This document has been checked for information on Native American burials. No images considered to be culturally insensitive, including images and drawings of burials, Ancestors, funerary objects, and other NAGPRA material were found.

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ETHAN ALLEN HITCHCOCK AND NATIVE AMERICAN ROUND STRUCTURES

MARK WILLIAMS AND KC JONES

Athens

Ethan Allen Hitchcock
And
Native American Round Structures

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Introduction and Acknowledgements

This paper is a much expanded version of a paper we first presented at the Southeastern Archaeological Conference in Jackson, Mississippi, in the fall of 2019. The original paper was primarily about the story of Ethan Allen Hitchcock and his diaries. As we intended at the time, we have now expanded and modified that paper to include a lengthy discussion of the native construction techniques of round houses in the Southeastern United States, growing out of our work in the Oconee Valley of central Georgia (Williams, Ledbetter, and Jones 2018).

In this effort we are thankful for the invaluable help of two individuals in particular. The first is Renee Harvey formerly of the Helmerich Center for American Research at the Gilcrease Museum in Tulsa, Oklahoma. The second is Michelle Krowl of the United States Library of Congress in Washington, D.C. Both of these dedicated researchers located invaluable data in the archives of their respective institutions as part of our hunt for the story of Hitchcock's diaries and we are forever in their debt. We also thank our brilliant colleague Scott Jones for many fascinating discussions on early technologies over the years. Finally, we thank our departed colleague Jerald Ledbetter, who we both miss terribly.

Our ongoing work with Late Mississippian farmsteads and Busk site Council Houses in the Oconee Valley of north-central Georgia has led us to questions regarding the nature of the construction of the structures comprising these thousands of dispersed farmsteads (Williams, Ledbetter, and Jones 2018). We have demonstrated that the majority of these farms consisted architecturally of three main structures—a round main house, a rectangular cooking shed, and a small square storage building or corn shed. The garbage was typically cast off just to the northeast of these farms. Thus the structures were typically located just to the southwest of the midden distribution on the sites.

With the current paper, Jones and I (minus the late, great Jerald Ledbetter) are conducting a study of the architectural structures of these abundant round houses excavated in the Oconee Valley. In this paper in particular, we are interested in the nature of the roof structures of these farmstead houses, and, by implication, the roofs of the round Council Houses also common in the Oconee Valley and much of the Deep South (Williams, Ledbetter, and Jones 2018). We know next to nothing archaeologically about the roof structures of the thousands of native round structures located in the Oconee Valley, however. Post mold patterns, yes, but the above ground details remain a matter of conjecture (Steere 2017).

As another introductory note, a great many larger round structures have been excavated in the southeastern United States over the last 90 years. At their most basic form, these larger round building, frequently called Council Houses or Rotundas, differ in three major structural ways—all three related to how the roof of the structure is supported. A number of structure, particularly earth covered structures such as the famous Macon Earth Lodge and the Plains Hidatsa and Mandan earthlodges, used a set of four large poles set in the center of the floor forming a central square support mechanism for the rafters (Fairbanks 1946 Wilson 1934).

The second possible architectural method of supporting the roof rafters is to use a series of concentric posts inside the outside ring of posts, presumably connected at their tops, to prevent the sagging of the roof rafters. This would obviate the need for the four (or three) center posts and create a larger open space in the center of the public structure. Both of these structure forms, however, have the defect that with all the poles erected inside the structure, many people simply will not have a complete view of everyone else in the structure, or of what is going on in the center. Architects have wrestled with this technical problem of large round buildings for thousands of years over much of the Old World–especially in Iran with Persian culture, right

through Roman architecture and straight down to the present in Western Europe. Thus was the invention of domed structures. All of these structures emphasize the elimination of center supports, therefore aiding universal visibility. Not coincidentally, such structures also promote acoustical efficiency since any center posts do not degrade the ability of everyone in the structure to hear what is being said—obviously in the age before the invention of microphones, audio amplifiers, and speakers!

The third type of round structure approach in the prehistoric and early historic southeastern United Stated was a round building without center posts and without concentric inner post rings. Many of the small farmsteads structures and some of the Council House structures in the Oconee Valley seem to lack either center posts or inner concentric posts. I (Williams), for example, have struggled attempting the find center support posts at the Council House at the Joe Bell site (9MG28) in the Oconee Valley (Williams 1983). What the heck was going on here? In this paper we present a little-recognized ethnographic example from Oklahoma that, while not exactly a dome, was perhaps a precursor to that roof style that had the advantages listed above for such a structure. While we will never know for certain, we go so far as to suggest that such a roof form may have started earlier in the Southeast and help explain such enigmatic buildings as the Joe Bell site Council House's lack of center posts.

We are aware that the vast majority of excavated family structures/homes in the Mississippian Southeast are rectangular in shape (Steere 2017). Most of these rectangular structures are included in true nucleated villages such as the King site (Hally 2008) in northwestern Georgia. Conversely, the houses in the widely dispersed farmsteads of the Oconee Valley were round structures, and numbered in the thousands across the landscape. Why the Oconee Valley had a dispersed settlement system with round houses as the main living structures

is a paper for another day. Now we shall proceed with some conjecture through ethnographic analogy of the roofs of native round structures.

Master Architect's Plan

We believe that the construction of a round Council House or even a smaller round family home was not a simple straight-forward activity. Having done a moderate amount of home construction himself, the lead author has come to believe that the construction of these structures was anything but simple. There are many ways to build a round house. In this paper we explore one possible design described by General Ethan Allen Hitchcock in 1842 as a starting point. We will present information we have discovered about the life of this unwitting early ethnographer and show how his observations have led us to reasonable speculations (in our opinion) about the nature of native southeastern round structures and their construction using the metaphor of the Master Architect as a straw dog in our explorations.

Traditional indigenous knowledge systems include those networks of beliefs, traditions, and activities intended to "preserve, communicate, and contextualize Indigenous relationships with culture and landscape over time" (Bruchac 2014:3814). These ways of knowing are conveyed both formally and informally within kin groups, throughout communities during social interactions, through oral traditions, during ritual practices, and through a multitude of other interactions as practicing members of a community. Importantly, they also include esoteric knowledge of technical skills like planting and harvesting, hunting and gathering, traditional ecological knowledge, and the manufacture of specialized technologies (including structures). Some traditional understandings are communally known and shared by all members of a tribal or

kin group, while specialized types of information are preserved by "gatekeepers" like ritual practitioners, tribal leaders, or medicine men/women (Vansina 1985).

We believe that in many places in precontact North America there must have been a head architect that knew ahead of time exactly how the construction process should proceed to ensure success. For this paper we choose to call the person, as just mentioned, the *Master Architect*. We envision this as a title passed down through generations in the protohistoric and early historic past (or much earlier) and that the architectural knowledge held by this individual was likely viewed as proprietary knowledge by this specialist, at least in chiefdom-level societies in the southeastern United States. Knowledge is power. Indeed, this knowledge may have been held by the chief him/herself. So we are attempting the impossible—to speculate on some of the architectural plans for building a Council House or even a smaller scale family round house as exemplified by the thousands in the Oconee Valley of central Georgia.

We are not starting with no real data, however. The story we want to present begins with one Ethan Allen Hitchcock, Junior. This extended section has provided us with many potential clues to the *Master Architect*'s plans. This introduction on Hitchcock is also presented here as an opportunity to document this incredible, but generally unknown, observer of southeastern Native American life in the early 19th century. We feel his place in the pantheon of southeastern ethnohistoric writers has been poorly recognized and his work in Oklahoma has been underappreciated.

Ethan Allen Hitchcock

One of our best ethnographic descriptions of the details of native round house construction, particularly of the roof structure—in this case a so-called Council House—was that

provided by General Ethan Allen Hitchcock in February of 1842 in his diaries. Many of you will have read his brief description of the construction details of the Creek Tuckabachee round Council House in Oklahoma as presented in John Swanton's 1928 *Social Organization and Social Usages of the Indians of the Creek Confederacy* volume (Swanton 1928:179-180). Swanton included a tiny drawing by Hitchcock of the roof structure of the Tuckabachee Busk Ground structure (Swanton's Figure 4 on page 180). This was drawn by Hitchcock in his field diary from his direct observation on February 1, 1842. While it is certainly possible that this unusual roof joist structure is a historic structural innovation, we are not so certain. In any event, we decided to investigate this intriguing little drawing further. The present study is part of a larger one we are now pursuing on the engineering aspects of native round structures, including calculations of roof weights and issues of structural dynamics. As a first step in this process, we decided to investigate Hitchcock himself and the mystery of the discovery of his diaries.

Ethan Allen Hitchcock (Figure 1) led an impressive and successful life as a soldier, author, and, most significantly, a diarist. Born just after the United States was founded in May of 1798, he lived to the age of 72 when he died, ironically, in the Oconee Valley just south of Sparta, Georgia, in the midst of what we now call the Oconee Province (Smith and Kowalewski 1980). It is not our intention here to review his entire life—a limited biography of him was published over 100 years ago in 1909 by historian Augustus Croffut (Croffut 1909). Born in Vermont, and a grandson and namesake of the famous Revolutionary War soldier Ethan Allen (leader of the Green Mountains Boys), he was a life-long professional soldier. His various military roles included those of an instructor at West Point Military Academy, where he was a teacher to Edgar Allen Poe among many others. Hitchcock was also a leading commander (sadly) during the Seminole wars in Florida, a leader and tactician in the Mexican-American

War, and a senior White House military advisor to Abraham Lincoln during the Civil War. He attained the rank of Major General in the U.S. Army and was buried with honors at West Point after his death in Georgia on August 15, 1870.

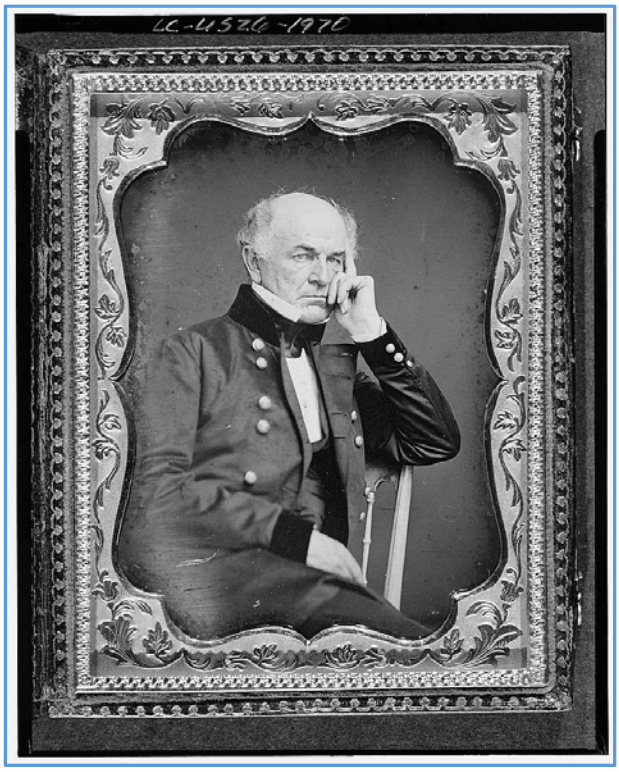


Figure 1. Ethan Allen Hitchcock. Image Courtesy of the Library of Congress.

The reason for our interest in Hitchcock stems from his diary entries related to Native American ethnographic and, by inference, archaeological work. He was a life-long diarist, penning 89 in all, and kept careful notes on his involvement in the Second Seminole War and on his trip to Oklahoma Territory from the fall of 1841 through the spring of 1842. He had been sent to Oklahoma Territory by the U.S. Government to assess the degree of success of the forced resettlements of most of the Southeastern Native American tribes in the aftermath of the Trail of Tears. He dutifully reported that the move was a disaster and his report was promptly buried in Washington for many years. This period is covered in his diaries Numbers 25 and 26. Specifically, we are concerned with his visit to the Tuckabachee Busk Ground in the Creek

Nation on February 1, 1842. This Busk Ground was located just southwest of Wetumka, Oklahoma, and just north of Wewoka Creek (Figure 2).

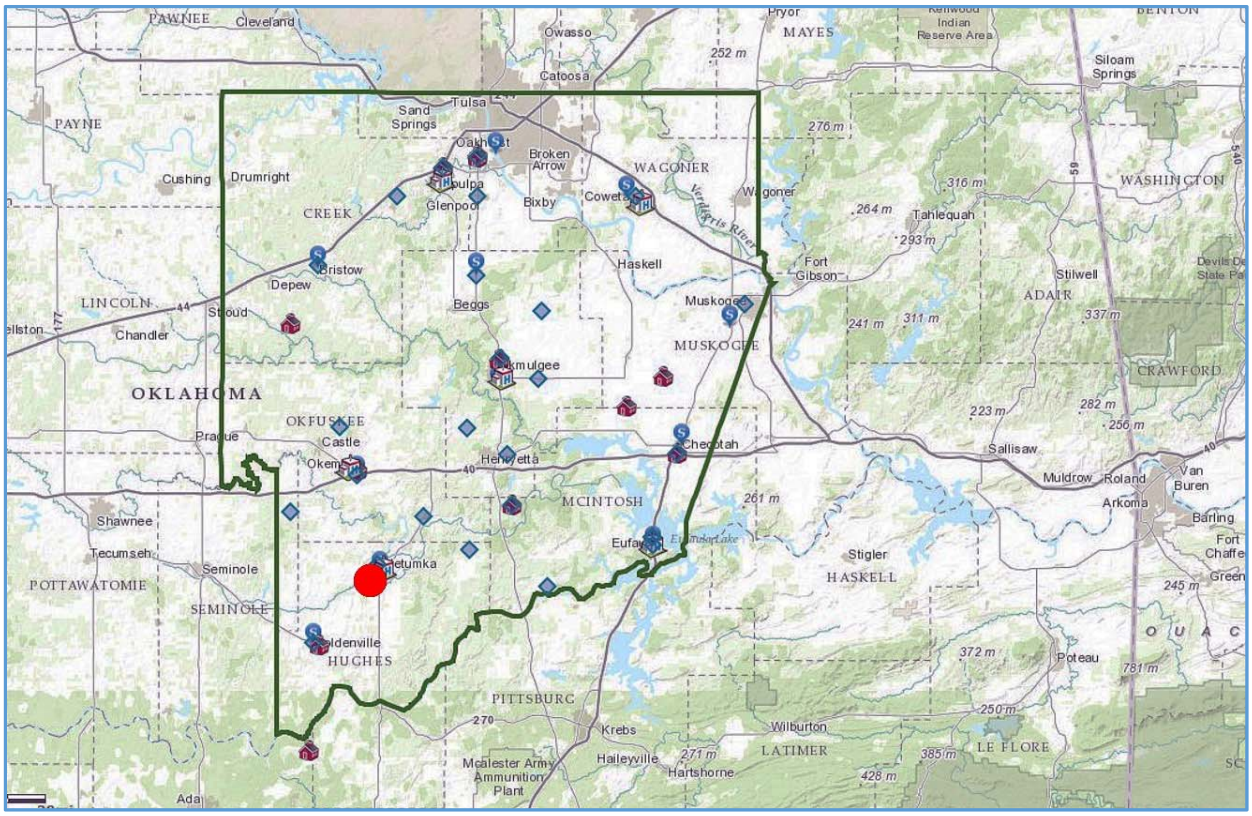


Figure 2. Location of Tuckabachee Town in Eastern Oklahoma.

Hitchcock apparently stored his diaries, letters, and other personal papers in a wooden trunk that he always kept with him. He was married for the first and only time to Martha Rind Nicholls of Washington, D.C., in 1868 at the age of 70. She was 35 years his junior, having been born on December 16, 1833. They had no children before his death two years later, and she never remarried. His health had been declining in Washington, and they had moved to Charleston for the warmer climate in January of 1870 (Croffut 1909:486). He almost immediately purchased an existing plantation just over 200 miles inland in Hancock County, Georgia, known as Glen Mary. It had been built in 1848 by Theophilus Jackson Smith (1819-1881), who had been financially ruined following the Civil War. Hitchcock had already published several books on a variety of esoteric subjects, and had been pushed to publish a

history of the Mexican-American war based upon his diaries by several friends and associates, including his colleague William Tecumseh Sherman (Croffut 1909). Unfortunately Hitchcock died on August 5 of 1870, having lived in Georgia for less than a year, leaving behind his precious trunk of letters, papers, and, most significantly, his diaries.

Martha Nicholls Hitchcock

His widow, Martha Nicholls Hitchcock, proceeded to run the Glen Mary plantation in Georgia successfully herself for the rest of the 19th century, with some limited help from many members of her natal family. We have found no mention of the use of Hitchcock's papers or diaries for almost 40 years after his death, and they presumably sat in his unopened trunk, perhaps in the attic of the Georgia plantation house for all that time. Martha moved to Washington D.C. in her final years and died on August 15, 1918, some 48 years after the death of her famous husband.

Martha had several siblings, including a brother, James William Nicholls (1828-1909). He was also a military man, having risen to the rank of Colonel in the U.S. Army during the Civil War. His first wife had died around the year 1859, and he then married Mary Ann Pitts. James had two children with each of his wives, and his child of importance to our story was Bessie Ballard Nicholls, born in April of 1861 – the same month the Civil War started – to James Nicholls' second wife Mary.

Bessie Nichols and William Croffut

Figure 3. William Augustus Croffut. Image Courtesy of Herringshaw 1909:154.

Bessie Nicholls was only 9 years old when Ethan, her uncle by marriage, died in the Piedmont of Georgia. Sadly, we have found no photograph of Bessie Nicholls. It is unclear if Bessie ever met Ethan Allen Hitchcock, but we believe this is likely. Bessie married William Augustus Croffut (Figure 3) in 1891 as his second wife. He was born on January 29, 1835, in Redding, Connecticut. Croffut earned a Ph.D. from Union College in Schenectady, New York, and was a noted journalist and author in the late 19th and early 20th centuries. In 1909 he published a disjointed biography of Ethan Allen Hitchcock under the title *Fifty Years in Camp and Field*: *Diary of Major General Ethan Allen Hitchcock, U.S.*A (Croffut 1909).

While this is clearly based upon Hitchcock's diaries, and he quotes extensively from them, Croffut omits large sections of them—particularly and, unfortunately, Hitchcock's extensive ethnographic material from Oklahoma in 1841-1842. Croffut also sadly fails to acknowledge how he obtained access to Hitchcock's diaries in his *Preface*. He clearly had

obtained them, however, through his wife, Bessie, who must have obtained them from her aunt Martha, the widow of Ethan Allen Hitchcock. We do not know when Croffut began his work leading to his 1909 publication. It could have been anytime in the previous 18 years since he and Bessie had married. We may speculate that he discovered the trunk with Hitchcock's materials while on a trip to Bessie's Aunt Martha's house in Sparta, Georgia, and found Hitchcock a worthy subject for his research and writing. Perhaps his wife Bessie urged him to pursue this endeavor. Some, but not all, of Hitchcock's materials were placed on loan to the *Library of Congress* as early as 1905 (Krowl, personal communication 2019). The loan probably did not include the diaries.

William Croffut died on July 31, 1915, at the age of 80 in Washington, D.C. Bessie, Croffut's widow, and her aunt Martha (Hitchcock's surviving widow) were living together at the same address in Washington at the time of Martha's passing three years later. Martha left the bulk of her estate, including a significant amount of money, Hitchcock's remaining papers, diaries, and the Glen Mary plantation in Georgia, to her niece Bessie. Bessie undoubtedly had been caring for her 84-year old aunt up to the time of her death. Bessie presumably already still had possession of most of Hitchcock papers and diaries in 1918 in Washington, and was likely very familiar with their content, particularly the ethnographic material her late husband William had ignored. She apparently loaned the diaries and most of the rest of Hitchcock's papers to the *Library of Congress* about 1922, but retained ownership of them (Krowl, personal communication 2019).

John R. Swanton

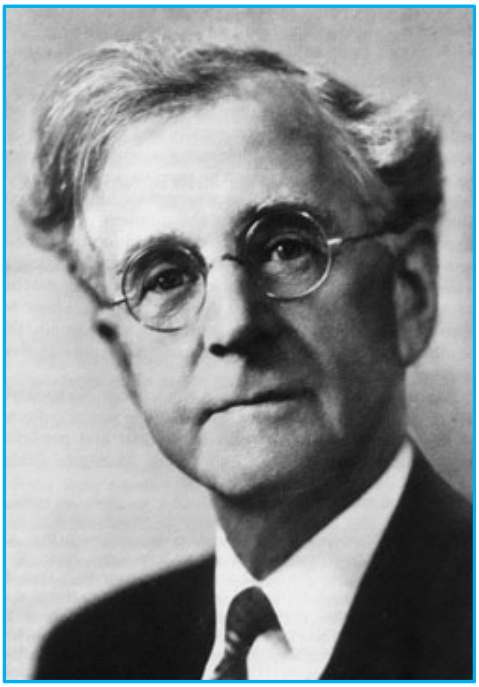


Figure 4. John R. Swanton. Image Courtesy of Fenton 1959:663.

Our story now turns to the famous John Reed Swanton (Figure 4), supreme ethnographer of Southeastern Indians for the first half of the 20th century and a fixture at the Smithsonian Institution for over 40 years. Although his work was clearly influenced by early 20th century anthropological thought, his impact on and importance to all we do was and is vital. One of Swanton's most quoted Smithsonian Publications was *Early History of the Creek Indians and Their Neighbors* (Swanton 1922). Researchers routinely use the publication date of 1922 in the *References Cited* section of our books and papers for his famous tome, but it is clear in his Preface that he submitted the completed manuscript to the Government Printing Office on December 15, 1918, just four months after Bessie Croffut officially inherited the Hitchcock diaries, letters, and other materials, and before she had loaned them to the *Library of Congress*. After a complete reexamination of Swanton's *Early History*, we have found not a single mention of the Hitchcock materials in his famous publication.

Swanton's next major Smithsonian publication was his *Creek Social Organization* book published in 1928 as the 42nd *Annual Report of the Smithsonian Institution*, but with a manuscript submission date of June 20, 1925 (Swanton 1928). This publication is absolutely filled with references to the Hitchcock diary information, including many direct quotes. Indeed, Swanton clearly acknowledges Bessie Croffut in that publication. His exact comment is as follows:

> The valuable and hitherto unpublished Hitchcock material was placed at the disposal of the Bureau of Ethnology through the kindness of Mrs. W. A. Croffut, General Hitchcock's niece (Swanton 1928:33).

We do not yet know exactly when or how Bessie Croffut contacted John Swanton. There may be letters yet found to show the establishment of their valuable communication either at the *Smithsonian* or the *Library of Congress*. We can at least state that it was sometime between late 1918 or 1922 and probably before 1924 while Swanton was actively writing what we consider his magnum opus. Swanton quoted many sections of Hitchcock's diaries, but most were undated snippets, as was typical of Swanton's research and writing. This is where he published a tiny 1-inch drawing of Hitchcock's roof sketch (Figure 5). Swanton must have realized that the Hitchcock ethnographic material needed to be published *in toto*. He likely had direct access to the diaries while working on his *Creek Social Organization* book, presumably then at the *Library of Congress* a mile to the east of his office in the *Smithsonian Castle*.

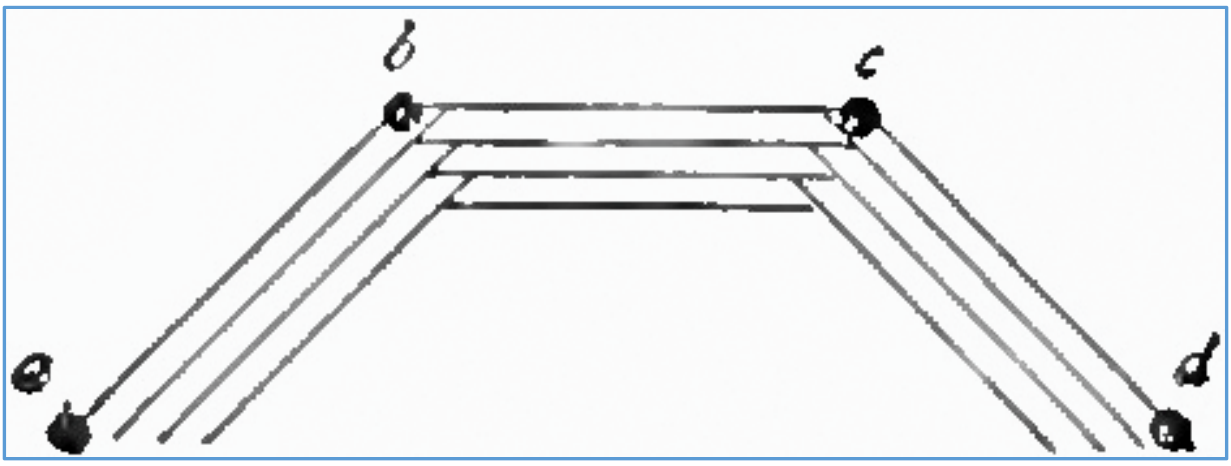


Figure 5. Swanton's Representation of Hitchcock's Drawing. From Swanton 1928:180.

Grant and Carolyn Foreman

Figure 6. Grant Foreman. Image Courtesy of Thomas-foremanhistorichome.com.

Figure 7. Carolyn Foreman. Image Courtesy of Gaylord-Pickens Museum.

In 1930 the ethnographic portion of Hitchcock's diaries was edited by famous Oklahoma historian Grant Foreman, with the research help of his wife, Carolyn, and published for the first time by the University of Oklahoma Press as *A Traveler in Indian Country: The Journal of Ethan Allen Hitchcock* (Foreman 1930*)*. The title is a bit misleading since the volume represents only a tiny fraction of Hitchcock's 89 extant diaries. Grant Foreman was an incredibly prolific writer of historical literature about the Southeastern Indians during the early part of the 20th century (1930, 1934, 1938). He was born on June 3, 1869. Trained as a lawyer, Foreman moved to Oklahoma Territory in 1899 and ran a successful law practice there until retiring in 1920 at the age of 51 to pursue full-time history writing. He died on April 21, 1953, in Muscogee, Oklahoma, at the age of 84. By 1924, he was on the board of Directors of the *Oklahoma Historical Society*. We do not know when or how Foreman became aware of the Hitchcock diaries. This may be revealed by careful future study of his and John Swanton's letters. A guess would be that Swanton was too absorbed in his other publications and turned the project over to the eminently qualified Foreman, who he must have met by the late 1920s or earlier. Indeed, Swanton wrote the

Foreword to Foreman's 1930 publication on Hitchcock, tying the two together as direct colleagues. Foreman's publication was republished in 1996 with a brief new *Foreword* by the late historian Michael David Green from the University of North Carolina (Foreman 1996). The Grant Foreman papers at the *Gilcrease Museum* were purchased from Foreman in 1944 by Thomas Gilcrease, the museum's founder. These papers may reveal more details when examined. The version of Hitchcock's roof drawing as presented in Foreman's book is shown here as Figure 8.

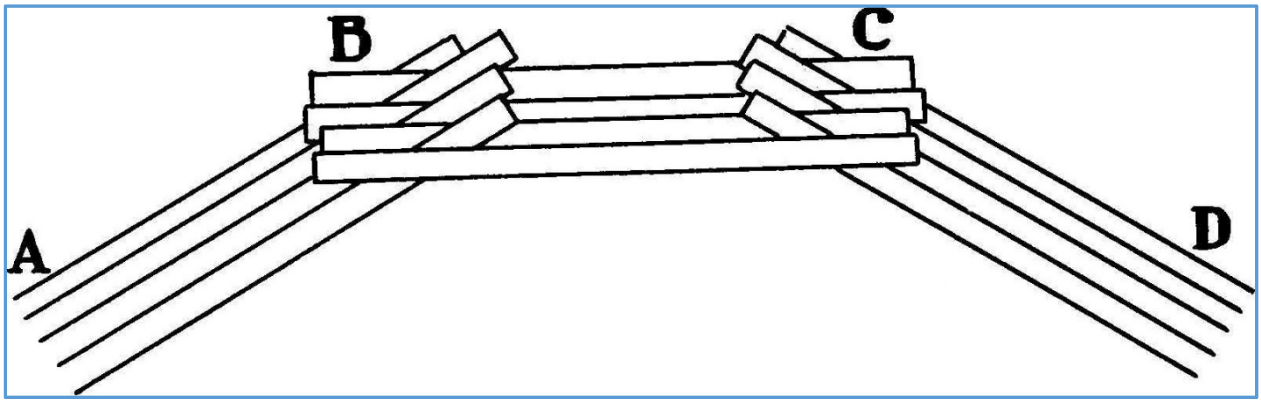


Figure 8. Foreman's Representation of Hitchcock's Drawing. From Foreman 1930:18.

Anita Virginia Nicholls

As stated earlier, *The Library of Congress* began receiving and conserving some of the Hitchcock papers as early as 1905, presumably from his widow, Martha, and made additional acquisitions continuing through 1938, clearly with the aid of his niece, Bessie Croffut. As stated earlier, Bessie apparently placed the diaries on deposit with the Library of Congress in 1922 (Krowl personal communication 2019). None of the Hitchcock items deposited with the Library from 1905 through Bessie's death in 1935 were ever actually owned by the *Library of Congress*, however. Bessie had retained ownership of them through the time of her death in 1935. She was

sadly buried in an unmarked grave at Oak Hill Cemetery in Washington, D.C. Without Bessie's active participation in preserving and disseminating the diaries of her famous uncle, all of his invaluable ethnographic work would surely have been lost.

Bessie's niece, Anita Virginia Nicholls, (October 17, 1899-November 25, 1984; buried at Zebulon Methodist Church Cemetery, Zebulon, Georgia, along with many other Nicholls family members) acted as executor of Bessie's estate in 1935. Anita's father was William Pinckney Nichols (1858-1942), an older brother of Bessie Nicholls Croffut. He is buried at the Glen Mary Plantation in Georgia. Anita was married to James Frederick Nicholls (1899-1932).

Anita sold the bulk of the Hitchcock collection on loan to the *Library of Congress* to that library in 1938 (Kroll personal communication 2019). The important diaries, however, are no longer at the *Library of Congress*. They are owned and curated at the *Gilcrease Museum* in Tulsa, Oklahoma. How did they get there and when and why were they separated from the rest of the Hitchcock materials?

Lester Hargrett and Thomas Gilcrease

Figure 9. Lester Hargrett. Image Courtesy of findagrave.com.

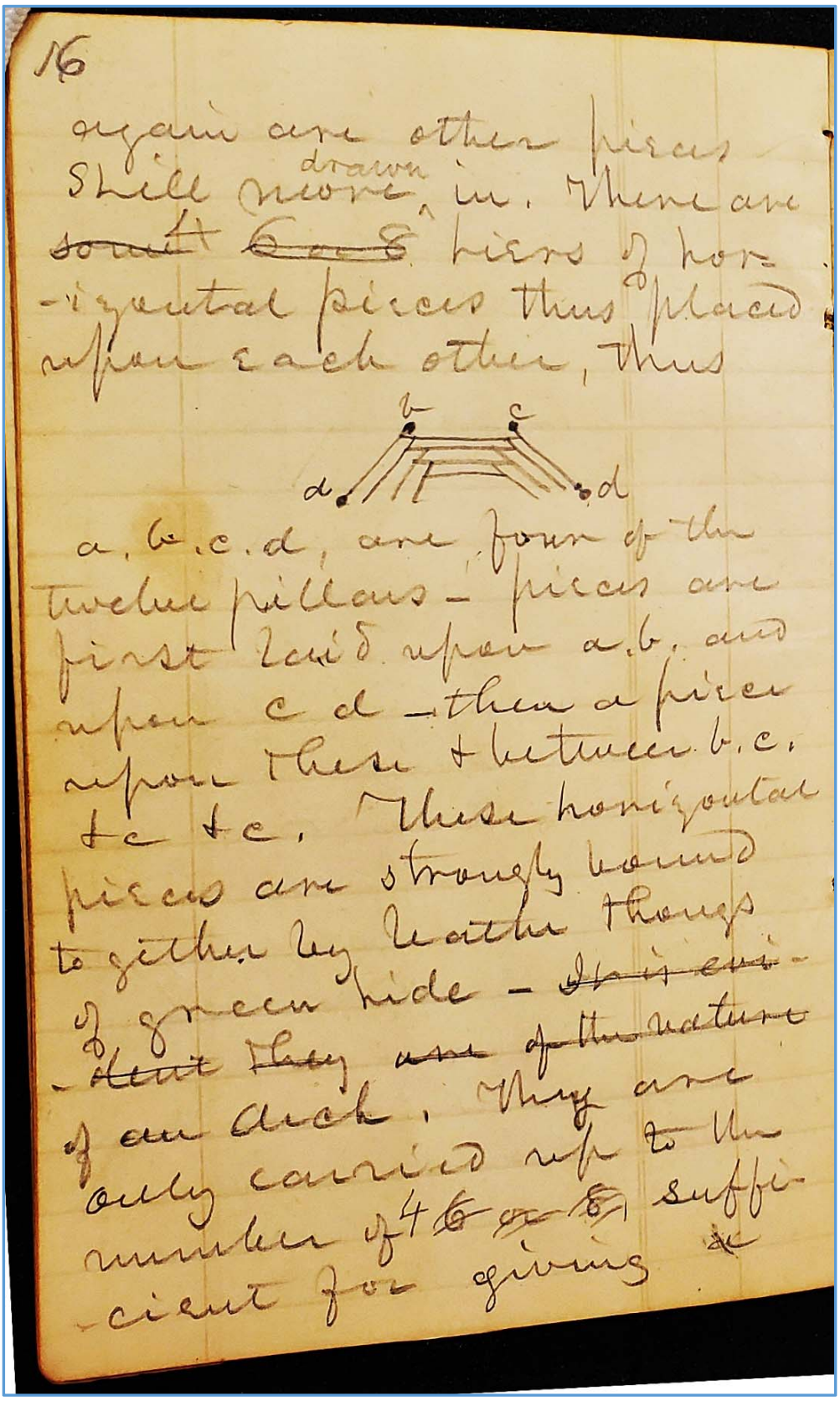
Figure 10. Thomas Gilcrease. Image Courtesy of Tulsa Historical Society and Museum.

Anita Nicholls apparently retrieved the diaries from the *Library of Congress*, probably in 1938, and apparently sold them very soon thereafter to Lester Hargrett (1902-1962). Lester and his twin brother, Felix (1902-1988), were both born in Tifton, Georgia, and were both graduates of the University of Georgia. Both also became collectors of rare papers and documents. Felix left his papers and a large endowment to the Special Collections Library of the University of Georgia, now known famously as the *Hargrett Library*. Lester, the purchaser of the Hitchcock diaries, became friends with Thomas Gilcrease (1890-1962) by the 1940s and sold his collection to Gilcrease, apparently including the Hitchcock diaries, about 1946. Gilcrease had made his millions in the oil industry, and, like Hargrett, was a collector of rare documents pertaining to Native Americans. Thomas Gilcrease set up his museum and foundation initially in San Antonio in 1946, and Lester Hargrett was hired by Gilcrease as its first director from 1946 through 1949. Gilcrease became unsatisfied with the San Antonio situation, however, and moved the Gilcrease Museum to a new building on his property in Tulsa in 1949 where it exists today.

Hitchcock's Roof Truss Drawing

Now we return to the actual analysis of the roof structure drawing made by Hitchcock. Of importance to our questions of what Hitchcock's drawing represents, it was immediately clear that the drawing of the roof structure in Foreman's 1930 publication (Figure 8) is quite different from that of Swanton's 1928 drawing (Figure 5). The differences between the drawings led us on a search for the original diaries of Ethan Hitchcock in order to compare the Swanton and Foreman versions with the actual Hitchcock diary drawing for ourselves. Which, if either, was correct?

We contacted the *Gilcrease Museum* in Tulsa and through the direct help of archivist Renee Harvey, we finally located the original relevant Hitchcock diary for his Oklahoma Tuckebatchee Council House roof drawing. This, we now know, was Hitchcock Diary 26, Page 16 (Figure 11). As can be easily seen, Swanton's roof joist drawing is more faithful to that of Hitchcock than Foreman's, but, significantly, we have discovered that neither is exactly the same as Hitchcock's original shown in larger form in Figure 12.


16

again are other pieces
still drawn more in. There are
~~sometimes~~ ~~6 or 8~~ tiers of hori-
-zontal pieces thus placed
upon each other, thus

a. b. c. d, are four of the
twelve pillars - pieces are
first laid upon a.b. and
upon c d - then a piece
upon them & between b. c.
& &c. These horizontal
pieces are strongly bound
together by leather thongs
of green hide - ~~their ends~~
~~that they are of the nature~~
of an duck. They are
only carried up to the
number of ~~6 or 8~~ 4, suffi-
-cient for giving &c

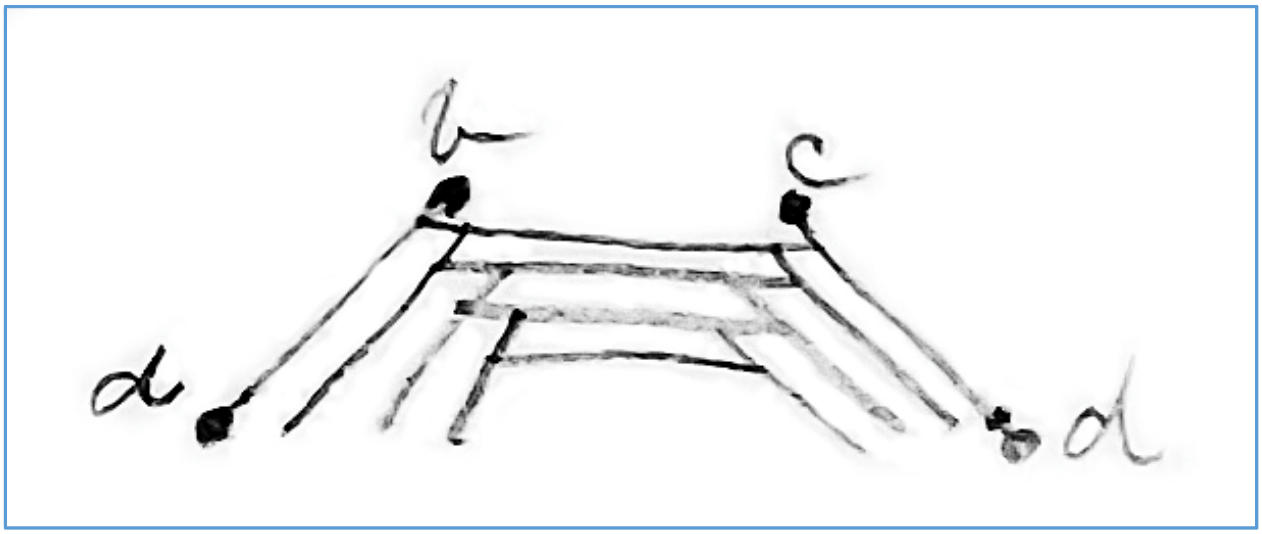


Figure 12. Hitchcock's Original Drawing, Magnified.

First, Swanton added a footnote (Number 82) to his 1928 publication implying that Hitchcock must have drawn his own drawing incorrectly, writing that: "The overlapping of the pieces in the sketch is crudely indicated, suggesting an outward rather than an inward flare" (Swanton 1928:180). What Swanton failed to realize or visualize was that Hitchcock's drawing was made from the inside of the structure looking UP rather than, as Swanton incorrectly assumed, looking DOWN from the top. Hitchcock would not have been able to see the structure from the top even if he had had a ladder, since the rafters and roof joists were covered with wooden shakes ("ordinary rived boards") (not thatching!) as described in Hitchcock's account (Foreman 1930:115) and Hitchcock's original Diary 26 (Hitchcock n.d.). Foreman's drawing from 1930 is a false view also from the top looking downward. Presumably he either read Swanton's footnote, or was persuaded by Swanton in direct conversation to redraw the image in the "correct" manner. We are not even certain at this point that Foreman even saw the actual

diary drawing, but this seems unlikely. The diaries were still at the *Library of Congress* in Washington when Foremen, in Oklahoma, wrote his account and published it in 1930.

Secondly, and more importantly, Swanton had graphically moved a log up between Posts B and C, whereas the original Hitchcock drawing importantly does NOT show this. Compare the shaded areas in Figure 13 below with the same areas in Figure 5 above. Foreman followed Swanton in this incorrect detail also. Indeed, a careful rereading of Hitchcock's accompanying text makes this clear. Hitchcock wrote: "Pieces are first laid between A, B and C, D—then a piece upon these and between B, C, etc." (Foreman 1930:114-115). He specifically does not say a piece or top plate, to use modern wall construction terminology, is placed directly between the tops of the B and C wall posts. Incidentally, our English word *Post* is of Latin origin, while *Stud*, meaning the same thing, is an actual Old English word. Perhaps we as English-speaking archaeologists should start speaking of Stud Molds rather than Post Molds!

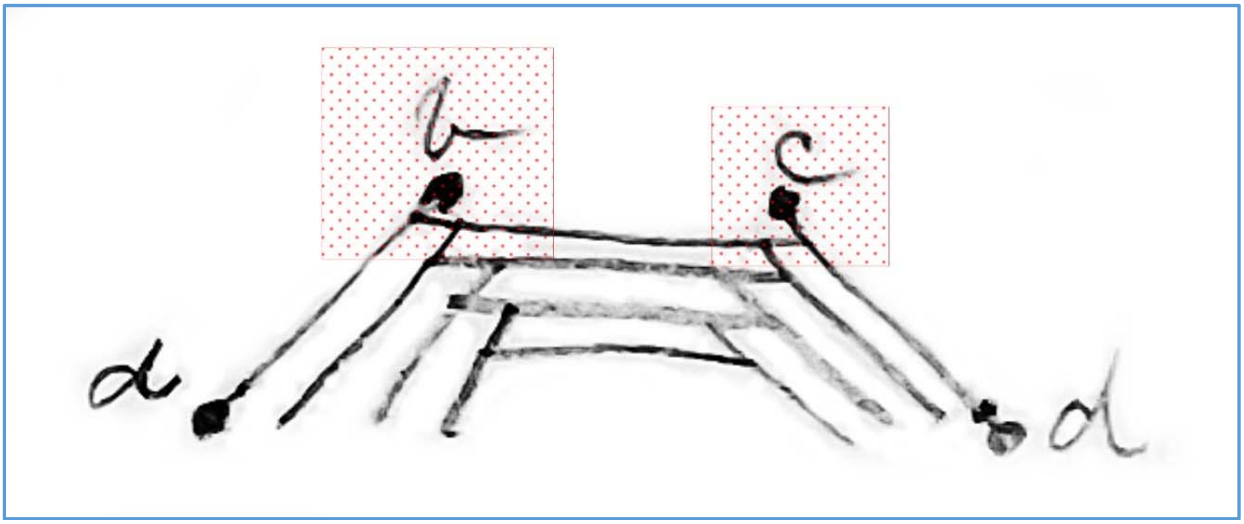


Figure 13. Detail Areas of Hitchcock's Original Drawing.

The view devised by Swanton, and Foreman after him, is that of a round structure with headers between the tops of every wall stud or post. This is illustrated here in Figure 14 below using the *Blender* software. The added roof joists were then laid inwardly from this outer ring of

headers or joists in the view of Swanton and Foreman. This is the approach most of us have likely assumed for these round structures up to this point.

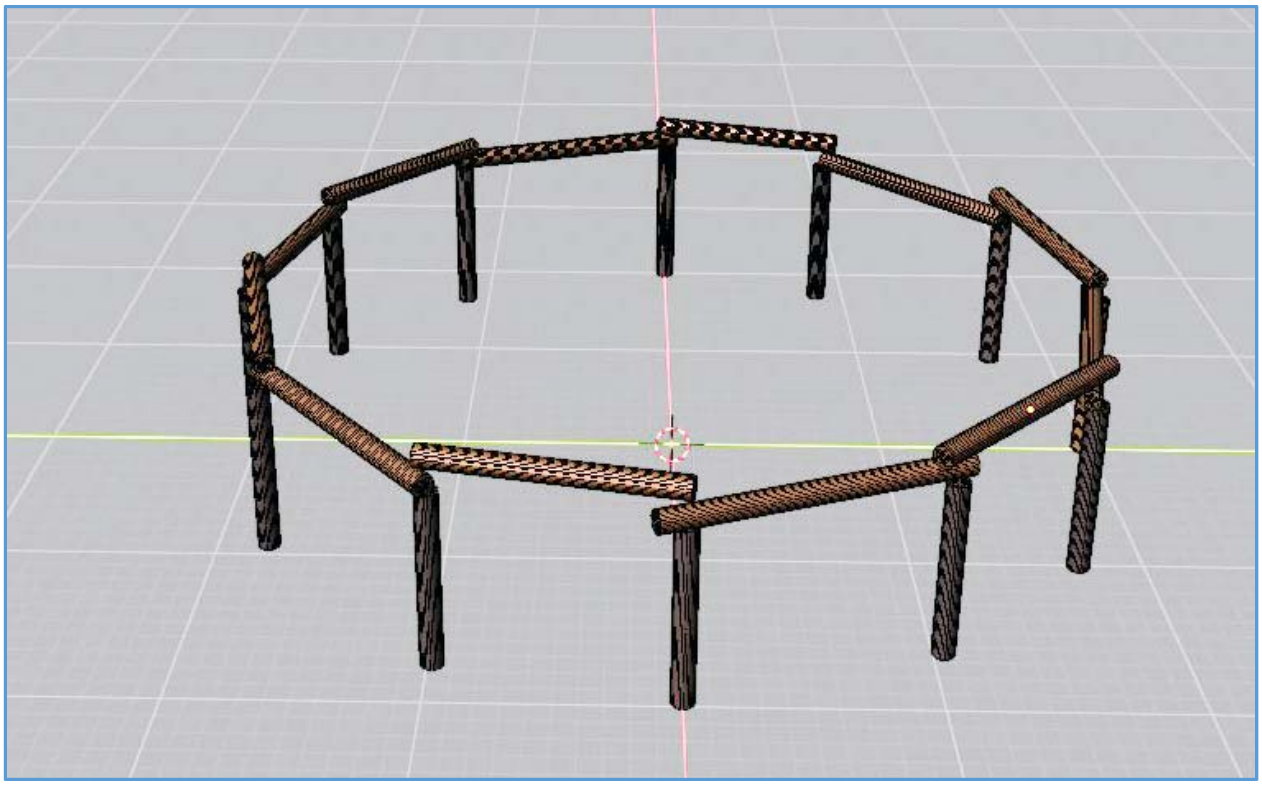


Figure 14. Swanton and Foreman's Idea of Council House Headers.

Following the actual Hitchcock drawing, however, the construction sequence began by constructing six sets of paired posts topped with a top plate or joist, all arranged into a large circular form (Figure 15). We are obliged here to note that this may help explain why almost all of the archaeologically excavated Late Mississippian circular structures in the Oconee Valley have an **even** number of posts on their perimeter. We have documented examples with 12, 14, 16, 24, and even 30 wall posts on round structures in the Oconee Valley (Williams, Ledbetter, and Jones 2018). An open question for the future is why this variation exists, since the number of posts does not appear to correlate with the diameter of the structures or its total roof weight.

Figure 15. Headers as Hitchcock Actually Observed and Recorded.

After this initial stage of construction, posts were then placed across the adjacent pairs, but pulled in a bit toward the center of the structure according to Hitchcock's drawing. This pattern continues adding six joists around the circle. Then two more similar layers are placed, each rotated 30 degrees from the next lower layer and pulled in further toward the center (Figure 16). These roof joist layers then served as the base for the actual angled rafters of the completed structure (Figure 17). The distance each layer was pulled toward the center determined, therefore, the actual final roof angle of the completed structure. We know from worldwide data that the roof angle for thatched roof structures is always between 45 and 50 degrees (https://www.hiss-reet.de/en/thatched-roof/reed-the-material/durability/criteria-for-the-durability-of-thatched-roofs). A now-famous painting of the Toqua site in eastern Tennessee made in 1804 shows a thatched roof Council House in the town with a roof pitch of approximately 45 degrees (Waselkov 2017). Indeed, the life expectancy of thatch roof structures is apparently doubled by this 5-degree difference, with steeper ones lasting much longer

(https://www.hiss-reet.de/en/thatched-roof/reed-the-material/durability/criteria-for-the-durability-of-thatched-roofs).

Note that the type of structure described by Hitchcock and presented here likely does NOT require the use of a center support post or posts. The joist system described by Hitchcock would support the rafters by spreading the roof load over a larger slanting area. The rafter rails would extend out past the outer circle as Hitchcock described and provide additional counter balancing for the rafters. Essentially, the Hitchcock roof structure was an example of the early stages of the construction of a domed roof.

In the Oconee Valley we have round structures with and without center posts as discussed in the beginning of this paper. When they are present, they tend to vary between either three or four posts, and are usually not very large. The advantage of no center posts is, again, a more open design and, in a Council House, no blocked views by posts of anyone in the Council House and better acoustics. We would also note that just because a given round house has center posts does not obviate the possibility of have a roof support structure as described by Hitchcock. It is even possible that a few center posts could be added in the later life of a structure to provide support as the roof aged to a non-safe stage through natural decay of the timbers. With all these thoughts in mind, then, we here present something of a guide to the construction of these round buildings.

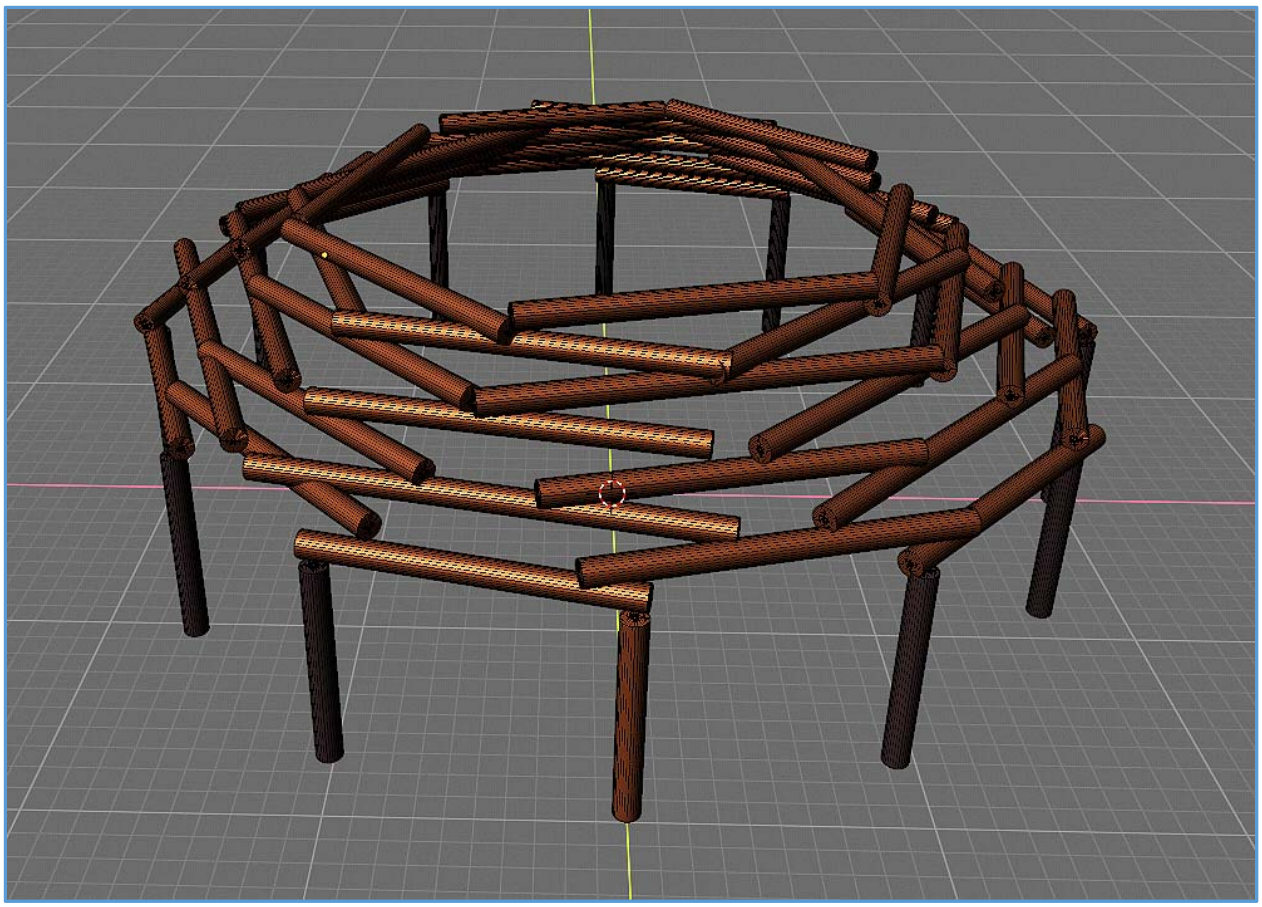


Figure 16. Four Layers of Roof Joists Added.

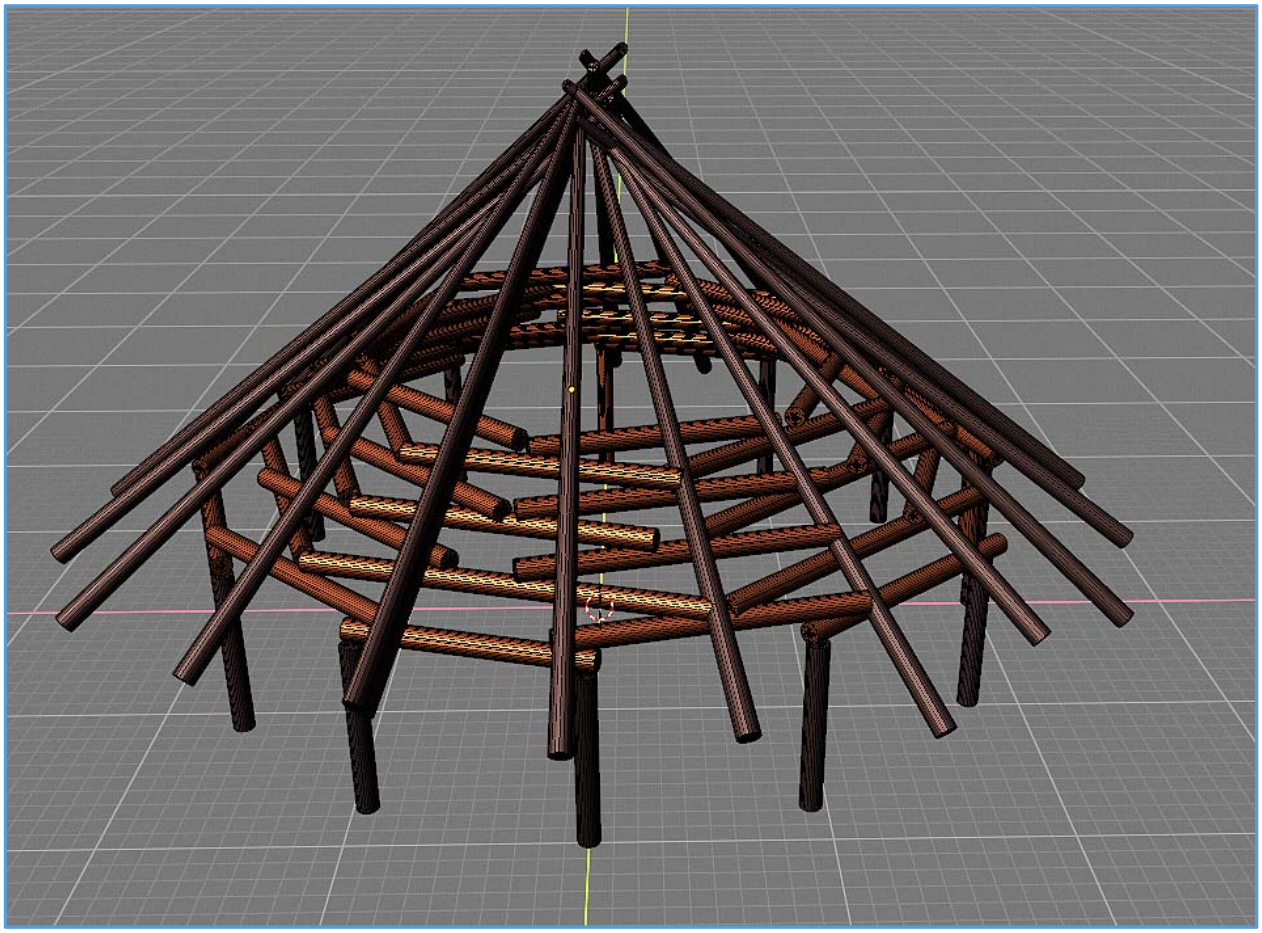


Figure 17. Rafters Added Over Roof Joists.

Guide to Building a Round House

One immediate assumption we have made in discussing precontact and perhaps early contact Council House or round farmstead home construction methods is that there was no universal southeastern measurement standard adopted (such as a foot or meter). There seems to be general agreement that measurement systems worldwide typically derived from human body measurements—known as *anthropic* systems (https://en-academic.com/dic.nsf/enwiki/10729687). This has been documented for most ancient complex societies. Unfortunately the foot, for example, of a human varies from only a few inches up to 18.5 and the meter was only accepted as a standard in the 1790s in France. In hindsight, we speculate here that the need for standardized measurements apparently only became critical once full state-level societies evolved on our planet, and then certainly varied from one state to another as well as over long periods of time. Think English versus Metric as a classic example.

Even if there were anthropic standards used in the Southeast in precontact times, these units would have to be operationalized using another standard measuring unit, perhaps made of ropes or sticks (”tape measures”) of standard or marked unit lengths. We suggest that a better and more repeatable way of designing and building these round structures, rather than randomly guessing at their length standards, might be to use fractions of the desired diameter and/or radius of the intended round structure using a prestreched rope. For the four models we will discuss momentarily, we have used the following “rope rules” as functions of the radius of the intended round structure. Others could have certainly been chosen, but these will suffice for this paper.

1. 75 Percent of radius = Fold radius length rope into 4 lengths and use 3.
2. 66 Percent of radius = Fold radius length rope into 3 lengths and use 2.
3. 60 Percent of radius = Fold radius length rope into 5 lengths and use 3.
4. 62.5 Percent of radius = Fold radius length rope into 8 lengths and use 5.

With these stated assumptions here are a series of steps we envision in the construction of native 12 post round structures. Perhaps the Master Architect had an analogous plan.

1. Find a flat spot on the landscape. In floodplain settings this is no problem. Much of the area of the Georgia Piedmont for farmsteads has a moderate slope. This makes finding a true flat spot more difficult and some of the excavated examples do have slightly sloping floors. For Council House locations, the selection of the exact spot of its location likely would have had additional non-logistical (read spiritual, lucky, or political) reasons for picking an exact spot.
2. Clear the ground completely of all sticks, leaves, and loose humus in the area of the intended circular structure.
3. Drive a stake into the ground in center of intended structure as a temporary **Center Post**.
4. Get a strong vine rope the length of the intended radius of the structure (**Rope 1**).
5. Have someone hold one end of **Rope 1** to top of the **Center Post**.
6. Attach a stake to outer end of **Rope 1** and pull tight and mark the ground. This will be the location of **Post 1** (perhaps to the east?).
7. Draw a circle on the ground of the intended round structure's outer wall with the stick attached to end of **Rope 1**. Be careful not to step on the circle and mar or disturb it after drawn and keep the drawing stick vertically oriented. Take your time.
8. Get **Rope 2** of the intended diameter (twice the length of **Rope 1**) of the house.
9. Stretch **Rope 2** across the circle from **Post 1** over the **Center Post** at the maximum diameter of the circle.
10. Place a rock or small hole at the end on the circle for location of **Post 2** (perhaps to the west?). **Post 1** (east) and **Post 2** (west), and the center locations are now established.

11. Turn **Rope 2** at rough right angles on the drawn circle from **Post 1** and **Post 2** (roughly north-south for example).
12. Estimate a spot on the drawn circle close to middle of this outer drawn half circle (southern half?).
13. Get a new **Rope 3** that stretches from **Post 1** to the rough location of **Post 3** (the South one?).
14. Stretch **Rope 3** to **Post 2** (west) and check if it is the same length to **Post 3** as from **Post 1**.
15. If not, move **Rope 3** left or right a bit until **Post 3** is exactly halfway around the drawn circle.
16. Use **Rope 2** from **Post 3** across the circle through the **Center Post** to establish **Post 4** (north side?) general area.
17. Uses **Rope 3** again as before from **Post 1** and **Post 2** to refine exact location **Post 4** (north).
18. Take **Rope 1** (the radius) and fold it in half to get a new rope length (**Rope 4**) and stretch it as a chord from **Post 1** to left and right to touch the circular outline. This will be where two posts go.
19. Do this from **Posts 2, 3, and 4** and all 12 posts will be properly and evenly located.

For a 24 post round structure do same as above, then add a post halfway between all 12 wall post locations by using a rope of the distance between the posts and folding to get a half-length point. The 12 wall posts should be of sufficient length to go in the ground ca. 2 feet

(anthropic = knee deep?) and then high enough for a person at least 6 feet high to enter. Thus the post should be ca. 8+ feet long. Cedar logs are best to avoid termite damage. More on this later

The length of the **Headers** for the six triarbs to be constructed should be the length of **Rope 5** plus one or two hand-breadths. We use the term **triarb** rather than trilithon since these will be made of trees rather than stone as at Stonehenge (tri**lith**on). Attach the six **Headers** to the tops of six alternating pairs of the 12 upright wall posts to create six triarbs (see Figure 15 for reference). We now believe that the length of the outside headers should be the same as the roof trusses added above the triarbs to tie the triarbs together.

Miniature Sticks

The next problem--a bigger one than might be thought at first--is how long the roof trusses should be. This had to have already been known to the Master Architect since we are told in at least one case that the chief sent out miniature sticks for families in the community to use for cutting all the necessary logs ahead of time so the building could be put together virtually as a kit in a community "Barn Raising" analogy.

Our first exposure to this method was a footnote in Swanton's *Creek Social Organization* volume (Swanton 1928:179). He presents an unattributed quote, ostensible from *Smithsonian Miscellaneous Collections* 53, Page 12. In attempting to check this reference, we sadly discovered that this reference of Swanton was completely in error. We eventually discovered the correct quote from a December 1852 *Smithsonian Publication*, not listed as part of any series of the *Smithsonian* at that time (Stanley 1852). The complete proper reference was a publication by someone named J. M Stanley. Who was this person? As is now often the case, it was not hard to locate him with an internet search.

John Mix Stanley

Figure 18. John Mix Stanley. Image Courtesy of the Gilcrease Museum.

John Mix Stanley was a now almost forgotten 19th century portrait and landscape artist who specialized in Native American subjects. He was born in upstate New York in 1814 and died in 1872. Stanley was in the Creek Oklahoma territory in 1843, just 2 years after Hitchcock, and made a portrait of Tuckabachee Mico, along with hundreds of others. Stanley loaned many of his paintings to the Smithsonian in 1852, and hoped to sell them to the U.S. government. Sadly he was never paid, and a fire at the Smithsonian in 1865 destroyed most of the collection, apparently including his painting of Tuckabachee Mico. The fire and loss of much of his work contributed to our general lack of knowledge of this "famous" painter.

The 1852 Smithsonian publication mentioned above that Swanton referenced was likely created in association with the display of Stanley's exhibition as something of a guide book. He provided background notes on each painting in the publication, including Tuckabachee Mico on pages 12-13. We present here that complete description of Stanley due to its importance to our study and its rarity:

TUCK-A-BACK-A-MICCO, or THE MEDICINE-MAN OR PHYSIC-MAKER. (Painted June, 1843.)

This is the great Medicine or Mystery Man of the Creeks; His fields of corn are cultivated by the people of the town in which he resides, and a salary of five hundred dollars per annum is allowed him from the treasury of the nation, for his services.

They suppose him to be imbued with supernatural powers, and capable of making it rain copiously at will.

In his town is a building of rather a singular and peculiar construction, used during their annual busk or green-corn dances as a dancing-house. It is of a circular form, about sixty feet in diameter and thirty feet high, built of logs; and was planned by this man in the following manner:-

He cut sticks in miniature of every log required in the construction of the building, and distributed them proportionately among the residents of the town, whose duty it was to cut logs corresponding with their sticks, and deliver them upon the ground appropriated for the building, at a given time. At the raising of the house, not a log was cut or changed from its original destination; all came together in their appropriate places, as intended by the designer.

During the planning of this building, which occupied him six days, he did not partake of the least particle of food.

He has in his possession, and wears, a medal said to have been presented to his parents by Gen. Washington.

He is painted in the costume which he usually wears. (Stanley 1852:12-13)

The “miniature sticks” attributed to Tuckebatchee Mico had bothered us for some time. How would such a system operate? Was this a common practice in the precontact period? We have already stated we believe there was no universal standards of length in precontact times. As described above, however, the location of the vertical wall posts can be determined using a simple set of ropes. How could these same ropes perhaps be used to determine the length of the roof trusses and how could these needed lengths be scaled down and up so things ran well on construction day as described by Stanley?

From Sticks to Logs

This conversion we have actually found to be relatively easy logically. The length of the log that a cooperating member of the log acquisition individuals or families, once they receive a stick, is likely a positive multiple of some number. There is no way to know for certain, but we would be very surprised if that multiple had nothing to do with the number of fingers and toes that humans possess. As a simple experiment we have had several human subjects take a plastic 3D printed stick 20.0 centimeters long and use it as follows. In a cleared area (lead author's flat graveled driveway) a small stone is placed at a beginning point. The end of the stick is then placed flat next to this stone and flipped end for end 20 times (number of fingers and toes). Then a second stone was placed at the end after the 20^{th} flip. The length between the two stones (presumably 20 times 20 = 400 centimeters or 4.0 meters) was then measured with an accurate meter tape. The error rate in every test was less than 1 percent, although we are not presenting the actual statistics here. We take this method to be easily within the construction needs of the Master Architect.

From Logs to Sticks

It seems more difficult to us, however, to envision how the Master Architect determined the exact lengths of the small sticks, needed for distribution to the populace, scaled down from the long reference ropes, was accomplished. Thus we have chosen to describe a possible method after the above section describing how one could convert stick lengths to full length logs. How does one convert a desired length of 4.0 meters (for example) down to 20 centimeters using ropes or some other common-sense magic without a known length standard? Clearly the length of the stick could be simply estimated by the architect and the stick-to-log method (20 flips)

described above could be used by him/her to see if it matched the needed log length, which was presumably already known from a standard rope. If it was too long or too short, then the stick could be adjusted in length until it is accurate for the needed log length. An alternate method would be to use a fine string the length of the desired log that had been curated from past constructions and fold it 10 times, thus making 20 lengths. Then take one of these lengths as the needed stick length to be passed out to the log procuring community. This method needs to be tested experimentally, but we have not yet attempted this experiment.

The Models

Now we return to the last and most difficult part of planning for the Council House roof—what is the proper length of the roof joists for a round building of a particular diameter? In order to help evaluate our joist length options and the impact of several different possibilities we decided to create a number of models in both digital form (*Blender* software) and with actual models made from plastic logs printed on a 3D printer (*Creality Ender-5 Plus*). We have found that both approaches had their unique value in this project. The digital approach is certainly a 21st century one, but, we intuitively believed that a set of actual physical models would provide us additional visual and tactile insights to the Council House designs, thus we created 3D printed versions of our models also. These are now curated at the UGA Laboratory of Archaeology.

For the 3D printed physical models we used a scale of 1 centimeter equal to 1 foot in order to replicate the English units recorded by Hitchcock. We are using outer wall posts scaled down from an assumed 1 foot in diameter and 10 feet long. These were placed 2 centimeters into ¾ inch (2 cm) thick plywood as a base to simulate a post being sunk 2 feet into the ground. The diameter of all the models was 38.2 centimeters (38.2 feet), thus with a radius of 19.1

centimeters (19.1 feet). These measurements conform to the stated measurements for the Tuckabachee Council House recorded by Hitchcock.

We used using varied length plastic 3D printed joist logs for the model printed to scale using the 3D printer. The goal was to create a model that seemed to comply with the observations of Hitchcock and with roof joist lengths that could be calculated as a fraction of the size of the building using tools and methods available to precontact populations. The Master Architect, hypothetically, could have curated the measuring ropes in a small box, perhaps stored in the "temple" structure on the mound summit.

Model 1 Rationale

For Model 1 we had no real idea how long to make the trusses, which became apparent to us after we completed it. We thought first that perhaps having trusses that were 75 percent of the length of the radius might work for all four layers, but in thinking about it again we envisioned intuitively that this might make a roof angle too low. We were correct in this assumption. Thus we ended up using a combination of two different lengths for the four layers of roof trusses described by Hitchcock, alternating them around the roof circumference. These two lengths were 75 percent and 66.6 percent. Both lengths are easily derived from the fractions of a radius rope as described above in this paper. The results as displayed in Table 1 and Figures 19-21 show that we clearly still overestimated the required lengths of the trusses. The roof angle of this model was under 30 degrees and, if covered with thatch, would have leaked like a sieve.

The Tables include the following information—all needed to calculate the roof angle. The **Model Truss Length**(s) are the lengths in centimeters. These exact lengths and diameters were easy to print using the slicing software (*Creality Slicer*) for the 3D printer we used

(*Creality Ender-5 Plus*), even down to the millimeter. The **Percent of Radius** is as discussed above. The **Implied Center Height** was measured using a simple centimeter scale using a small straight stick (bamboo skewers) placed over the fixed trusses at their angle toward the center bamboo skewer pole (see photos). The **Horizontal Space Between Trusses** was the measured horizontal distance between the centers of each truss. The **Rafter Extension Outside Wall Posts** was the horizontal distance to where a rafter would touch the ground. This, of course, determined how much space was potentially covered by the roof. As Hitchcock says, however, the rafters did not extend all the way to the ground, but about half way. We needed the location to the ground for the rafters, however, so we could use the distance from there back to the center of the structure (**Center to Far Outside Rafter Ground Point**) to use simple trigonometry to calculate the **Derived Roof Angle Degrees**. We used the Right Triangle Calculator at *Calculator.net* for these calculations.

Roof Truss Layer	Model Truss Length	Percent of Radius	Implied Center Height	Horizontal Space Between Trusses	Rafter Extension Outside Wall Posts	Center to Far Outside Rafter Ground Point	Derived Roof Angle Degrees
1	14.33	75	19.5	2.2	15	34.1	29.8
2	12.73	66.6	19.5	2.2	15	34.1	29.8
3	14.33	75	19.5	2.2	15	34.1	29.8
4	12.73	66.6	19.5	2.2	15	34.1	29.8

Table 1. Model 1 Data.

Figure 19. Model 1, Horizontal View

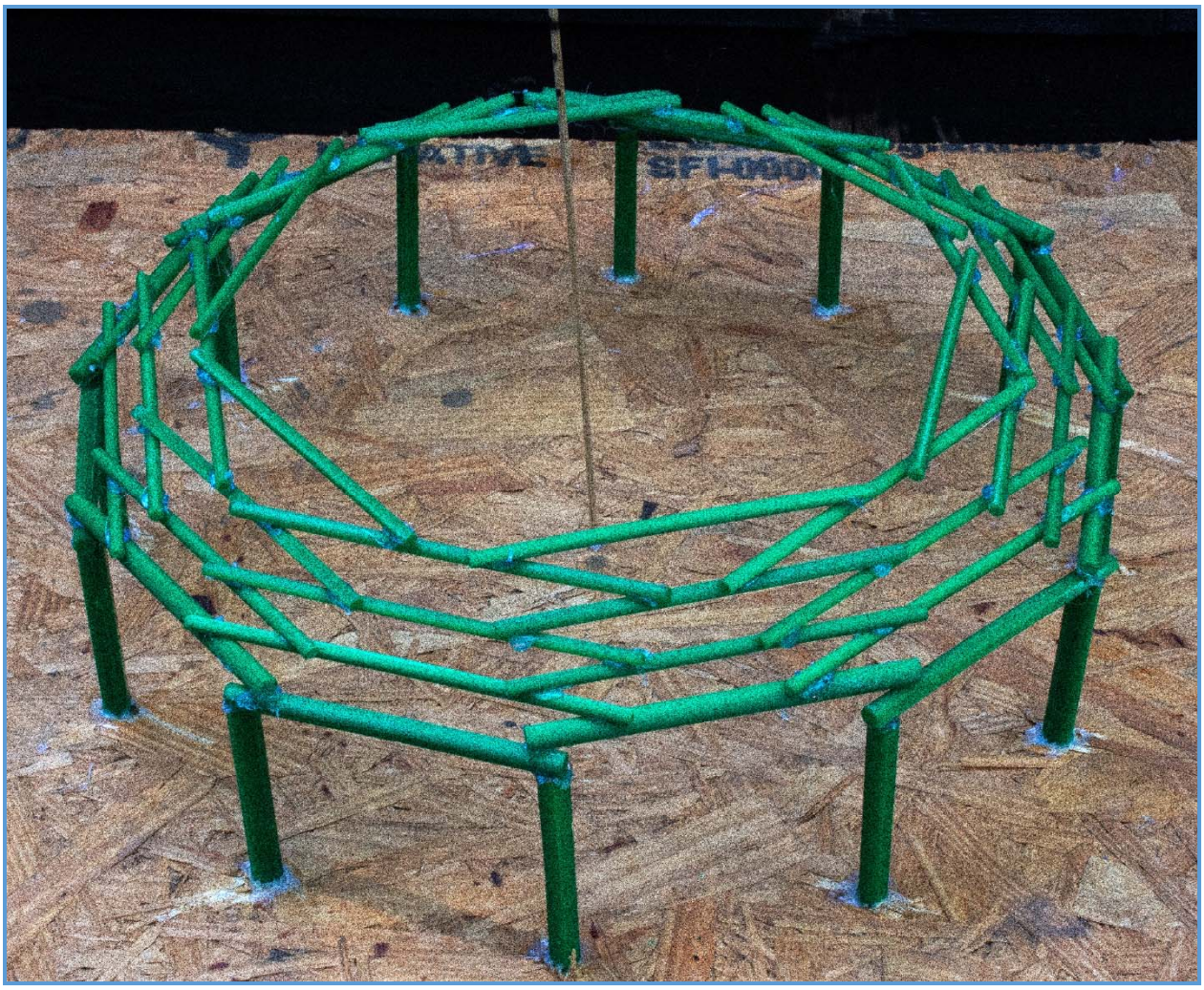


Figure 20. Model 1, Angle View.

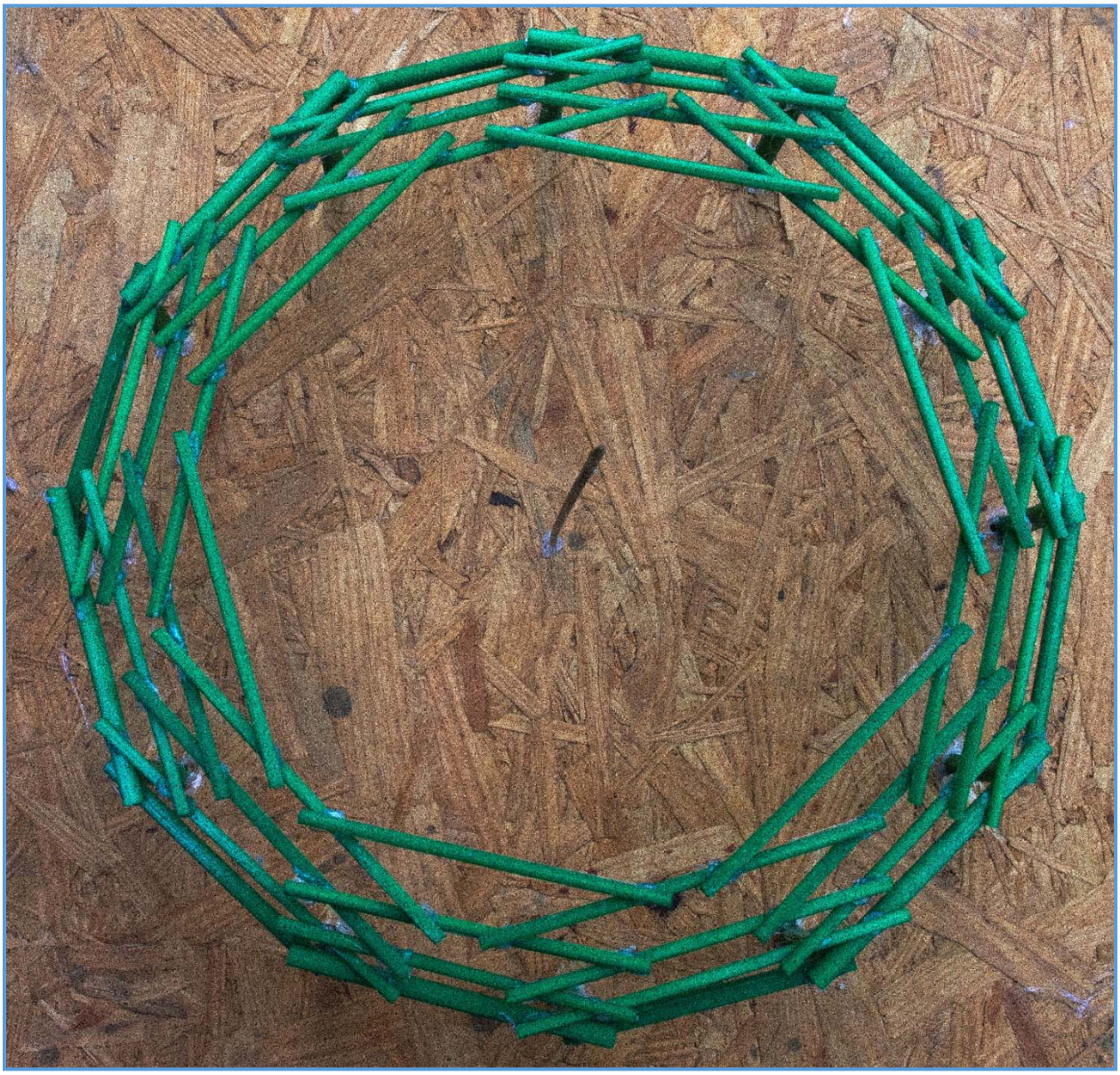


Figure 21. Model 1, Top View.

Model 2 Rationale

For this second model we decided to change all the four courses (layers) of the roof trusses to 66.6 percent of the structure's radius rope length. This helped raise the roof angle as we hoped, elevating it to just over 40 degrees. This was still well short of the desired 45-50 degrees used world-wide for thatch covered round structures, however discussed above. The results of Model 2 are presented in Table 2 and Figures 22-24. On to Model 3.

Roof Truss Layers	Model Truss Length	Percent of Radius	Implied Center Height	Horizontal Space Between Trusses	Rafter Extension Outside Wall Posts	Center to Far Outside Rafter Ground Point	Derived Roof Angle Degrees
1=4	12.73	66.6	25	1.5	10	29.1	40.6

Table 2. Model 2 Data.

Figure 22. Model 2, Horizontal View.

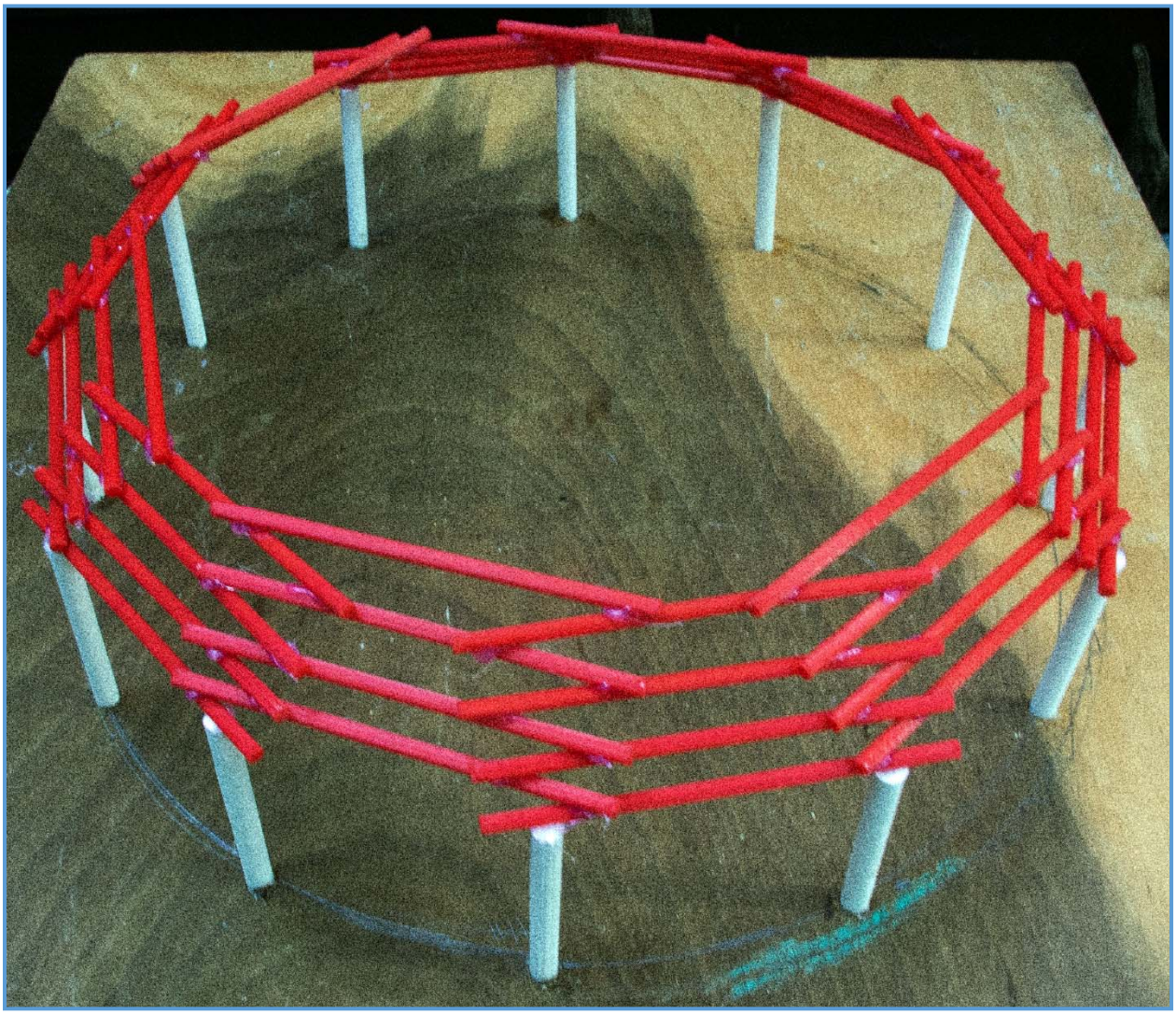


Figure 23. Model 2, Angle View.

Figure 24. Model 2, Top View.

Model 3 Rationale

We intuitively believed that a rope length 50 percent of the radius of the structure would have created a structure much too steep. Thus we tried a rope length of 60 percent of the radius. We were a bit reluctant to try this length at first since obtaining this length from the radius rope required folding into five lengths and taking three of them stretched out. The results, however, as presented in Table 3 and Figures 25-27, show a roof angle of just over 51 degrees – much closer to the 45-50 degree target angle! This seems acceptable, but we wanted to try one more variation to see if we could get the angle just a bit lower and closer to 45 degrees. Now on to the final model, Number 4.

Roof Truss Layers	Model Truss Length	Percent of Radius	Implied Center Height	Horizontal Space Between Trusses	Rafter Extension Outside Wall Posts	Center to Far Outside Rafter Ground Point	Derived Roof Angle Degrees
1-4	11.46	60	30	0.75	5	24.1	51.2

Table 3. House Model 3 Data.

Figure 25. Model 3 Horizontal View.

Figure 26. Model 3, Angle View.

Figure 27. Model 3, Top View.

Model 4 Rationale

In attempting to come up with a rope radius length percentage that could be easily derived from a radius rope, we were stymied at first. Then we remembered that the decimal fraction 5/8 was .625. Therefore for the fourth model we made the roof trusses equal to that fraction of the length of the radius. This could be derived by folding the radius rope into eight sections and using five of them. The results of this final model are presented in Table 4 and Figures 28-30. The calculated angle for this rood pitch is 46.5 degrees, and well within the goals we had set for the models.

Roof Truss Layers	Model Truss Length	Percent of Radius	Implied Center Height	Horizontal Space Between Trusses	Rafter Extension Outside Wall Posts	Center to Far Outside Rafter Ground Point	Derived Roof Angle Degrees
1-4	11.94	62.5	28.1	1.0	7.5	28	46.5

Table 4. Model 4 Data.

Figure 28. Model 4, Horizontal View.

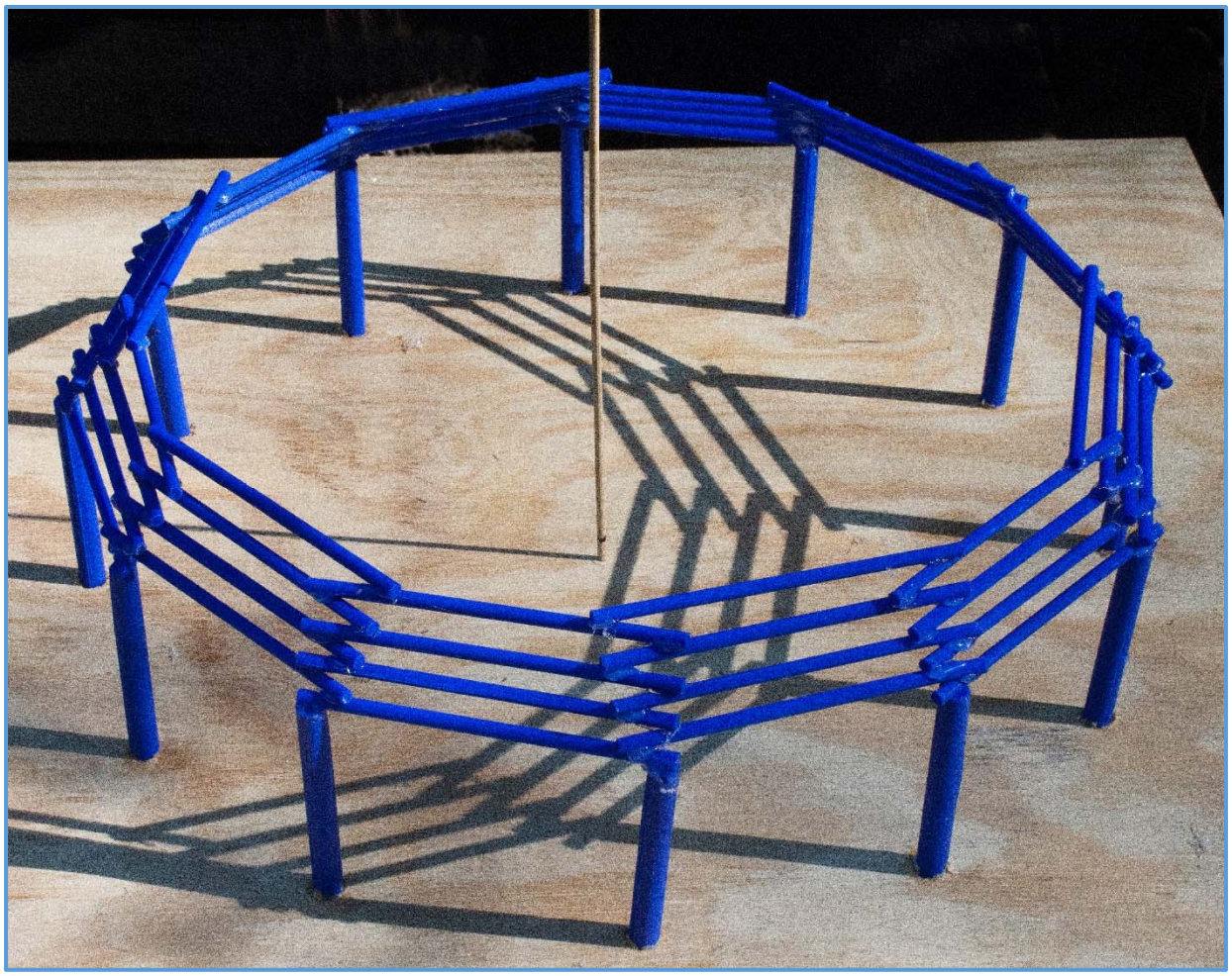


Figure 29. Model 4, Angle View.

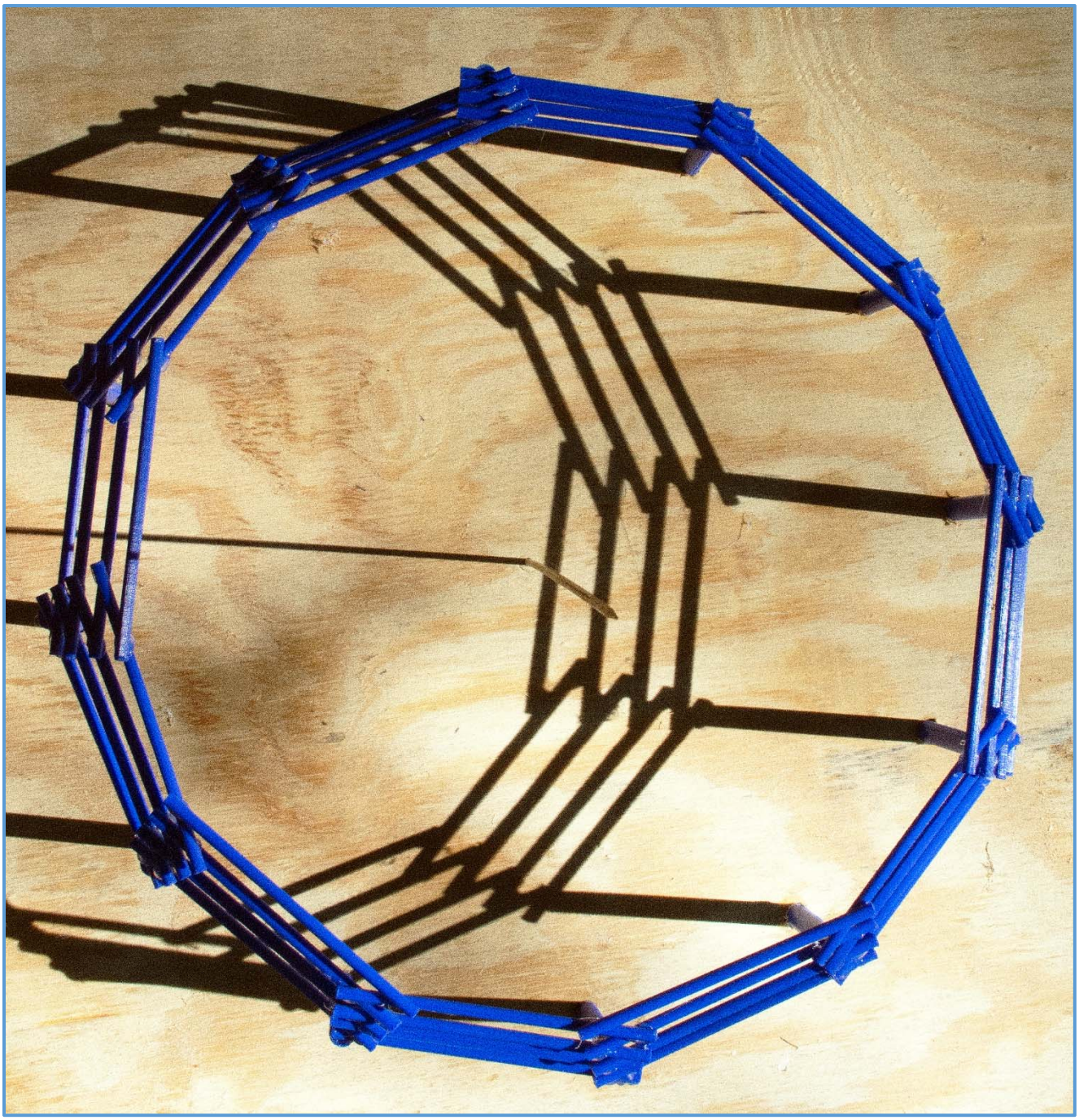


Figure 30. Model 4, Top View.

Issues of Center Support Posts

As discussed in the beginning of this paper, we have completely ignored the question of center posts. Hitchcock mentions absolutely nothing about center posts in his detailed description of the structure at Tuckabachee, and we believe his described roof truss design preempts the need for center post(s) and optimizes the floor space as we also described above. Lacking any archaeological confirmation, it is simply unknown if there were center posts in the Tuckabachee structure.

It is well known archaeologically that a great many round houses (small and large) in Georgia and the Southeast do have some center posts. If the Hitchcock structure DID NOT have center posts, it is within the realm of possibility that the elaborate roof joist proto-dome structure described above was entirely an invention of the historic period. We do not believe this, however.

Advantages of Center Support Posts

The clear advantage of center posts when used in southeastern round houses was the simple function, usually unstated, of providing a solid framework at the summit of the structure to support the upper ends of the rafters and thatch or earthen roof. The majority of archaeologically documented center post arrangements consists of four posts in a square formation (Steere 2017). The classic image of this sort of center post arrangement is the famous painting by artist Karl Bodmer (1809-1893) of a Mandan earth covered round building in the valley of the upper Missouri River (Figure 31). Closer to the Oconee Valley in Georgia is the famous Macon Earthlodge at Ocmulgee National Monument. Earth covered buildings have much heavier roofs that by definition require a much stronger supporting structure. Further, the

earth covered buildings, where they occur, seem to never have roof angles of anything approaching 45 degrees because if they did, the insulating roof earth would wash off the roof much more easily during the first heavy rainstorm.

Figure 31. ***Interior of the Hut of a Mandan Chief*** **by Karl Bodmer. Image Courtesy of the Library of Congress.**

A second advantage of a center post design, particularly for structures intended as homes rather than sacred structures, was the use of these posts as a basis for storage off the floor of any number of things. These could include food, clothing, baskets filled with any number of supplies, tool kits, and other useful items needed to maintain a home. For a structure the size of the one described by Hitchcock with a 45 degree roof, just under 84 percent of the total volume of the building is in the upper conical part of the building. For a structure of only 25 feet in diameter, the upper conical part of the building would be just over 77 percent. We argue that this

dry space in all these structures would have been effectively used for storage of a wide variety of household or special items. Access to these stored items would have been made simple with the placement of center posts and likely ladder steps added to the posts.

A third advantage of having center poles in such a structure relates to the placement of the rafters, and, more significantly, the thatching of the roof. These activities would have been greatly facilitated by the presence of the center poles, thought of as scaffolding. We also are aware that the thatching would have had to be repaired with some frequency, and this would also have been greatly simplified by access to roof from the interior of the structure on the center poles. We also believe it likely that light-weight children in the 5-10 year age group would have been intimately involved in such repairs. Adult women or men of very slight size could also have performed these necessary maintenance tasks.

A final advantage of the center poles would have been allowing easy access to the smoke or "chimney" hole in the top center of the structure. Presumably they had a system in place to cover the hole with a section of leather or other material, likely with a series of pull ropes to open and close it. Maintenance of such a system would have been greatly facilitated by the presence of center poles.

Disadvantages of Center Support Posts

The number one disadvantage of center posts is that they are always in the way as discussed earlier in this paper! This is most significant in a public building used as a council structure or deliberative buildings where the posts constantly block the view of a fraction of the people inside the structure. In fact, there would be no seat on the perimeter (or anywhere toward the center) where anyone can see everyone in the room. For important meetings or gatherings this is a distinct social disadvantage. Facial expressions often tell more than words.

A second disadvantage is that center post limits movement in the room. This is certainly important if any performance or dance is involved in the proceedings in the round room. This is made all the more difficult given that most large round structures contained a central fire pit. The Macon Earth Lodge is a perfect example of these limitations (Fairbanks 1946).

For small round houses that served as family homes as in the Oconee Valley (Williams, Ledbetter, and Jones 2018) these limitations are of much more limited consequences. Indeed, the presence of center posts in a home permits direct the access to the upper space/attic, which can be used for curation of many useful and needed items for a family that must be protected from rain. These might include leather, dried foods, and baskets for example. The attic area could also perhaps be used for storing bows, arrows, and wood being dried for the preparation of these and other hunting tools. The upper parts of a round domestic structure would accumulate heat from a central fire and be the perfect place to provide dry things that need such treatment.

On the other hand, heating fires in domestic round houses such as those in the Oconee Valley would likely produce sparks from time to time that could lodge in the material stored in the attic and burn the entire structure in an instant. We do know from earth covered domestic structures such as those at the Bullard Landing site, 9Tw1 in central Georgia (Williams and Evans 1990) that mud daubing was placed on the inside of these structures surrounding the smoke hole in the top center of the building. This daubing would extend for about a meter away from the smoke hole. This daubing was often hardened to a sub-ceramic state by the heat exiting from the hole over a long period of time. It is certainly possible that such a system could also have been implemented on thatch roofed round domestic structures.

Construction Material Speculations

What organic materials were used to make the round buildings, both public and private in the Southeastern U.S.? Many people have speculated about this in the past, and all we can offer are our own speculations, backed up, perhaps, by some reasonable suppositions.

Wall Support Posts

The most commonly thought tree used for the outer wall posts in these structures is Eastern Red Cedar (*Juniperus virginiana* var. *virginiana*). On rare occasion fragments of this material have been found preserved in some postmolds in the Oconee Valley farmsteads, particularly the Sugar Creek site (Williams and Williams 2012; Marshall Williams personal communication). The clear advantage of cedar over other trees is its natural resistance to rotting and termite destruction. Figure 32 shows the distribution of Eastern Red Cedar (Little 1971). Curiously, it correlates well with the known distribution of the Mississippian archaeological culture.

Figure 33 show the distribution of termites in the United States (https://www.termitestreatment.com). The area of the Deep South, including all of Georgia, is obviously in the highest area of termite damage potential for posts set into the ground. Pine tree posts (untreated with modern chemicals) rot in an incredibly short time.

Cedar, being a harder wood than pine, is also somewhat stronger and, therefore, more capable of supporting the roof load of a native round house.

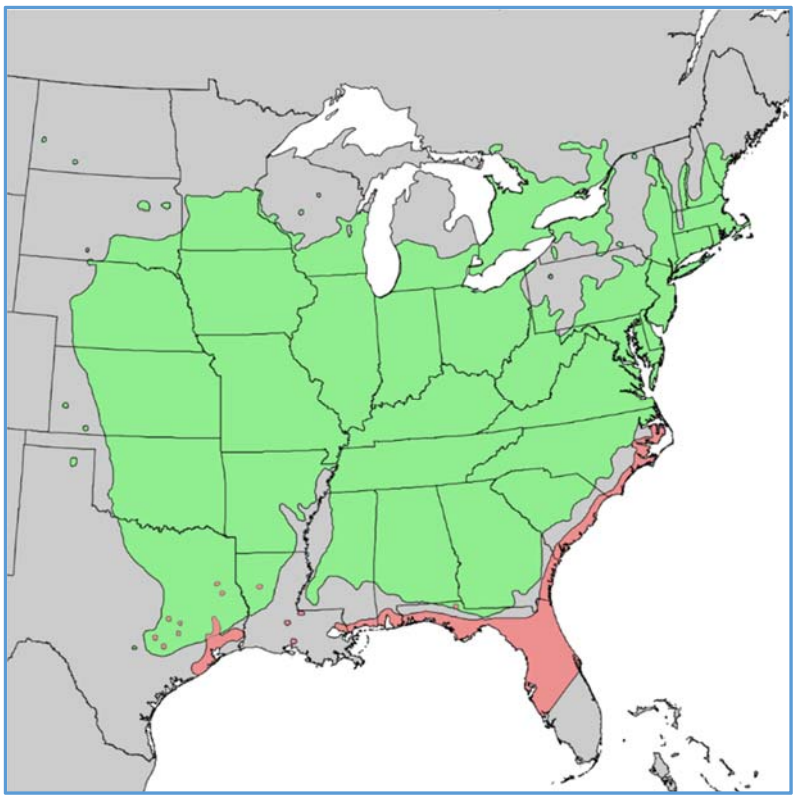


Figure 32. Current Distribution of Varieties of Eastern Red Cedar (Little 1971).

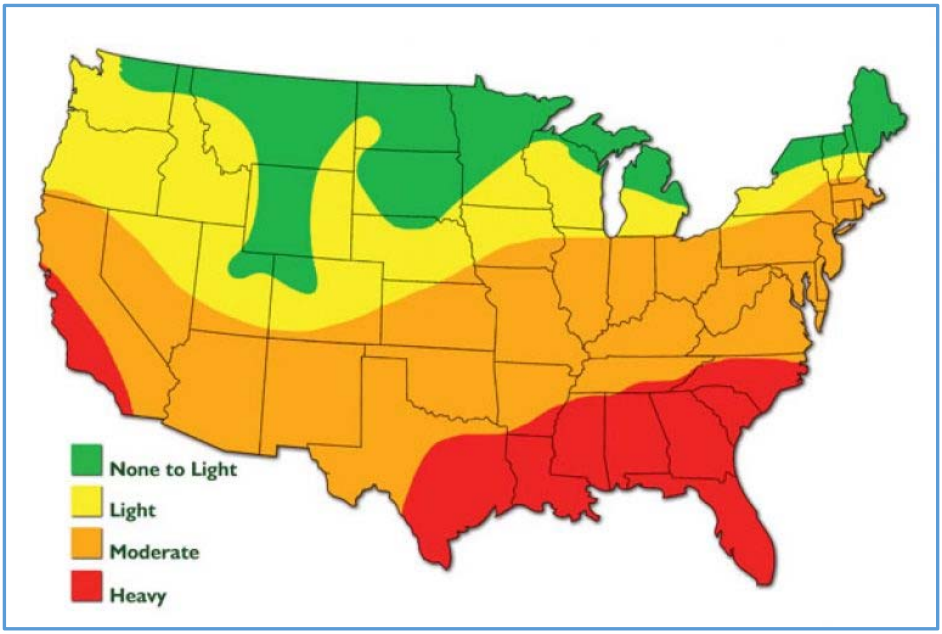


Figure 33. Current Distribution of Termites in the United States. Image Courtesy of termitestreatment.com.

Roof Headers and Trusses

Here we are speculating on the logs used in the creation of the trusses Hitchcock described from the Tuckabachee Busk Ground. Hitchcock, unfortunately, says nothing about the type of trees used in any part of the Council House he described above. We see no reason not to believe that pine logs, stripped of their bark, could have easily fulfilled this need. They would be readily available, not in contact directly with the earth (termites), and would be kept reasonably dry by the roof covering. Also, most pine species grow nice and straight and have relatively few knots in their lower sections. The trusses could not be too tapered, and pine trees grow tall enough that for the lengths required, cutting sections of them with minimal taper would not be difficult. Further, pine trees are easier to cut down and cut to length than most other trees. Although the historic ones would have been cut with steel axes, prehistoric ones were cut with stone axes, and cutting pine poles would have minimized the necessary labor expenditure

While cedar and other trees such as oaks, could also have been used for the trusses, most of these have fewer straight and knot-free sections, and would have required much more labor for cutting, debarking, and transportation in our estimation.

Rafters

Again, we see no compelling reason that long debarked pine poles should not be the most likely candidate for roof rafters. Pines are one of the few trees in the south that grow tall and stay thin and straight, the perfect requirement for roof rafters. Pines tend to be tallest and thinnest when in a crowded pine forest. Modern forest managers thin a pine forest mid-growth period so the remaining pines will thicken and reach their maximum size (Georgia Forestry Commission 2019). Young pine trees in a mature forest often are too short to serve as rafters.

Finding just the right trees for the job might have taken some moderate time searching in the woods for the perfect tree just as people now search for their own "perfect" Christmas tree. Since the perfect trees might not be available immediately near the construction site, we see the system of having people from a large area search for and bring in the perfect trees from miles around as a logical and practical reason for involving much of the larger community in the social activity of home/Council House construction.

Center Posts

When present, again we believe pine was the most likely tree to be used for this function. There is the problem of termites, but it is difficult to find cedar trees tall enough, straight enough, and with few enough knots to serve for center poles. Further, a center fire would keep the earth around the base of the center posts quite dry, a condition anathema to termites. Earth Lodges such as the Macon Earth Lodge (Fairbanks 1946) and the Mandan lodges of the Dakotas would have to support more substantial loads, and it is not surprising that the center posts in these structures are larger, shorter, and perhaps made of stronger trees than pine—perhaps oak or hickory.

Roof Thatching

Now to the most speculative part of native house construction, whether Council House or small round family home—the roof thatching. The most commonly suspected material by archaeologists we have met is "grasses". Certainly grasses have been and are still used in many areas of the world (Figures 34 and 35). We will discuss these as possibilities, but will suggest a few reasons why we do not believe these form the most logical source of natural roof material

for the thousands of farmsteads in the Oconee Valley, and suggest a few other logical materials locally available there.

Figure 34. Historical Northeastern England Reconstruction. Image Courtesy of the Ryedale Folk Museum.

Figure 35. Northern Ghana Structures. Image Courtesy of Creative Commons.

Before presenting a discussion of either of these, however, we must point out that Hitchcock explicitly states that the Tuckabachee Council House was covered with wooden shakes or shingles. This clearly was an adoption of a roofing material used in Europe and brought to America by immigrants. Interestingly, all shakes before about 1830 were hand made using a froe and hammer. In the early 19th century, shakes began to be made commercially through the uses of steam-powered saw mills (Park 1989). Since the Tuckabachee structure was built before 1842, we wonder if the shakes on the Council House roof were handmade or purchased readymade. In any event, a shake roof does not require as steep a roof angle as a thatched one. Using the measurements given by Hitchcock, we have calculated that the roof angle of the Tuckabachee Council House was only about 32 degrees. This angle is fine for a shake roof, but much too low for a thatch roof. The Creeks and Cherokees were adopting more modern building methods by this time even in their "traditional" structures. Both Bartram (Dallmeyer 2010:122) and Timberlake (Williams 1948:84) mention such roofing in the late 18th century in their publications.

We think that the shake roof was clearly an historical development and that the roofs of early historic and prehistoric round houses in Georgia were covered with thatching at angles of 45-50 degrees just as such structures over the rest of the world long ago and even at present in some areas of the world (Figure 34 and 35).

Palmetto, probably Saw Palmetto (*Serenoa repens*) is a logical roofing material for southern Georgia and Florida, and likely was the thatching of choice there. The range of this material, however, barely makes its way north of the Fall Line in Georgia, although occasional plants can be seen as far north as Greensboro. The current accepted distribution is shown in Figure 36 below.

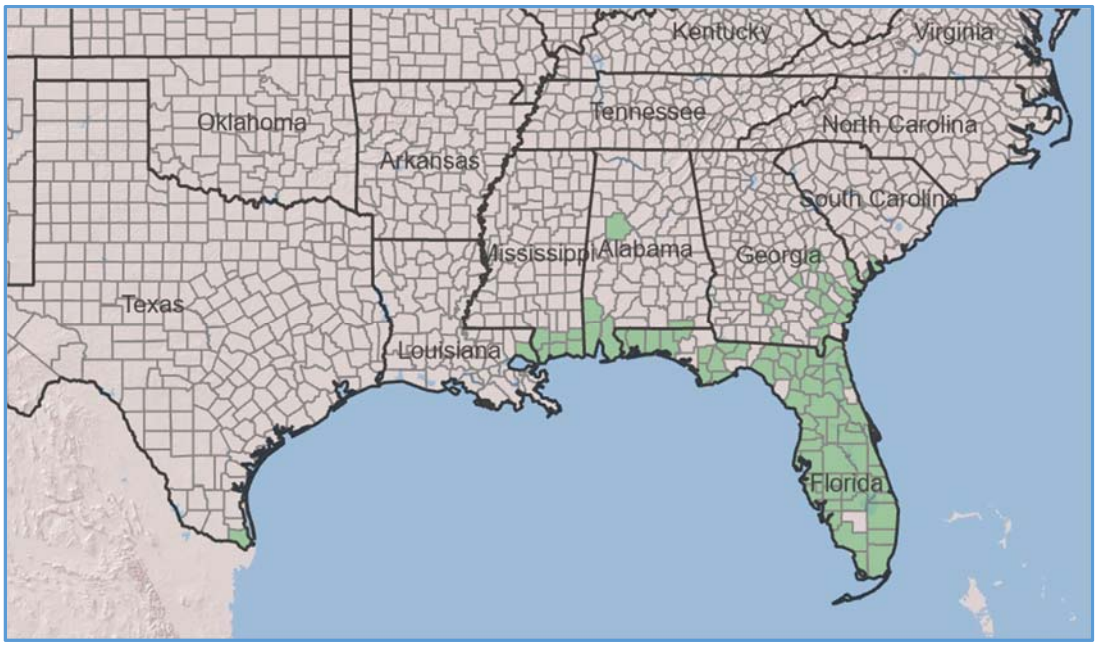


Figure 36. Current Distribution of Saw Palmetto. Map generated from USDA Plants Database: plants.USDA.gov.

Now back to a discussion of grasses as thatching. In Georgia there are 58 known native grass and sedge species (Wade et al. 2017, Chafin 2007). These include 30 species of warm weather grasses, 18 species of cold weather grasses, and 10 species of sedges. Of these 58 species, 40 grow to a height of at least 3 feet at maturity, and could conceivably be used as roof thatching material. One of the more common grasses in the Oconee Valley area that could have been used a thatching is Broomsedge (a misnomer, as it is in fact a grass and not a sedge) (*Andropogon virginicus*). We see a simple practical problem with these grasses used a thatching, however. Grasses and sedges are opportunistic plants that require a great deal of sunshine. In prehistoric Georgia, trees were essentially ubiquitous—they were almost everywhere. Natural forces such as tornadoes and fire would open relatively small open areas in which grasses could thrive. Agricultural fields of people would have provided open area for grasses, but these would

have been considered competitors to the corn, beans, and squash that formed much of their vegetable diet. Our point here is that large quantities of appropriate grasses in wooded areas needed for roof thatching might have been much more difficult to obtain in the quantities needed exactly when they were needed. Certainly there are native grasses in Georgia's woodlands, but the important consideration here we believe is quantity.

We and a hopefully growing number of our colleagues believe for dispersed Mississippian societies in Georgia and elsewhere in the Southeast there was a useful and well-developed commensal relationship between individual farmers and adjacent beaver ponds and habitats (Williams and Jones 2006, Williams 2017). Certainly beavers and their ponds were everywhere in Georgia for long before people first occupied the area. These thousands to tens of thousands of ponds across the state are the focus of another couple of plants that we believe were very important in roof coverings – cane and cattails.

Both of these plants surround virtually every beaver pond in Georgia and beyond. Cane (*Arundinaria gigantea*) is present over all of the southeastern United States, with its distribution closely aligning with that of the Mississippian archaeological culture. It was widely used by native people for a great many things and we believe should be considered as a strong potential plant for roof coverings, particularly since it was present in large quantities near ponds and as a southern grass, follows similar growth cycles and habitat preferences.

Another plant that is very common near beaver ponds is cattail (*Typha latifolia*). The large tall stems of this perineal would have made an ideal roof thatching material. It is available across the entire United States. The stems could have been cut at the water line in the late fall after the seed heads had dispersed, leaving the tubers to regenerate the following spring. Given the huge number of beaver ponds originally in Georgia (Williams 2017), both cane and cattails

would have been readily available to individual farmers living adjacent to these ponds. The late Steve Watts of North Carolina worked extensively with cattails and published on his work in in 1998 (Watts 1998). Figure 37 below shows a structure he built using cattails as the thatching material.

Finally, we suggest that another readily available source of roof thatching to farmers and groups building Council Houses would have been corn stalks. After harvesting of the corn cobs themselves, the remaining dried stalks would have provided abundant roofing material for Mississippian farmers. Such thatching material was used by rural Midwestern farmers as recent as the early 20th century in the U.S. as reported by the U.S. Government in USDA Farmer's Bulletin 1548 (Baker and Bradley 1948:33-34). See Figure 38 below.

If course, a newly initiated farm would not have any cornstalks until the end of the first harvest. This would require cornstalks to be supplied initially from some other farm field of a neighbor or relative. We believe this would have potentially led to increased social bonding between neighbors or family. Since the best time to obtain cornstalks, cattails, and perhaps dried cane would have been the fall, this might suggest that farm house building time would have been in the fall, perhaps in October or November in Georgia. This would likely also be the most comfortable time of the year for the physical labor of house construction

In truth, across the Mississippian Southeast there were likely many different materials used as thatching in different places and at different times. These depended certainly on locally available materials, tradition, and human preferences, which are always important factors to remember.

Figure 37. Steve Watts Cattail Thatched Round Structure.

Figure 38. Livestock Shed with Cornstalk Thatching.

Lashings

There would, of course, been a need for a tremendous amount of lashing material to tie together all the roof trusses, rafters, and thatching. While leather strips from deerskin would work perfectly well, we believe this material would have been more useful for clothing, moccasins, and other small uses, and that it would be wasted on house construction compared to lashings made from plant materials. A large literature exists on plant ropes and lashings made from split oak, and many other materials. We can do no better here than refer the reader to a great many articles published in the *Journal of Primitive Technology*.

Summary

This is a long and rambling paper without a doubt. We have used the wonderful and insightful observations of Ethan Allen Hitchcock, a generally unknown ethnographer of the native people of early Oklahoma as a jumping off point to study native southeastern round house construction. We were driven into this because of the huge number of round farm houses, as well as Council Houses in the dispersed Late Mississippian societies in the Oconee Valley of Georgia**.**

We have supplied something of a reasoned guide to the construction of such structures, and tried to do it from the imagined perspective of the highly intelligent engineers – the Master Architects – who designed and built these structures. There is little doubt also that we have barely scratched the surface of the quality of the engineering and deep thought that went into the construction practices of these prehistoric and early historic people of the Southeast. The evolution of these practices must have taken many generations to develop to perfection, and it is certainly likely that there were many different such building traditions alive in different places

and times in the Southeast. We hope that others will pick up on our few leads presented here and carry the fascinating study of native southeastern architecture forward in the future.

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