the summer. August is about the only time you need air conditioning."<sup>20</sup> Another benefit of rammed earth construction is the availability of cheap, local material—dirt. But rammed earth does have its downsides. On a practical level, there have been few well-known publications on rammed earth construction and few construction firms that have practiced it; those that do so today constitute a niche market.<sup>21</sup> Historically rammed earth structures

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<sup>18</sup> Tibbets, "Rammed Earth: Developing New Guidelines for an Old Material," 10.

<sup>19</sup> Easton, *The Rammed Earth House*, 45-46.

<sup>20</sup> Roach, "Rammed Earth Houses in Mount Olive," 37.

<sup>21</sup> According to Joe Tibbets' 1998 September-October article for *Building Standards* "Rammed Earth: Developing New Guidelines for an Old Material," rammed earth construction work has grown in the Southwest, California, and Colorado, where, "roughly a half dozen contractors ply the trade." These



have only been a few stories high and have been limited to farms, housing, or related domestic structures. Additionally, rammed earth is best used in straight, boxy designs, unlike adobe, which can incorporate more curved forms; its thick and durable walls also mean altering the footprint of a rammed earth building can prove challenging.<sup>22</sup> Thus, access to rammed earth has been difficult to come by and its form can be architecturally limiting. Rammed earth also suffers from cultural perceptions that it is dirty, exclusively for poor and developing nations, temporary, and not representative of progressive, modern architecture. Such impressions are nothing new; the father of modern rammed earth, François Cointereaux, fought against such assumptions as early as the late 18<sup>th</sup> century.

Cointereaux aimed to popularize rammed earth construction in Revolutionary-era France because the method allowed the builder to make a better life for himself out of simple materials with his own hands. In his mind, France's large peasant population would be able to benefit from the technique, improving their overall living conditions and providing them with a sense of ownership and dignity. Cointereaux also believed that earth construction would help bring about a utopian society that upheld and appreciated agrarian values. In 1786 he established a school in Grenoble that taught earth building techniques along with other farming-related subjects. Students enrolled in his program were part of the "École d'Agriecture" (a

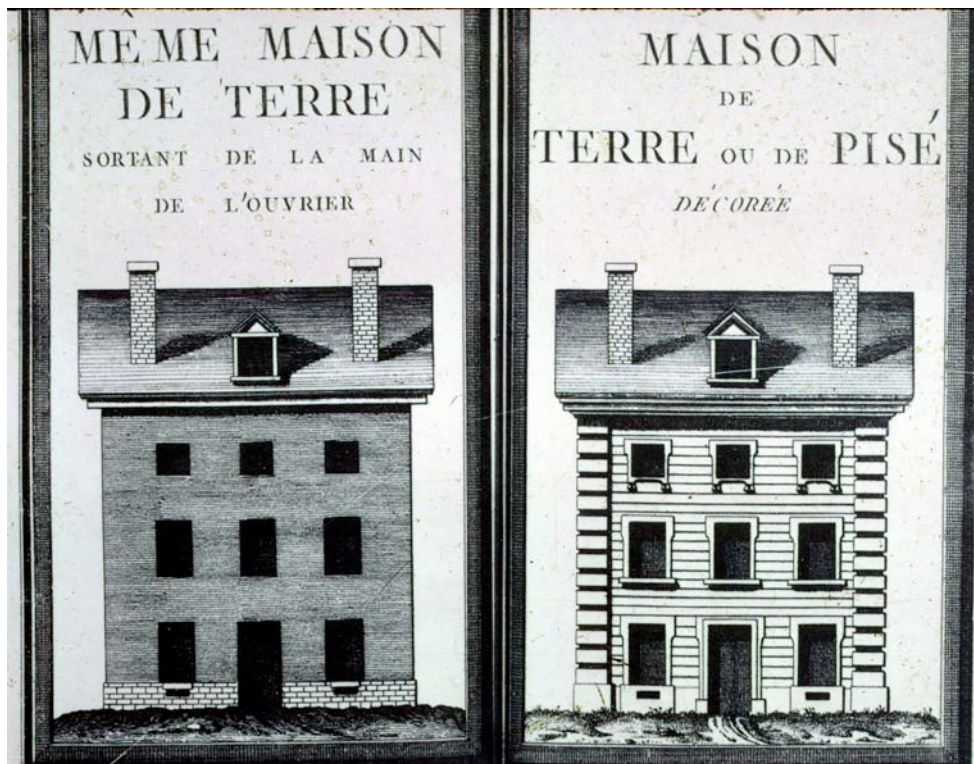
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contractors often work on high-end custom jobs that are booked up to two years in advance. *Dwell* magazine's May 2009 article "PISE Does It" describes the clients of David Easton's Rammed Earth Works as "wineries, restaurants, and high-end homes."

<sup>22</sup> Tibbets, "Rammed Earth: Developing New Guidelines for an Old Material," 11.



**Figure 13.** Completed rammed earth walls at Gardendale (*photograph from the Library of Congress, Prints and Photographs Division*).



**Figure 14.** Cointereaux's sketches of pisé houses, from *Agriculture Rural IV* (*image scanned from Alley Visual Resource Collection, University of Maryland*).

combination of the words agriculture and architecture). He later moved to Paris to continue his pedagogical work; he also began publishing notebooks, or “cahiers,” about his experiments. These illustrated manuals described how to build with rammed earth, informing the potential builder about soil types, tools, and techniques. However, his ideas were not well received in Parisian building trade circles, as they feared the technique would threaten their livelihood. Cointereaux himself stated that his work on rammed earth faced criticism from other groups, including “an elitist academic tradition and...cookie-cutter architects.”<sup>23</sup>

American president and fellow agrarian Thomas Jefferson visited Cointereaux in Paris, where the Frenchman offered to move his family to the new nation to teach his technique to pioneers on the Western frontier. Jefferson was interested in rammed earth’s academic application and continued to correspond with Cointereaux after returning to the United States. The future president did not believe, however, that rammed earth would prove advantageous, given America’s climate and availability of other building materials, namely wood.<sup>24</sup> But Cointereaux’s work had inspired others; in 1806 an American version of his cahiers appeared. Samuel Johnson’s *Rural Economy* was a modified version of Cointereaux’s publications with experiences and tips learned from Johnson’s own trials in New Jersey. *Rural Economy* extolled the virtues of rammed earth for agricultural buildings due to its simple design and cheap materials; in particular, Johnson hoped the method would appeal to farmers looking

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<sup>23</sup> Lee, “François Cointereaux and the School of ‘Agritecture’ in Eighteenth-Century France,” 39-46. Cellauro and Richaud, “Thomas Jefferson and François Cointereaux, Professor of Rural Architecture in Revolutionary Paris,” 181, 191-193.

Lee, “Pisé and the Peasantry: François Cointereaux and the Rhetoric of Rural Housing in Revolutionary Paris,” 60-63, 70-73.

<sup>24</sup> Hallock, “Pisé Construction in Early Nineteenth-Century Virginia,” 40.

to build something quickly with the intent to later improve their properties. He dedicated his work to Thomas Jefferson, and the book inspired gentlemen farmers and plantation owners, those whom Johnson described as, “employ[ing] their leisure in the study of rural economy.”<sup>25</sup>

The technique of rammed earth, while centuries old, is not widely studied or understood, even though it is similar to other earth building methods, like adobe. Its expression within the United States began in the early 1800s within an agricultural context. The popularity of the technique rose and fell over the following decades, but as it did, rammed earth took on additional meanings and purposes. Its qualities—thrift, durability, and energy efficiency—allowed rammed earth to become a way to build during challenging times. It was also a way to experiment with America’s built environment, allowing one to build in a socially responsible manner. At Gardendale, rammed earth was part of the New Deal’s Resettlement Agency, which sought to remedy the housing needs of impoverished communities around the country. But before delving into the story of Gardendale’s rammed earth homes, some additional historical context is necessary.

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<sup>25</sup> Johnson, *Rural Economy*, 1.

Johnson worked from an English translation of Cointereaux, completed by Henry Holland in 1797 for the English Board of Agriculture. He quoted from Holland’s version without acknowledgment. (Cellauro and Richaud, “Thomas Jefferson and François Cointereaux, Professor of Rural Architecture in Revolutionary Paris,” 192-193).

### **Chapter 3: Early Rammed Earth Buildings in the United States: First Wave**

Whether or not any of Johnson's rammed earth experiments in New Jersey still stand is unclear, but the work of at least two of his devoted gentlemen farmers still survives in Virginia. Bushrod Washington, George and Martha's nephew, built seven rammed earth buildings at Mount Vernon between 1810 and 1815. None survived past 1874, but the foundations have been excavated and include standard agricultural buildings such as a greenhouse, barn, ice house, and cow feed boiler, and a slave quarters and overseer's house. In addition to believing that rammed earth would help improve local agricultural techniques, Washington viewed the form as providing "proper" housing for his slaves because of its thermal benefits; it was much better at keeping temperatures comfortable than the drafty wood frame buildings normally erected. Its cheap material and durability were also attractive. Washington was not successful, however, as rammed earth was not popular with Mount Vernon's slave population.<sup>26</sup>

Johnson also inspired John Hartwell Cocke, owner of Bremo Recess and Pea Hill Plantation in Brunswick County. Recognizing the financial and thermal benefits of rammed earth, Cocke built new quarters for his slaves, although with a slightly different technique. Instead of erecting one giant wall of earth, Cocke constructed individual compressed earth blocks that he then stacked together, which made it easier to monitor for construction mistakes. Some of Cocke's rammed earth buildings are still extant. Three single- and multi-family dwellings stand at Bremo, and the

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<sup>26</sup> Hallock, "Pisé Construction in Early Nineteenth-Century Virginia," 40-43.



**Figure 15.** A rammed earth building at Bremo Recess, Brunswick County, Virginia (photograph from the Library of Congress, Prints and Photographs Division, *Historic American Buildings Survey*).

Historic American Buildings Survey (HABS) documented one at Pea Hill. In total he built 18 rammed earth quarters between 1815 and 1820; these structures typically housed domestics or slaves with specialized skills. Even with the moderate success enjoyed by Cocke, rammed earth buildings in 19<sup>th</sup>-century Virginia were not as successful as their builders might have hoped. The technique withstood a damp climate, but it was not popularly accepted or compatible with the transient nature of the farming practices of the time. Fields were used until depleted and abandoned, so erecting adjacent plantation buildings with heavy, permanent walls was not practical. In other words, the permanence of rammed earth proved to be too permanent for these Virginian plantations.<sup>27</sup>

While it may seem that Washington and Cocke had good intentions in erecting warmer, more durable rammed earth quarters for their slaves, it is likely that the form was not utilized out of concern for slaves' comfort. The publication *The Southern Agriculturalist* sheds some light on the matter. Thomas Spaulding's December 1830 letter to the journal documented his surprise when some of his own slaves constructed tabby houses on his plantation 20 years earlier. This saved him a lot of money, and he urged other planters to explore the technique for financial reasons. Since the planters already had the available manpower (and they were not paying for it), erecting buildings out of cheap materials would prove even more economical. Moreover, it was assumed that most slaves would be able to easily erect buildings in this manner, since Spaulding's had without his direction. Articles on rammed earth followed in the November 1835, and April, August, September, and December 1836 editions of the journal. Interestingly, the December issue featured an excerpt from Philip St. George

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<sup>27</sup> Ibid., 45-51.

Cocke, son of John, who also appears to have erected rammed earth buildings on the family plantations. According to the article, he built about thirty slave quarters between 1824 and 1832, along with larger overseers' homes. Like Spaulding, Cocke observed that slaves would sometimes use mud to coat their wood frame quarters, leading him to believe they would be similarly suited to rammed earth construction.<sup>28</sup>

*The Manufacturer and Builder* looked to different sources of labor a bit later in 1869, comparing rammed earth to other earth building techniques for the interested reader, which it described as “men of humble means.” With low material outlay and ease of construction—requiring only a man and a “couple of sons”—rammed earth was characterized as economical and comfortable. An August edition from that same year extols the method’s fireproof qualities and, perhaps again in deference to its audience, states that rammed earth was a particularly good building method for farmers, as they could erect such buildings quickly, cheaply, and independently.<sup>29</sup> It is possible that the outlawing of slavery a few years before contributed to a shift in the way rammed earth construction was envisioned, both in terms of how it was to be constructed and who was best suited to use the form. Instead of gentlemen planters exploring rammed earth for agricultural buildings and slave quarters because it was cheap and inspired by their captive workforce, rammed earth was now the purview of individual farmers and pioneers looking to build smartly and efficiently.

Rammed earth was not only used for agricultural buildings during the 19<sup>th</sup> century. Erected in 1849 in South Carolina, the Church of the Holy Cross was apparently inspired by *Rural Economy*, as the Hill Crest Plantation (of which the

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<sup>28</sup> Cody, “Earthen Wall Construction in the Eastern United States,” 191-201.

<sup>29</sup> *The Manufacturer and Builder*, “Cheap Houses--Building in Pisé,” 110-111.  
*The Manufacturer and Builder*, “The Construction of Cob Work (Pisé),” 240.



church was part) reportedly held a copy of Johnson's work in its library. Whether or not that is true, the choice of rammed earth is due to the influence of the chairman of its Building Committee, Dr. William Wallace Anderson. Anderson had built five rammed earth structures of his own (three of which still stand),<sup>30</sup> and he believed a much larger church building could be erected for the same amount of money if built of earth. It was, and the church withstood several natural disasters, including the Charleston earthquake of 1886 and the 1895 hurricane. A cyclone in 1903 destroyed the church's tower, which was rebuilt in cement. Despite this, the church endured. Its existence was not widely known until 1926 when the owners contacted the Division of Agricultural Engineering within the United States Department of Agriculture to discuss repairing a crack sustained from the quake forty years earlier. Today, the church still stands in Stateburg, South Carolina, and has been listed in the National Register of Historic Places and as a National Historical Landmark.<sup>31</sup>

Additionally, two influential men, Henry Leavitt Ellsworth and Charles Dwyer, explored and promoted the technique before the Civil War. Ellsworth, the first U.S. Commissioner of Patents, wrote a Congressional report in the early 1840s dealing with the use of unburnt brick as a form of earth construction for agricultural buildings. Inspired by the earthen, settler-built structures in Indiana, Ellsworth erected his own unburnt brick structure on Massachusetts Avenue in Washington, D.C. Dwyer, architect and author of *The Economic Cottage Builder*, included plans for

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<sup>30</sup> Cellauro and Richaud, "Thomas Jefferson and François Cointereaux, Professor of Rural Architecture in Revolutionary Paris," 194.

<sup>31</sup> Merrill, *The Rammed Earth House*, 14-17.  
The Church of the Holy Cross, "A Brief History of The Church of The Holy Cross,"  
<http://www.holycrossstateburg.com>.



**Figure 16.** The Church of the Holy Cross in Stateburg, South Carolina, built of rammed earth, is listed in the National Register of Historic Places and is a National Historic Landmark *(photograph courtesy of Wikipedia user Pollinator)*.

earthen wall dwellings within the publication.<sup>32</sup> Despite their work to publicize and professionalize the technique, 19<sup>th</sup>-century rammed earth exhibited an agricultural flavor that meant different things depending on the context. On one hand, the form was for gentlemen plantation-owners interested in rammed earth's architectural novelty, its thermal properties, and its financial advantages; their slaves were also available to perform the bulk of the work. On the other hand, rammed earth was increasingly pitched to autonomous farmers who were mostly concerned with thrift and efficiency. Yet rammed earth construction was not a widespread agricultural practice; this era's pioneer farmer more famously recalls images of sod rather than rammed earth homes. Rammed earth's popularity also suffered as the Industrial Revolution took hold. As author William Jeffrey Cody states, "The chief reason those [earthen] walls ceased to be constructed in the late nineteenth-century was that other materials, such as lumber, brick and cement, became cheaper, more abundant, more accessible, and easier to use."<sup>33</sup> Thanks to new trends in construction and transportation improvements, rammed earth would have to wait 45 years until it became the subject of interest with a new generation of enthusiasts.

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<sup>32</sup> Cody, "Earthen Wall Construction in the Eastern United States," 218-279.  
Dwyer, *The Economic Cottage Builder*, 38-42, 85.

<sup>33</sup> Cody, "Earthen Wall Construction in the Eastern United States," 325.

#### **Chapter 4: The Rammed Earth Renaissance and the Gardendale Experiment: Second Wave**

Following World War I, the United Kingdom found itself with a surplus of unemployed former soldiers and a shortage of housing. British author Clough Williams-Ellis believed earth building could help address these issues. His book *Cottage Building in Pisé, Chalk, and Cob*, written in 1919, demonstrated his awareness of the long history of earth building and suggested that training and employing men in this technique would provide both jobs and homes. In particular, Williams-Ellis preferred rammed earth, thanks to its use of local materials, its fitting to “neighborhood traditions,” and relative speed—according to him, a man could erect a wall between 8 and 9 feet in one day.<sup>34</sup> However, Williams-Ellis was also aware of rammed earth’s shortcomings. First, there were very few men that were well versed in the technique, so finding and training capable workers would take some time. Second, unlike carpentry or masonry, rammed earth construction was not considered a formal building trade. Third, while the rammed earth technique was relatively easy, it was necessary that the architectural plans and construction be done correctly, or else the home would not be structurally sound. Still, given the severity of the labor and housing crises, Williams-Ellis believed that rammed earth home construction held potential. Fellow British architect Edwin Lutyens, renowned for his country cottages, was also a believer in rammed earth.<sup>35</sup>

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<sup>34</sup> Williams-Ellis, *Cottage Building in Cob, Pisé, Chalk and Clay*, 63, 116-118.

<sup>35</sup> Rael, *Earth Architecture*, 11.

In the United States, Karl Ellington and his wife Inez hoped to prove that rammed earth had a more permanent and long-term appeal. In his book *Modern Pisé Buildings: House Building with Rammed or Compressed Earth*, Ellington argued that the technique was not just “the way out during a crisis or while building materials and building labor come high...the merits of the pisé-method are such that the method could be utilized with profit at any time and under any conditions wherever land is cultivated.” He too, however, heralded the method’s do-it-yourself and money-saving characteristics: “the man who prefers to expend a little more of muscular energy instead of hard cash, can save from 1/2 to 2/3 of the cost...” Ellington’s book addressed ‘modern’ rammed earth buildings, meaning better techniques, improved tools, and more effective time-saving procedures, all of which the author delivered in his pages of advice, plans, and drawings. Not defining modern via cosmopolitan or urban contexts, Ellington continued to place rammed earth firmly in the countryside, where he believed its application most fruitful. The method was not limited to farmers, though, as “self-builders,” “working men,” and “settlers” were also cited as eligible beneficiaries. The last group he took to task especially, criticizing their sod houses as “not fine nor comfortable” when compared with rammed earth.<sup>36</sup>

### **Federal Government Interest**

Published in 1924, *Modern Pisé Buildings* marked the beginning of a ‘rammed earth renaissance’ within the United States that witnessed a level of government interest and involvement heretofore absent. A small group of men within agriculture-related bureaucracies began exploring the technique, responding to

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<sup>36</sup> Ellington, *Modern Pisé Buildings: House Building with Compressed or Rammed Earth*, 9-10, 27, 48, 101, 112.

inquiries, conducting tests, publishing informational bulletins, and generally advocating rammed earth. One of the earliest examples of government involvement was the assistance that T. A. H. Miller of the Division of Agricultural Engineering (part of the United States Department of Agriculture) provided to the Church of the Holy Cross in 1926. Miller also wrote the authoritative government bulletin on the subject, titled *Farmers' Bulletin No. 1500* (written in 1926 and revised in 1937), which included a brief history of rammed earth, provided guidelines, and informed the curious reader of the technique's merits. Miller also headed a test project at Arlington Farms, where the Bureau of Agricultural Engineering erected a large fertilizer machinery laboratory of rammed earth and earth blocks. The project was featured in the November 1934 issue of *Agricultural Engineering* and rammed earth enthusiast and author Anthony Merrill found the building to be sound when he visited seven years later. However, it was torn down shortly thereafter to make way for a government workers housing project.<sup>37</sup>

Another government employee interested in rammed earth was Dr. Harry Baker Humphrey, Chief Plant Pathologist of the USDA. Humphrey built his own rammed earth home near Washington, D.C. Merrill notes that it was the "first modern earth home to be built in this country in his generation" and was the model for *Farmers' Bulletin No. 1500*. The second floor of the home is timbered, but the home's 18" thick walls provided enough strength for an impressive gambrel roof with three dormers.<sup>38</sup> The home is still extant, located at the end of 75<sup>th</sup> Street in Cabin John, Maryland. In the Midwest, Dr. Ralph Patty and Elbert Hubbell also

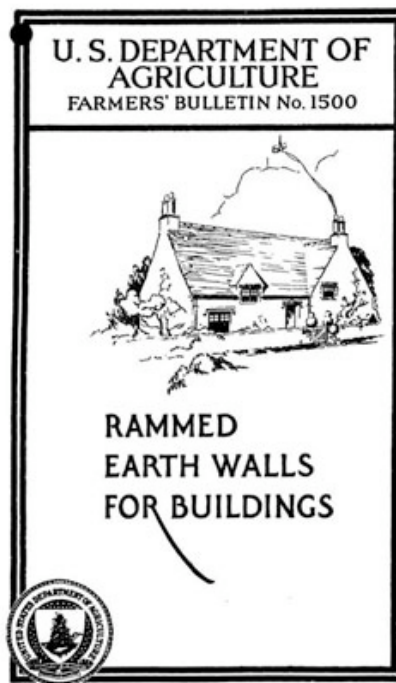
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<sup>37</sup> Merrill, *The Rammed Earth House*, 13-18.

<sup>38</sup> *Ibid.*, 14-17.

**Figure 17.** The Humphrey House in Cabin John, Maryland, built of rammed earth by Dr. Harry Humphrey of the USDA. The house reportedly served as the inspiration for the Farmers' Bulletin 1500 (*photograph from The Rammed Earth House by Anthony Merrill*).

**Figure 18.** Cover of the USDA's only publication on rammed earth construction, *Farmers' Bulletin 1500*. The pamphlet was available for five cents.



experimented with rammed earth. Patty headed the South Dakota Agricultural Experiment Station, which built test walls and farm buildings of rammed earth, and wrote articles and bulletins about the technique. Merrill cites Patty's tests as the first to "amount to anything and carry any weight;" he also authored an article on the subject for the September 1942 edition of *Agricultural Engineering*. Hubbell, a vocational instructor at the Turtle Mountain Indian School in Belcourt, North Dakota, believed rammed earth would be a natural fit for the nearby Pine Ridge Reservation, much like adobe was in the southwest. He erected several barns, dwellings, and other structures on the reservation, the most impressive of which was a school building. At 108 feet long and 68 feet wide, it was, according to Merrill, the largest modern rammed earth building in the nation. It is unclear if the building is still standing today, but Hubbell's dedication to Native American issues continued. In 1941 while working at the Office of Indian Affairs, he authored a report about his earth construction work.<sup>39</sup>

From the mid-1920s until about 1940, federal and state government agencies demonstrated considerable interest in rammed earth, conducting numerous tests and compiling reports and bulletins. Perhaps inspired by authors Williams-Ellis and Ellington, Miller, Humphrey, Cook, Patty, and Hubbell each endeavored to prove the soundness and durability of the method, sometimes by taking matters into their own hands—literally, in the case of Humphrey and Hubbell. The tests and publications added to rammed earth's credibility, but this enthusiasm did not appear to move much

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<sup>39</sup> Ibid., 21-24.



beyond the bureaucratic circles of government agricultural agencies. The chance to experiment on a larger level would come, however, as part of the New Deal.

### **Resettlement Administration**

The federal government's rammed earth initiative would have remained a series of singular test buildings, reports, and articles if not for the creation of an agency called the Resettlement Administration (later the Farm Security Administration). As historian Sidney Baldwin explained, the agency was conceived to "explore the nexus of politics and poverty"<sup>40</sup> with the goal of remedying chronic rural poverty, especially in the South. How exactly to go about tackling such a large, complex issue—especially during the Great Depression—was unclear. Providing impoverished farmers and sharecroppers with the opportunity to relocate to collective housing communities called subsistence homesteads had been part of the discussion as early as 1932; they were provided for in Section 208 of the National Industrial Recovery Act (NIRA) a year later.<sup>41</sup> However, the resulting Subsistence Homesteads Division "...experienced almost every conceivable difficulty—legal entanglements, political attack, diffusion and confusion of responsibility, loss of leadership and direction, administrative delay, technical miscalculations, and worst of all, growing doubts about the desirability and feasibility of the program."<sup>42</sup> When the NIRA was

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<sup>40</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 17.

<sup>41</sup> Finding Aid, Farmers Home Administration, Record Group 96, National Archives and Record Administration, College Park.

Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 26.

<sup>42</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 60-62, 70-75.

declared unconstitutional in 1935, and with the inability of the Division to fully function, a new organization was needed.<sup>43</sup>

The Resettlement Agency was provided for with the Emergency Relief Appropriation Act of 1935 and Executive Order 7027, which specified “rural rehabilitation and relief in stricken agricultural areas.” The agency was charged with three tasks: a land-use program, resettlement of low-income families from rural and urban areas, and a rural rehabilitation loan and grant program for land, equipment, and livestock.<sup>44</sup> Much of the agency’s focus was on the South, a region that President Roosevelt called “The Nation’s No. 1 economic problem.”<sup>45</sup> The need was great, as 1.1 million white families and 700,000 black families in the area were employed as farmers or sharecroppers “living in poverty comparable to that of the poorest peasants in Europe.”<sup>46</sup> As a result, over 50% of the Resettlement Agency’s county offices were located in the area and 20% of resettlement projects were contained within three states of Region 6 (Mississippi, Louisiana, and Arkansas).

Rexford G. Tugwell, an agricultural economist and professor at Columbia University, was tapped to head the new agency. He believed in collectivism, comprehensive economic and social planning, and a re-imagining of the relationship between man and land, especially within a rural context. Additionally, he argued that government involvement was necessary to inspire or sponsor such reforms, as he did not believe it would happen voluntarily.<sup>47</sup> He was also cognizant of the fact that the

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<sup>43</sup> Ibid., 87.

<sup>44</sup> Ibid., 92-93.

<sup>45</sup> Shulman, *From Cotton Belt to Sunbelt: Federal Policy, Economic Development, and the Transformation of the South, 1938-1980*, 1.

<sup>46</sup> Kidd, *Farm Security Administration Photography, the Rural South, and the Dynamics of Image Making*, 1-5.

<sup>47</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 36-37,

public assistance work of the Resettlement Agency needed public support. He hired Roy Stryker, a coworker from Columbia, to photograph the rural areas in distress, in particular the “phases of the Resettlement Administration...with regard to the historical, sociological, and economic aspects of the several programs and their accomplishments.”<sup>48</sup> Stryker and his crew of photographers were to set the tone for the agency’s work; their images were used in public relations campaigns and sent to periodicals to demonstrate the necessity and successes of the Resettlement Administration’s projects.<sup>49</sup> Called the Historical Section, Stryker’s group documented the early subsistence homesteads erected by the agency, including Gardendale.

In approaching its task of rural and urban resettlement, it was necessary for the Resettlement Agency to build homes efficiently and in a cost-effective manner. To do this, it kept the homes’ square footage to a minimum and arranged the space in a way that benefited the daily activities of the family within. It also built in accordance with the environment and local custom. For example, in the North the agency’s homes were often two-story with a basement to better conduct heat, but in the south the homes were one-story with no basement and porches to facilitate cooling. Different regions of the country also expressed a preference on where specific rooms would be located within the home. The agency took their input into account and sought to bring the homes they were building in line with modern

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Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 67.

<sup>48</sup> Stryker, *In This Proud Land: America 1935-1943 as Seen in the FSA Photographs*, 11-15.

<sup>49</sup> Mora and Brannan, *FSA: The American Vision*, 12-15.

**Figure 19.** A Resettlement Agency house built for the Cumberland Homesteads in Crossville, Tennessee. The home used locally quarried Crab Orchard stone, oak and white pine.

**Figure 20.** A Resettlement Agency house built for the Ironwood Homesteads in Gogebic County, Michigan. The homes are made from concrete blocks, plywood, and fir (*images from The Architectural Forum, June 1937*).

methods. Finally, the agency emphasized the use of local material and labor; the latter's familiarity with the area would help save some money.<sup>50</sup>

The Resettlement Agency faced a challenging situation. Born of confusion and struggle, its goal of alleviating rural poverty was a substantial one. Tugwell remained hopeful—and perhaps a little idealistic—that the agency's programs would provide relief for farmers, sharecroppers, and others in need. Given the economic severity of the period, his agency faced less initial opposition than it may have in more prosperous times, permitting great opportunities.<sup>51</sup> The agency's task of resettlement allowed it to re-examine the way people lived on the land and within their communities; its home construction efforts were afforded a good deal of flexibility in design. At Gardendale, the opportunity extended further, as it was there that the agency experimented with rammed earth construction on a handful of its homes.

### **Gardendale, Alabama**

Gardendale was one of the earliest resettlement communities, with planning beginning in December 1933. It was one of four similar sites within Jefferson County, Alabama (Trussville, Palmerdale, and Greenwood were the others). The selection of Alabama as one of the first states to receive financing for subsistence homesteads is due to the efforts of Senator John Bankhead II, an ardent supporter of the program. Bankhead proposed two bills in the spring of 1933 for subsistence homesteads (both died), was a member of the National Advisory Committee on Subsistence Homesteads, and managed to include a \$25 million appropriation for subsistence

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<sup>50</sup> *The Architectural Forum*, "Resettlement Houses," June 1937: 473-475.

<sup>51</sup> Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 29.

homesteads within the National Industrial Recovery Act.<sup>52</sup> His influence and position was likely the primary reason the state was home to some of the nation's first resettlement projects.<sup>53</sup>

Located 14 miles north of the industrial city of Birmingham, Gardendale consisted of 68 homes on 512 acres of land; 56 were frame construction and 12 were brick. Each homestead sat on three to five acres of land and had a cow barn and hen house with water supplied by individual wells. The community also had a cooperative store. Much like other homesteads, Gardendale was open to impoverished farming families, but given its location, it was also available for urban dwellers desiring to get back to the land. According to the homestead corporation's manager, "a signal feature of the Birmingham experiment will be selection of half of the homestead colonists from the white-collar class. Many of these people are anxious for a touch of life near to the soil. We will not make previous farm experience a test of fitness."<sup>54</sup>

The draw of the homesteads was strong. During a time of financial difficulty, the chance to start over and the appeal of possible homeownership enticed thousands of applicants. The homes began as rentals, with payments applied towards ownership. With an average price of \$3,000, monthly payments were about \$13. In practice, this system provided a trial period, where families could try out their new homes before committing to purchase. At Gardendale, accepted families were exclusively white, married couples with or planning to have children, and of good reputation.<sup>55</sup> The men

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<sup>52</sup> Ibid., 26.

Roach, "Rammed Earth Houses in Mount Olive," 36.

<sup>53</sup> Hunter, "Rammed Earth Houses: An American Vision in the New Deal," 2.

<sup>54</sup> Roach, "Rammed Earth Houses in Mount Olive," 37-38.

<sup>55</sup> Hunter, "Rammed Earth Houses: An American Vision in the New Deal," 5-6.

Although Gardendale was home to whites only, the Resettlement Administration did build communities for African Americans exclusively and a few for both races, although they tended to

were usually employed at area mills, mines, and factories and had an annual income of less than \$1,200. In this way, the subsistence homesteads were just that—the men were expected to remain employed in or around Birmingham and commute to and from their new homes, where they would engage in farming or animal husbandry on a small scale, providing enough for their families should their job fall through.<sup>56</sup>

In addition to the 68 homes of traditional construction, seven additional homes were erected towards the back of the community. Listed as “experimental” within the Gardendale project records, these seven homes (lot and block numbers 9-7, 10-7, 11-7, 12-7, 13-7, 16-6, and 15-6) were distinct from their counterparts in both construction method and style. Built of rammed earth, the low-slung, one-story abodes had clean, modern lines, a sensibility just taking hold throughout the architectural community; each home was about 1,500 square feet. The poured concrete slab foundations extended six inches above grade and were covered with asphalt tile; plumbing was located underneath. Eighteen-inch thick walls sealed with boiled linseed oil and paint encased the homes’ electrical wiring and defined the interior spaces, which were arranged in the shape of a rough cross. There were two styles depending on the number of rooms (plan 4-RE and plan 5-RE), but they shared

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self-segregate. The all-black communities included five in Arkansas, two in Louisiana, and one in Mississippi. About 200 African American families also lived in communities that were mostly white. By 1940, 1,393 black families were housed within FSA communities, but it was not a policy of the agency to challenge the Jim Crow laws of any of its southern project areas. (Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 180-186).

<sup>56</sup> Hunter, “Rammed Earth Houses: An American Vision in the New Deal,” 7-8.  
White, *The Birmingham District: An Industrial History and Guide*, 299-301.



**Figure 21.** The façade of one of Gardendale’s rammed earth homes, shortly after completion.



**Figure 22.** Rear view of one of Gardendale’s rammed earth homes, shortly after completion (*photographs from Library of Congress, Prints and Photographs Division*).





**Figure 23.** Side view of one of Gardendale's rammed earth homes, shortly after completion.



**Figure 24.** Gardendale's rammed earth homes used French doors to help with air circulation (*photographs from the Library of Congress, Prints and Photographs Division*).

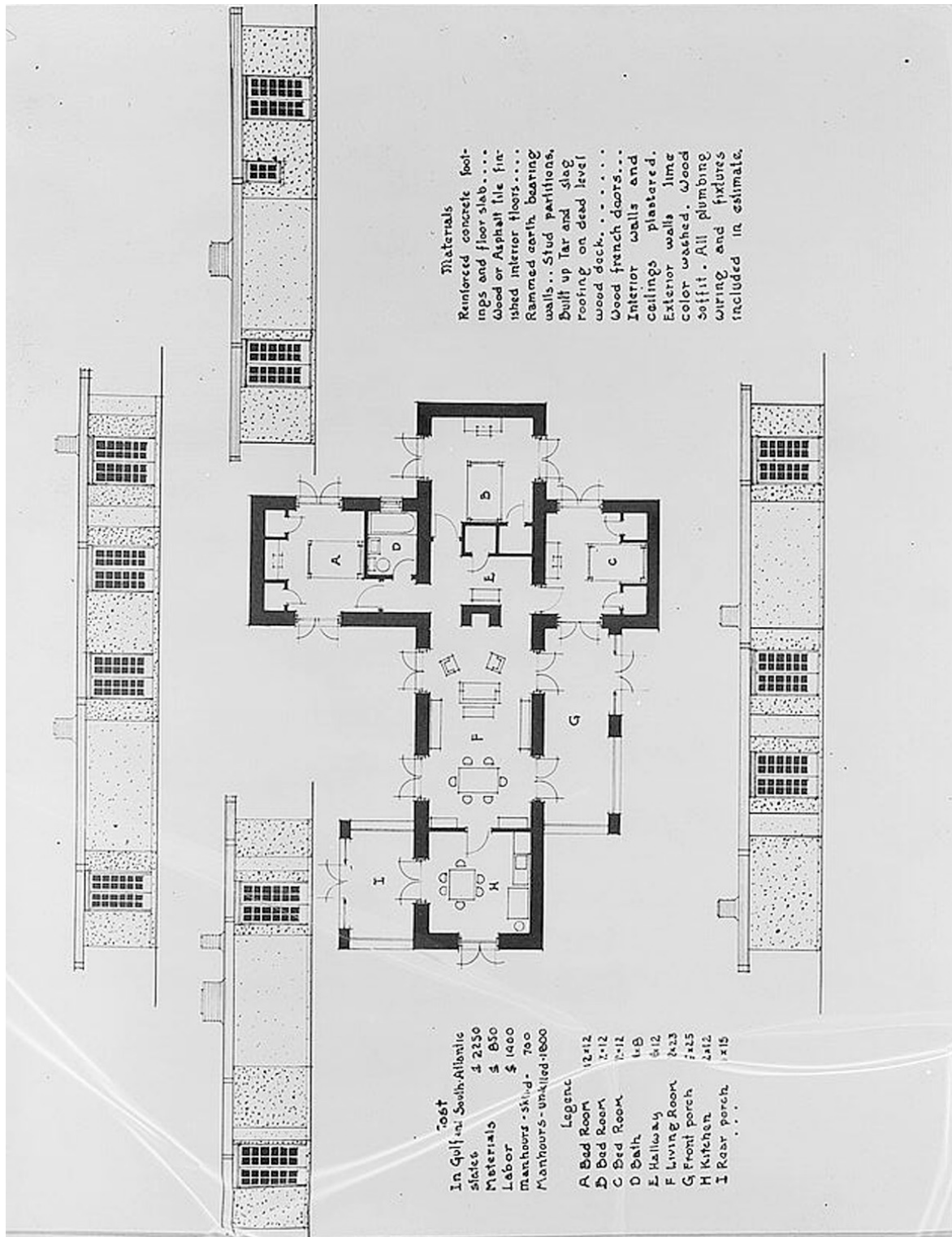


Figure 25. Hibben's plan for his experimental rammed earth homes, with cost and material information (image from Library of Congress, Prints and Photographs Division).

the same general layout: a kitchen at one end, a living room with brick fireplace and chimney in the center, and two or three bedrooms at the opposite end. While the only window in the house was in the bathroom, twelve sets of French doors with screens provided additional light and ventilation throughout the rest of the home. The ceiling was constructed of wood planks, and the flat roofs covered in tarpaper and tar mixed with gravel were painted with black and white stripes to provide better air flow and thermal benefits.<sup>57</sup>

The architect in charge of these experimental units was Thomas Entriiken Hibben, Jr. Like Miller, Humphrey, Hubbell, and Patty, Hibben was part of the small group of men who were exploring rammed earth's possibilities within federal agencies. Born in October 1893 in Indiana, he was an architect and engineer who studied at Princeton and the University of Pennsylvania. Hibben designed several of Butler University's buildings and the first phase of the Lincoln Boyhood National memorial in Indianapolis.<sup>58</sup> Hibben moved to Washington, D.C., in the early 1930s to assume the post of chief engineer in the Federal Emergency Relief Administration (FERA). In the summer of 1935, he became Chief of the Planning Section of the Suburban Division of the Resettlement Agency. It was there that he became involved

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<sup>57</sup> Hunter, "Rammed Earth Houses: An American Vision in the New Deal," 9-11.  
Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.  
Records of the Farm Security Administration and Predecessor Agencies. "Project Records, 1935 1940, Gardendale Homesteads (AL-4)." Record Group 96, Entry A1-71, boxes 20-24. National Archives, College Park, Maryland.

<sup>58</sup> Hibben Family History, 297.  
[hibbengenealogy.org/Documents/Chapter\\_VI.%20Generation%206.1\\_R.pdf](http://hibbengenealogy.org/Documents/Chapter_VI.%20Generation%206.1_R.pdf).  
National Park Service, Lincoln Boyhood National Memorial Administrative History, Chapter 3  
<http://www.nps.gov/archive/libo/adhi/adhi3.htm>.  
Hibben was also a successful children's author and illustrator; his 1933 book *The Carpenter's Tool Chest* was favorably reviewed by the *New York Times* and he later authored *The Sons of Vulcan: The Story of Metals*.

with the Greenbelt housing development, located outside of Washington, D.C. On August 16<sup>th</sup> he transferred to Rexford Tugwell's office to serve as an advisor on engineering problems for the entire agency, which opened him up to freely explore suburban and rural resettlement projects.<sup>59</sup>

Although brief, Hibben's time with the Suburban Division is notable, because it could provide a possible stylistic source for Gardendale. The rammed earth homes at Gardendale bear a similarity to some of Greenbelt's early modernist homes. Located along Forest Way, the seven homes of the Parkbelt subdivision in Greenbelt also have flat roofs and a streamlined sensibility. These homes, built by private developer General Homes, Inc., were prefabricated out of steel and aluminum parts. The company's president, Howard T. Fisher, believed that standardizing units, materials, and building processes would provide affordable homes for the working class—a five room home cost about \$3,500 in 1932.<sup>60</sup> Like Hibben's work at Gardendale, the prefabricated units were also considered “experimental.”<sup>61</sup> Several of the Parkbelt homes have been altered over the decades, but the house at 7 Forest Way has survived relatively unscathed. In recent years, preservation groups have turned their attention to the vacant home in hopes of saving it.<sup>62</sup>

Hibben was possibly aware of the Parkbelt homes, given his familiarity with the Greenbelt from his earlier post, so they could be of significance to Gardendale

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<sup>59</sup> Arnold, *The New Deal in the Suburbs: A History of the Greenbelt Town Program, 1935-1954*, 46-47.

<sup>60</sup> *Time Magazine*, “Business: General Houses,” July 4, 1932.

General Homes, Inc. participated at the “Century of Progress” exhibition at the 1934 World's Fair in Chicago and erected the Parkbelt homes four years later.

<sup>61</sup> Maryland Historical Trust, “Greenbelt Historic District.” <http://mht.maryland.gov/nr>.

The House of Steel: Preserving Modernism at Connecticut College. “General Houses, Inc.” <http://oak.conncoll.edu/~steelhouse/ghinc.html>.

<sup>62</sup> Prince George's Heritage, “Historic Places in Prince George's County, 12 Priority Endangered Historic Places for 2008.” <http://www.edterry.com/pgh/endangered.html>.



**Figure 26.** 7 Forest Way, one of the “experimental,” moderately priced homes built within the Parkbelt subdivision of Greenbelt, Maryland.



**Figure 27.** As the Parkbelt home with the most integrity, 7 Forest Way has recently attracted the attention of historic preservationists (*photographs by the author*).

even though the Resettlement Agency did not build them. It is also likely that he was aware of Fisher's work with prefabrication and his goal of affordable housing. Indeed, the two men shared a dedication to reasonably priced homes, as well as an attachment to the modern style. Begun in the 1930s in Europe, the modern, or international style refuted historical precedent while emphasizing simplicity, flat roofs, and little to no ornamentation. Its expression in the United States morphed into what is called regional modernism, practiced by famous architects like Frank Lloyd Wright and Julia Morgan. Regional modernism uses the same simple forms, but possesses an organic, intuitive sensibility that incorporates local building traditions and the overall setting.<sup>63</sup> The Parkbelt and Gardendale homes exhibit several characteristics of the modernist style: flat roofs, simple shapes, and little exterior decoration. Given the Gardendale rammed earth homes' use of an organic material, local labor, and consideration of the site and climate, they also embrace a tradition of regional modernism.

As an architect and engineer, Hibben's philosophy led his designs and projects. In describing his work for Butler University, he stated, "I believe architecture to be an expression in three dimensions of the social, economic, intellectual, and spiritual state of a civilization."<sup>64</sup> Cited as being "social-minded rather than political-minded" and practical, his work for New Deal agencies allowed him to exercise his "bootstrap philosophies and an enthusiasm for 'low tech' solutions

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<sup>63</sup> Curran, Oregon State Historic Preservation Office. "Preserving Buildings of the Recent Past," National Council on Public History Conference 2010 Session, March 12, 2010.

<sup>64</sup> Hibben Family History, 297.

[hibbengenealogy.org/Documents/Chapter\\_VI.%20Generation%206.1\\_R.pdf](http://hibbengenealogy.org/Documents/Chapter_VI.%20Generation%206.1_R.pdf)



to society's problems."<sup>65</sup> If the government was going to provide housing for people down on their luck at Gardendale, Hibben believed rammed earth construction provided a chance to explore how to do so cheaply and efficiently. Moreover, Hibben believed the rammed earth construction method would provide jobs to many unemployed Americans.<sup>66</sup> Perhaps channeling the earlier thoughts of Williams-Ellis, in an interview with a Birmingham newspaper Hibben stated, "One of my greatest pleasures in all this work is that I taught these unskilled, laboring men a skill. They are now about and earn their living in a trade." The reporter was impressed, writing, "And then I realized that Tom Hibben was building more than houses. He was building men, and sending them out in society to take their place and earn their way."<sup>67</sup>

However noble Hibben's intentions, Gardendale's rammed earth homes were to be constructed in secret because the federal government was not convinced of their feasibility. Hibben was also limited to seven homes instead of the entire rammed earth community he initially envisioned. An out-of-the-way, small-scale project would help the government avoid the possible embarrassment of the homes collapsing, which would not bode well for the Resettlement Agency and its programs, or the policies of the New Deal on a broader scale. Still, the fact that Hibben was permitted to experiment within one of the first resettlement homesteads is significant, as it shows the severity of the situation, the timely opportunity provided within the newly-born agency, and the determination of an inspired architect-engineer. Hibben

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<sup>65</sup> Ibid., 299.

Roach, "Rammed Earth Houses in Mount Olive," 37.

<sup>63</sup> Merrill, *The Rammed Earth House*, 2.

<sup>67</sup> Roach, "Rammed Earth Houses in Mount Olive," 40.

christened his new project “the government’s experimental station for rammed-earth construction” and began work, utilizing *Farmers’ Bulletin No. 1500* and a trial-and-error process, learning as work progressed. Sometimes his methods were decidedly un-scientific; for example, he told the *Birmingham News Age-Herald*, “Our test for moisture is to squeeze a ball of dirt in the hand and then drop it; if it shatters it is all right. If it doesn’t shatter—to use the expression of the men—it’s too wet to plough.” Other times he combined a modern desire for speed and efficiency with an ancient building form: “One of the first jobs we had at Gardendale was to teach the men a work rhythm so that they could do the tamping with the least effort for the best results, that they could tamp the earth with a rhythmic stroke rather than pound it into place.”<sup>68</sup>

Even with his enthusiasm, Hibben was not always entirely sure of his project. One night during a fierce rainstorm, the architect lay awake worrying about the durability of his rammed earth walls. When he returned to the site in the morning, the walls were intact, much to his relief.<sup>69</sup> Still, his project moved slowly. The first home took 14 men five weeks to finish, given the novelty of the form and the inexperience of the workers. By the time the last house was completed, it took the same men only five days,<sup>70</sup> but a curing period of 30 days was still necessary to ensure the walls were completely dry. Construction costs varied given the size of the house and the amount of labor involved. According to the Gardendale project records, the approved construction costs for the seven rammed earth homes varied between \$2,260 and \$2,725. These numbers were comparable to the community’s traditional house types;

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<sup>68</sup> Ibid., 38-39.

<sup>69</sup> Merrill, *The Rammed Earth House*, 1-2.

<sup>70</sup> Roach, “Rammed Earth Houses in Mount Olive,” 39.



most of the approved construction costs for those homes ranged between \$2,500 and \$2,750, although a few types ranged between \$3,070 and \$3,415.<sup>71</sup> Similarly, a 1938 Farm Security Administration report on the rammed earth homes estimated their construction costs to be between \$2,050 and \$2,750 (both types cost approximately \$.12 per cubic foot). Whatever their actual cost, the savings of rammed earth versus frame or brick construction was not significant. What is important about the rammed earth homes' construction costs, however, is the amount spent on labor versus the amount spent on material. According to an October 1936 *Architectural Record* article on the homes, the construction cost ratio was about 65% labor/wages and 35% materials. It, too, cites the homes' slow construction.<sup>72</sup> The Farm Security Administration report on the homes provided the following numbers: Plan Type 4-RE (two bedrooms) cost \$750 in material and \$1,300 in labor, while Plan Type 5-RE (three bedrooms) cost \$1,050 in material and \$1,700 in labor.<sup>73</sup> When compared with the other Gardendale structures, \$.75 of each dollar went to rammed earth labor, almost double the \$.35 labor cost for frame or brick homes.<sup>74</sup> Spending more on labor helped create jobs, which was helpful in terms of alleviating the period's massive unemployment rate, but it was less helpful in keeping overall costs down.

As the rammed earth home experiment progressed, Tugwell and the Resettlement Agency's photographic arm did their part to publicizing it. Visiting the site in the summer of 1936, Tugwell pronounced the rammed earth homes a success

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<sup>71</sup> Records of the Farm Security Administration and Predecessor Agencies. "Project Records, 1935-1940, Gardendale Homesteads (AL-4)." Record Group 96, Entry A1-71, boxes 20-24. National Archives, College Park, Maryland.

<sup>72</sup> "Rammed Earth Construction," *The Architectural Record* 80, no. 4 (October 1936): 323-324.

<sup>73</sup> U.S. Department of Agriculture Farm Security Administration, *Experiments in Rammed Earth Construction*.

<sup>74</sup> Roach, "Rammed Earth Houses in Mount Olive," 43.

and commended the workers;<sup>75</sup> photographer Arthur Rothstein took several images of the newly completed rammed earth homes between February and April 1937. The striking black and white photos are now part of the Library of Congress' collection. The public and future residents, however, took a fair amount of convincing, as some called the homes a "complete waste of manpower and mud."<sup>76</sup> After being informed that a house was available in the community, Mrs. Dorothy Wilson responded, "If it's one of those old dirt houses I won't have it."<sup>77</sup> She eventually came around and ended up loving the one she received. The homes also took on a novelty status, becoming objects to be seen. The WPA Writers' Project's volume on Alabama mentioned Hibben's rammed earth homes, stating somewhat incorrectly, "In Jefferson County, near Birmingham, where labor is cheap and material relatively high, the rammed earth house has been found cheaper than a comparable frame structure." It recommended stopping by the community to view the homes within one of its suggested tours of the state.<sup>78</sup> Mrs. Naomi Mayhew recalled that despite the fact that many of the roads leading to and around Gardendale were still unpaved, people traveled to see the unique structures: "We had about as much privacy as a gold fish in a gold fish bowl."<sup>79</sup> Perhaps the most famous visitor was Indian Prime Minister Jawaharlal Nehru in 1951, who signed resident Rachel Scisson's guest book.<sup>80</sup> Turnover within the community was high, especially in the early years of the settlement. Beginning in 1940, the government began to sell the units, giving the first

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<sup>75</sup> *The Birmingham Post Herald*, "Success! County Homes Built 'Dirt Cheap!'," July 14, 1936.

<sup>76</sup> Roach, "Rammed Earth Houses in Mount Olive," 42.

<sup>77</sup> *Ibid.*, 35.

<sup>78</sup> Works Progress Administration Writers' Project, *Alabama: A Guide to the Deep South*, 156, 262.

<sup>79</sup> Roach, "Rammed Earth Houses in Mount Olive," 42-43.

<sup>80</sup> *Ibid.*

option to purchase to those renting the units at the time. Mostly industrial and white-collar workers, the average annual income of the community hovered around \$1,400.<sup>81</sup>

Today, all seven of the experimental units still stand, although some improvements and alterations have been made, such as sloped roofs to allow for HVAC units and modern water and electrical systems, screened-in porches, and additional bedrooms. A couple of the homes have suffered from poor water drainage, leading to cracked and/or sinking concrete slab foundations.<sup>82</sup> Some second- or third-generation family members still occupy the homes. According to Carolyn Lyon, who moved to the community in 1944, the rammed earth residents called each other “dirt daubers.” This no-nonsense attitude regarding the architectural novelty of their homes persists, says current resident Scott Cousins, “We call them mud homes. It is what it is.”<sup>83</sup> While the community is aware of its history and architectural novelty—it has been featured in various newspaper articles, books, and public exhibitions—there has been no formal effort to preserve the homes. The durability of rammed earth is unquestioned, but the memorable stories and integrity of the homes could suffer should they remain undocumented.

The rammed earth homes of Gardendale represent the culmination of the second wave of rammed earth interest, a period of government research, investigation, and testing of an alternative building technology. Begun in the mid-1920s, the USDA and other similar bureaucratic agencies began experimenting with

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<sup>81</sup> Ibid., 40-41.

<sup>82</sup> Sutterlin, University of Alabama and CEO of Renewable Alternatives, in email conversation with the author, 2010.

<sup>83</sup> Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.

the method, but it was not until the New Deal that their testing and singular experiments led to a significant government-backed exploration of the technique. As part of the Resettlement Agency, Gardendale was one of many homesteads that looked to re-imagine society's built environment, but its experimental units today are the only remaining rammed earth structures ever built by the government,<sup>84</sup> making them worthy of documentation and preservation. Additionally, architect-engineer Hibben's philosophy and project approach at Gardendale reflects the extent of the period's financial difficulty and labor surplus, as well as the attitudes of the hopeful and creative government workers attempting to solve such problems. Rammed earth was not without its drawbacks, such as high labor costs, lengthy building periods, and a public reluctance to accept the form, but for a brief moment, it looked like a viable solution. This was short-lived however, as the Resettlement Agency faced increasing criticism, government support of the method fell away, and the Great Depression turned into World War II.

### **Abandonment of Rammed Earth**

As word of the Resettlement Agency's construction projects got around, Congress listened. Historically, public support of housing for the poor has been lukewarm, and the resettlement communities were no exception.<sup>85</sup> Although the agency attempted to save costs and provided homes that were comfortable but by no means extravagant, some members of the public and Congress complained that the

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<sup>84</sup> Gardendale is home to the only extant rammed earth structures ever built by the federal government, although the Resettlement Agency did erect 100 adobe homes for farm workers outside of Phoenix, Arizona. It is unclear if these still stand. A brief description and floor plan of the adobe homes can be found in *The Architectural Forum*, "Resettlement Houses," June 1937: 480-481.

<sup>85</sup> Radford, *Modern Housing for America: Policy Struggles in the New Deal Era*, 1.

homes were too nice for people accepting government aid.<sup>86</sup> Additionally, because of the novelty of the agency's approach to rural and urban poverty, their work was often mischaracterized and misunderstood. For example, the cooperative organizations within some of the homesteads were labeled as "Communitistic communities" and "un-American social experiments." Complaints grew. During the congressional debates of the Wagner bill, Senator Byrd of Virginia was "perturbed by what he regarded as the excessive costs and threatening social implications of the cooperative farms the Resettlement Agency organized in his home state...."<sup>87</sup> While Gardendale is not mentioned in particular, the agency's "haste in planning, expensive experimentation in construction methods, and relatively high housing standards for resettlement families [that] tended to push construction costs upward"<sup>88</sup> were duly noted. As director, Rexford Tugwell was criticized and nicknamed "Rex the Red."<sup>89</sup> The Resettlement Agency and Tugwell soon became political liabilities. In the winter of 1936, Tugwell resigned from his post and the agency was folded into the USDA, later to become part of the Farm Security Administration.<sup>90</sup>

Gardendale's homes also received a fair amount of publicity, and not just from the photographic efforts of the Resettlement Agency's Historical Section. Articles about rammed earth were featured in numerous publications, including trade journals like *The Architectural Forum* and *The Architectural Record*, as well as popular magazines like *Business Week*, *American Home*, *Country Gentlemen*, *The*

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<sup>86</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 111. Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 127-128.

<sup>87</sup> Radford, *Modern Housing for America: Policy Struggles in the New Deal Era*, 190.

<sup>88</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 111.

<sup>89</sup> Donald Holley, *Uncle Sam's Farmers: The New Deal Communities in the Lower Mississippi Valley*, 105-107, 132-133, 174-175.

<sup>90</sup> Baldwin, *Poverty and Politics: The Rise and Decline of the Farm Security Administration*, 120-123.

*Rotarian*, *Literary Digest*, and *Popular Mechanics*.<sup>91</sup> Gardendale's experimental units were cited as successful models, but rammed earth failed to move beyond architectural curiosity. The 1939 *Rotarian* article suggested two possible reasons why rammed earth was not widely used in the United States: its inability to generate profits and an unconvinced public. The government did not use the method for profit at Gardendale, but the technique's labor costs and long construction period, although helpful during times of mass unemployment, were not viable for large-scale projects. The Farm Security Administration continued to provide relief for needy farm families, but turned away from experimental design to prefabricated houses that cost between \$1,000 and \$1,500.<sup>92</sup>

Government interest was not yet completely abandoned, however, and the men who championed rammed earth still ran within its circles. In 1940, a Farm Security Administration report entitled *State on Condition of Rammed Earth Houses* found the Gardendale's rammed earth homes to be "very satisfactory living quarters" and cited the homes' thermal benefits. The French doors, however, did not pass muster.<sup>93</sup> In 1940-1941, Hibben, Hubell, and Miller provided technical assistance to the Bureau of Standards Office, which wanted to conduct tests on earth building methods.<sup>94</sup> Different types of earth construction were tested and found to be generally satisfactory, but the Bureau failed to promote its results or continue its research.<sup>95</sup>

Hibben was then part of the National Youth Administration, where rammed earth and

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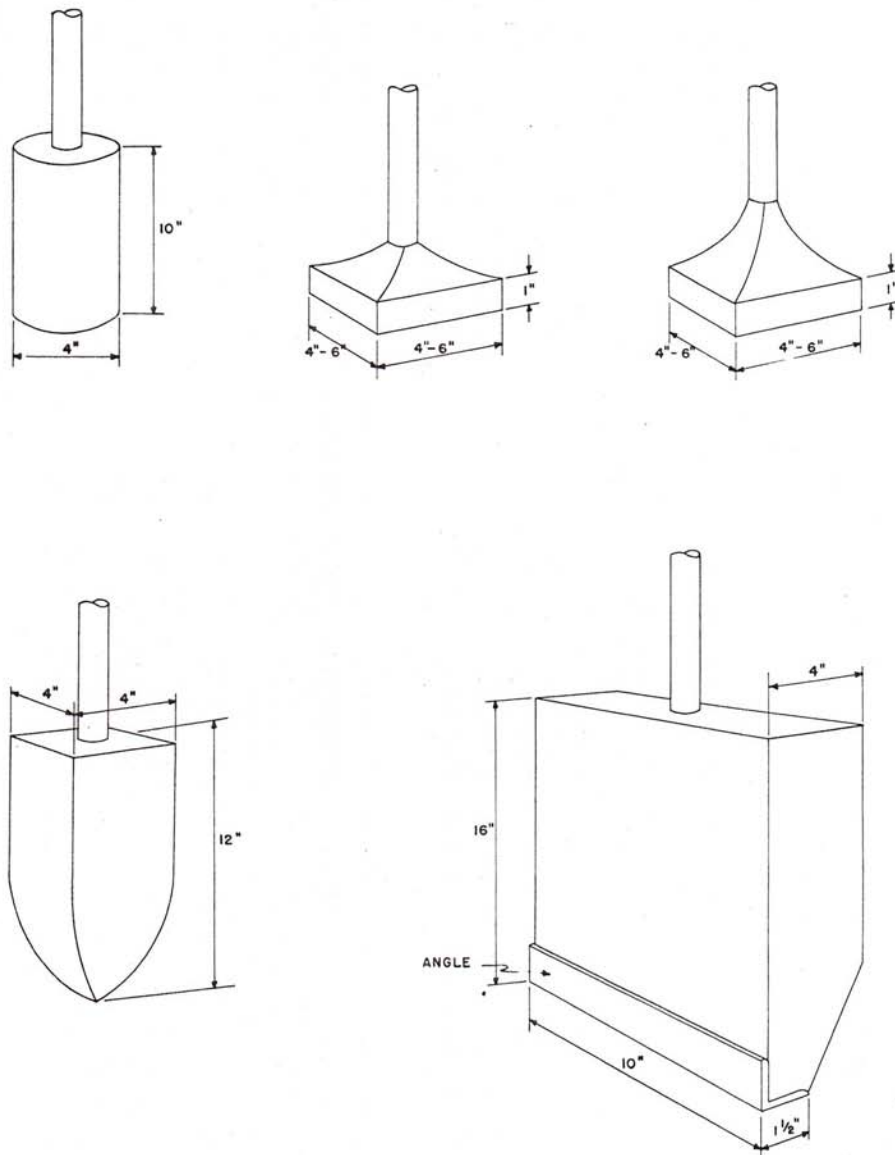
<sup>91</sup> Merrill, *The Rammed Earth House*, 227-230.

<sup>92</sup> United States Farm Security Administration, *Small Houses*.

<sup>93</sup> U.S. Department of Agriculture Farm Security Administration, *Statement on Condition of Rammed Earth Houses*, June 6, 1940.

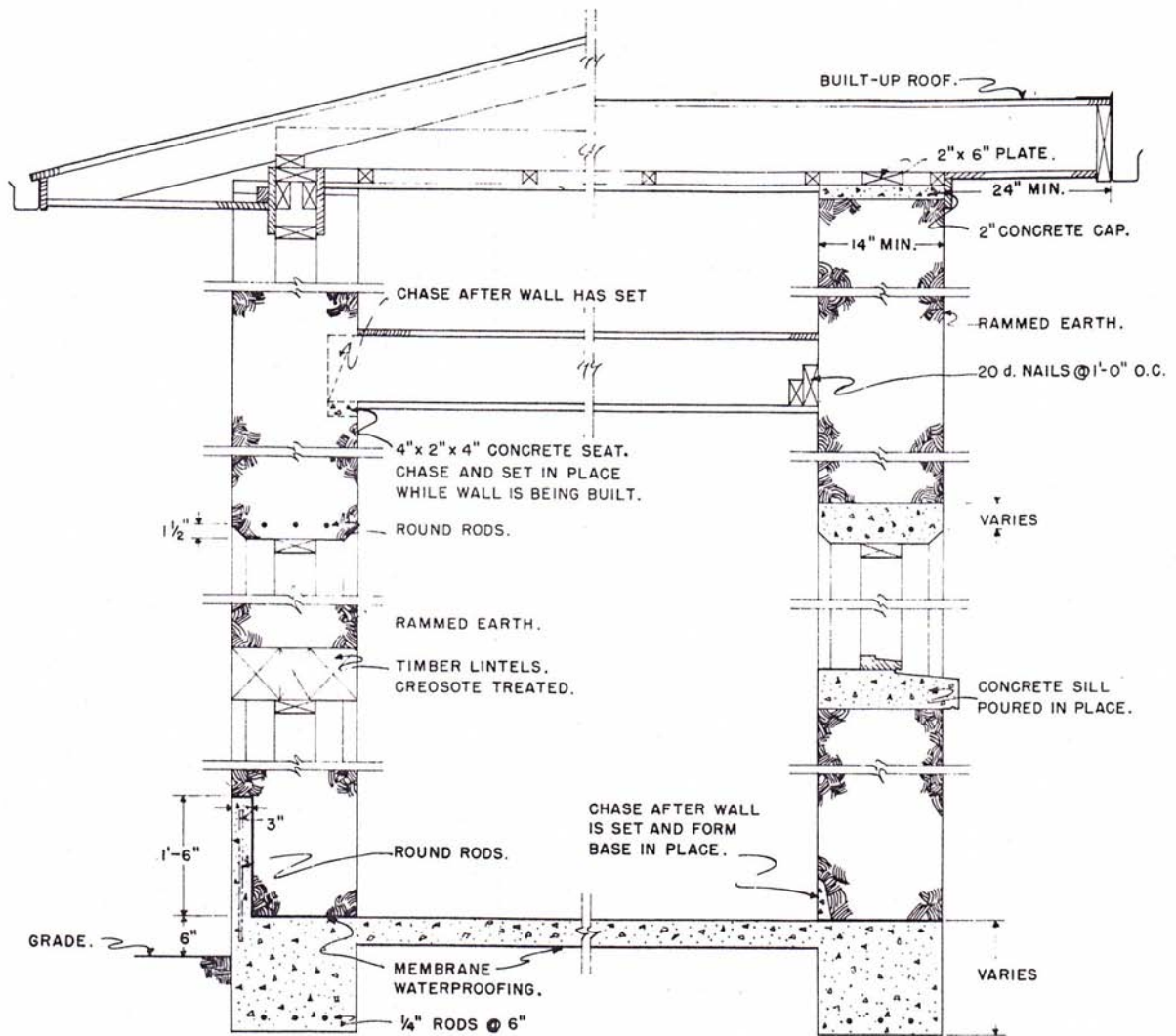
<sup>94</sup> Merrill, *The Rammed Earth House*, 220-221.

<sup>95</sup> *Ibid.*, 23.



**EXAMPLES OF RAMMED EARTH TAMPERS**

**Figure 28.** Diagram showing tampers used to compact damp earth, part of Hibben's Technical Circular for the National Youth Administration, 1941 (*image from the National Archives and Records Administration*).



TYPICAL SECTIONS THRU A RAMMED EARTH BUILDING

**Figure 29.** Section of a rammed earth structure, part of Hibben's Technical Circular for the National Youth Administration, 1941 (image from National Archives and Records Administration).



his philosophies again mixed. He authored a Technical Circular on the method that was published by the agency detailing the technique and promoting its use for schools and community buildings. Hibben specifically mentioned his work at Gardendale, where he wrote, "...of all the building types erected there, those of Rammed Earth construction have cost least for maintenance."<sup>96</sup> He also spoke at the Washington Youth Conference, where he expressed a need for the government to create jobs and provide practical training for young people.<sup>97</sup> About this time, Hibben also began working on experimental rammed earth units for a community outside of Alexandria, Virginia.

Named Cameron Valley, this community was part of the Federal Works Agency's Division of Defense Housing, built to alleviate the crowded conditions experienced by government defense workers throughout the country. Hibben was again permitted to build a few experimental units, where he explored different materials such as concrete, asphalt-stabilized adobe brick, bituminous earth block, and cement-stabilized tamped earth (rammed earth with added cement for increased strength). Sometimes he combined two of the methods in different sections of the same home. At Cameron Valley, Hibben also looked to improve earth building technology, attempting to invent a way to mass-produce rammed earth walls by using metal forms and mechanically tamping the earth with machines run by compressed air. Stylistically, the experimental homes shared a modern sensibility, one- and two-

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<sup>96</sup> Hibben, *Rammed Earth Construction*. Technical Support Circular No. 16, Supplemental No. 1, National Youth Administration, Washington, DC: National Youth Administration, October 1941, Record Group 114, Entries 253-254, National Archives and Records Administration, College Park.

<sup>97</sup> *The Washington Post*, "Misled Youth," November 26, 1939: B8.  
*The Washington Post*, "Speakers Put Democracy Up to Youth," November 25, 1939: 15.

story rectangular layouts with flat roofs and clean lines much like Gardendale's rammed earth structures. Additionally, Hibben needed to build the defense homes cheaply and efficiently, just as he attempted to do in Alabama. According to *The Architectural Forum*, Hibben's second set of experimental units ranged from \$2,642 to \$2,950.

Rammed earth enthusiast and author Anthony Merrill visited Cameron Valley in the late 1940s and declared the rammed earth walls to be in excellent shape. However, he did not believe the Cameron Valley experimental homes to be good examples of rammed earth for several reasons. First, the coverings chosen were also experimental and proved to be deficient (and ugly); second, the housing authority in charge of the units did not keep them in great shape; and third, the metal forms and mechanical tamping used by Hibben caused structural issues. Hibben's new forms used metal bolts to hold the sides together, which when withdrawn, caused large holes in the walls that were susceptible to erosion. The mechanical tamping also proved to be uneven, causing the earth to be too tightly packed in some sections of the walls or too loose in others.<sup>98</sup> Cameron Valley's traditional and experimental homes lasted until the early 1980s, at one time housing low-income residents, when they were demolished and redeveloped as Quaker Hill.<sup>99</sup>

Renowned architect Frank Lloyd Wright also briefly toyed with rammed earth during this period. A group of Detroit autoworkers contracted Wright to draw up

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<sup>98</sup> "Defense Houses at Alexandria: House Types One and Two Story," *The Architectural Forum* 75, no. 4 (October 1941): 211-240.

Merrill, *The Rammed Earth House*, 29-31.

<sup>99</sup> *Alexandria Times*, "Out of the Attic," August 27, 2009.

<http://www.alextimes.com/news/2009/aug/27/out-of-the-attic-2/>.

Before demolition, Cameron Valley's rammed earth homes were documented by the Historic American Buildings Survey (HABS); the images are available on the Library of Congress's web site.

**Figure 30.** Hibben's plans for "experimental" defense housing units at the Cameron Valley development in Alexandria, Virginia (from *The Architectural Forum*, October 1941).

**Figure 31.** Hibben's Cameron Valley units included one model built of cement-stabilized rammed earth walls (*from The Architectural Forum, October 1941*).



**Figure 32.** Cameron Valley's rammed earth units were documented by HABS before demolition in the 1970s.

**Figure 33.** View of the deteriorating rammed earth wall at Cameron Valley (*photographs from the Library of Congress, Prints and Photographs Division, Historic American Buildings Survey*).



plans for their rammed earth community, named Cooperative Homesteads. In 1942, the group purchased 120 acres outside the Motor City, and with Wright's plans they expected to build 79 homes, each two bedrooms with a breezeway carport. Rammed earth was the selected building material because it would allow the workers to construct their own homes and was cheap. Wright referred to the homes as 'berm-type' in his book *Natural Home* and cited its advantages, such as ease of construction, insulation, lack of need for fancy finishes, and "economy and preservation of landscape."<sup>100</sup> However, the project never got off the ground. According to Wright, drainage and landscape issues stalled progress, but it is unclear what exactly happened. Merrill visited the site in 1946 and found the few walls erected abandoned and crumbling.<sup>101</sup> Rammed earth's moment had passed.

Gardendale and Cameron Valley remained the only multi-home rammed earth projects in the country, built by the federal government as experiments during times of financial difficulty and defense concerns. But the government never used the form again. Hibben's efforts within various federal agencies (the Resettlement Agency, the National Youth Administration, and the Federal Works Agency) to promote rammed earth as a way to provide proper, moderately priced housing and jobs failed to garner widespread support. The reason for this is not clear; everything from unjustified higher construction costs to the disinterest of government officials and the lobbying efforts of the building industries is possible.<sup>102</sup> Of Hibben's rammed earth projects,

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<sup>100</sup> Wright, *The Natural House*, 148-150.

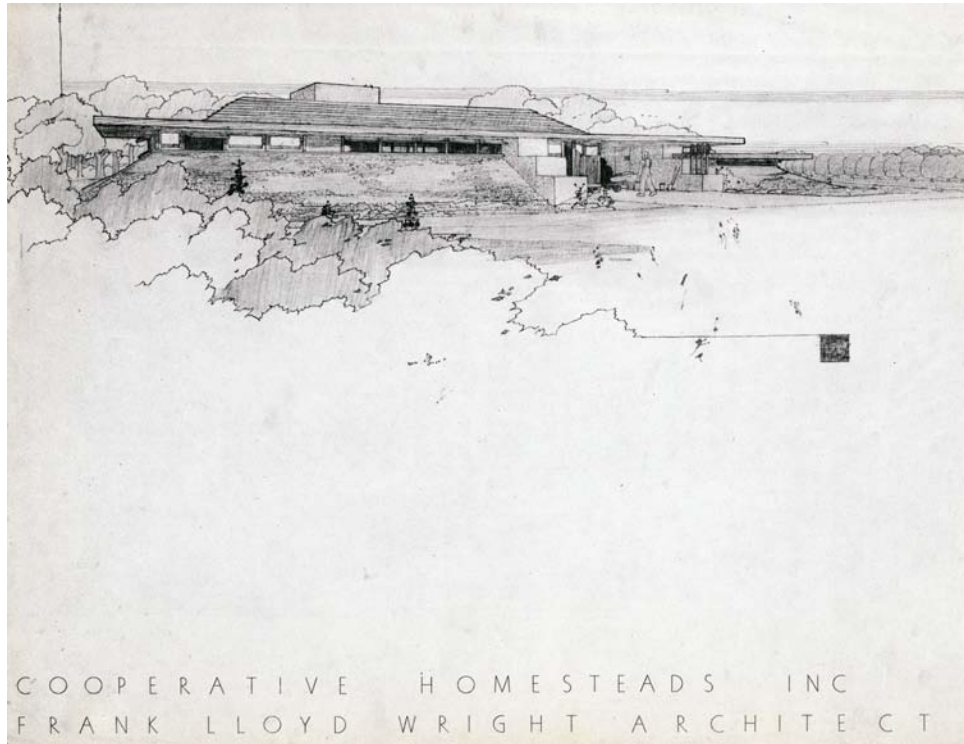
Aaron G. Green Associates, Inc., <http://www.agaarchitects.com/>

<sup>101</sup> Rael, *Earth Architecture*, 12.

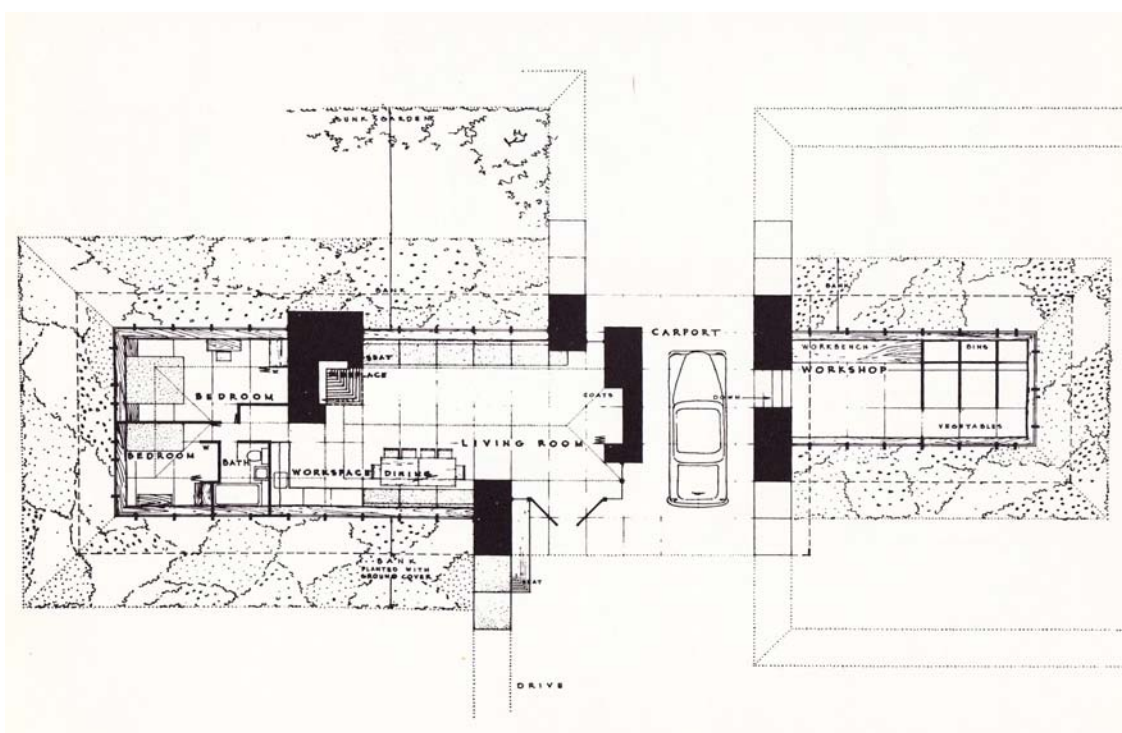
Merrill, *The Rammed Earth House*, 31-32.

<sup>102</sup> Ibid., 17-21.

"Rammed Earth History." Soledad Canyon Earth Builders. [www.adobe-home.com](http://www.adobe-home.com)



**Figure 34.** Frank Lloyd Wright's rendering for Cooperative Homesteads' rammed earth homes, which were never completed.



**Figure 35.** Wright's plan for Cooperative Homesteads' rammed earth homes (*Cooperative Homesteads, Detroit, Michigan, 1942. Project.* © 1954 Frank Lloyd Wright Foundation, Scottsdale, AZ. Used with permission).

Gardendale proved most successful; it served as a model for rammed earth enthusiasts and was featured in various popular publications after its completion. But as the post-World War II housing boom gained momentum, rammed earth once again faded into the background. Frame house subdivisions like Levittown—quickly erected, easily prefabricated, and profitable—overcame the desire to explore alternative building technologies using earth.



## **Chapter 5: Rammed Earth Resurrection and the Environmental Movement: Third Wave**

The third and current wave of rammed earth home construction began with the environmental movement of the 1970s and 1980s. Groups concerned with sustainability resurrected the form, as documented by the epic *The Next Whole Earth Catalog*. This large volume of “tools” helped its readers explore everything from hobbies like jewelry making, gardening, and yoga, to farming, blacksmithing, and home construction. With books like *Design with Climate*, *The Owner-Built Home*, and *In Harmony with Nature*, the catalog featured a wealth of resources for the inspired, environmentally-minded builder. Adobe had its own section within the catalog, but rammed earth was also featured. The book *Soil-Cement*, a 1964 United Nations publication, outlined four different earth-building methods including “moistened soil compacted in situ in suitable rigid frames to form monolithic walling,” or rammed earth as it is expressed in Gardendale. The product featured next to *Soil-Cement*, the Cinva-Ram Block Press, was the latest machine that would help one mold earth mechanically into blocks.<sup>103</sup>

With its collection of manuals and advice books, the *Next Whole Earth Catalog* emphasized do-it-yourself-ness, a theme that rammed earth had connected with since its introduction into the United States. But the method now took on a new theme of environmental responsibility, or green benefits thanks to its use of natural, local products and the walls’ thermal capacity, which keep energy costs low. Unlike earlier periods, when plantation owners, farmers, and government bureaucrats used

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<sup>103</sup> Brand, *The Next Whole Earth Catalog: Access to Tools*, 228-229.

rammed earth for its economy, durability, and novelty, the form began to be promoted as a way to practice environmental stewardship. While Wright had noted that rammed earth contributed to an “economy and preservation of landscape,” this aspect was not the driving force behind the use of rammed earth in earlier applications. Today in particular, the green benefits of rammed earth are some of its strongest selling points.

In the United States, rammed earth home construction is gaining ground in California and the southwest; companies such as Rammed Earth Works, Soledad Canyon Earth Builders, Southwest Solar Adobe School, and Rammed Earth Development, Inc., offer professional earth homebuilding services and consultation, as well as publications and training sessions.<sup>104</sup> New technological improvements have also added to rammed earth’s appeal. David Easton, rammed earth specialist and author, developed the P.I.S.E. method, or Pneumatically Impacted Stabilized Earth. Instead of hand tamping the damp earth into forms, it is blown into open framework with specialized air guns. This method greatly speeds up the process and increases efficiency, as a crew of several workers can erect all of a building’s walls in a single day. PISE was recently used in an Adirondack-style house designed by Eric Haesloop of Turnbull Griffin and Haesloop for clients in northern California, who love the home’s simple design and natural earth colors. They explained, we “wanted the house to compliment the land, to be subservient rather than stand up and wave and show the world how big and beautiful it was. I wanted to fit in.”<sup>105</sup> Rammed earth is becoming popular again in light of its reinterpretation as a green environmental practice, but it

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<sup>104</sup> Soledad Canyon Earth Builders. <http://www.adobe-home.com>  
Southwest Solar Adobe School <http://www.adobebuilder.com>  
Rammed Earth Works <http://www.rammedearthworks.com>  
Rammed Earth Development, Inc. <http://www.rammedearth.com>

<sup>105</sup> Fisher, “PISE Does It,” *Dwell*, May 2009: 62-66.



**Figure 36.** The Kavner house in northern California, built of rammed earth using the modern PISE technique (*image courtesy of Matthew Millman Photography and Turnbull Griffin and Haesloop. Used with permission.*)

**Figure 37.** Diagram of the PISE technique, which pneumatically impacts earth via a hose into framework instead hand tamping into a form (*image from Dwell magazine*).

**Figure 38.** (left) The PISE technique in action: a workman applies damp earth to open framework with a pneumatically powered hose.

**Figure 39.** (right) The PISE technique in action: a second workman smoothes out the impacted earth (*images from Rammed Earth Works*).

remains a niche market.

In addition to themes dealing with nature and the environment, rammed earth has also historically been utilized with the hopes of remedying difficult social issues, such as providing better slave housing in the 19<sup>th</sup> century (although the planters' ultimate intentions are debatable), creating new jobs for the unemployed after World War I in Great Britain and during the Great Depression in the United States, and improving housing standards for impoverished farmers and industrial defense workers during the late 1930s at Gardendale and 1940s at Cameron Valley. Rammed earth's third wave continues to incorporate this theme of improving social conditions, as expressed in architect Hassan Fathy's book, *Architecture for the Poor*.

Documenting the building of New Gournia in the late 1940s, Fathy advocated returning to earth building as a way to house the disadvantaged. He also encouraged the revival of ancient crafts, such as claustra (lattice designs in the mudwork), to adorn the buildings.<sup>106</sup> Although his book was well received, the experiment at New Gournia was ultimately abandoned. Rammed earth for needy communities has been more recently explored by Samuel Mockbee's Rural Studio. Founded in 1992 as part of Auburn University's architecture program, the Rural Studio sought to embody architecture as activism, building for local, disadvantaged communities in Hale County, Alabama. Additionally, Mockbee wanted to build inexpensively, so he encouraged his students to shun traditional building materials, erecting homes, community centers, and churches out of old, discarded, or recycled materials.<sup>107</sup> This included rammed earth walls; the Yancey Chapel, built in 1995, uses walls of tires

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<sup>106</sup> Morgan, *Earth Architecture: From Ancient to Modern*, 117.

<sup>107</sup> Moos and Trechsel, *Samuel Mockbee and the Rural Studio: Community Architecture*, 7-15.

filled with rammed earth and covered in stucco.<sup>108</sup> Mockbee may have been aware of the rammed earth homes at Gardendale. Ronald Rael, author of *Earth Architecture*, states that Mockbee's students working on the Mason's Bend community center in 1999 used Hibben's homes as inspiration for their own rammed earth walls. Given the fact that both projects were in the same state and shared similar goals, building good homes cheaply for the less fortunate, this source of inspiration seems plausible.

Rammed earth's third wave is ongoing and has taken on a new 'green' hue as part of its most recent reincarnation, thanks to the environmental movement of the late 1970s. Books of that era, like *Architecture for the Poor*, have led to more recent editions exploring affordable earth construction, such as *Building With Earth: A Guide to Flexible Form Earthbag Construction* by Paulina Wojciechowska (2001) and *Earth Architecture* by William Morgan (2008). Potential builders can also consult *The Natural Home: A Complete Guide to Healthy, Energy Efficient Living* by Daniel Chiras (2000) and an updated version of *The Rammed Earth House* by David Easton (2007). The Rural Studio at Auburn is still in operation as well, despite Mockbee's death in 2001. Themes of economy and do-it-yourself-ness persist in current discussions of rammed earth, as well as a sense of social responsibility, both in terms of providing for the disadvantaged (as is the case of the work of the Rural Studio) and promoting environmental justice (emphasizing rammed earth's

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<sup>108</sup> Bowsher, *Alabama Architecture: Looking at Building and Place*, 104.  
Rael, *Earth Architecture*, 48-49.



**Figure 40.** Mason's Bend Community Center, built by The Rural Studio out of unconventional materials, includes a rammed earth wall (*image from Earth Architecture by Ronald Rael, © Princeton Architectural Press. Used with permission.*).

green benefits). But unlike its earlier history, rammed earth is no longer exclusively for farmers or those in need. Several of the rammed earth homes erected in the southwest and California were built by architects for specific clients interested in the technique who, given the homes' beautiful, custom architecture and locations, would certainly not qualify as poor.<sup>109</sup> Indeed, states Eric Haesloop of Turner Griffin Haesloop Architects, "In seismic areas such as ours, rammed and sprayed earth are not dirt cheap!"<sup>110</sup> For these homebuilders, rammed earth was attractive specifically for its environmental sensitivity and unconventional form. This is good news for the private rammed earth building industry, but it does little to support rammed earth's viability as a widespread, cheaper building approach. As rammed earth looks to the future, its green benefits should continue be lauded, but its wider history of government involvement and social reform should not be overlooked.

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<sup>109</sup> Beautiful examples of current custom earth architecture can be found in the following publications: Joseph Giovannini, "Earth Work," *Architecture*, December 1998: 90-98. William Morgan, *Earth Architecture: From Ancient to Modern* (Gainesville: University of Florida Press, 2008).

Ronald Rael, *Earth Architecture* (New York: Princeton Architectural Press, 2009).

<sup>110</sup> Haesloop, FAIA, LEED AP, Haesloop Turner Griffin architects, in email conversation with the author, 2010.



## **Chapter 6: Why Gardendale and Rammed Earth Matter: A Case for Preservation**

Generally speaking, the preservation of rammed earth has not received much attention, especially in the United States. Adobe has fared a bit better; the National Park Service's Preservation Brief Number 5 is entitled, "Preservation of Historic Adobe Buildings." The Getty Conservation Institute (GCI) has taken an interest in earthen architecture, holding conferences and special working groups on the subject. It most recently published a final report on the study and conservation of earthen architecture in the Mediterranean region.<sup>111</sup> This work is notable, but it does not focus exclusively on rammed earth, nor does it address the historic buildings within the United States employing the method. This could be a result of a lack of knowledge of American historic rammed earth structures, especially given their tendency to be erected in rural areas.

Much of the focus on rammed earth has been concerned with new construction; for example, Joe M. Tibbets of the Southwest Solar Adobe School's 1998 *Building Standards* article, while acknowledging the technique's historical roots, focuses on developing new guidelines and code. However, preservation of historic rammed earth features has occurred in the United States. In 1986, REW (Rammed Earth Works) Associates agreed to restore a 1850s rammed earth building near Sacramento, California, named the Chew Kee Store. Constructed by Chinese immigrants, the building needed some maintenance work: a reinforced foundation, a

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<sup>111</sup> National Park Service, "Preservation Brief Number 5: Preservation of Historic Adobe Buildings." [www.nps.gov](http://www.nps.gov).  
The Getty Conservation Institute, "Earth Architecture Initiative." *GCI Bulletin* February 2010.

new roof, cracks repaired, and a new coat of plaster. As work progressed, the crew faced a few surprises. The building had no foundation (leading them to dig a trench for a buttress wall of stabilized earth for better structural support) and the walls were so solid that a standard rotary drill did not penetrate them. Unforeseen difficulties aside, REW Associates was ultimately successful and came out of the project with a renewed appreciation for the durability of rammed earth. Today the store is open to the public.<sup>112</sup>

Despite rammed earth's recent resurrection via themes of environmental stewardship and responsibility, the method is not widely understood or practiced. Some of the same prejudices about the technique persist today as did during the Gardendale era, when people expressed dismay about living in a "dirt" house. Other misconceptions include the belief that rammed earth is for dry climates, only houses poor and developing communities, and is architecturally limiting.<sup>113</sup> In reality, the technique can be practiced in a variety of climates, is used in beautiful custom homes for well-off clients, and, due to the adaptability of the material, holds great potential for new architectural possibilities.<sup>114</sup> But challenges remain, including a loss of traditional building methods (which includes rammed earth), inflexible building codes, the influence of the powerful building industry lobby, and what could be described as "prejudices of progress," the idea that building with earth is a primitive and not "modern" building technology.<sup>115</sup> It is also possible that rammed earth has remained unpopular because of its association with the groups that have used it over

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<sup>112</sup> Easton, *The Rammed Earth House*, 244-247.

<sup>113</sup> Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.

<sup>114</sup> Rael, *Earth Architecture*, 9-11.

<sup>115</sup> Cody, "Earthen Wall Construction in the Eastern United States," 3-4, 426.

the centuries. Rammed earth's earliest application was within an agricultural context that expressed itself as slave quarters; its New Deal-era application consisted of rammed earth homes for the impoverished within homestead communities that were described as socialistic and communistic; and the method's latest application was spurred by environmentally-minded hippies and counterculture groups. During each of these waves, rammed earth became equated with marginal communities, in turn giving the method a similar sense of insignificance. Thus, rammed earth's historical trends and sense of exclusivity—it is only for certain populations and not the general public—have likely had an impact on the popularity of the technique.

It should then be no surprise that the history of rammed earth home construction in the United States is not well known. The technique goes back to the 18<sup>th</sup> century, when wealthy plantation owners and farmers experimented with the form, erecting agricultural buildings and living quarters for enslaved workers. Even George and Martha Washington's nephew Bushrod Washington explored rammed earth's possibilities at Mount Vernon.<sup>116</sup> Planters in particular viewed the form as an innovative way to house their slaves, either out of concern for their living conditions or because they saw the method (already employed by some of their slaves) as economical. While rammed earth suffered as the Industrial Revolution took hold, it eventually piqued the interest of agricultural agencies within the Federal Government beginning in the mid-1920s. The Great Depression permitted one of the government's most avid enthusiasts, Thomas Hibben, to erect a few experimental homes outside of Birmingham, Alabama, as part of the Gardendale-Mount Olive resettlement homestead. Hibben also experimented at Cameron Valley, west of Alexandria,

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<sup>116</sup> Hallock, "Pisé Construction in Early Nineteenth-Century Virginia," 40-53.

Virginia, erecting defense homes for the many workers stationed in the capital region during World War II. However, rammed earth failed to win wide spread appeal, and was not revived until the environmental movement of the late 1970s.

Throughout its history, rammed earth has embodied several themes, such as economy, efficiency, novelty, independence, social responsibility, and environmental sensitivity. The method was cheap, durable, unique, and simple enough for the inspired builder to learn on his or her own, of great thermal benefit, and looked to as an answer for the unemployed, those suffering housing shortages, and disadvantaged communities. These varied themes correspond with the three waves of rammed earth use and experimentation in American history, ebbing in and out of Americans' consciousness. During the first wave, rammed earth was understood as durable, cheap, and easily constructed. It was mostly used by farmers and plantation owners, as witnessed by the era's agricultural and mechanical publications discussing rammed earth. During the second wave, these sentiments remained, but given the circumstances of the Great Depression, rammed earth was revived as a way to provide new jobs and new homes—collectively, a new chance—for those attempting to make it through the trying period. Government interest in the technique reached its peak during this wave, culminating in the experimental homes at Gardendale. The third and current wave celebrates rammed earth's environmental and energy benefits, and the method is employed by architects, consultants, and individuals interested in these qualities. However, notions of using rammed earth as a tool for social responsibility still resonate through the work of groups like The Rural Studio.



**Figure 41.** Gardendale’s rammed earth homes did not include a HVAC system; some residents have since installed such systems or window units.



**Figure 42.** While the integrity of Gardendale’s rammed earth homes is generally excellent, some upkeep is needed (*photographs courtesy of Gwendolyn Fernandez. Used with permission*).

Gardendale is one part of the larger narrative of rammed earth home construction within the United States, but its experimental units are the only remaining rammed earth features ever built by the federal government. For this fact alone they are worthy of preservation at the local, state, and national levels. In considering these homes for nomination to the National Register of Historic Places, they would fit squarely within Criterion C (structures that embody the distinctive characteristics of a type, period, or method of construction). Their connection to New Deal history is also very significant and thus they are likely to be eligible under Criterion A as well (places or structures that are associated with events that have made a significant contribution to the broad patterns of our history). Finally, the homes could be further eligible under Criterion C given the fact that they were built by Hibben, an architect-engineer who had several notable private and government projects under his belt.

Moreover, the homes possess excellent integrity; only a few have been altered over the decades to make space for HVAC units or additional rooms. They are still used as personal houses, however, and the possibility exists that their integrity could suffer as housing styles and technologies change. While there has been no effort to list Gardendale's rammed earth homes in the National Register as of this writing,<sup>117</sup> the community is aware of their architectural novelty and place within history, as witnessed by recent newspaper articles and exhibits featuring the houses.<sup>118</sup> A strong

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<sup>117</sup> Wofford and Enzweiler, Alabama Historical Commission, in email conversation with the author, 2010.

<sup>118</sup> Kemp, *Rammed-earth houses in Mount Olive still functional years after they were built as a New Deal project*, June 28, 2009, <http://blog.al.com>.  
Michael Huebner, Photo exhibit: Digging out of the Great Depression in Birmingham, Alabama, October 27, 2009, <http://blog.al.com>.

oral history tradition also lives on, as those occupying the homes are in some cases second or third generation homesteaders who recall their first impressions with their new “dirt” homes and offer insight into the community’s history. This is promising, as community backing is necessary for the listing process, both in terms of providing information and support for the endeavor. Furthermore, the community’s sense of pride could lead to other preservation efforts for the homes, such as an oral history project or programs for the owners discussing the ins and outs of rammed earth home maintenance.

But the argument for the preservation of Gardendale is larger than their unique construction type, rarity, and their possible listing on the National Register. Given current discussions of sustainability and environmental sensitivity, the history of rammed earth becomes even more important to explore and understand. Gardendale’s experimental homes provide us with living laboratories to study and document, allowing us to reflect and improve on earth building methods. Moreover, as rammed earth continues to be feted as a green building practice, it is important to remember that the technique began much earlier with different considerations. The method’s recent associations with green-ness and its development into a niche market represents a departure from rammed earth’s historical associations with society’s marginal groups. This is exciting because it could mean that rammed earth may become more popular, but also potentially dangerous because it may overlook the important connections between rammed earth and those groups throughout history that have contributed to its existence. Gardendale provides us with a link to that

story; its homes embody the historic associations of the method—cheap, durable, efficient housing with social considerations—and can act as a vehicle for stimulating current discussions on sustainability.

Gardendale's seven rammed earth homes are deceptively simple—simple in material, construction method, and style. This simplicity belies a rich history, while the homes' form and rarity make them strong candidates for formal recognition by local, state, and national preservation groups. Given the lack of education about rammed earth, the case for Gardendale's preservation grows even stronger. Listing the homes could raise consciousness about their distinctive construction type and could engage a public discussion about alternative building technologies. The current move towards green building practices, a buzz word in today's lexicon, has a much deeper history than most people would guess in rammed earth. The technique also holds great possibility for building in a more responsible manner in the future. In this way, Gardendale's rammed earth homes awake us to a history of a little recognized and understudied construction type and ask us to evaluate our housing patterns and the way we live.



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