

Gungywamp: A Review of the Major Theories

By Mary Gage & James Gage
Copyright © 2010. All Rights Reserved.

I. Introduction

The Gungywamp Complex in Groton, Connecticut contains house foundations, colonial roads, and historic stone walls. Researchers, archaeologists, and historians are in general agreement about the historic origins of these features. A strong Native American presence within the area dating back thousands of years is likewise agreed upon by all the researchers. The Native American utilization of several rockshelters within the complex is well attested to by the archaeological evidence. The consensus amongst researchers about the site's history ends there.

Gungywamp's other stone structures like the stone chambers, standing stone rows, stone bridge features, and the double stone circle have puzzled researchers for decades. These stone structures have been the subject of numerous theories as to their origins, date of construction and purpose. These theories ranged from those based on archaeological evidence and scientific argument to those based on wild speculation. These theories have been often repeated and cited but rarely subjected to scientific review and analysis.

The theories can be grouped into two broad categories. The first group contains theories that offer various utilitarian historical explanations for the structures. The second group focuses on Native American ceremonial explanations for the features. This article is a scientific analysis, review, and critic of both groups of theories. Each theory is evaluated to determine the soundness of its evidence, plausibility of its hypothesis, and tested to see if it withstands basic scientific inquiry. Through this process the theories with merit can be sorted from those without.

II. Standing Stone Rows

The Gungywamp complex has two rows of standing stones generally referred to as the *North Stone Row* and the *South Stone Row*.

Physical Description from Published & Unpublished Sources

Location: East side near northern end of South Complex, as shown on site map. (Barron & Mason 1994, 6)

Number of Stones per Row:

24 Stones – John Dodge's 1965 redrawn illustration shows 18 stones (11 upright and 7 fallen) and 6 empty spaces – missing stones (Whittall 1976, 21)

29 Stones – David Barron stated that, "Research over the past ten years has found that both rows contain as many as twenty nine individual standing stones, stumps [tops of stones broken off], or empty 'sockets' where stone slabs had once stood." (Barron & Mason 1994, 23)

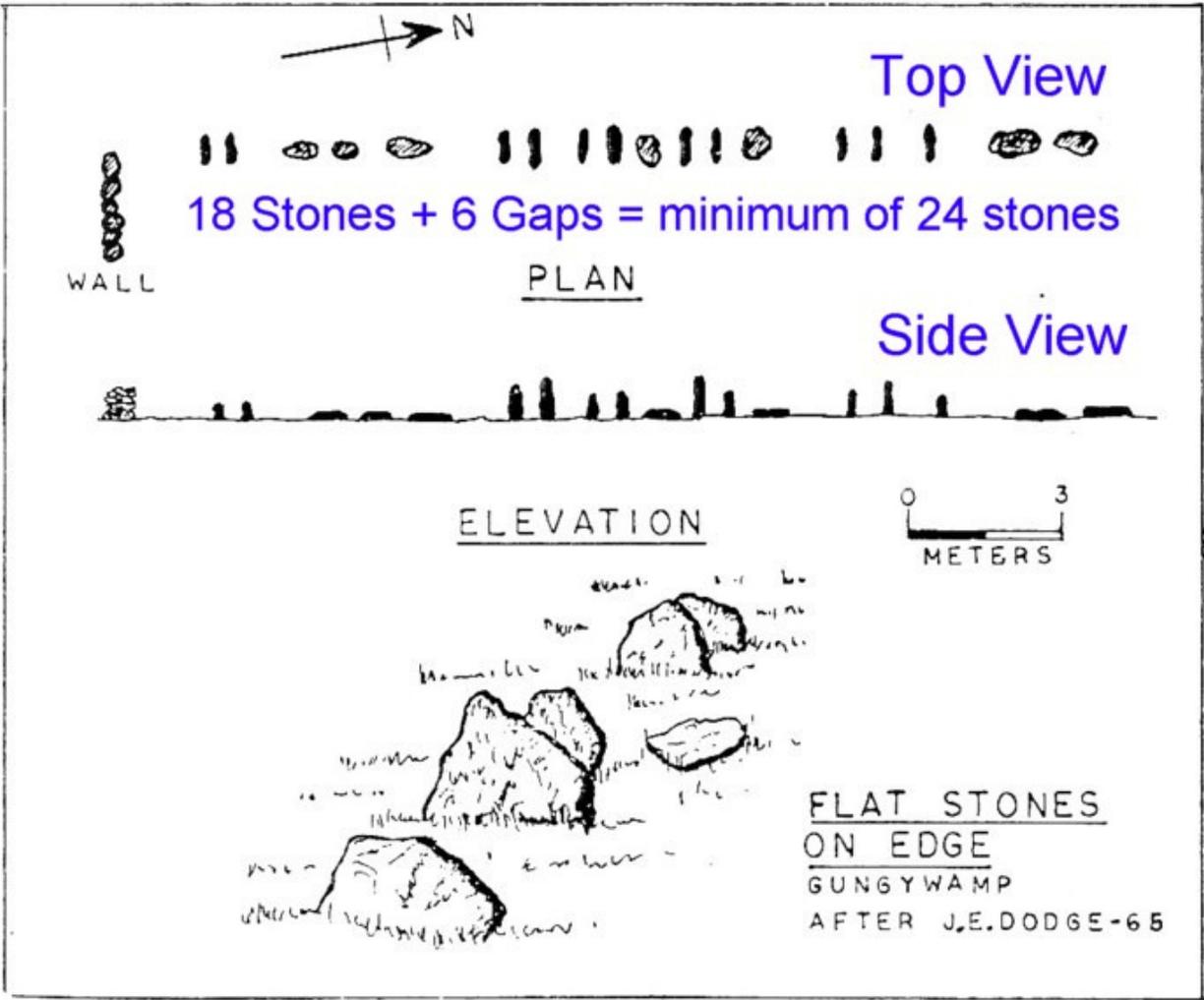


Fig. 1 - Illustration by James Whittall II, from *Early Sites Research Society Bulletin* vol. 4 no. 1 pp. 21 (Notes in blue by authors)

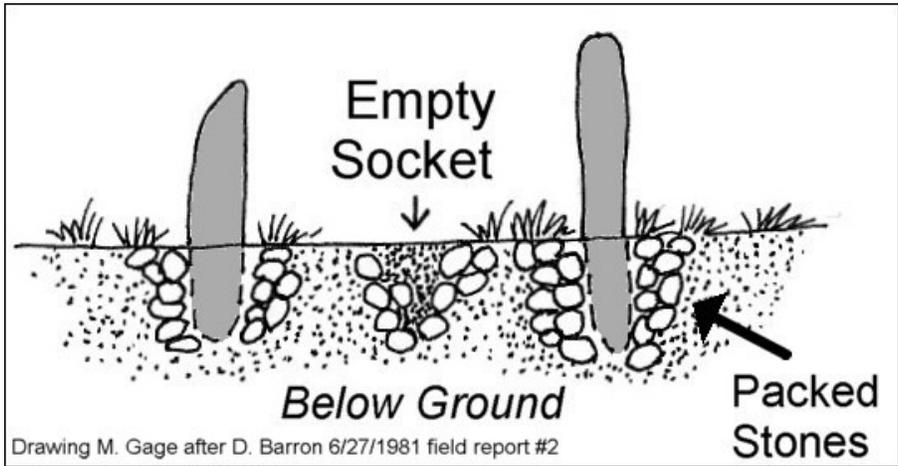


Fig. 2 - Standing stones were placed in sockets in the ground.

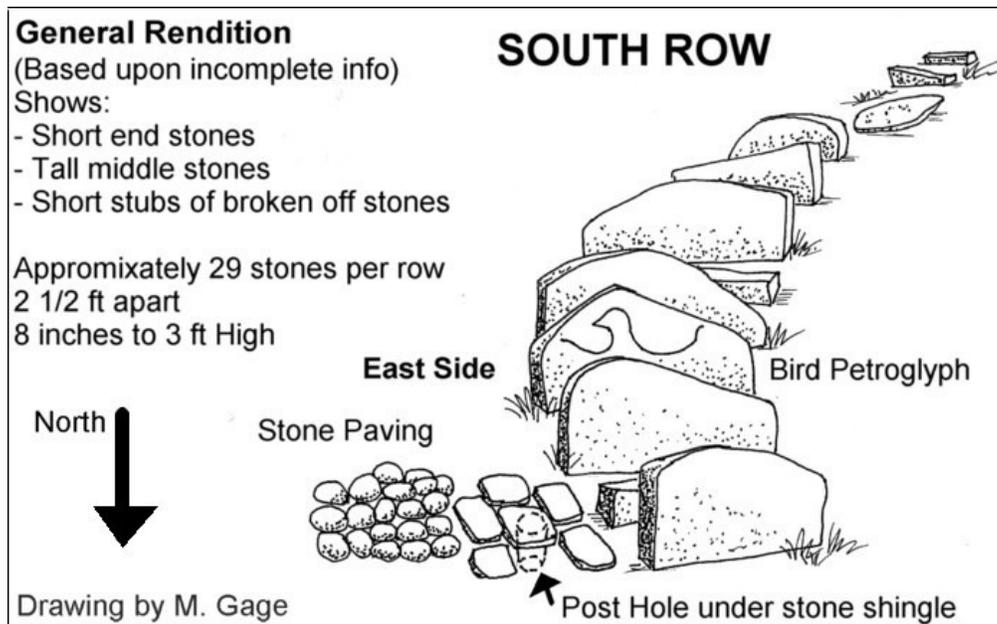


Fig 3 - Drawing of south standing stone row showing each features (i.e. bird petroglyph, curvature of row, stone paving and covered hole.)

Sockets: Barron’s Field Report #2 contained an illustration of the sockets. Each socket was a 12-18 inch deep depression packed with small rocks, cobbles and rubble. (Barron 1981a; Barron & Mason 1994, 23)

Position: “... standing flat stones on edge, facing at right angles to the line ...” (Whittall 1976) The flat sides of upright stone slabs are perpendicular to the length of the row.

Arrangement: “3. The SS tend to be shorter and smaller at each end of the rows; the taller cluster more toward the center of each row.” (Anon 1981) “Short slabs start and end both rows, with the tallest slabs found in the middle of each row.” (Barron & Mason 1994, 23) There is a good photograph of the graduated height of standing stones by Juliana Lewis in *Stonewatch* (2006, p. 9).

Elliptical Arc: In Field Report #1, Barron notes “Line of sight showed row of stones [south row] to be curved from a W – E – W [a]skew.” Barron further clarifies that, “Both rows are gently ‘bowed,’ having an elliptical arch toward the east.” (Barron & Mason 1994, 23)

Triangular & Angular Tops: “The SS found intact i.e., not smashed, split by erosion, or toppled, all tend to have pyramidal or angular tops;” (Anon 1981)

Two Rows:

“The South Row has several missing stones at the southern most end ...There is a neatly ‘pecked’ bird effigy inscribed in the north side of one of the larger stones ...” (Barron & Mason 1994, 23)

“The North Row is composed of many badly eroded, broken and leaning stone slabs.” And, “It is possible that the North Row was built before the South Row, judging from the greater wear and erosion.” (Barron & Mason 1994, 23)

Distance Between Rows: The north row is “approx. 22.5 m of southern row of standing stones” (Barron 1981a)

Bird Effigy: In the south row, “There is a neatly ‘pecked’ bird effigy inscribed in the north side of one of the larger stones, wings spread apart, head and beak facing east.” (Barron & Mason 1994, 23) In the photograph of the bird effigy, on the tip of the right wing there appears to be a small crescent shaped line that curves in the opposite direction of the wing. This is unconfirmed by the author.

Covered Post Hole: From 1993 excavation “in pathway paralleling the stone rows ... one of the workers discovered a single, flat shingle [small thin stone slab] which when removed, revealed a vertical, round clay lined post hole about 25 cm [9 ¾”] deep.” (Barron & Mason 1994, 24)

Stone Paving & Rubbing Stone: A 1993 excavation found, “in pathway paralleling the stone rows. A medium sized sapling had been blown over by a hurricane and in the socket left by the roots we discovered uniform cobbling as well as a unique ‘rubbing stone.’ Several meter squares were methodically excavated on the easterly side of the south row of standing stones. This disclosed that a single layer of cobbles had been laid directly on sandy, orange loess. Also, flattened stone ‘shingles’ were laid closer to the standing stones in a purposeful manner.” (Barron & Mason 1994, 23)

Restoration Project: Several stones in the north row were pulled out by vandals. In *Field Report #1 and #2* from June 1981, David Barron describes the restoration of the stones. These stones were painted orange on the bottoms to discourage further vandalism.

Historical Theories for the Stone Rows

Multiple Upright Stones in Historical Stone Wall Theory

This theory states that standing stones in historic stone walls are unusual and rare but do occur. The upright stones were used to “stabilize” the stone wall. Two variants of this theory were discussed in Summer 2003 issue of the Gungywamp Society’s *Stonewatch Newsletter*. Carol Hallas summed up the challenge of researching the stone rows in the following words, “One of the foremost problems in finding an explanation for the two rows of standing stones ... is that we have not been able to find a similar example.” Two researchers have tried to draw comparisons between the two stone rows and other potential examples. According to Hallas, “Frederic W. Warner, former chairman of Central Connecticut State University’s Anthropology Department, noted, ‘The use of standing stones for walls is unusual but not unknown, either in this country or in Britain.’ The [He] then went on to describe an example in Pennsylvania (ASC Bulletin, #44). But the example Warner used shows the standing stones with their broadsides all facing outward and abutted right next to each other. This does not at all bear any resemblance to the rows of

standing stones at Gungywamp.” (Hallas 2003) Hallas was referring to the fact that the standing stones in Gungywamp’s rows of stone are perpendicular to the length of the row.

In the same issue of the *Stonewatch Newsletter*, Paulette Buchanan briefly mentions another variant of this theory (Buchanan 2003). Buchanan provided a detail explanation of the theory in a subsequent article. Buchanan stated “The style of rock wall that uses periodic vertical bracing stones in a horizontally constructed rock wall is found in US colonial sites and in Ireland, Scotland and England. The name of this type of stone wall construction is called *coping* and *dyking*. This type of construction makes a very stable and durable wall. ... through email correspondence, Scottish resident John Russell and I discussed the art and craftsmanship behind the construction of ‘dry stane dyke’ walls ...” (Buchanan 2004) This statement was accompanied by two illustrations.

There are several significant problems with this statement. First and foremost, Buchanan misunderstood the Scottish terms *dry stane dyke*, *coping* and *dyking*. Lawrence Garner, former director of the Dry Stone Walling Association states “In Scotland stone walls are called *drystone dykes*.” (Garner 2003, 15) The term *dry stane dyke* is a general term for a dry masonry stone wall not a reference to a specific construction technique. The term *dyking* simple refers to the act of building a dry masonry stone wall.

Garner offers the following remarks on the subject of *coping*, *copestone*, *cope*: “Copestones have two functions apart from their decorative effect. Firstly they add considerable weight to the wall, weight which is specially vital to stabilise the lighter stones in the upper half. Secondly, they act as throughstones and must make good contact with both sides [both sides refers to a double wide wall]. The ideal copestone is fairly thin and flat and is placed upright on the wall. In this way more stones, and therefore more weight, can be placed in a given length. Copestones should add about 9 inches (230 mm) to the height, bringing the wall up to the specified 4 feet 6 inches (1.37 m).” (Garner 2003, 9) Coping stones are placed on the top of the wall and therefore bear no resemblance to the two Gungywamp stone rows.

In support of the idea of vertical bracing stones, Buchanan offered two illustrations from a British BTCV website page (page is no longer available). Both illustrations came from *Dry Stone Walling: A Practical Handbook* (Brooks and Adcock 2010) and appear on page 140 and 141. The first illustration showed stones place in vertical position, one row on top of another. On the right side a single vertical stone goes from the bottom of the first row to the top of the second row. Buchanan claims the illustration shows the use of “vertical bracing stones.” According to the *Handbook*, the illustration shows only the top section of the wall and illustrates the proper coping technique. The “bracing stone” is only a part of the coping it does not extend to the bottom of the wall.

The second illustration shows stones extending from the “bottom” to the “top” of the wall. Closer examination of the illustration shows it is top view of a stone wall and the stones extending through the wall are in a horizontal position not a vertical position. According to the *Handbook*, this illustration shows how to properly lay the foundation for a stone wall in a trench in the ground. These horizontal stones are known as *throughstones*. Garner states “At a specified height (in this case halfway up the double wall) the two sides will be leveled off and the

throughstones laid on. *Throughs* are long stones, stretching across the two sides and making good contact with each other. Their purpose is to act as ties to hold the sides together and stop the wall bellying out.” (Garner 2003, 9) Throughstones are long, flat stone slabs, laid flat across the double width half ways up the wall. They are not placed in a vertical upright position. The throughstones do not disrupt the interlocking of the smaller stones. They reinforce the interlocking by tying the two sides of the wall together and being the same thickness are integrated into the interlocking process.

This variant of multiple upright stones in wall theory is deeply flawed. It was based upon a misunderstanding of Scottish terminology and two illustrations which were taken completely out of their original context. This example illustrates the need for careful research and verification of the basic details.

Were upright stones used in stone wall construction? A review of seven major books on dry masonry stone wall construction yielded only two examples. In both examples, the upright stones were placed 6 to 8 feet apart. The first example was a low wall that had upright stone slabs perpendicular to the wall’s length. The upright stones had a wide notch in the top. This was called a “saddle wall” due to the fact the notch was used to place a wooden rail in it to raise the height of the wall (Hubbell 2006, 44). The second was an early 1900’s wall built of large round boulders interspersed with tall boulders (Allport 1990, 159).

There are several major flaws with the theory that upright standing stones were used to support and stabilize the stone wall. First, there is a lack of comparable examples to Gungywamp standing stone rows. There is a practical explanation for this absence. Standing stones, whether they are flat slab or tall boulders, create vertical seams in the walls. According to various books on dry stone wall masonry, vertical seams are highly unstable. Stone walls need to be built with layers of overlapping horizontal stones which effectively interlock with each other creating a very strong and stable wall. The second problem is a number of stones in the two rows are short and would not extend from the bottom of the wall to the top of the wall. The tallest stones range from 2 ½ to 3 feet in height while the smallest stones are only about 6 inches high. Thirdly, there are no smaller stones placed between the standings stone and there is no evidence that any were ever placed between them.

Feed Box Or Supply Boxes Theory

William Dopirak speculated that, “The standing stones appear to compartmentalize the earth. With wooden sides and lids, a standing row of stones conceivably could have stored different supplies or feed (purchased elsewhere.)” (Dopirak 2006) Dopirak offers no historically documented examples of this feed or supply box construction to support his idea. Presumably these boxes would be used by a farmer on his farm or soldiers in an encampment during one the periodic colonial wars. A review of 19th century literature on farming and 18th century military encampment equipment found no comparable examples. If the standing stones were boxed-in with wood then nails would expected to be found. David Barron in his excavations at the stone rows did not find any nails.

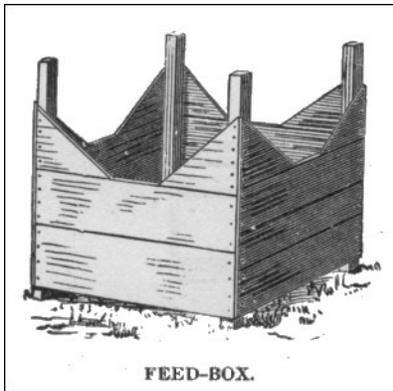


Fig. 4 - 19th Century Farm Wooden Feed Box (Periam 1884, 418)

Stretchers for Tanning Hides Theory

Dopirak goes on suggest that, “Perhaps the standing stones acted as drying racks for clothes or for the stretching of tanned hides.” (Dopirak 2006) *The Arts of Tanning, Currying, and Leather Dressing* (1852) emphasizes the fact that, “leather is dried in the usual manner, care being taken to avoid exposure to the sun, a strong wind, or a cool and damp atmosphere in which they might mould.” (p.217) The idea that the stones were used for drying hides during the tanning process can be safely rejected. Dopirak does not explain how the tanned hides could be *stretched* using the upright stones. Stretching any material including leather requires the ability to securely attach one end to a pole, rack or framework. There is no obvious means to attach the leather to the stones. A mid-1700’s illustration shown in Diderot’s encyclopedia shows the leather being stretch on a rack attached to the shop wall. (reprinted in *The Leatherworker in Eighteenth-Century Williamsburg*, p.16)

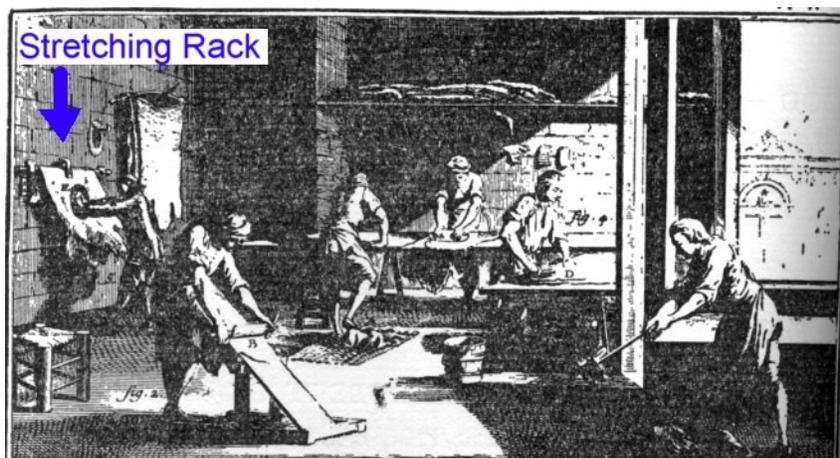


Fig. 5 - A 1760’s leather shop showing a leather stretching rack attached to shop wall (From *Diderot’s Encyclopedia*)

Livestock Herding Theory

“Others have indicated that perhaps the rows could have been used to herd cattle.” (*Stonewatch* Winter 2003) No historical accounts were found of multiple narrow openings, one after another in the same stone wall, for use by livestock. However, there are examples of single narrow openings about the width (1’ to 2’ wide) found in Gungywamp’s stone rows. William Hubbell in *Good Fences* found several names for the narrow slit “cow slip, open stile, rike or cow stile” (p70). Hubbell explains, “Perversely named, the cow slip is designed so humans—and even yellow Labs [dog in photograph]—can slip through, but not cows.” (p70) In Lawrence Garner’s Shire book *Dry Stone Walls* a slightly different version was shown, a V shaped opening in the top half of the wall called a “squeeze-gap” (p 13). The narrow opening “will accommodate walkers but not cattle.” (p13)

Native American Theory

The review of various historical explanations for the two standing rows has demonstrated they are deeply flawed. There is currently no plausible utilitarian explanation for these structures. Archaeological excavations at several rockshelters within the complex have demonstrated the presence of Native Americans within the complex. Excavations at the double stone circle by Whittall and Barron (1994) also recovered a number of Native American artifacts at the site. Having reject all of the historical explanations, it is necessary to explore the possibility that the two rows were constructed by Native Americans. This raises an important question: was there a Native American purpose for erecting the standing stones?

Moon Ceremonialism Theory

The two standing stone rows are located in northeast section of the site. The North Row is badly eroded suggesting it is older than the more intact South Row. The North Row is briefly talked about in published sources but there are no photographs or specific information about it. This discussion will rely heavily on the better documented South Row.

The South Row was constructed following a carefully designed plan. The standing stones at each end of the row are short. From these short stones, the height of the stones increases until the maximum height is reached in the middle of the row. Each row has an elliptical arc that is bowed out towards the east. On the east side of the South Row there is a covered post hole and stone paving. One of the stones has a bird effigy with its head and beak pointed towards the east. All of these details indicate the stone row was intentionally constructed for a specific purpose. There seems to be a strong symbolic association with “east” or “northeast.” Both rows are located in the northeast section of the site, the bird’s head points east, the stone row bows out towards the east, and the post hole and stone paving were placed on the east side. The “east” orientation is too consistent to be the result of random coincidences. This arrangement suggests potential ceremonial activity. What type of ceremonialism?

The elliptical arc forms a crescent shape. The moon is generally represented by a crescent shape. There are 24 and up to 29 standing stones in the South Row. Without a full excavation, the actual number of missing standing stones in the South Row remains unknown. The moon’s cycle is 29

days of which there are 3 days when the moon is invisible in its New Phase. The variation between 24 and 29 stones without knowing the actual number of stones used suggests two possibilities: (1) lower number represents the number days moon is visible and (2) higher number represents number of days in the moon's full month cycle.

Each year beginning in late November through December and into early January in the northeastern United States (depending upon the moon's year to year positioning) one to two full moons rise on the northeast horizon at dusk (personal observations by the author over several years). Where the moon rises over water there is a moon beam on the water. East of the South Row is an expanse of wetlands upon which the moon's light could have formed a beam on.

Based upon the number of stones and the elliptical arc of the rows (i.e. crescent shape) this theory argues that the stone rows were related Native American moon ceremonialism. The presence of stone paving along the east side of the south row and the unusual post hole covered by a stone shingle reinforces the idea of a ceremonial structure. The post hole could have been used to hold a ceremonial staff. The east / northeast orientation suggests the ceremony took place during the early to mid winter when the full moon could be observed rising on the northeastern horizon.

Is there any historical and anthropological evidence to support the idea of Native American moon ceremonialism? Is there evidence for the use of ceremonial staffs?

Historical and Archaeological Evidence of Moon Ceremonialism

Connecticut

Staff (Mohegan) – "... with a curious staff, also said to have belonged to the old sachem, [Grand Sachem of the Mohegan] descended for a long time in the Uncas family, and were finally given, by a Mohegan squaw, to Mrs. J. B. Goddard, who resides next to the Mohegan cemetery, and in whose possession I saw them." (DeForest 1853, footnote on page 13)

Post – War Dance: "...the warriors, fiercely painted, and grasping their arms, moved round a painted post." (DeForest 1853, 34)

Gods (Narragansetts) – "The Narragansetts repeated to Roger Williams the names of thirty-seven of these *manittos*, each being an object of worship, and each bearing a significant name. There was a god of the north, a god of the south, a god of the east, a god of the west, a god of the house, a god of women, and a god of children. The sun, the moon, the sea, the fire, and many other things were believed to be animated by spirits; and each of them as circumstances seemed to require, might be made an object of sacrifice and adoration." (DeForest 1853, 24)

Narragansett Bay – Mohegans

Moon in Birth & Death – "The association of birth and death occurs also in other contexts. For example, the Mohegans believed that births often occurred when the moon was full and that butchering should be preformed under a full moon." (Simmons 1970, 61)

New Hampshire

The Indians of the Winnepesaukee and Pemigewasset Valleys

Moon Petroglyphs – Four images of crescent moons and one image with a single curved line in a “c” shape were carved into small stone pendants. These moon pendants are part of a larger collection of small stone pendants with fishes, wigwams, river, tree, faces, and a bird found in Odell Park at the horseshoe bend in the river at Franklin Falls in Franklin, New Hampshire. (Proctor 1930, plates XII, XIII, XVI)



Fig. 6 – Stone pendant with crescent moon found in Franklin NH

New England

Gods – “[Daniel Gookin circa 1644] Their religion is as other gentile are. Some for their God adore the Sun, others the moon, and some the Earth.” (Quoted in Piotrowski 2002, 74)

Ceremonies – “Songs, dances, and ceremonies grew to celebrate the harvests of wild strawberries and blueberries, and to mark the seasons of Sun, *Gizos*, and of Moon, *Nanibosad*, the ‘all night walker’.” (Caduto 2003, 146)

Western Abenakis –Vermont

Seasonal Cycles – “Basic to western Abenaki life was a cyclical pattern of subsistence activities, which varied according to seasons of the year ... Four seasons, calculated by ‘moons,’ were recognized.” (Haviland & Power 1994, 159)

Iroquois of New York and Canada

Moon used to regulate the day the ceremony is held:

(1) “The mid-winter ceremony is set in January or February with the new moon.” (Hranicky 1996, 136)

(2) “At the Tonawanda, Newtown, Coldspring, and sour Springs Longhouses, the Midwinter ceremonial begins the fifth day, that is the fourth night after the January new moon, a date now ascertained by referring to a drugstore calendar. If January has two new moons, as occasionally happens, the date of Midwinter, at least at Tonawanda, is calculated from the second.” (Tooker, 1970, 39)

New York

Portable Petroglyphs – In Willard E. Yager’s Upper Susquehanna Collection at Hartwick College, Oneonta, New York. “Four so-called moonstones or calendar stones are in the Yager Collection.” Although not exactly alike they are similar. Each one has twelve to thirteen points around the circumference of the stone disk. Each one has a circle and/or circle with smaller crescent shaped lines inside. One is a pendant. (Lenik 2002, 198-200)

Menomini -Western Great Lakes

Moon’s Cycle – From folklore “Here are two of the stories told in social situations that accounted for natural phenomena.”

The Moon (Menomini)

Once, the Sun and his sister, the Moon, lived together in a wigwam in the east. The Sun dressed himself to go hunting and took his bow and arrows and left. He was absent such a long time that when his sister came out into the sky to look for her brother, she became alarmed. She traveled twenty days looking for the Sun; finally he returned, bringing with him a bear which he had shot.

The Sun's sister still comes up into the sky and travels for twenty days; then she dies, and for four days nothing is seen of her. At the end of that time, however, she returns to life and travels twenty days more. (Ritzenthaler & Ritzenthaler 1970, 152)

Beothuk of Newfoundland

Staff – staff with a flat half-circle stone on top. The caption reads, “ceremonial staff surmounted by a symbol of the moon.” The caption and drawing came from Shanaawdithit, a Beothuk woman living with white people from 1823 to 1829. The staff with the moon symbolism was one of several staffs illustrated, each with a different symbol. (Willoughby 1973, 63)

Moon Legend – “Kuus (moon) handle painted red 6 feet long.” “No.3 This represents the half moon inverted, and is named ‘Kuis’.” There is no note of any kind to indicate what [other] significance was attached to it.” (Willoughby 1973, 69)

Fig. 7 (Right) – Ceremonial staff with moon symbol (. (Willoughby 1973, 63)



Inuit

Moon Spirit Transition – “*Tatginiqquaq*, the moon of the shortest days, has become *nalirgaituq*, the moon signaling the return of the sun. It has been seventy-five days since she [sun] disappeared over the horizon, taking her shadows, sun dogs, rainbows and reflections. ... The Inuit once believed that this was when the spirits came closest to earth.” (Hallendy 2000, 42)

Ceremonial Sites (Baffin Island)

(1) “As long as anyone can remember, Pauta said, this was an ancient place. People came here from all along the coast, but they never lived here. From the earliest time, this was where people held celebrations ...” (Hallendy 2000, 63)

(2) “The ceremonial site of the mid-winter moon festival, Qujaligiagtubic, is dominated by a granite ‘sugar loaf’ hill some 35 metres (115 feet) high, at the top of which is a small tunillarvik, where offerings were left by those embarking on hazardous journey’s across the treacherous Hudson Strait to the mainland of Canada. The entire site is sheltered by surround hills, making it an ideal place for gatherings. Qujaligiagtubic is kept very clean, indicating the respect that the Inuit continue to have for the site.” (Hallendy 2000, 64)

Discussion

Moon ceremonialism predates the earliest settlers as recorded by Gookin in the mid 1600's. The *Moon* was revered as a God. Ceremonies were held for the Moon. The Moon regulated the timing of ceremonies. The crescent moon was carved on pendants and small stones similar to pendants but without a hole in New Hampshire and New York. From the arctic in the northeast and the western Great Lakes down to Connecticut moon ceremonialism was recorded within many Native American cultures. Each culture had its own stories about the moon.

Of interest to the Gungywamp site is the two part cycle of life and death, the twenty days of travel (life) and four days of death from the Menomini. If the stone row(s) at Gungywamp turn out to have twenty-four standing stones then there is a probability, the Native Americans in Connecticut also had a two part moon cycle "visible and invisible." Twenty-four stones would indicate that the Native Americans viewed the moon according to when it was in the sky and when it left the sky. If it turns out there are twenty-nine standing stones it would simply indicate the Native Americans were aware of the moon's month long cycle which they chose to depict. Both 24 and 29 have the possibly of representing the moon.

The south stone row had a covered round hole which could hold a staff or post. In Connecticut, Uncas had a special staff. Also in Connecticut, there was a record of a painted post used in war dances. This confirms the Native Americans of Connecticut used staffs in their ceremonies. In Newfoundland, the Beothuks had staffs with symbolic tops, of which one had a half moon. The covered post hole indicates a portable post, possibly a staff, with some form of symbolism was used in the ceremony at the south stone row.

It has often frustrated professional archaeologists because there are no artifacts at stone structure sites. One answer may be that the Native Americans respected the ceremonial site to the point they did not have camps or villages on site and kept it clean as recorded on Baffin Island. On Baffin Island it has also been recorded the Inuit traveled long distances to their ceremonial site.

Mid-winter moon celebrations / ceremonies were held by Inuit and Iroquois. The symbolism embedded in the stone row at Gungywamp suggests a mid-winter ceremony (see *Moon Ceremonialism Theory*).

Gookin makes an interesting statement, "Some for their God adore the Sun, others the moon, and some the Earth." This implies different groups of Native Americans had different spirits as their chosen God/Spirit. The group of Native Americans at the Gungywamp site in Connecticut appears to have revered the Moon Spirit, to whom they built and dedicated a ceremony.

Bird Theories

Union Soldier – "A bird image is carved into one of the standing stones. The hooked, overhanging beak would indicate a bird of prey ... War was not a welcomed acquaintance to Groton, Connecticut through the past four centuries. Nonetheless, Gungywamp Hill would be a perfect place for any wayward soldier (or warrior) to encamp, or act as an excellent keep (or

stronghold). Perhaps a Union soldier carved an eagle in one of the stones at Gungywamp.” (Dopirak 2006)

The bird image is on a standing stone. It does not have a “hooked, overhanging beak”. The author says a wayward soldier or a warrior may have stopped there. The author then chose to suggest the person who carved the bird image was a Union soldier from the Civil War, ignoring soldiers from the Revolutionary War and other colonial wars. Indians are an afterthought judging by the “warrior” being put in parentheses. The Indians presence has been confirmed by artifacts found at the rock shelter and the remains of a Native American lodge at the Gungywamp site.

Native American Petroglyph Theory

Indians have a long tradition of carving bird images on stones. Most are Thunderbirds but a few are non-thunderbirds such as eagles, hawks, hummingbirds, owls and non-descript birds.

Birds in Native American Images (Non-Thunderbird):

(1) “... Pamola was described as a birdlike flying creature with a huge head and wings, with or without a body, ...” The Abenaki Indians say Pamola lived on Mount Katahdin in Maine. (Lenik 2002, 54-5 based on Dean Snow’s research)

(2) An illustration on a boulder along the north shore of Assawompsett Lake in Middleborough, Massachusetts shows a bird in flight. The image is a realistic type of carving of a complete bird with head, body, two wings and tail. “The birdlike figure is oriented to a ‘ten o’clock’ position when viewed straight on from the south. Its head is in profile and is turned to the figure’s left.” (Lenik 2002, 127)

(3) “According to William S. Simmons, northeastern Algonkian folklore includes stories of a giant bird that carried off people in its claws, and such a tradition was noted in 1809 in the Wampanoag area.” (Lenik 2002, 127)

(4) “... a Sagamore with a humberd [hummingbird] in his eare for a pendant, a black hawke on his occiput for his plume, ...” This was the description given by William Wood in 1629 in *New England’s Prospect*. (Quoted in Piotrowski 2002, 66)

(5) In a Minisink burial site in New Jersey there were four bird pendants: 3 owls and 1 of either an eagle or hawk image. (Lenik 2002, 207)

Discussion

Does the Gungywamp bird image represent a Thunderbird? Thunderbird images have one common factor they are all in an upright position with the full body facing forward.¹ The head is always turned to one side in profile. Wings are generally straight out at the shoulders and turned down the sides of the upright figure. A few have wings straight out. The tail is generally forked but a few have a fan shaped tail. Gungywamp’s bird image shows a bird’s head and the top of two wings spread out. It does not meet the criteria for a Thunderbird image. However, it does have characteristics of Pamola, a bird creature from the Mount Katahdin area in Maine.

¹ There was one exception to the body of a bird facing forward that was not Thunderbird symbolism. At the Minisink burial site 3 owls and 1 hawk or eagle had the bodies face forward, and the heads of these birds face forward, also. All four birds were pendants.

Pamola was described as a birdlike creature with a large head and wings with or without a body. This description fits the bird image on the standing stone. A bird with a head and wings without a body matches the Gungywamp bird image with a head and wings without a body.

Various species of birds are represented in the archaeological records: hawk, eagle, hummingbird, owl, and non-specific regular birds. Gungywamp's bird was portrayed as a large bird with a short beak but otherwise it is non-descript. Although the beak is not hooked and overhanging, the short aspect suggests it portrays a hawk or eagle. Large hawks and eagles are powerful high flying birds.

At the Assawompsett Lake site in southeastern Massachusetts there is a realistic type image of a bird. It is a side view of a bird with spread out wings representing a bird in the air flying. This indicates symbolic flight was used by the Native American culture in New England.

Among the stories of the northeastern Algonkians, there is one about a giant bird that carried people off in its claws. This indicates a large bird such as a large hawk or eagle. The basic story of people being taken away by creatures is found among several Native American cultures. What is interesting is in this case it was a giant bird. To carry people the bird had to fly.

Although the various bird representations span several time periods there are common themes. Birds appear to represent creatures that have the ability to carry other things. This is represented by the folklore story of the giant bird carrying people. At the Minisink site in New Jersey bird images were buried with the dead. One explanation is the bird images were placed there to assist the dead by carrying their spirits to the spirit world. These examples indicate spirit-birds carried both living beings such as live people and deceased beings such as dead people.

At America's Stonehenge there is good archaeological evidence in the form of split stone spirit portals associated with the setting sun on the winter solstice and the rising sun on the equinox. The arrangements indicate the spirit of the sun left the sun's sphere on the winter solstice and entered the Underworld. The reverse occurs on the spring equinox when the spirit of the sun leaves the Underworld and returns to sun's sphere which is rising up to the Upperworld. The winter ceremony was a simple matter of the sun's spirit leaving the sphere of the sun. But the spring ceremony was much more complex. There is a split stone with a niche attached to its end. The niche is aligned with a fallen standing stone with a wide opening on its top. The opening is aligned with a lodge at the bottom of the hill. The lodge had two hearths where fires were kindled over a 700 year span of time from 1900 years ago up to 1200 years ago. An excavation of the lodge did not turn up any artifacts suggesting the lodge was used for ceremonial purposes. The sun's spirit was guided down to the lodge where there was a ceremonial fire. Fire and smoke rise upwards. Everything indicates the Fire Spirit carried the Sun's spirit up to the sphere of the rising sun on the spring equinox in order to return Sun Spirit to the Upperworld (Gage 2006, 127-133).

Within the Winnebago Tribe of Wisconsin *fire* and the spirit of fire were part of the Snake Clan Feast. "... fire is the mediator between the people and the spirit." "Grandfather (fire), I offer you tobacco, for you are the interpreter (between the spirits and human beings), and I know that you

will deliver the requests I address to our grandfather-who-crawls (the snake), just as I have said them.” (Radin 1990, 277)

In the two examples from America’s Stonehenge, people created ceremonies using stone structures. They did so to assist the Sun’s spirit to leave the Upperworld on the winter solstice and later in the year to return the Sun’s Spirit to the Upperworld on the spring equinox. As part of the spring equinox ceremony the people included a fire.

Though the Winnebago Tribe is a Midwestern tribe, it confirms that some tribes utilized the Fire Spirit in ceremonies. The fire example shows how one spirit could be asked to carry a message to another spirit. In the northeast, a bird spirit was believed to be able to carry a person. The general concept is spirits were capable of carrying things and were able to work with other spirits through the people requesting them to do so. The concept of people to spirit and spirit to spirit is seen in Gungywamp’s row of stones.

Gungywamp’s bird was a large bird capable of carrying a spirit high into the sky, up to the Upperworld. The bird is part of a row of standing stones associated with a moon ceremony. The Indians of southeastern Connecticut appear to have believed the Moon Spirit returned to the moon’s sphere at an appointed day in the year. The Bird Spirit image suggests the Moon Spirit was carried up to the Upperworld.

This would indicate that sometime during the year the Moon’s spirit left Upperworld for a few months. It is not uncommon to find one aspect of a cycle expressed while the opposite part of the cycle was not represented. The build-out at the America’s Stonehenge site was done to fill in those *opposite parts* of the cycle (Gage, 2006).

III. Stone Bridges

Background Information on the Stone Bridges

The Gungywamp complex has several structures described as *a stone bridge*. What is a stone bridge? The stone bridge is made up of a long bar of stone laid horizontally. An opening underneath the stone bar creates the “bridge” affect. In a photograph of one bridge, the two ends of the stone bar rest on raised bedrock which is lower in the middle thereby creating the opening. A few smaller stones were placed on top of the stone bar. Next to the bridge is a standing stone. The standing stone is wide and thick at the base, and tapers to a point at the top.

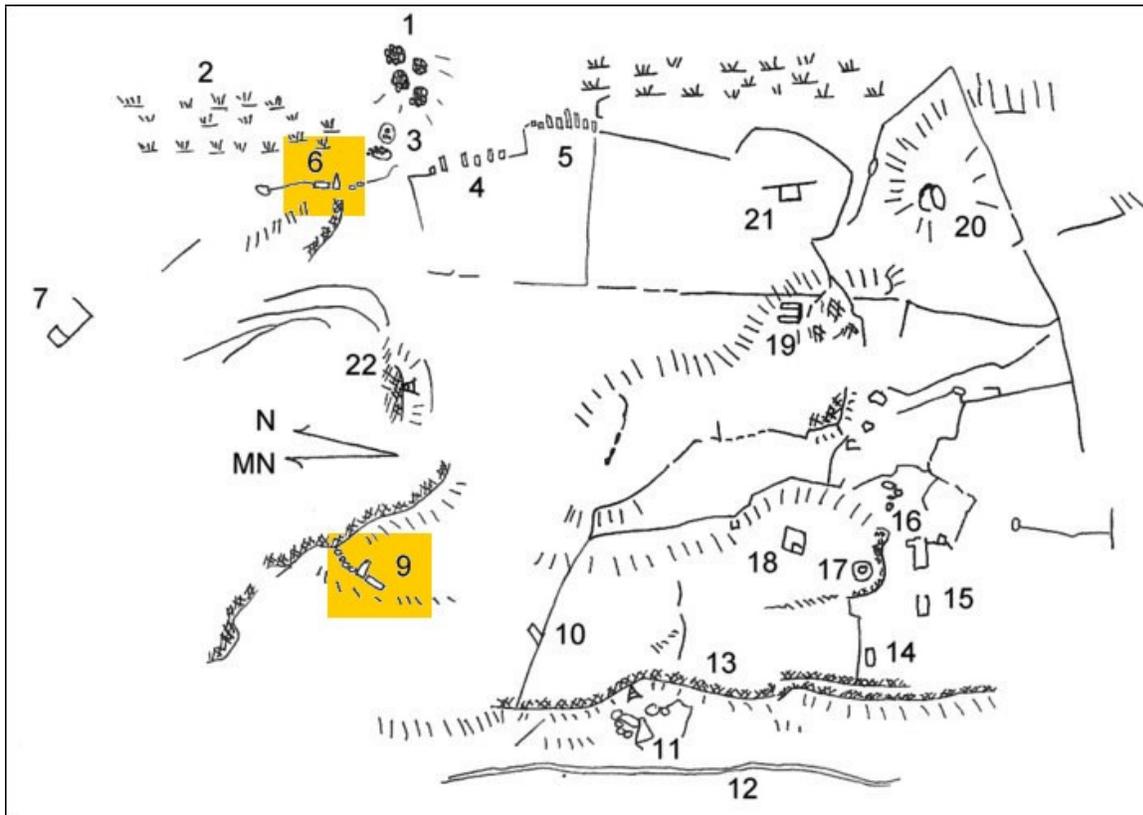


Fig. 8 - South complex map showing the location of two of the three bridge & standing stone structures. The two bridge & standing stone structures labeled #6 and #9 come from Dodge’s map. (Based upon a survey by John Dodge & drawing by James Whittall II, with additional notations by Mary Gage)

John Dodge’s 1965 map of the Gungywamp site labeled two bridge and standing stone structures (Barron & Mason 1994, 6). One is next to the road near the rows of standing stones. A second is in a short stonewall extending out from a longer east-west oriented stonewall. It is below the ridge where the quartz slab was mined. The two bridge & standing stones structures are on the north end of the site, and are located in the northwest and northeast corners. They are clearly labeled “bridge” and “r” the symbol used to represent standing stones. Dodge specifically noted five standing stones. Presumably, these stones stood out in some way (i.e. shape, size, etc.) that

made him think they were relevant or significant. No information is currently available to confirm or disprove Dodge's judgment. David Barron and Sharon Mason mentioned two other bridge & standing stone structures in addition to the one by the road: "There are two more stone-bridge-standing-stone combinations to be found in the Greater Gungywamp. These unfortunately, are in remote areas with difficult access." (Barron & Mason 1994, 27-28) The bridge & standing stone below the hill with quartz on Dodge's map is one of those in the remote area. It is not beside a road. There is no information available for the exact location of the third bridge & standing stone structure.

Dodge's map shows three standing stones in the area of the two chambers near the double circle of stones. The arrangement shows two standing stones flank the east and west sides, and the third, on the north end forming a triangular layout. The two bridge & standing stones Dodge found are shown on north end and flank the east and west sides. If the bridge & standing stone layout is similar to the standing stone layout then the third bridge & standing stone is located north and somewhat in the middle of the other two. It should create a triangular layout.

There are two published photographs of these structures. These photographs are in the 1994 edition of the *The Greater Gungywamp Guide Book* and the 1982 *NEARA Journal*, vol.17 no.2 (Barron 1982, 42). The *Guide Book* and *NEARA Journal* do not state the location of the bridge & standing stones represented in the photographs. When I toured Gungywamp in 2004 I took a photograph of the bridge & standing stone in the stone wall by the road near the rows of standing stones. The bridge & standing stone in my photograph and the two published photographs appear to be different structures. One image is clearly different from the other two as the stone bar forming the bridge is much thicker than the other two bridges. The other two bridges have thin stone bars and each one shows an opening underneath the bar. The arrangement of stones on top of the two thin stone bars is different in each image suggesting they are two different structures. All three structures have very similar standing stones. The photographs appear to confirm Barron & Mason's statement that there are three bridge & standing stone structures.

Bridge (Culvert) Theory

In the Winter 2003 *Stonewatch Newsletter*, Paulette Buchanan stated, "Before an attempted explanation of the rows of standing stones, another stone wall structure must be described. One of the walls within the south-central section of the Gungywamp has some similarities to the rows of stones. This similar wall also runs in a north-south direction and is on the part of the trail system that runs roughly parallel to a swamp and North Gungywamp Road. This similar wall is about 100 feet away from the row of standing stones and has periodic standing stones between traditional rock walling, two stone bridges between boulders in the rock wall ... Given the hillside and steep slope of ledge opposite the trail and rock wall, and also given the location of the swamp system located about 30-50 feet down a slight decline on the other side of the wall, could colonial folks have built the two stone bridges to provide an opening for water run-off to keep the trail from becoming too muddy and impassible?" (Buchanan 2003a)

There are no photographs with the 2003 article to confirm the "two stone bridges" in the stone wall by the road. The author of the 2003 article, Paulette Buchanan, was the tour guide on my

2004 visit. I was shown only one bridge & standing stone structure along the road. That structure did have an opening underneath the stone bar forming the bridge.



Fig. 9 - Stone Bridge & Standing Stone along road (photo by M. Gage)



Fig. 10 - A typical stone culvert under a road (Governor's Island, Hampstead, NH)

Is the bridge a culvert, “an opening for water run-off”? The water runs off the steep hillside along side the road. Can a single low, small opening handle a large volume of water during a

heavy rainstorm? It can not. How is the water along the road funneled over to the single opening? There are no dug ditches on either side of the road which is the common way of diverting rainwater. How does a single opening on the opposite side of the road from the hill keep the road from getting muddy? For the water to reach the opening it must first run across the dirt road which puts the dirt in contact with the water creating a muddy road. To keep a road from getting muddy the water from the steep hillside would have to be caught in a ditch on the uphill side of the road and then channeled into a culvert *underneath the road*, thus keeping the bulk of the rainwater build-up off the road to begin with. This is the common way a road culvert functions. There are many examples in New England.

The theory that the stone structure is a bridge / culvert does not meet the standard design criteria for documented historical stone road culverts. In addition, in my photograph there is a gap on both sides of the standing stone which creates ground level openings next to the so-called bridge. The openings next to the standing stone negate the need for a rainwater run-off feature and are further proof the bridge-like structure was not designed to operate as a bridge/culvert.

Native American Theory*

** This theory is based on information that has been confirmed and unconfirmed. Therefore, it is subject to change when a complete survey of all the stone structures becomes available.*

The number and arrangement of the bridge and standing stone structures indicate intentionally created patterns. Patterns one would not anticipate with utilitarian culverts. The openings under two of the bridges are similar to ceremonial spirit portals found other Native American ceremonial sites. Altogether, this is sufficient grounds to explore a Native American explanation for these structures.

There are three bridge & standing stone structures. In the photographs, two of the bridges have an opening underneath the stone bar. From the photograph of the third bridge it is unclear if the bar is lying on the ground or if there is a low open space underneath. Otherwise, all three bridge & standing stone structures are the same. This forms a pattern. What do the patterns show? What was the purpose of these structures?

Sets of three were repeatedly used within the Gungywamp site. In the South Complex there are three standing stones in a triangular layout. There are also three bridge & standing stone structures. Potentially these structures are arranged in a triangular layout. In the North Complex there are three standing stones on top of an elongated cairn (Barron & Mason 1994, 39). The three standing stones arranged in a straight line all have a triangular shape. That makes three sets of three's within the Gungywamp site.

Within the greater Thames River Valley additional sets of three's were found. On top of the French River Chamber there were three standing stones in a triangular layout (Ferryn 1998, 263). In the Quinebaug River Chamber in Thompson, CT there are three upright stone slabs in the interior wall (Whittall 1991, 2-5). On the boulder at the entrance to the Hunt's Brook Chamber in Montville, CT there are three inscribed vertical lines (Boyle 1993, 76-77).

In four cases, the use of three standing stones was integrated with a triangular shape. This suggests the triangle and number 3 were interchangeable. The three and triangle appear to have been used independently and combined, for the same symbolic purpose.

The triangle is a common shape used throughout New England with stone structures. (See the “Shapes” webpage) A triangular stone slab was found prominently positioned in a cairn on Manana Island in Maine, triangular shaped stones were used in stone structures in Massachusetts and Rhode Island, and extensively used at the America’s Stonehenge site in New Hampshire. The common usage is to block out uninvited spirits. Interpretation of the triangle symbolism’s usage comes from an intensive study done at the America’s Stonehenge site (Gage 2006).

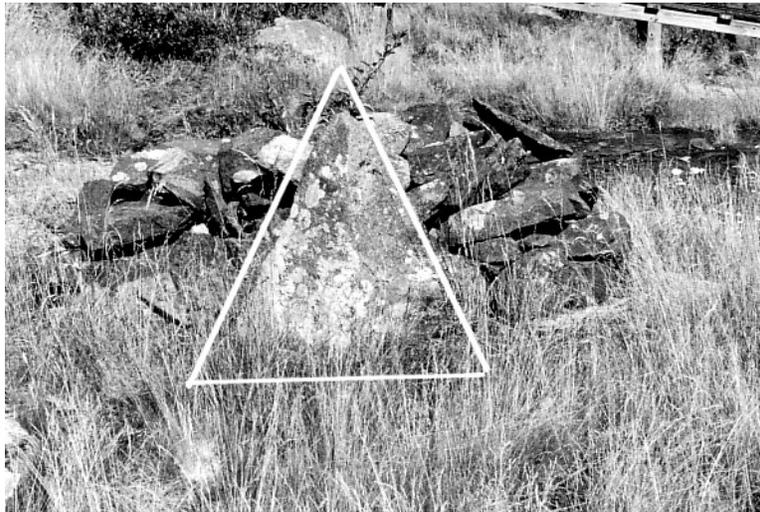


Fig. 11 - Triangular standing stone placed against a stone cairn on Manana Island in Maine. This structure marks a dividing line between two different cairn groups on the island.

Two of the bridges have a low, small opening underneath the stone bar. Small openings, low to the ground are uncommon. One was recently found at a Massachusetts cairn site in conjunction with triangular symbolism (unpublished study). America’s Stonehenge site has several small openings low to the ground (Gage 2006). Small, narrow openings incorporated into cairns were found by the author at a site in Sandown, NH. In all three cases, the small openings were determined to be spirit portals. A spirit portal is an exit or entry for a spirit to travel through.

The openings underneath two of the bridges appears to be spirit portals. The triangular layout suggests a form of protection. The protection part is the standing stone. There are two sets of standing stones in the South Complex (area with chambers). One set encloses two chambers and the double circle of stones. The second set of standing stones are attached to the so-called stone bridges. These combined structures appear to have a dual purpose. The sets of bridge & standing stone structures enclose the north end of the site, hence it blocks out uninvited spirits from entering the overall area called the South Complex. Within the set, at least two bridge structures have an opening underneath the horizontal stone bar. One of these is on the east side in close proximity to the row of standing stones. This spirit portal creates an entrance or exit for a spirit associated with the Moon Ceremony at the row of stones. At the same time, the standing stone blocks uninvited spirits from entering the ceremonial area.

Example:

***Sandown NH* - multi-component cairn showing a small hole used as a spirit portal**

A56 Multi-Component Cairn, section A-VIII. The cairn has a low long base boulder. On the east end is an open L shape with a piece of stone split off and slanting downward toward the base with one small stone inside the open L. A few inches from the open L are two stones leaning in against each other with an open space underneath. The opening is narrow but triangular. On the west end is an On Top Trailing to Ground cairn with a mound of stones and a triangular stone on its outer edge.

Interpretation: The open L feature on the east end is a spirit portal to the Underworld. The narrow triangular opening is a second spirit portal. It was lined up with the open L spirit portal for the spirit emerging out of the Underworld to travel to the west end of the cairn. Both of these spirit portals are on the east end.

The stones in the mound cairn on the west end were probably used as an offering to call forth the spirit from the Underworld. The triangular stone on the outer side of the mound cairn was used to either block out uninvited spirits or to contain the spirit called out of the Underworld.

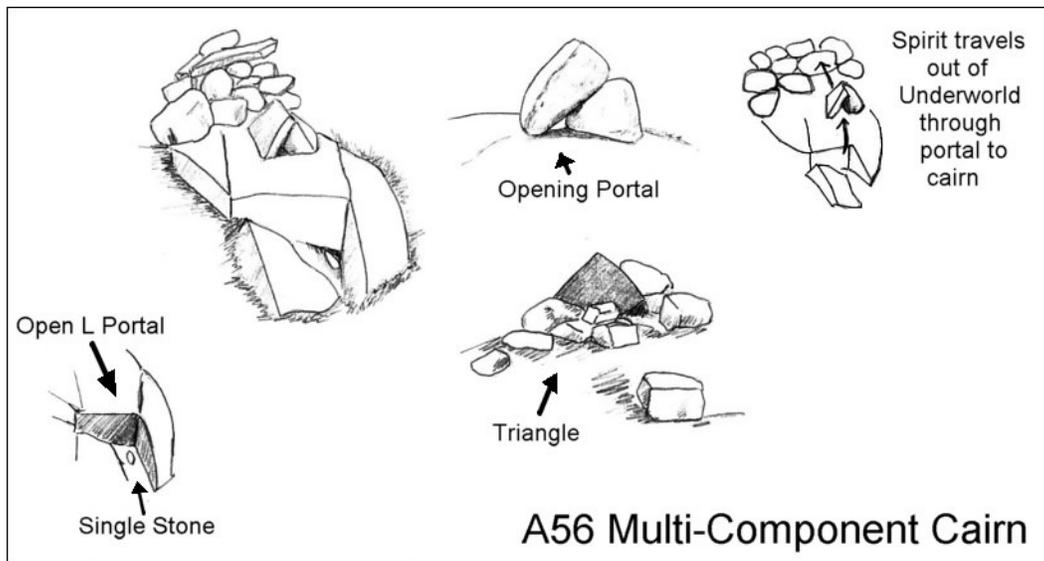


Fig. 12 – Cairn from Sandown NH with a small opening used as a spirit portal.

It is not unusual to have dual usage of stone structures. At America's Stonehenge, inside the Watch House Chamber, a white semi-triangular stone in the back wall faces the entry. In the dark back corner there is a v-shaped opening, a confirmed spirit portal to the Underworld. Hence, the chamber allows one spirit to enter the interior room while at the same time blocks spirits milling outside from entering the chamber.



Fig. 13 - Watch House Chamber at America's Stonehenge has a triangular white stone placed in the interior wall of the chamber opposite of the entrance. It blocks spirits from entering the chamber from the outside but allows a spirit to enter the chamber from an interior spirit portal.

IV. Stone Chambers

The Gungywamp complex has a total of four stone chambers generally referred to as chambers #1, #2, #3, & #4. All four chambers are located in the "South Complex." Chambers #1 & #2 are in a good state of preservation. Chambers #3 and #4 are partially collapsed and currently roofless (roof stones were found adjacent to the chambers but not in situ). Detailed descriptions and technical drawings of all four chambers can be found in "Gungywamp Decoded" article on website. It is recommended that the reader review those materials before proceeding with this discussion. The chambers have been the subject of much discussion by many researchers. A number of theories have been proposed over the years. At present, there are four major theories: (1) Sheep birthing chambers, (2) Ice houses, (3) Root cellars, (4) Native American ceremonial structures. The three historical utilitarian theories have been mentioned by several different researchers over the years but none have offered any supporting evidence for their theory. These theories will be evaluated by comparing the chambers to what is known about root cellars, ice houses, and sheep farming practices from the agriculture literature.

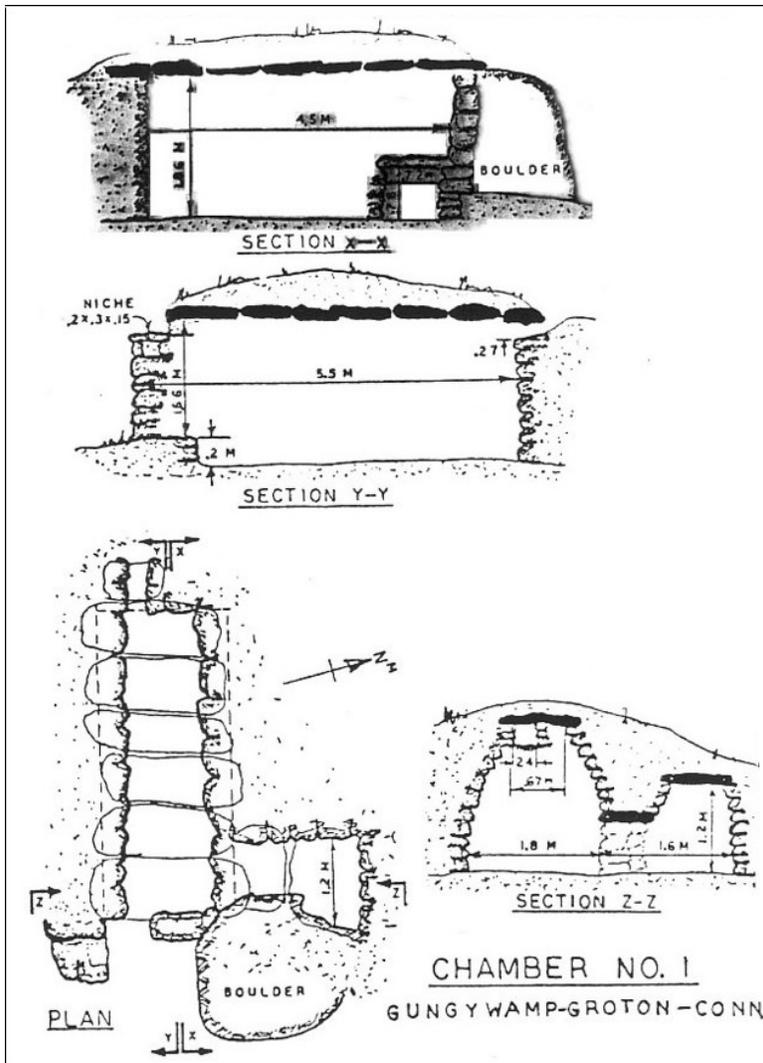


Fig. 14 – Gungywamp Chamber #1 (Whittall 1976)

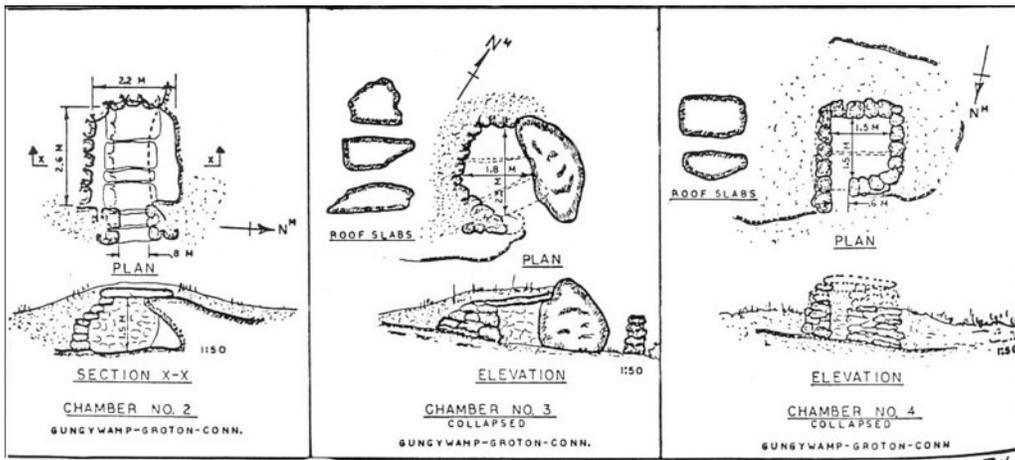


Fig. 15 - Gungywamp Chambers #2, #3, & #4 (Whittall 1976)

Chamber Dimensions

Chamber #1

Large Room – Rectangular shape 14.7' L x 5.9' W x 6.1' H

Small Room – Irregular shape 5.25' L x 3.9' W x 3.9' H

Corbelled walls

Entrance – 5.45' H

Chamber #2

Roughly rectangular shape room with one convex wall

Corbelled walls

8.5' L x 7.2' W x 4.9' H

Chamber #3

Irregular shape room

Vertical walls

5.9' L x 7.6' W x less than 3.25' H

Chamber #4

Square shape room

Vertical walls

4.9' L x 4.9' W x approximately 4.9' H

Sheep Birthing Chamber

The sheep birthing chamber theory was first proposed by Nick Bellatoni during a 2004 tour of the Gungywamp complex. The theory has been repeated by other researchers since. According to the theory, small enclosed roofed structures like the Gungywamp chambers were commonly used in Connecticut for sheep giving birth. A detailed search of 19th agriculture literature in general and more specifically in farming manuals on sheep farming has failed to find a single reference to the use such structures.

There are occasional references to special pens or stalls for holding the mother and her young for a few days after birth. For example an 1813 *Essays on Sheep* states, “In addition to the general fold, I have four partitions under the shed, large enough each to contain a couple of ewes. When a lamb drops, it is put, with its mother, into one of these enclosures, which is well littered. Here they are kept for two days, and the ewe [mother] is fed with bran and succulent food. When more lambs come, and these cells are wanted, the older give place to the younger, the lamb being generally sufficiently strong the third day to take care of itself, and to find its dam when turned into the flock.” (Livingston 1813, 82) An 1824 article that appeared in the *American Farmer* journal stated that, “The principal requisites for the stall or shelter for sheep are dryness, airiness, and sufficient room. They are very little liable to injury from cold. Lambs, however, should be protected from extreme cold for a few weeks after birth.” (Grove 1824, 131)

In general, according to the literature, sheep do not like small enclosed spaces. *The Home & Farm Manual* published 1884 notes, “It is well known that sheep will not bear close and constant

confinement like cattle.” (p.419) At an 1883 agricultural conference, Mr. S. Bradford of Virginia stated that, “Open shelters are of very little value, for the reason that, unless sheep are accustomed to them from their birth, they will not go into them in any degree of weather-rain or cold. The sheep is naturally a timid animal. It is suspicious of danger all the time, and it is a difficult matter to get sheep into thicket to protect themselves from the cold or storms of winter. Consequently, they will not frequent an open shelter in bad weather unless they have been educated to it from lambhood. It is therefore necessary to have a closed shelter into which you drive them.” (Anon 1883, 179)

The stone chambers do not come close to being a stall that is dry, airy and with sufficient room. They are cold dark confined spaces. Being a prey animal, sheep have a natural fear of being in enclosed spaces. They need to be trained to even go into an open shed for shelter in inclement weather. The small size and low height of chamber #3 would make it too small for the farmer to be able to assist the sheep if they had birthing difficulty. The small dimensions would also make it difficult to clean out the manure to maintain cleanliness. Finally, there is no evidence to support the existence of a “sheep birthing chamber.”

Ice House Theory

The ice house theory seems to have originated with Paulette Buchanan. Buchanan argues that chamber #2 was used as an ice house. The evidence given is the coolness of the chamber, close proximity to Lapham Pond, the quartz stone of the chamber would have reflected sunlight keeping the chamber cool, and quotation from the book *Dorothy Bennett, A Memoir* that mentions the presence of ice houses on some farms. (Buchanan 2007). In the same discussion of the chamber as a possible ice house, Buchanan notes the chamber “easily floods throughout the winter and early spring months.” Standing water in an ice house will increase the rate of melting and is a serious threat to the long term storage of ice. All ice houses were equipped with floor drains to remove melt water for this very reason. None of the chambers have any evidence of floor drains.

How were 19th century farm ice houses constructed? Detail instructions for constructing a farm ice house can be found in various period farm manuals. Two examples are quoted below and are typical for the 1800’s.

The Farm Ice House [1884]

Every farm homestead should have an ice house as one of the out-buildings. The construction is exceedingly simple, merely two walls fourteen inches apart filled with sawdust, drainage underneath, and a floor of poles filled in and covered with sawdust for the ice to lie on. There must a double door on one side, for putting in ice and for ventilation, as shown, under the eaves, but no ventilation – all must be tight – at the bottom and sides. A cube of ice of eight feet, that is, eight feet on every side, will keep perfectly and supply a moderate family for a year. Lay the ice in square blocks to the eaves, the height of the house to be determined by the width, and cover the top with a foot of sawdust, or eighteen inches of hay,

allowing a free circulation of air above the ice as shown in the cut.” (Periam 1884, 412)



Fig. 16 - 1884 ice house illustration that accompanied the above description.

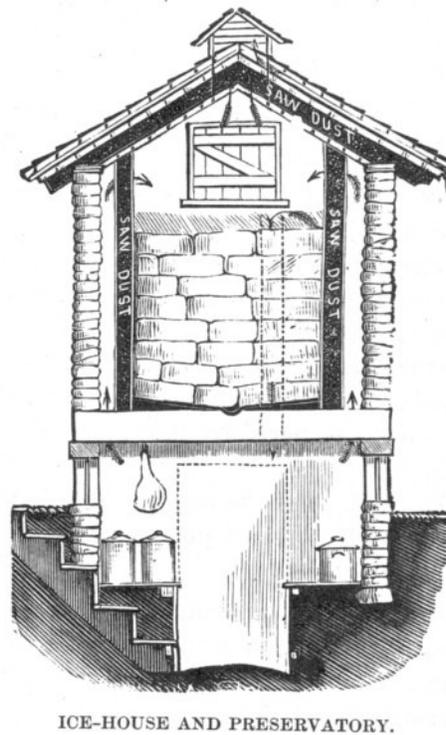


Fig.17 – Another 1884 ice-house illustrated in the same book. It shows the double wall construction, sawdust insulation, and door in the garret for loading the ice into the house from the top of the structure. A cooling room was built below the ice house.

How to Build an Ice-House [1870]

An ice-house is not the complicated, costly structure that some people appear to think it is. ... it is not necessary to build an ice-house under ground, although in dry, gravelly soil it may be built so at less expense than on the surface and it is easier to fill. A hill-side is the most convenient location, with the gable of one end above the surface, in which having an opening to put in ice – the other end, to a level with the floor, being exposed – through which we would have the ordinary entrance by double doors. In such a situation we would use broken stone, making a hollow grouted wall; and the same kind of wall might be built on level ground; and a very good, cheap, durable wall it is. Brick or stone may also be used for the walls, according to the fancy of the builder, always making them hollow, and the outer and inner part of the wall absolutely as air-tight as could be made with brick and mortar. (Robinson 1870, vol. 1 p.293)

Whether built from wood, stone or brick, ice-houses followed the same basic design characteristics. They had a double wall system with a space between the walls, double entry doors, floor drains and airtight walls around the ice. The four chambers do not have any of these requirement construction features. The chambers were not ice-houses.

Root Cellar Theory

The four Gungywamp chambers along with numerous other stone chambers throughout New England are routinely interpreted as historical root cellars. Root cellars were used to provide long term storage of root crops (potatoes, carrots, turnips, parsnips, etc) through the winter months and into the spring. These crops were used to supply the farm household's winter vegetables and as livestock feed for dairy cows and sheep. One of the authors of this article completed an indepth study of historical root crops storage techniques from 1600's through 1920. This study was published in the book *Root Cellars in America* (Gage 2009). This study will serve as the basis for this analysis.

There are many different types of root cellars (root cellars in house foundations, barn foundations, root pits, etc). The theory that the chambers are root cellar specifically refers to root cellars built as separate free-standing structures built into a hillside or under an artificial earthen mound. This type of root cellar had two broad design requirements. First, they needed to successfully preserve the root crops stored in them. Second, they need to be designed for the practical needs of the farmer who accessed the structure on a daily or weekly basis. These practical needs included ease of access, ease of removing stored roots, and economical & efficient organization of the crops within the cellar. According to the period agricultural literature and documented examples of 19th and 20th century root cellars, farmers met these two broad requirements in a similar manner when constructing their root cellar.

Root cellars were consistently built with walk-in height doorways similar in height and width to dimensions to a house door. A few large root cellars were built with doors large enough to admit a cart or wagon inside the cellar. The walk-in height door size allowed for easy access to bring crops both into and out of the cellar. (A smaller size door, less than walk-in height, would require

the farmer to crawl into the structure through snow and mud, getting his cloths wet. Farmers avoided this problem by using full height entrances). The interior of the cellar was walk-in height as well to make it easy to work within.

Root cellars were designed with a single square or rectangular shaped interior room. The square or rectangular shaped room worked efficiently for stacking rectangular wooden storage boxes, subdividing the room into permanent large storage bins, or accommodating rows of barrels and baskets. All of the storage containers needed to be setback at least 6 inches from the interior walls to allow for air flow and to protect the containers from coming into contact with the condensation on the walls. The walls were vertical from floor to ceiling except when the roof was built with an arch in which case only the lower half of the wall was vertical.

Farmers showed an overwhelming preference for the use of wooden roofs in root cellar construction. Wooden roofs only had a 10-20 year life span, but, remained extremely popular despite the limited life span. Wealthier farms and private estates would sometimes build a stone or brick arched roof instead. This was an expensive architectural feature which limited its usage to those who could afford it. At present, there is only a single documented stone slab roof root cellar. It was built under unique circumstances. The root cellar was owned by a blacksmith whose neighbor was a stone quarrier. The blacksmith maintained the quarrier's tools in exchange the quarrier built him an elaborate root cellar. There are no other documented examples of stone roof root cellars except for stone arches.

Root crops required a high humidity in the cellar but water was detrimental to proper storage. Root cellars were always constructed in well drained soils and a location with good drainage. If there was any risk of water entering the cellar, the cellar was equipped with a floor drain.

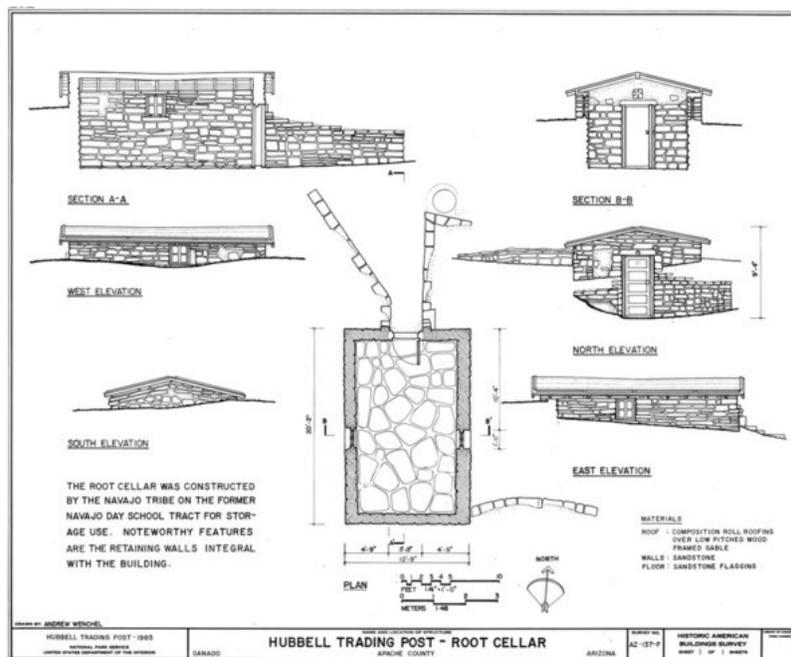


Fig. 18 - Hubbell Trading Post Root cellar (Arizona) -A typical example of a wooden roofed root cellar. (Courtesy of the Library of Congress)



Fig. 19 & 20 - Stone Arch Root Cellar (Thompson, Connecticut)

Discussion

Do the four chambers meet the walk-in height design requirement? Only chamber #1 has a walk-in height interior room. However, the smaller interior room of #1 is only 3.9 feet in height. The other four chambers have maximum interior heights of less than 5 feet. The chambers fail the walk-in height test.

Do the chambers meet the single square or rectangular room with vertical walls design requirement? The large room of #1 is rectangular, #2 is rectangular with three straight walls (the 4th being convex), and #3 has a square room. The smaller room of #1 has an irregular shape. Chambers #1 and #2 have walls that start off as vertical but quickly lean inward due to their corbel construction. Only #3 & #4 have vertical walls from bottom top. Overall, the chambers lack the rigid square or rectangular rooms with square corners and flat vertical walls so typical of European-American architecture.

All four chambers have or once had stone slab roofs. With one exception there is no historical or archaeological evidence documenting the use of this type of roof system. Wooden roofs and to a less extend stone or brick arch roofs were the dominant architectural style used.

According to Paulette Buchanan chamber #2, “easily floods throughout the winter and early spring months.” (Buchanan 2007) Flooding would destroy any crops stored in the chamber. This would conclusively rule out the use of this chamber as a root cellar.

None of the four Gungywamp chambers meets all of the expected design requirements for an effective root cellar.

Native American Theory

The theory, the chambers are of Native American origins was explored on several levels. One was a comparison with other chambers in the local geographical area looking for patterns. Second was a search of archaeological records to see if Native Americans had the capacity to

work with large stones. Third to see if Native Americans used natural caves which are conceptually similar to stone chambers. Fourth was a search of anthropological records to see if any accounts had information relevant to the stone chambers.

List of Chambers in Study

- (1) C6-24 Chamber in Montville, Connecticut (Barron 1984, 5-6)
- (2) C6-25 Chamber in Montville, Connecticut (Barron 1984a, 3-4)
- (3) Hunt's Brook Chamber in Montville, Connecticut (Whittall 1984, 7-11)
- (4) Large Chamber #1 in Groton, Connecticut at Gungywamp (Guide Book 1994)
- (5) Smaller chamber #2 in Groton, Connecticut at Gungywamp (Barron & Mason 1994)
- (6) Small chamber #3 near Adams foundation in Groton, Connecticut at Gungywamp (Barron & Mason 1994)
- (7) Chamber #4 in ruins in Groton, Connecticut at Gungywamp (Barron & Mason 1994)
- (8) Small chamber attached to house foundation on outskirts of Gungywamp site (found by Jack Rajotte and shown to the author on 2004 tour)

Patterns

When a feature showed up two or more times, it was considered a pattern. The following features were found to have been repeatedly used:

Anchor Stone: 7 Chambers

An anchor stone is a large boulder or outcrop integrated into a chamber as a wall or part of a wall.

Pairs of Chambers: Gungywamp and Montville

Pairs of chambers are two chambers in close proximity to each other with similar attributes. Gungywamp and Montville each had a pair of chambers. Montville's two chambers were approximately 100 feet apart. Gungywamp's two chambers (#1 & #2) were approximately 100 feet apart.

Shaft: 2 Chambers - Gungywamp and Montville

The shafts in this study are horizontal, small tunnel like openings. The shafts extend through the wall from the exterior to the interior. The two pairs of chambers in Gungywamp and Montville each had a single chamber with a shaft.

Slot: 2 Chambers at Gungywamp

A slot is a small short groove in a stone. Chambers #1 & #2 at Gungywamp (i.e. the pair) each has a small short groove on one side of the entrance at the base on the left hand side.

Closing: 3 Chambers at Gungywamp

Closing refers to blocking or closing up a chamber. Three chambers (#1, #2, & the one found by Jack Rojotte) on the Gungywamp site exhibited full or partial closing up of chambers.

Discussion

The chambers at the Gungywamp site had attributes that are similar to chambers on the west side of the Thames River in Montville. This led to comparison of chambers on both sides of the river which are in the same general geographical area. Of the eight chambers in the study seven chambers had an anchor stone or outcrop as part of a wall.

In both the Gungywamp site and the Montville area there was a pair of chambers. At Gungywamp the pair of chambers was 100 feet apart, each chamber had a small slot at the base of the entrance and each chamber faced east. At Montville the pair of chambers was 100 feet apart, each chamber had an exposed retaining wall built around its exterior, and both have a long anchor stone forming the north wall. The two Montville chambers were located in a remote area “3/4 of a mile from the nearest habitation ...” (Barron, 1984, 5) In each pair of chambers there is an attribute unique to that pair, indicating the two chambers form a pair. Root cellars do not come in pairs. Within each pair there are differences. Of the two chambers in each pair, one chamber has a shaft. In the Montville pair, only one has an attached enclosure. In the Gungywamp pair, only one has an attached small chamber room. These differences indicate the two chambers in each pair had different uses. The two pairs of chambers place a pair of chambers at two different sites locally indicating a local regional practice.

At Gungywamp three chambers had evidence of being formally closed. One was the small chamber that was seen through the collapsed house foundation wall on the outskirts of the site. The chamber was closed by walling up the entrance with stones similar to that used in the house foundation. The second was the smaller chamber (#2) of the pair which had a large slab of quartz quarried a ¼ mile away, brought over and placed in front of the entrance. The third was the small interior chamber room of the larger chamber (#1) of the pair which had its entrance walled up. The main entrance to the large chamber was left open. When a habitation site is abandoned the only structure that is closed is the well. The in-ground well shaft is filled with stones or the top is covered. Root cellar entrances were never closed up, when abandoned. Furthermore, there are differences in the way the chambers were closed. The chamber in the side wall of the house foundation may well have been closed up by the people who built the house. The large slab used to close the smaller chamber was quartz rather than a common stone material. It was brought from a long distance indicating the quartz material had significance to the people using it. In the third closing, only the small interior chamber room was closed. The shaft in the upper part of the wall in the main room is aligned so that it focuses a beam of sunlight inside on the equinox which travels across the interior wall of the large chamber down to the entry of the small interior room. The sunlight beam highlights the entrance to the small interior chamber room. The small interior room appears to have had significance hence it was closed rather than the main entrance to the large chamber.

The patterns indicate the people who built the chambers on the east and west sides of the Thames River had contact with each other. However, they built independent of the other. One used a

retaining wall around the exterior of the mound covering the chamber while the other did not. Both used a pair of chambers each with a shaft in one chamber but not the other chamber.

The patterns raise several questions. Why is there a pair of chambers at some sites? Within the pair why does one chamber have a shaft and the other chamber does not have a shaft? Who built the chambers? Did the Native Americans have the skills and strength? What was the purpose of a small grooved slot on only one side of the chamber entrance? Why were the chambers closed? The archaeological and historical records hold some of the answers.

Native American Quarrying of Large Stone Slabs

At Gungywamp a large stone slab was quarried and dragged over to the small chamber. There are no metal tool quarry marks on the stone slab.

During the 1980's Dr. Gary Hume, at the time New Hampshire's State Archaeologist, state historic preservation officer and a specialist in lithics (stone tools) was the head archaeologist at an excavation at America's Stonehenge in Salem, New Hampshire. He was assisted by David Stewart-Smith who had a doctorate degree in Theology and was a Master Stone Mason from Scotland. David Stewart-Smith at the time was studying for a doctorate in archaeology. The project entailed a stone, 13 feet long by 5 feet wide by 1 foot thick that had been moved and worked. A large flake deliberately removed from the face indicated the large stone had been worked. The excavation showed the large stone had been moved horizontally 10 inches, then lifted vertically 9 inches and propped up with another stone underneath. In addition, to the large flake were numerous smaller flakes confirming the underside of the stone was worked using a stone hammer. "It is apparent that the masons wished to create not only a pointed shape to the stone, but also to sharpen and refine the edge of the face." David Stewart-Smith who supervised the on-site excavation work went on to say, "The peripheral stones [standing stones around the perimeter of the America's Stonehenge site] are shaped in this manner and several of the roof slabs and uprights within the central site [Grooved Stone area] have also been quarried and shaped in this manner. The technique is consistent with indigenous [Native American] stone working techniques used on handtools ...". Dr. Gary Hume was interviewed by *The New Hampshire Times*, (4/25/83, pp. 20-21). "The bulk of the stones at Mystery Hill were quarried by hand, using stone tools. 'The marks are unmistakable,' says Gary Hume, archaeologist for the state historic preservation office." (Quoted in Stewart-Smith 1989).

Stewart-Smith noted in his report published in 1989 that a, "A few years later, Dr. Hume was interviewed on the local PBS program 'New Hampshire Crossroads,' on which he admitted the possibility of some great age to the site. He speculated that something akin to an American Indian 'vision quest' site might be one use for the pre-colonial portion."

Both Dr. Gary Hume and David Stewart-Smith agreed Native Americans moved, shaped and built stone structures at America's Stonehenge. Their excavation demonstrated that the Native Americans had the masonry skills to move and shape large stones.

Native American Twenty Man Dugout Canoes

In the Pequot Museum there is a life size replica of a twenty man dugout canoe. Its size is huge. Even without weighing it, it is possible to see it weighs more than some stone slabs. This shows the Connecticut Indians had the capacity to move objects of great weight.

Can any interpretations be made about usage or purpose?

Grooved Slot

This is a narrow, short groove in stone at the base of the entrance. It is too small for any utilitarian purpose, plus the slot is only on one side of the entrance. In the Native American culture there are references to small dug holes and small baskets used to make offerings to spirits.

In *Medicine Trail*, Gladys Tantaquidgeon spoke about a visit with Mashpee elder Eben Queppish. He shared with Gladys the art of making small baskets and their folklore. “He [Eben] explained that Little People lived in the woods and along the beaches and that in early times it was customary for groups going out to gather food plants, herbs for medicine, fishing, or hunting, to put some corn bread and meat in a small basket and leave it for the Little People. He added, ‘That was for good luck’.” (Fawcett 2000, 84-85)

In the Great Lakes Region a Mita’win Ceremony described a similar practice. “The gathering of roots and herbs for medicinal use is always attended by placing tobacco in the holes from which they [herbs] were dug, with a song or a prayer in honor of Earth Grandmother, whose hairs they are.” (Skinner 1921, 66)

The small grooved slots meet the criteria of a small hole or small basket. The hole and basket were used to place an offering to spirit people. It is likely the slot which is on only one side of the entrance was used to place a perishable offering to a spirit prior to entering the chamber.

Shaft

In Gungywamp’s large chamber the shaft was aligned with the setting sun on the equinoxes. It creates a solar alignment inside the chamber.

Within the historical records there is one very rare telling of a vision from a Great Lakes Region elder. As the elder explained, if an Indian told anyone of his or her vision, the benefits revealed during the vision would be taken away. So nobody was willing to reveal a vision to anyone else. However, in this case, the benefit of the vision had been fulfilled and perhaps that is why Ogauns was willing to reveal it. Ogauns had asked for a long life, when interviewed he was an old man, hence his vision had been fulfilled.

Ogauns, an Ojibwa Indian, recounted a vision in which he traveled into and through portions of the Underworld. It was a dark place. According to Ogauns, he was joined by “my friend, one of the suns in our sky who had come to join my expedition ...” The Sun Spirit provided light and

assisted Ogauns when the two fought evil spirits. “My companion [the sun] attacked it while I tugged desperately at the arrows in its mate; but by the time I had recovered them our enemy, half serpent was dead.” But not all the spirits were evil. At the end of his spiritual journey, Ogauns states, “The child then led us on to where human beings dwelt in happiness. My companion and the child waited behind while I pressed forward to the place where I should meet the blessed [sacred] *manido*.” (Jeness 1935, 57-59)

In this rare account, Ogauns went into the dark Underworld where he encountered evil spirits and good spirits. His companion was the sun spirit from Upperworld. In his vision, he meets the “blessed [sacred] *manido*” deep inside Underworld who grants him one of his requests. The account shows that Indians as late as the late 1800’s although influenced by Christianity did not give up their Indian beliefs about Underworld. In his vision, Ogauns originally went up to Upperworld seeking his requests but was told by the spirit up there he had to go into the Underworld. Ogauns respected the Upperworld spirit and went into Underworld where he received his request. This shows Native Americans went into the Underworld. It also shows the Sun Spirit went into the Underworld.

The large chamber (#1) is a cool, damp, partially darkened room with a small dark interior room. The sun light lights up the entrance to the small chamber on the equinoxes. The chamber is similar to Underworld. It was built with an earthen mound which places it semi-underground. People going inside the chamber appear to go underground into to the Underworld. On a specific day the Sun Spirit enters the chamber and thus Underworld. This scenerio fits Ogauns vision.

Pairs of Chambers

In the Native American culture preparation ceremonies are as important as the main ceremonies. The pairs of chambers in Gungywamp and Montville each have a plain chamber primarily lacking features and an elaborate chamber with features. This suggests the two chambers had different functions / purposes. The plain chamber may have been used for preparation and the elaborate chamber may have been used for the main ceremony.

Niche

At the entrance to the large chamber (#1) there is a niche. The niche is on the exterior of entrance, not inside the chamber. It is up high above the small short slot at the bottom of the entrance. The placement of the niche suggests it was used for a ritual purpose. It may have held a sacred object or been used to place an offering.

Rock Shelters With and Without Niches

The term “shelter” implies habitation but Martin G. Dudek and Craig S. Chartier in their article *The Tall Pines Rockshelter, Clinton, MA and Rockshelter Use During the Late Woodland and Contact Periods* (2004), showed that some rock shelters were used otherwise. During a full excavation of the Tall Pines Rockshelter the excavators recovered, “quartz shatter with very few flakes and a concentration of sherds from a collared Native American vessel.” The authors concluded, “... pots occasionally found in rockshelters, especially when no other evidence of

occupation is present, may indicate that these vessels were left as offerings, not because they were broken and discarded.” The authors reviewed other rockshelter articles where there was possible ritual activity some with niches used to hold objects like pipes. They concluded, “... from this limited survey, Native people in southern New England considered rock shelters as special places as well as habitation sites. Several of these rockshelters contained burials or objects of ceremonial significance such as smoking pipes.”

The two archaeologists pointed out some rockshelters were potentially used as special places. The term special place indicates spiritual, ritual, or ceremonial activity took place in them. Rockshelters are similar to stone chambers in that they are stone-lined (naturally) and partially underground. Some rockshelters have niches which were used to hold ceremonial objects. Some stone chambers have niches. Some rockshelters lack evidence of occupation. Most stone chambers lack evidence of habitation and/or domestic usage. In some cases, there is a probability that Native Americans built stone chambers in lieu of using rockshelters. Perhaps the local rockshelter did not have a niche, or it lacked the means to set up a solar alignment, or it lacked an extra small interior room. There could be any number of reasons why a stone chamber fit the needs better than a natural rockshelter.

At America’s Stonehenge the earliest chambers imitate a small rockshelter on the property. The small rockshelter has a man-made free-standing niche downhill a few feet in front of it. This indicated the small rockshelter was used for a ritual / ceremonial purpose. A second larger rockshelter in the same ledge was excavated. Shards from two broken pottery vessels and a single middle section of a projectile point were found. The artifact assemblage meets the criteria the archaeologists gave for a rockshelter being a special place.

The small rockshelter at the America’s Stonehenge site is on the extreme end of a long ledge wall. The ledge wall extends upward above the rockshelter. What is called the Mensal stone chamber is a prime example of the how the Native Americans imitated the small rockshelter. The chamber is on the extreme end of a long tall wall. The tall wall extends upward above the chamber. The man-made chamber matches the small rockshelter.

What the chamber did was allow the Native Americans to build a man-made rockshelter on the top of the hill where they had previously built an enclosure, drain and basin. This was done to consolidate the ceremonial structures. The chamber has a V indentation in the wall complete with lintel stone indicating it is an intentional feature. In turn, the man-made chamber allowed the people to incorporate features. As time went on, the features became more and more complex allowing the people far more flexibility than what was found in natural rockshelters.



Fig, 21 - Small cave or rockshelter at America's Stonehenge



Fig. 22 - Mensal stone chamber at America's Stonehenge which imitates the small cave/rockshelter's design with the placement of the chamber on the extreme end of a long wall.

Closing

Three chambers were closed up at Gungywamp. Two of these chambers form a pair of chambers thus they are related. Closing these two chambers closed down whatever activity took place there. Closing also took place at America's Stonehenge.

At the America's Stonehenge site inside the Oracle Chamber the speaking tube, a small horizontal shaft from the interior to the exterior had a thin stone covering the interior end. It was

so well fit that it had to be pried loose. At the opposite end of the chamber the interior entrance to the covered drain had a thin stone closing the drain (Goodwin 1946, 60). The Grooved Stone attached to the exterior of the Oracle Chamber was filled with fine sand devoid of artifacts. William Goodwin was curious about the lack of artifacts because the fill inside the Oracle Chamber, placed there by the town of Salem had copious amounts of artifacts (Goodwin 1946, 112). It is the author's theory the sand fill without artifacts under the Grooved Stone was part of the formal closing by the Native Americans that took place at the same time the speaking tube and drain were closed, thus closing the ceremonies that took place at the Oracle Chamber and Grooved Stone. The Oracle Chamber was replaced with a downsized, downgraded, and simplified plain chamber called the East-West Chamber. The East-West Chamber has the exact same number of interior rooms (2 large and 2 small) as the Oracle Chamber. What occurred at America's Stonehenge was a re-organization of the ceremonies (Gage, 2006, 209-222).

There is evidence of Native American activity at the North Complex at Gungywamp where a sapling covered lodge was built along with several cairns. The large cairn had three standing stones on top indicating it had ritual / ceremonial significance. The lodge had a hearth at its entrance. Artifacts found at the lodge consisted of one woodland quartz projectile point, a Shoreline railroad (trolley) token, dated 1916 and other modern artifacts (Barron & Mason 1994, 40). What those artifacts were is not stated in the article. By 1916 Native Americans were not living in bark or skin covered lodges in Connecticut. The hearth was at the entrance not inside, so the entrance was not covered. The placement of the hearth suggests the lodge was not used for habitation. The use of old fashion lodges for ceremonial purposes persisted in the Great Lakes region into the early 1900's. Authors Bruce Trigger, and husband and wife team, Pat and Robert Ritzenthaler both have photographs of old fashion lodges being used for ritual or ceremonial purposes. The Ritzenthaler's also, have a photograph of a grave house made out of modern lumber boards and shingles. (Trigger 1978, 749-750; Ritzenthaler & Ritzenthaler 1970, fig. 5 & fig. 43)

The closing of the two chambers suggests the ceremony held at the chambers was terminated. The lodge and cairns in the North Complex show a late date indicating one of the ceremonies (Moon or Sun) held in the South Complex was re-configured and re-located. Or a new ceremony was created that superceded the older two ceremonies at the South Complex.

A closing can occur with or without evidence. In most cases, when an older ceremonial structure was closed a new ceremonial structure was built. The new ceremonial structure can be an upgrade as seen in the two rows of standing stones where the newer row has a petroglyph. Or it can be a downgrade as seen at America's Stonehenge where the formally closed Oracle Chamber was replaced with the simple and plain East-West Chamber.

Stone Chamber Conclusion

A review of period agricultural literature and detailed study of root cellars found that the four Gungywamp complex stone chambers do not meet the expected design requirements for sheep birthing stalls, farm ice-houses, and farm root cellars. Having rejected all of the historical utilitarian explanations for the chambers, one is left to consider the controversial idea that the chambers were Native American ceremonial structures. There are no direct references in the

anthropological literature to Native American construction of such structures or their use for ceremonies. The Native American cultures have consistently been protective of their spiritual beliefs and reluctant to disclose details of their sacred ceremonies to outsiders. The absence of information can be potentially attributed to this non-disclosure policy.

Although direct references to stone chambers do not exist, there are references to cultural practices similar to some of the concepts and features found in the chambers. For example, chamber #1 brings a beam of sunlight into the interior of the underground room on the equinoxes. Ogauns vision describes a similar conceptual situation in which the spirit of the sun enters the Underworld. Archaeological excavations at rockshelters have demonstrated ceremonial use of these natural features by Native Americans. Chambers can be conceived as man-made versions of natural caves and rock shelters. Through the use of this and other types of examples from the anthropological literature and archaeological record, a cohesive conceptual model emerges that can explain the many physical features found at the Gungywamp and Montville chambers. The pattern analysis found evidence of intentional and purposeful cultural traits like 7 of the 8 chambers having anchor stones, the pairing of an elaborate chamber with a plain chamber, and so forth. Combining the pattern analysis with the evidence from linking anthropology records to physical and conceptual traits of the chambers, and the archaeology of rockshelters used for ceremonies creates the basis for a compelling argument to give serious consideration to the Native American theory.

This analysis has demonstrated that sometimes it is necessary to develop innovative and “out-of-box” research strategies to address the research questions like those surrounding the Gungywamp stone chambers.

V. Double Stone Circle

The double stone circle structure at the Gungywamp site was the subject of two confirmed archaeological excavations and several non-excavation investigations based upon the surface remains of the structure. Frank Glynn excavated the center of the double circle in the 1960's in search of a central pivot hole. Glynn never issued an excavation report and the whereabouts of his field notes is currently unknown. According to James Whittall, Glynn's excavation did not find a pivot hole and the excavation produced no significant findings. David Barron informed Whittall that "a husband and wife team of archaeologists from Yale trenched through the feature" during the 1960's. Some disturbance in the northwest quadrant of the structure was noted by Whittall in 1990, and attributed to the Yale team. James Whittall (Early Sites Research Society) and David Barron (Gungywamp Society) did a preliminary excavation of the channel between the two stone circles in 1987. In 1990 they excavated the surrounding area outside of the double stone circle. Some preliminary remarks about the excavation were reported in the Gungywamp Society's *Stonewatch* publication. Whittall and Barron issued a complete report in 1991 in the *Early Sites Research Society Bulletin*.

Whittall and Barron's 1991 report lacks the disciplined scholarly format used by modern professional archaeologists. Pertinent information about the excavation is scattered throughout the report in the text, illustration captions, and the illustrations themselves. A few additional pieces of information are found in 1990 *Stonewatch* article. To address this issue, the findings section (below) gathers all of pertinent details together in a more organized format.

There are a few documentation issues. The unit number where some of the artifacts were recovered is not recorded in the report. The depth of the artifacts was rarely mentioned. Whittall's excavation plan (fig.23) does not show any of the "backing stones" around the outer stone circle. The plan shows a tree in unit NOW2 which is not present in any of the excavation photographs. (It should be noted that all unit references are to upper right corner of the unit.) The outer circle of stones is reported to have 12 stones. Whittall's hypothetical reconstruction of the structure shows 13 stones in the outer circle. Whittall added another stone to the southwest quadrant. Notwithstanding these issues, there is more than sufficient details from the excavation reports to proceed with an analysis.

Findings

1987 Excavation Findings

Whittall and Barron summarized the findings of the 1987 excavation in their 1991 report. The 1987 excavation focused on the trough between the two stone circles:

[It is located] on an elevated ledge outcrop, the feature is composed of two concentric circles of quarried stone slabs laid end-to-end, one within the bounds of the other. The outer circle of twelve slabs has an inside diameter of approximately 3.30 meters (10.82 feet). The inner circle of nine slabs has an outside diameter of approximately 2.70 meters (8.85 feet). The stones have been carefully chosen by quarrying or worked to create a continuous curve, either

convex or concave, in the opposing faces which form the runnel. These sides are approximately 30 centimeters (11 inches) apart. A preliminary excavation by Early Sites and the Gungywamp Society in 1987 revealed that the runnel had a stone slab flooring. This extending under the stone circles and was dressed in some area to level the surface. There were no signs of metal wedge or drill marks on the slabs. Extensive fire burning on some slabs was apparent. This suggested probable quarrying, shaping by fire and water, and then by hammering activities. It was apparent also that some of the slabs were picked because of their naturally curved shape in ledge outcrops. About 30 meters from this feature is a semi-curved section of worked ledge which might have been dressed for the inner ring but was rejected before it was utilized. (Whittall & Barron 1991: 7)

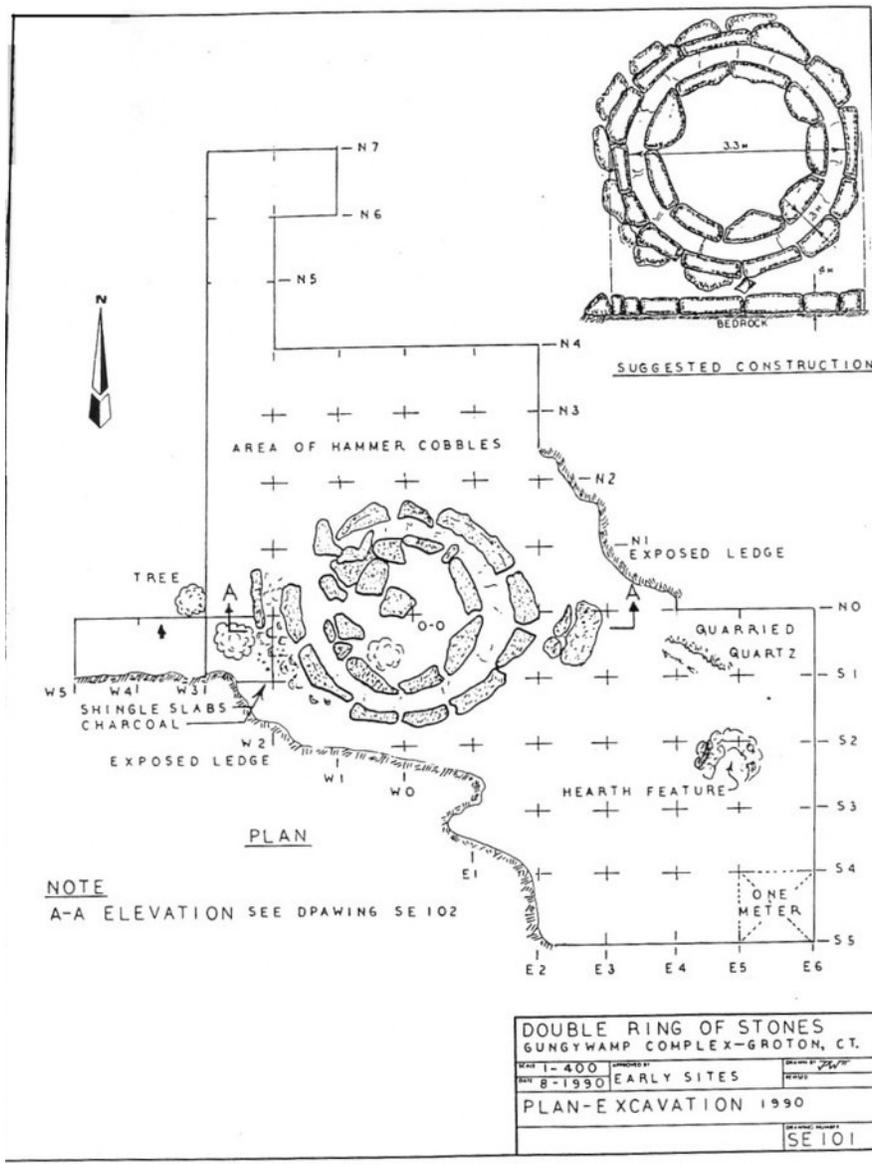


Figure 23 – 1990 Excavation Plan (Whittall & Barron 1991)

1990 Excavation Findings

The 1990 excavation excavated 54 one meter square units outside of the double stone circle (fig.23) All of the units were excavated down to the underlying ledge. The soil stratigraphy was described as follows: “The soil profiles were clearly identified into three levels of recent topsoil, roots and compost, then a level of orange brown infill, and finally an ancient level of whitish tan infill.” (Anon 1990)

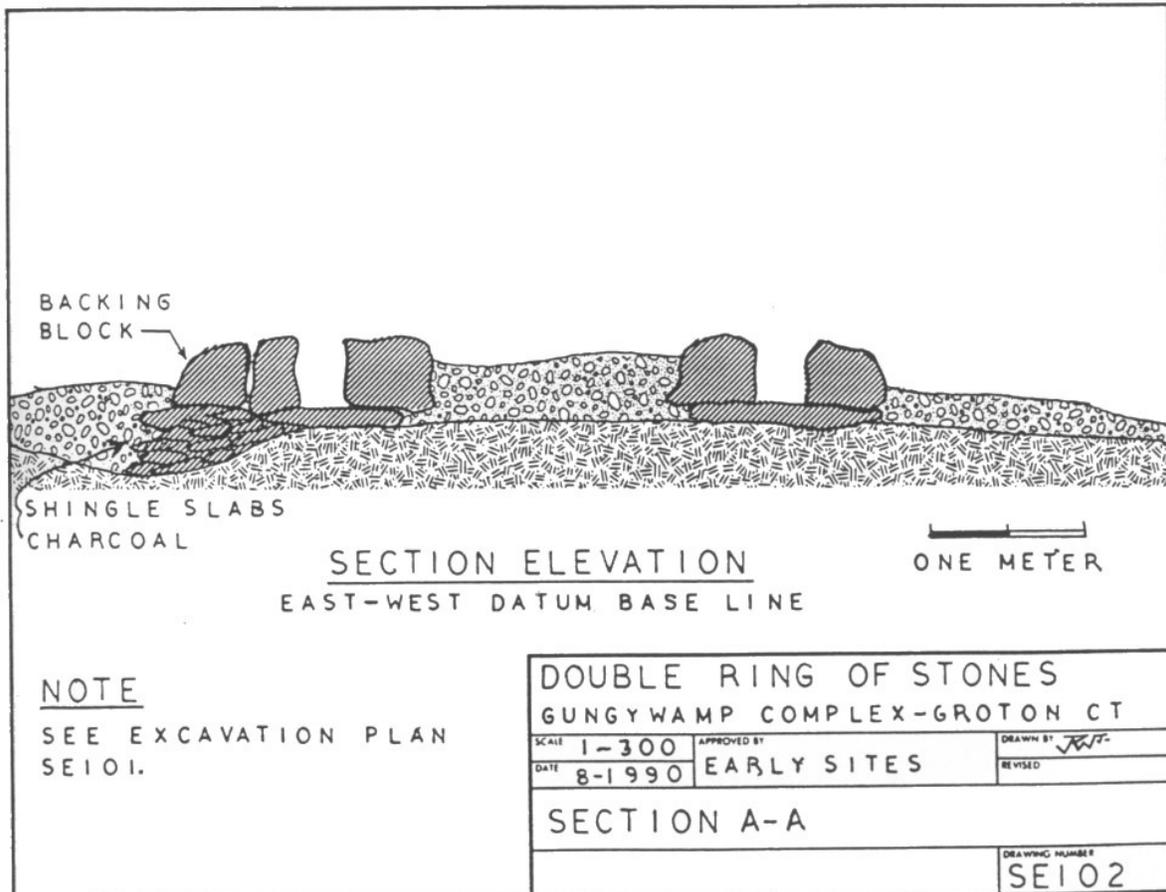


Figure 24 – Cross section view of double stone circle (Whittall & Barron 1991, 13)

Circle Construction

A slab flooring was laid out in the trough area and probably chinked with spall waste (the flooring was not disturbed by us and we could not satisfactorily answer the question from the destruction in the disturbed area.) The quarried and dressed slabs (some fireburned) of the two rings were then installed. Shingle slabs of stone were laid up where necessary against the outer ring. Large backing stones were placed over the shingle slabs and rested against the large ring slabs as supports ... In the southeast quadrant there were no support slabs, but the outer ring slabs are of such size and weight, perhaps there was no need for further buffering though they might have been removed in historic times. Uneven areas in

the floor of the trough were hammered level. The final construction step was to infill with dirt and other waste materials (hammerstones, spalls) around the outer area of the structure. (Whittall & Barron 1991, 12)

Whittall's explanation of the stone shingles requires some clarification. As shown in figure 24, there is a dip or drop in elevation of the ledge along the outside edge of the circle. The stone "shingles" which are flat and wedge shaped stones were stacked horizontally in the dip of the ledge to create a level platform to support both the stones in the outer circle and the backing stones. These leveling stones were laid against the sloping ledge and underneath the outer circle stones and backing stones. The use of leveling stones seems to only occur in the southwest quadrant.

Wear Evidence

"... close inspection of the floor slabs and inner walls of the feature geologist Jelle De Boer of Wesleyan University noted some indications of rubbing or wear which could result from the operation of a circling heavy stone wheel." (Whittall & Barron 1991, 12)

Artifacts

Glazed Redware – "The small glazed sherds of redware were recovered in N2W2 just below the humus and date to the latter half of the 18th or early 19th century." Whittall noted that the shards represent two different types of redware. Based upon photo I in the report, a total six shards were recovered. (Whittall & Barron 1991, 8 & 16)

Red Slip Shard – "The sherd with the red slip recovered from N1W0 in the B horizon might be of an earlier date [earlier than the redware]." (Whittall & Barron 1991, 12)

Iron Button – "The 19th century iron button was recovered in the humus in N1E2." (Whittall & Barron 1991, 12)

Lithic Artifacts – "... a quartz scraper, and two broken quartz biface projectiles. Numerous quartz flakes were recovered in the immediate area of the projectile point ..." It was noted that, "All the lithic material was recovered in the B horizon; the quartz scraper (?) B with biface projectile A from N1W1, and projectile C from S1W3, associated with the flakes scattered about the general area." (Whittall & Barron 1991, 8, 16)

Hammer Stones – Photo G of the report shows eight hammerstones described as having been recovered from the area north of the double stone circle. The location is also noted on Whittall's map (fig. 23) An article in Gungywamp Society newsletter *Stonewatch* reported "Numerous stone cobbles, showing scarred and chipped ends, appeared throughout the area and strongly suggest their roles as hammer stones in the working of the dressed stones." (Anon, 1990)

Sandstone Artifact – Photo H of the report shows an artifact described as a "chipped sandstone digging artifact" p.18

Scraper Tool – Photo H of the report shows an artifact described as a “Scraper tool with worn garnets” P.18

Features

Hearth – “To the east of the feature #5 [double circle]² a carefully constructed ‘hearth’ was uncovered in a depression in the ledge in squares S2E5 and S2E6. It was noted that at some time in the recent past, person unknown had excavated a small square into the central hearth area, but this disturbance had missed the laid up material of stone spalls and clay.” (Whittall & Barron 1991, 16) An original excavation slide printed in *Stonewatch* (Summer 2003) indicates the hearth was built directly on the ledge.

Quarried Quartz Vein – “An area of the ledge near the hearthlike feature showed evidence of fire quarrying on a fractured vein of white quartz.” (Whittall & Barron 1991, 16)

C-14 Dating

“Scattered about in the lower course of the in-fill of dirt and shingle slabs placed against the support stones of the mill were some *fire-burned* spalls and some small amounts of charcoal (S1W1-S1W2). Some fire-burned earth (Munsell 10YR 5/4) was found. This charcoal material did not appear in the outlying squares excavated, i.e. N6W1-N6W2. A sample of charcoal recovered was submitted to Geochron Laboratories for a radio carbon date. The results yield a date of 1495 +/- 175 C-14 years BP(C-13 corrected) (GX 15986). This gives a dating range from 280 AD to 630 AD with a mean of 455 AD.” (Whittall & Barron 1991, 13)

“Charcoal was taken from 23cm in the deep second level, well below forest fire and burning root sources.” (Anon 1990)

Edge-Runner Mill Hypothesis

Various researchers have hypothesized that the double stone circle is the remains of a crushing or pulverizing mill. This hypothesis states that the double stone circle once had a runner stone similar to a mill stone which rolled around the trough or channel between the stone circles. The edge of the runner stone could be smooth or have teeth. The runner stone was attached to a horizontal shaft which in turn was attached to a vertical shaft in the center of the circle. Materials placed inside the channel were crushed under the weight of the roller stone.

This type of mill is sometimes referred to as an *edge-runner mill*. Edge runner mills date from ancient times and saw widespread usage in Europe and the British Isles from the medieval period through the 1800’s. They were used for a wide range of applications including pulverizing apples for cider making, crushing seeds in preparation for oil extraction, crushing tan bark, and crushing various minerals for different industries. By the 1800’s edge runner mills were becoming technologically obsolete as more efficient mechanized grinding machinery was developed. However, the cheapness of construction and ease of maintenance favored the continued use of

² Whittall had assigned feature #'s to all of the major structures in Gungywamp complex. The Double circle was designated #5.

this older technology well into the 1800's. In his 1802 travels in the midwestern and southern states, Andre Michaux noted, "In all the towns that I travelled through every tanner has his tan mill, which does not cost him above ten dollars to erect. The bark is put into a wooden arch, twelve or fourteen feet in diameter, the edges of which are about fifteen inches high, and it is crushed under the weight of a wheel, about one foot thick, which is turned by a horse, and fixed similar to a cyder-press. For this purpose they generally make use of an old mill-stone, or a wooden wheel, formed by several pieces joined together, and furnished in its circumference with three rows of teeth, also made of wood, about two inches long and twelve or fifteen wide." (Michaux 1805, 270)

Researchers have proposed a long list of potential materials which may have been processed by the double stone circle "mill." These include tan bark for the leather industry, apples for cider pressing, seashells for lime, iron ore for smelting, and quartz. The double circle lacks any evidence of having a sealed (i.e. water tight) trough. This effectively eliminates any liquid materials like apples and extracting oils from seeds. The absence of fragments of shell, iron ore, and quartz rules out the idea it was used for processing minerals. The processing of tan bark remains the only plausible variant of this hypothesis and is the most often cited.

The general similarity of the double stone circle to edge runner mill designs, the presence of 18th century pottery shards, availability of trees suitable for tan bark (i.e. oaks), the wear along the inside of the trough (possibly from a rolling stone), and the remains of a nearby colonial homestead are usually offered as evidence in favor of this hypothesis.

Edge Runner Mill Design and Construction

In order to analyze whether the double stone circle is an edge-runner mill, it is necessary to learn more about their construction. The 1890 edition of *The Century Dictionary: an Encyclopedic Lexicon of the English Language* offers this concise description of an edge runner mill:

"*Edge-runner mill*, a mill in which the millstones grind by their peripheral surfaces instead of by their flat surfaces. The stones are generally two in number (though a single one is sometimes used), and run in a circular trough provided with a bottom of stone or of iron. The trough holds the material to be ground. The stones are pivoted to the ends of an axle like cart-wheels, and the axle is attached in the middle to a vertical shaft which rolls the stones around in the trough, thus effecting both a rolling and a rubbing action upon the material to be ground. Such mills are used for grinding flaxseed preparatory to expressing the oil, in iron foundries for grinding sand and clay, and for other purposes." p.3764

J. de Fontenelle and F. Malepeyre offer the following observations on edge-runner mills in their book *The Arts of Tanning, Currying, and Leather-Dressing* (1852):

"Bark is ground in mills varying in construction in different countries, and driven or propelled by horse, water, or steam power. In England, it is crushed between chasers, or stones. ...

In the south of France they use a vertical mill of hard stone, similar to that employed for crushing oil seeds. It consists of two vertical stones (Fig. 2), of about 7 1/2 feet in diameter, and 18 inches in thickness. The axle of these stones is fixed in a frame which incloses an upright shaft turning upon a pivot, and fixed in the centre of a strong stone bed. Rotary motion being communicated, imparts to each stone a double movement; that upon the other, and that which it undergoes in describing a circle upon the stone bed upon which it rolls.

The axle of each stone should be so adjusted as to allow it to be raised or lowered according to circumstances. One of the stones is placed nearer to the vertical shaft than the other, so as to give a greater extent of crushing surface beneath. Two followers press the bark forward under the stones, and a cloth is attached to the outer one, for the purpose of rubbing off any pieces of bark that may adhere to the edges of the stones.” pp.113-114

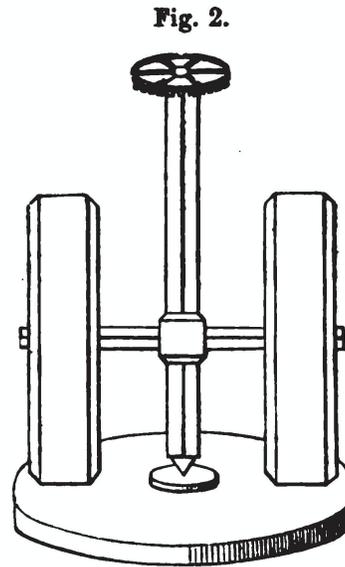


Figure 25 – The illustration that accompanied Fontenelle and Malepeyre’s description of a tanbark mill.

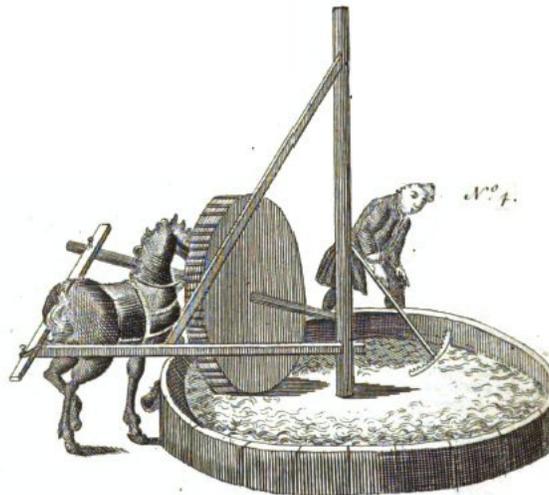


Figure 26 – 1764 illustration of a tan bark mill. (Society of Gentlemen 1764, vol. 4 pp.3155)

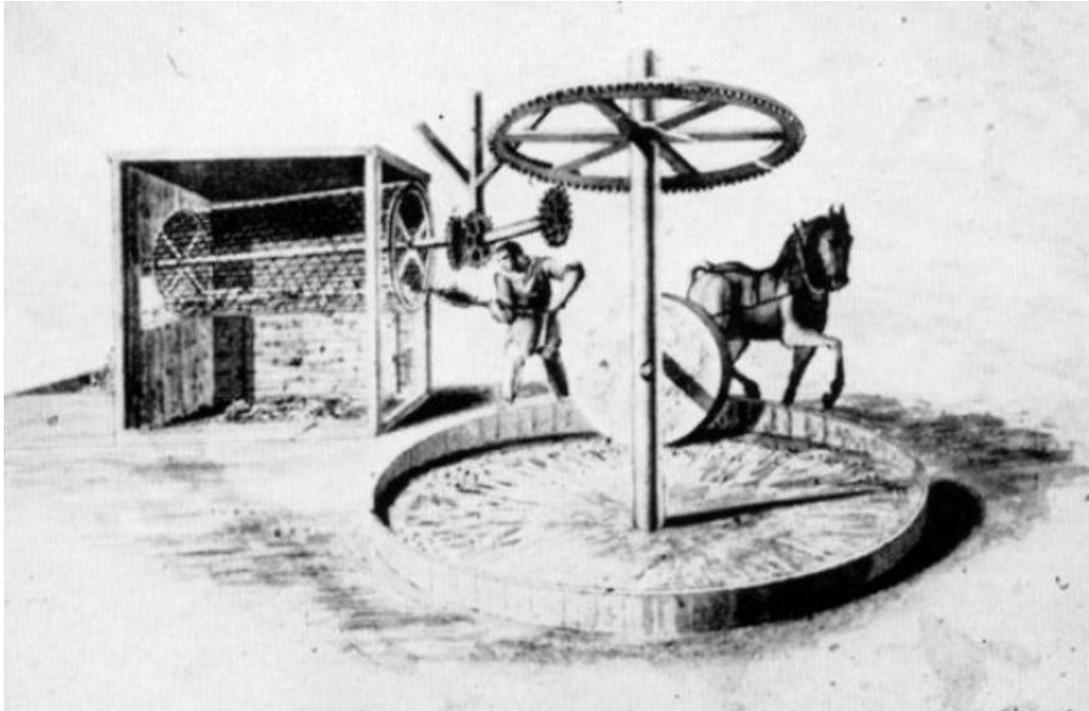


Figure 27 – 1805 water color of a tan bark mill based upon patent drawing (reprinted in Welsh 1963)



Figure 28 – A multi-segment stone trough held together by mortar from Elms, NJ. This mill was used to crush apples for cider making. (Courtesy of Wikimedia Commons website)



Figure 29 - A multi-segment stone trough held together by iron fasteners. The fasteners are currently sitting near the vertical post (A), but, were original install at (B) to hold the quarter sections of the trough together. (Leominster Reclamation & Architectural Salvage Co.)³



Connecticut State Library, State Archives: mills_tan_bark_mill

Figure 30 - Bethany CT tan bark mill circa 1935 (courtesy of Connecticut State Library)

³ http://www.leorec.co.uk/cidermills_mill_stones.htm

Discussion - Tan bark Hypothesis

There are two basic types of edge-runner mills. The first as shown in fig 26 & 27 consists of a flat circular area with an exterior wall around the circumference. The flat surface would be composed of paving stones. Although not explicitly stated, the paving stones would need to be laid in mortar or packed in clay to hold them in place and fill the gaps between the stones. With this type of mill the runner stone was set back from the outside wall and did not come in contact with it. The second type as shown in fig 28 & 29 has a circular trough or channel in which the runner stones revolves in. The trough could be carved out a single piece of stone or formed by multiple sections of stone. When composed of different sections of stone, the sections were either mortared together or bound with iron fasteners. With this type of mill the runner wheel rubbed against the outer edge of the mill. The vibration and contact between the runner and trough sections could potentially cause the trough sections to shift out of place. This may account for the consistent use of mortar and/or iron fasteners. The Bethany Connecticut tan bark mill (fig. 30) did not use either mortar or iron fasteners. The outer circle of stones seems to have been prevented from shifting out of position by the weight of the long stone bars and earth banked against the outside of the trough.

These few examples established that edge-runner mills were many times built using multiple curved segments of stone to form the trough of the mill. With this type of construction there was a strong preference for mortar or iron fasteners to hold the outer circle in place and preventing shifting of the stones. However, the Bethany tan bark mill demonstrates that other methods for holding the outer circle of stones in position did occur. Whittall and Barron noted the presence of “backing stones” around the outside perimeter of the double circle. These backing stones most likely served the purpose of holding the circle together.

Tan bark mills consisted of one or two wood or stone runner stones mounted on a horizontal axle. The horizontal axle which was generally squared off at one edge fit into a corresponding square socket in the stone. The opposite end of the axle was rounded and passed through a drilled hole in the vertical axle. This allowed the horizontal axle with its attached stone to revolve around. The vertical axle rotated as well. It could be mounted using two different methods. The first and most common method was to set the bottom of the vertical axle into a hole or pivot point drilled into a stone or stone base in the center of the mill. The top of the axle was placed in a drill hole or socket in a heavy wooden cross beam which was part of the building superstructure. The second and less common method was to set the vertical axle in a deep drilled shaft hole in the center of the mill. The shaft hole needed to be deep enough to prevent the horse from inadvertently pulling out the center axle and damaging the mill. The depth of such a shaft hole is not given in the literature thus must be inferred from illustrations and photographs of surviving examples of cider mills. A minimum depth of 8 to 12 inches is suggested by the cider mill examples.

The lack of a pivot hole or shaft socket drilled into the bedrock in the center of the double circle remains one of the fundamental flaws with the tan bark mill hypothesis. It has been suggested that a pivot could have been drilled into a moveable block of stone which has been removed from the site. As evidence in favor of this argument, an example of pivot hole stone block found in the University of Connecticut Archaeological Collection is cited (Hallas 2003). This is a

reasonable argument. A pivot hole in a moveable block would require the vertical axle to have a corresponding pivot hole at the top in a heavy beam in a building super-structure. Most tan bark mills were housed in a shed or other type of structure to keep the mill dry. Tan bark pulverized using an edge-runner mill could only be milled after it was thoroughly dried in the sun or kiln. A dry mill was critical to milling operations. The archaeological excavation of the double circle did not find nails, iron building hardware, sill walls, or other evidence of a wooden structure. The building super-structure could have been constructed directly on the bedrock using only wooden pins to for the mortise joints. Shingling the roof would have required nails. The lack of evidence for a building is not sufficient evidence to prove that none was constructed at this location, but, it does raise an important issue.

The runner stones used in these mills ranged from 400 to 800 pounds each. Due to their weight, the runner stones would wear away the edges of the channel as well as the bottom of the channel. Wear was noted on the sides of the channel stone by geologist Jelle De Boer.

In 1802, Andre Michaux noted in his travels through the United States that every tannery was equipped with its own tanbark mill. The reason for this was simple. Tanbark could be ground from very coarseness to a very fine consistency. Each tanner had his own preferences as to how course or fine he wanted the bark ground. Therefore, a bark mill at the tannery allowed the tanner to maintain control over the grinding process. Given that each tannery was equipped with its own mill, there was no reason for mills to exist outside of the tannery like at the location the bark was collected. If the double circle is a tanbark mill then the expectation would be to find evidence of a tannery nearby. Currently, there is no historical or archaeological evidence to suggest the presence of a tannery at the site.

Native American Hypothesis

The lithic artifacts (quartz scraper, two quartz projectile points, quartz flakes, a chipped sandstone tool, scraper, & hammer stones), hearth like feature and fire quarried quartz vein all attested to a Native American presence at the locus. The fundamental question is whether this activity was related to the construction of the double stone circle?

The stones forming the double circle were modified to create a curvilinear surface to match the curvature of the circle. There was no evidence of metal tools being used to dress these stones. In fact, the evidence indicates that stones were shaped using a technique of heating the stones and chipping away at the fire heated surface with hammer stones until the desired shape was achieved. The Native Americans are known to have used this technique for mining copper and quarrying quartz.

George Quimby, a Professor of Anthropology and expert on Great Lakes Native Americans⁴, stated that “The method of mining was as follows. The Indian miners followed the veins of pure copper from surface outcrops by digging pits and breaking the copper from its rock matrix with the aid of fire and water and large beach boulders used as hammers.” (Quimby 1971, 52) Fire and hammer stone quarrying and shaping of stones has also been documented at the America’s

⁴ George Quimby (1913-2003) chair of the Anthropology of the field Museum of Natural History, Professor of Anthropology at University of Washington, Director of Thomas Burke Memorial Washington State Museum, etc.

Stonehenge site in North Salem, New Hampshire. This activity has been dated to 2995 BP +/- 180 (Gage 2006, 23).

Charcoal found intermixed with fire burnt spalls in the lowest course of fill in and around the leveling stones of the double stone circle was dated to 1495 +/- 175 BP (C-13 corrected) (GX-15986) and had a mean date of 455 A.D. The association of the charcoal with the fire burnt spalls and leveling stones (i.e. "shingles") along with the absence of charcoal in the surrounding units indicates the charcoal is most likely from the stone dressing activities rather than from a forest fire.

The double stone circle was built directly on the exposed bedrock. Was the rest of the ledge exposed as well at the time of construction? The soil stratigraphy was described as having a clearly defined soil profile of humus level, orange level, and tan level. Whittall and Barron do not mention the presence of a builder's trench. (A builder's trench would indicate the masons dug through the soil to expose the bedrock.) In fact, Whittall and Barron noted that fill was packed against the outside circle after completion of the structure. This fill was placed directly on the bedrock. Although circumstantial, the evidence suggests the ledge surface was partially if not completely exposed at the time of construction. The soil profile with its clearly distinguished levels suggests the accumulated soil was naturally deposited. If the soil on top of the ledge was infill dumped there, the soil would be mottled from intermixing and would not exhibit such a clear stratigraphy.

This is an important point. If the ledge was completely exposed at the time of construction and the soil was naturally accumulated, it would mean that lithic artifacts found in the soil post-date the construction of the double circle. The quartz projectile points, quartz scraper, and quartz flakes are prehistoric artifacts. This would date the structure prior to the arrival of European colonists to New England. It could be argued that the lithic artifacts were part of earthen fill transport to the site from elsewhere. However, the soil stratigraphy does not support the argument that the soil is dumped fill (with the exception of fill packed against the outside circle.)

A 19th century button was found in the humus level. The early 19th /late 18th century red glazed shards were found just below the humus level which would be the junction between the humus and orange soil. The red slip shard was found in the orange level. The lithic artifacts were found in the "B horizon" which in this case would be the orange and tan levels. The artifacts are arranged chronologically from youngest to oldest within the stratigraphy. This is exactly what would be anticipated for naturally deposited soils.⁵

The overall design and wear evidence along the inside of the trough are consistent with an edge-runner mill but the use of fire and hammer stones to dress the stones is consistent with a Native American origins. Is there a possible solution to this apparent paradox? There is one other documented example of a stone structure that is visually similar to an historic technology but the evidence demonstrates that it is a Native American ceremonial feature.

⁵ The position of the red slip shard within this chronology is not perfectly clear due to the lack of location details (i.e. top, middle, bottom) within the orange level. Similar information is lacking for the lithic artifacts. Overall, the chronology seems to be sound.

The large grooved stone at America's Stonehenge has a groove around the perimeter of stone which is connected to a carved spout. Visually, it looks like the base to an apple cider press. The groove was carved with hammer stones. There is no evidence of iron or steel tools used in its construction. A careful review of historical literature about apple presses found a number of problems with the apple cider press hypothesis for this stone. The grooved stone was raised too far off the ground for a person to operate the overhead bars that turn the press screw. It is located on moderately sloping bedrock and a more suitable flat area was available nearby. It was located in a very tightly confined area which would be difficult to maneuver in to bring pulverized apples to the press and remove the cider. Again, an open area far more suitable for this type of operation was available close-by.⁶ The grooved stone is an integral part of a larger Native American ceremonial site. The large grooved stone establishes a precedent for the Native Americans constructing a stone structure that looks like an historic technology but was created for a different purpose.

There is sufficient evidence to advance a hypothesis that this structure was built by Native Americans. There is no obvious utilitarian purpose for such a structure within Native American culture. This would suggest it was a ceremonial structure.

Conclusion

The edge-runner mill hypothesis has established that the double stone circle is visually similar to historically documented examples of this type of mill. The use of an un-mortared segmented kerb stones (with no iron fasteners) to form the channel of the mill is extremely rare but the Bethany CT tanbark mill example proves that this technique was used to construct at least one edge-runner mill. Edge-runner mills required either a fixed or rotating center shaft mounted in a drilled shaft hole or the use of two pivot holes, one at the top and one at the bottom. No evidence of either a shaft hole or pivot hole was found. However, a reasonable argument has been advanced that the pivot hole could have been cut into a moveable stone block similar to an example currently in the Connecticut State Museum which was found at a different site. Such a moveable block could have been re-purposed for another mill or removed from the site by collectors. The absence of a tanbark runner stone can likewise be accounted for by a similar line of argument. The presence of these features would strengthen this hypothesis but their absence cannot be used to disprove it.

The channel of the double stone circle was never sealed and therefore could only have been used for crushing dry materials like tanbark, shells, quartz, clay, etc. There is no evidence of clay processing at the Gungywamp site and the absence of crushed quartz and sea shells around the structure leaves tanbark as the only logical material. Period documents and historical research indicates that each tannery had its own on site tanbark mill. The reason for this was that each tanner had his own preferences as to how coarse/fine the bark should be ground and therefore onsite control over the processing was necessary. There is no historical precedent for the presence of tanbark mills offsite or at the location that bark was collected. Proponents of this hypothesis have failed to find any archaeological or historical evidence to suggest a tannery operation at this site.

⁶ "Cider Press Theory" <http://www.mysteryhillnh.info/html/cider-press-theory.html>

European-American culture, since the Medieval period, has had a deeply embedded cultural preference or bias towards the use of iron tools in every aspect of stone quarrying, shaping, and construction of structures. Extensive research by American, British, and European researchers has failed to find examples of stone tools like hammer stones being used in the quarries or by stone masons in the historical period. There are historical references to the use of fire to split field boulders by heating them and then dashing cold water on them, dropping cannon balls on them, or hitting them with sledge hammers. With the exception of the first fire method, the other two involved iron “tools.” This is the extent of the usage of crude stone working methods. There is **no** evidence for the use of fire to *shape* stones. The use of metal hammer, metal hammer and chisel, or metal mill pick to shape a stone was faster and also the standard dry stone masonry techniques used by Europeans for centuries prior to colonization of the Americas. There is a high probability (>99%) that a stone edge-runner mill would be constructed using common iron tools like hammer, chisel, or pick. The absence of hammer, pick, chisel or other iron tool marks on the stones and evidence for the use fire and hammer stones to shape the stones is a significant problem. This line of evidence is sufficient to establish reasonable doubt about the edge-runner mill hypothesis.

The kerbs stones of the double circle were shaped using fire and hammer stones. This technique of working stone is well documented at Native American copper mines in the Great Lakes region. Native American use of this technique has also been documented at the America’s Stonehenge site in Salem, NH. Native American stone working activity at the double stone circle is further attested to by charcoal found intermixed with fire burnt spalls in the lowest course of fill in and around the leveling stones. This charcoal was dated to 1495 +/- 175 BP.

The double stone circle was built directly on the ledge. The absence of a builder’s trench and the presence of fill deposit on the bedrock around a portion of the perimeter of structure suggests that a portion, if not all, of the ledge was exposed at the time of construction. With the exception of the fill around a portion of the structure, the surrounding soil stratigraphy was most likely naturally accumulated (rather than fill brought from elsewhere). This would mean that the soil was deposited after construction. The Native American artifacts found within the soil would likewise be deposited after construction giving further evidence of a pre-contact date. A detailed review of the original excavation records would be needed to clarify the exact location where some of the artifacts were found and other details about the stratigraphy. The available evidence suggests this is a plausible argument.

The obvious objection to the Native American hypothesis is the lack of other documented examples of double circle construction by Native Americans and the structures visual similarity to historic edge-runner mills. There is at least one case in which the Native Americans constructed a unique structure which was conceptually similar to a well known historic technology. The large grooved stone at the America’s Stonehenge looks like the base of a cider press stone but was carved using hammer stones, a distinctly Native American stone carving technique. Both the large grooved stone and the double stone circle are found in association with stone chambers, stone cairns, standing stones and astronomical alignment(s). There is a growing body of evidence that these other types of structures are related to Native American ceremonial activities.

Based upon the evidence and different lines of argument neither the edge-runner mil hypothesis nor the Native American structure hypothesis can be either conclusively proven or disproven. With each hypothesis there is evidence that is consistent with the hypothesis and also evidence which is contrary to the hypothesis. In weighting all the evidence, the absence of iron tool marks and the evidence for fire and hammer stone technique for dressing the stones of the double circle along with the C-14 date tips the balance in favor of the Native American hypothesis.

Bibliography

Allport, Susan

1990 *Sermons in Stone: The Stone Walls of New England and New York*. W.W. Norton & Co.

Anon

1883 *Proceeding of a Convention of Agriculturist Held at the Department of Agriculture January ...1883*. Miscellaneous Special Report no. 2. Washington: Government Printing Office.

1981 "More on G'wamp Stones." *Stonewatch* vol.2 no. 3 (Winter 1981).

1990 "Ring of Stones." *Stonewatch* (Summer 1990).

Barron, David P.

1981 "Field Report #1." Unpublished document dated June 23, 1981. Gungywamp Society archives.

1981a "Field Report #2." Unpublished document dated June 27, 1981. Gungywamp Society archives.

1982 "A Differential Diagnostic Approach to the Greater Gungywamp Enigma." *NEARA Journal* vol. 17 no.2 (Fall 1982) pp.42-43.

1984 "Chamber C6-24, Montville, Connecticut." *Early Sites Research Society Bulletin* v.11 no.1 (December 1984) pp. 5-6.

1984a "Chamber C6-25, Montville, Connecticut." *Early Sites Research Society Bulletin* v.11 no.1 (December 1984) pp.3-4.

Barron, David P. & Mason, Sharon

1994 *"The Greater Gungywamp" North Groton, CT: A Guidebook*.

Boyle, Charles E.

1993 "An Epigraphic Alternative." *NEARA Journal*, v.27 no.3 & 4.

Brooks, Alan & Sean Adcock

2010 *Dry Stone Walling: A Practical Handbook*. Doncaster [UK]: BTCV.

Buchanan, Paulette

2003 "...And Yet Another Explanation ..." *Stonewatch Newsletter* (Summer 2003).

2003a "The Rows of Standing Stones with carved Bird Effigy" [*Stonewatch*] *Newsletter* (Winter 2003).

2004 "More Conclusive Research on the Rows of Standing Stones & Other Sites in the Gungywamp." *Stonewatch Newsletter* vol. 21 no. 1 (2004).

2007 "Stone Chambers as Private Ice Houses." *Stonewatch* vol. 24 (2007).

Caduto, Michael J.

2003 *A Time Before New Hampshire: The Story of a Land and Native Peoples*. Hanover: University Press of New England.

DeForest, John W.

1853 *History of the Indians of Connecticut from the Earliest Known period to 1850.*
Hartford: Wm. Jas. Hamersley. [pages 13, 24-5, 34]

De Fontenelle, J. and F. Malepeyre

1852 *The Arts of Tanning, Currying, and Leather-Dressing.* Translated and edited by Campbell Morfit. Philadelphia: Henry Carey Baird.

Dopirak, William J.

2006 "Earth Science Field Excursion: The Gungywamp Complex (Fall 2005)." *Stonewatch*
vol. 23 (2006).

Dudek, Martin G. & Chartier, Craig S.

2004 "The Tall Pines Rockshelter, Clinton, MA and Rockshelter Use During the Late
Woodland and Contact Periods." *Bulletin of the Massachusetts Archaeological Society*
vol.65 no.1.

Fawcett, Melissa Jayne

2000 *Medicine Trail, The Life and Lessons of Gladys Tantaquidegeon.* Tucson, AZ:
University of Arizona Press.

Ferryn, Patrick

1998 "A European View of Diffusion and Transoceanic Contacts before 1492." *Across Before
Columbus? Evidence for Transoceanic Contact with the America's Prior to 1492.*
Edgecomb, ME: The New England Antiquities Research Association.

Ford, Thomas K. (ed.)

1967 *The Leatherworker in Eighteenth-Century Williamsburg.* Williamsburg: Colonial
Williamsburg.

Gage, James E.

2009 *Root Cellars in America: Their History, Design and Construction 1609-1920.* Amesbury,
MA: Powwow River Books.

Gage, Mary E.

2006 *America's Stonehenge Deciphered.* Amesbury, MA: Powwow River Books.

Garner, Lawrence

2003 *Dry Stone Walls.* Buckinghamshire [UK]: Shire Publications Ltd.

Goodwin, William B.

1946 *The Ruins of Great Ireland in New England.* Boston, MA: Meador Publishing Company.

Grove, H. D.

1824 "Essay on Sheep." *The American Farmer* vol. 6 no. 17 (Jul 16 1824) pp. 130-131.

Hallengy, Norman

2000 *Inuksuit: Silent Messengers of the Arctic*. Seattle: University of Washington Press.

Hallas, Carol

2003 "Possible Explanations of the Rows of Standing Stones." *Stonewatch Newsletter* (Summer 2003).

Haviland, William A. & Marjory W. Power

1994 *The Original Vermonters: Native Inhabitants, Past and Present*. Hanover: University Press of New England.

Hranicky, William Jack

1996 "Virginia's Prehistoric Observatories." *Rock Art of the Eastern Woodlands*, C. H. Faulkner (ed.) American Rock Art Research Association Occasional Paper 2.

Hubbell, William

2006 *Good Fences: A Pictorial History of New England's Stone Walls*. Camden, ME; Downeast Books.

Lenik, Edward J.

2002 *Picture Rocks: American Indian Rock Art in the Northeast Woodlands*. Hanover: University Press of New England.

Livingston, Robert R.

1813 *Essays on Sheep*. Concord, NH: Printed by Daniel Cooledge.

Jenness, Diamond

1935 *The Objibwa Indians of Parry Island, Their Social and Religious Life*. (Bulletin No. 78, Anthropological Series No. 17 Canada Department of Mines, National Museum of Canada.) Ottawa: J.O. Patenaude, I.S.O., printer. [Facsimile Reprint, Coyote Press]

Michaux, Andre

1805 *Travels to the West of the Alleghany Mountains in the States of Ohio, Kentucky and Tennessee, and Back to Charleston by the Upper Carolines*. London: Crosby and Co.

Periam, Jonathan

1884 *The Home & Farm Manual*. Facsimile Reprint. New York: Crown Publishers.

Piotrowski, Thaddeus (ed.)

2002 *The Indian Heritage of New Hampshire and Northern New England*. Jefferson, NC: McFarland & Co., Inc.

Proctor, Mary

1930 *The Indians of the Winnepesaukee and Pemigewasset Valleys*. Franklin NH: Towne & Robie, Publishers.

Quimby, George

1971 *Indian life in the Upper Great Lakes 11,000 B.C. to A.D. 1800*. Chicago: University of Chicago Press.

Radin, Paul

1990 *The Winnebago Tribe*. Lincoln, NB: University of Nebraska Press. [Reprint of 1923 edition].

Ritzenthaler, Robert E. and Pat Ritzenthaler

1970 *The Woodland Indians of the Western Great Lakes*. American Museum Science Books.

Robinson, Solon

1870 *Facts for Farmers*. New York: A. J. Johnson, Publishers.

Simmons, William S.

1970 *Cautantowwit's House An Indian Burial Ground on the Island of Conanicut in Narragansett Bay*. Providence, RI: Brown University Press.

Skinner, Alanson

1921 *Material Culture of the Menomini*, Indian Notes and Monographs [Series] New York: Museum of the American Indian.

Society of Gentlemen

1764 *A New and Complete Dictionary of the Arts and Sciences*. 2nd Edition. London: W. Owen.

Stewart-Smith, David Dr. Th.d; M.M.

1989 *Ancient and Modern Quarry Techniques*. America's Stonehenge at Mystery Hill: Monograph Series #1: Nashua, NH: Gamesmasters Publishers Assn.

Tooker, Elisabeth

1970 *The Iroquois Ceremonial of Midwinter*. Syracuse, NY: Syracuse University Press.

Trigger, Bruce G. (ed.)

1978 *Handbook of North American Indians: Northeast* (V. 15). Washington, DC: Smithsonian Institute.

Welsh, Peter

1963 "A Craft that Resisted Change: America Tanning Practices to 1850." *Technology and Culture* v.4 no. 3 (Sum 1963) pp. 299-317.

Whitney, William D. (ed.)

1890 *The Century Dictionary: An Encyclopedic Lexicon of the English Language*. New York: The Century Co.

Whittall, James P. II

- 1976 "The Gungywamp Complex – Groton, Conn." *Early Sites Research Society Bulletin* vol. 4 no. 1 (May 1976) pp. 15-25.
- 1976a "Excavation – Stone Chamber, Groton, Conn." *Early Sites Research Society Bulletin* vol. 4 no. 1 (May 1976) pp. 26-27.
- 1984 "Hunt's Brook Site-Souterrain, Montville, Connecticut." *Early Sites Research Society Bulletin* vol. 11 no. 1 (December 1984) pp. 7-12.
- 1984a "Gungywamp Complex – Groton, Connecticut: Archaeological Report 1984." *Early Sites Research Society Bulletin* vol. 11 no. 1 (December 1984) pp. 16-18.
- 1991 "Quinebaug River `Tholos' Chamber Site." *Early Sites Research Society Bulletin* vol. 18 no. 1 (October 1991) pp.3-6.
- 1991a "Vernal Equinox Light Channel: Chamber One – Gungywamp Complex, Groton, Connecticut." *Early Sites Research Society Bulletin* vol. 18 no. 1 (October 1991) pp. 24-26.

Whittall, James II & David P. Barron

- 1991 "Double Ring of Stones, The Gungywamp Complex." *Early Site Research Society Bulletin* vol. 18 no.1 (October 1991) pp. 7-24.

Willoughby, Charles

- 1973 *Antiquities of the New England Indians with Notes on the Ancient Cultures of the Adjacent Territory*. New York, NY: AMS Press, Inc.