

USU Eastern Prehistoric Museum Hones in on Fremonts

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At a slow, tedious pace, USUE paleontologist Timothy Riley, digs 40-square-inch increments no more than four-inches deep to ensure excavation is done right.

He was not in a particularly scenic spot - nothing near the splendid granaries and pictographs of Nine-Mile Canyon farther up the road - but the same people who left their trace in that famous canyon at their peak 900 years ago, did something even more noteworthy at this particular place: they put down roots.

For Riley's part, he put down stakes. The nondescript excavation site, 30 minutes east of Price, consists mainly of sagebrush and rice grass. The area is mostly uninhabited, except for a sprawling waste storage facility a half mile away. The irony is not lost on him. In fact, there is a bit of double irony when he explains what the blue-plastic strips are staked to the ground next to the excavation site. They mark what he calls a decent abundance of Fremont trash, albeit bits and pieces.

These middens, or refuse sites, are little treasure-troves containing a scattering of tiny ceramic parts, stone tool debris, pieces of projectile points and other "semi-important evidence for showing what's beneath," he said. Important, because where ancient trash heaps are found, dwellings are not too far away. In this case, 10 yards to

the west. It is here the Martinez Pithouse site is beginning to emerge.

It was the curious way the rocks were piled at this location that first caught the attention of Paul Martinez, a dentist in Price who also runs a small cattle operation in the area around East Carbon. He asked Riley if he would be interested in taking a look. It was a good hunch by the dentist. What he stumbled upon was the remains of an old pithouse foundation.

It was no surprise to Riley that such a house once existed here, and no doubt many more close by. The Fremont people tended to live in small communities and dwell in the same places where people today like to live - mostly in the valleys. This particular pithouse is located along an ancient floodplain - an ideal spot for Fremont farmers to plant their crops and build their homes. Canyons, such as Nine Mile, hold treasures that came later in Fremont chronology. They were mostly summer places - a respite from the heat and a good place to store food for winter.

Riley began preliminary excavation in the fall of 2015, ramping up efforts in early spring of 2016. The 538-square-foot structure was roped off into smaller 4-square-foot sections. He hoped to uncover at least 129 square feet of the plot before winter. It is slow, tedious work. He digs in 40-square-inch increments that are no more than 4 inches deep. He says he only gets one chance at this and so haste is never an option.

Already the site was beginning to take shape. He had dug down deep enough to find what appeared to be compacted sediment of clay plaster used for a bench. In another section, a vein of charcoal-rich sediment was slowly emerging from careful brushwork, suggesting that this home, like so many other pithouses, was burned to the ground before being abandoned.

"I am coming out of the roof fall, with some fairly large timbers, and into the interior of the house in a couple of units," he said in an update. "I am starting to encounter some interesting artifacts such as a bone gaming piece (something like a domino), a very small bead and various stone tools."

Typically, these ancient structures - the main form of housing for the Fremont people - are dug some 3-feet deep by 12-feet around. Their roofs are supported by four main beams held up by an equal number of sturdy posts buried 2 feet down. Small logs that comprise the roof beams are evenly placed from main beams to ground around the circumference of the circle. Branches

and willows are interwoven in perpendicular and parallel directions to form a sturdy shell that makes up the mound-shaped roof. The frame is then topped off with an adobe mixture of mud and grass to bind and harden the roof strong enough to eventually walk on.

A pithouse diorama at the USU Eastern Prehistoric museum brings to life what these structures looked like inside. It includes life-size mannequins, complete with sound effects, of a Fremont family awaiting a dinner cooking in a ceramic pot over a small fire while a woman is grinding cornmeal on a metate.

What makes the display feel so real is its careful attention to detail and accuracy - a reflection of the academic attentiveness and continuous curiosity of Riley, archaeology curator, and his boss Ken Carpenter, museum director and curator of paleontology. Both of these scientists devote much time in their respective fields puzzling through pieces of the past found in the rocks and dust of eastern Utah. Inevitably, an answer to one question leads to another. They know, for example, what pithouses look like, but what did they feel and smell like inside? Were they smoky? Were they cold? Gazing through a window into the past is great, but pithouses don't have windows. What they needed was an actual door to climb through.

"We couldn't find answers in the literature," Carpenter says. "We decided we needed to take more of an approach to reality and build a pithouse ourselves."

So on June 22, 2014, in a fenced in pasture on Carpenter's property, they commenced to do just that. Twenty-four days later on July 15, they finished up. Other duties, such as running a museum, kept them from being able to work steadily on it, but it was enough time and heat (temperatures soared to 102 degrees during construction) for them to upwardly revise their original labor estimates - and appreciation - for what Fremont families had to go through to build these structures.

Before intentionally burning it to the ground last spring, the pithouse stood almost extraterrestrial in the pasture, blending with the vermillion soil among the alfalfa, thistle and morning glory. Its inconspicuousness merely added to the wonder.

As you climbed down into the room, the shadows gave way to a surprising amount of light. The single hole at the top let in just enough sunlight to cast a pleasant golden glow about the cozy quarters. A distinct and pungent aroma greeted your nostrils. Carpenter explained that it was caused by fresh willows used to bind the sticks and

logs that made up the roof. He said the willow meshing was used to keep the adobe from falling through.

It did an equally good job at keeping the temperature down. Outside it was 84 degrees Fahrenheit, but a comfortable 68 degrees inside. Indeed, it would be easy to get used to a place like this. Throw down some bedding and get dinner simmering over a small fire and you'd be set - even in the dead of winter. Carpenter knows this because he monitored inside and outside temperatures in one-hour increments for the full month of June 2015, and then again in December of that same year.

June outside temperatures fluctuated between 40-104 degrees, compared to 65-75 degrees inside. In December, when the temperature dropped to minus 4 degrees, it was a survivable 35 degrees inside, and that was without heat. When the temperature further plunged to minus 7 degrees, Carpenter placed a 600-watt heater inside to mimic a small fire. It warmed the house to a relatively comfortable 47 degrees. The same heat source warmed the structure to around 60 degrees on another winter day when it was 14 degrees on the outside.

"You can see it would not take much to keep the inside of the pithouse comfortable," he said. "This does not even consider what body heat would add." In addition to measuring temperatures by simulating heat from a fire, he and Riley also wanted to know how the Fremonts kept from smoking themselves out. They knew they cleverly used vent systems at the base of their structures to pull in fresh oxygen, but how efficient was the hole at the top for drawing out the smoke?

To test this, Carpenter used colored smoke bombs at various outside wind speeds and at different times of year. The smoke bombs proved that slight breezes of 6-8 miles per hour in the summer and 5 mph in the winter were enough to effectively vent the smoke. By building a scale model of a pithouse and placing it in a wind tunnel, he was able to approximate what he witnessed with the smoke bombs. It turns out that when wind blows across a dome shaped structure, it creates a low pressure area over the opening - just enough to suck out smoke.

Another aspect of fire that intrigues Carpenter and Riley is how common it is to find pithouses that had been burned to the ground, such as the one Riley has been excavating. Why is it that so many of these structures succumbed to fire? Were they deliberately set ablaze by raiding parties or was burning them down part of a ritual when abandoning a home? Answers to those questions eluded them, which is why they intentionally burned it

down last March. They at least wanted to determine, with some certainty, what it would take to reduce one to ashes. They set their creation on fire, in the name of science, to determine how much effort it would take to ignite and how long it would take to burn it down.

They already know a pithouse takes a lot longer to build than what they originally anticipated. They timed the construction every step of the way. For accuracy, Carpenter even built a replica of a primitive wood-carved shovel that the Fremonts likely used in digging out their pits. Shoveling honors were bequeathed to Riley. He began by breaking up the compacted soil with a digging stick and then shoveling through the loosened earth with the dull wooden blade. It took about 30 minutes to remove 75 pounds of soil before they brought in a backhoe to do the rest (12 tons of soil in all was excavated). It was just enough dirt and time to extrapolate that it would have taken at least 211 hours to do what they did with the back hoe in just two hours, not counting an additional hour to dig the four postholes.

And that is just the pit.

“The biggest controlling factor on time is not how long it would take to dig the hole in the ground, but how far to get resources, such as logs, willows and water for the adobe,” Carpenter said.

It seems that close access to riparian areas was not only necessary for Fremont farming, but equally necessary for Fremont home-building, Carpenter said.

That is because these structures, simple as they may appear, are comprised of numerous materials that add up to copious amounts of time when having to find them and haul them out by hand. For example, basing time estimates on a 15-minute walking distance, Carpenter said it would take at least 56 hours for one person to locate, prepare and haul back the 112 poles and four upright posts that were used for the reconstructed pithouse. Cutting, preparing and transporting willows: 32 hours. Tying the willows onto the roof: 21 hours. Hauling 423 gallons of water for the adobe: 70 hours. Mixing the adobe, adding the straw and applying it to the roof: 94 hours.

When you tally it up, a staggering 485 man-hours are needed to build one pithouse. So more likely than not, these structures were built with a lot of help over several days.

“The number of actual days it would take to build such a structure would depend on how many hours per day

was expended with the pithouse, taking into account the need to get food, care for the crops, etc.,” Carpenter said. “A couple of weeks by a small band of several families per pithouse seems reasonable to me. Of course any point in our calculations can be quibbled, but ultimately, none of this is really testable since we don’t have any Fremonts living today in the relatively short and time to these people, whose lifespan averaged only 30 years, was exceedingly precious. Mutual cooperation would allow them to devote more time to other survival needs such as caring for children, planting crops, hunting and building food storage facilities in nearby canyons.

For Riley and Carpenter, all the fresh knowledge they gleaned from the reconstructed pithouse, combined with their work at the Martinez pithouse excavation site, has helped them to fill in knowledge gaps, like adobe on a thatched roof. The fact remains, though, these two detectives are sleuthing over a very cold case.

At this juncture, Riley has not uncovered a complete basket or pot at the Martinez excavation site, nor does he expect to, despite his certainty that the area surrounding the site likely once held many more artifacts than those found in Nine Mile. The problem is that it has been picked through by settlers for more than a century now. Any jaw-dropping finds have likely already occurred or have been slowly dismantled by rodents, wind and erosion.

Nonetheless, real evidence, however small its form, still exists in abundance and that is what keeps Riley, in his floppybrimmed hat, down on hands and knees scrapping and sifting. He knows the ashes he finds points to the wood these Ancients used for cooking and constructing their houses. The seeds, animal bones and pieces of tools he uncovers helps him to paint a clearer picture of diets, preferences and even free-time activities. He knows the more evidence he accumulates, the more complete and compelling will be his narrative of the family who lived here 1,000 years ago.

“They have an important story I want to tell,” he says. “This is a house not that much different from houses today. They were built by people, just like you and me. They deserve our respect. They’re human beings who loved and lusted, fought and died – all the things that we do today.”

~ John DeVilbiss