

An Investigation of the Stone Huts (5SH4041) near Crestone, Colorado

A SENIOR CAPSTONE PROJECT
Presented to
The Department of Anthropology
The Colorado College
Bachelor of Arts

By
Shelby Patrick
May 2020

Abstract

Outside of Crestone, Colorado, a group of stone huts have been the subject of local lore for many years. Despite the speculation surrounding the structures, there has been no conclusive determination of their function or origin. Theories as to the huts' purpose have ranged from ovens to storage units to ceremonial structures. Thoughts on who constructed the stone huts are just as varied. While some local community members believe the huts to be of Native American origin, others have suggested that they are associated with the mining or railroad industry boom that occurred in the San Luis Valley. Examination of historical documents, associated artifacts, analysis of the huts' architecture, and interviews with local community members aided in evaluating the evidence in support of these various interpretations. Ultimately, the interpretation with the most supporting evidence is that the Crestone huts were associated with the 1901 railroad line running from Moffat to Cottonwood that passes through Crestone and by the Crestone huts.

Honor Code

On my honor, I have neither given, nor received, any unauthorized aid on this project. Honor Code Upheld.

Shelby M. Patrick

Acknowledgements

Thank you first and foremost to the town of Crestone for letting me explore this part of the town's history. Thank you to Becky Donlan, Ken Frye, Angie Krall, Tim Fohl, and Barbara Maat for sharing their research and thoughts on the Crestone huts with me. I would also like to thank Adrian Niemetz and his family for donating his work on the huts for future researchers to use. Also, thank you to Aaron Calicutt and Mary Dunn who were invaluable members of the 2010 excavation team along with Adrian Niemetz. Thank you to Dr. Amanda Minervini for her help with Italian translation and for sharing her knowledge of Apulian *trulli*.

Finally, thank you to the Colorado College Department of Anthropology. I would especially like to thank Dr. Scott Ingram for his unwavering support and encouragement throughout my four years at Colorado College. Thank you to the family of Kathleen A. Jones for setting up a memorial fund which provided financial support for this project. Thank you also to my parents and my peers Emma Paradiso, Josh Birndorf, and Madison Wilkinson for their support throughout the capstone process.

TABLE OF CONTENTS

ABSTRACT.....	II
HONOR CODE.....	III
ACKNOWLEDGEMENTS.....	IV
INTRODUCTION.....	1
DESCRIPTION OF THE CRESTONE HUTS.....	2
PREVIOUS WORK ON THE CRESTONE HUTS.....	8
HISTORICAL ARCHAEOLOGY AND THE CRESTONE HUTS.....	10
UTILIZING INFERENCE TO THE BEST EXPLANATION.....	11
PREVIOUS LAND USE OF THE CRESTONE AREA.....	11
RESEARCH METHODOLOGY.....	16
RESULTS.....	17
DISCUSSION.....	50
CONCLUSION.....	53
REFERENCES.....	54
APPENDIX.....	63

TABLES AND FIGURES

Table 1. Crestone huts' dimensions and entrance orientations.....	3
Table 2. Ovens used during railroad construction test implications.....	19
Table 3. Use as explosives storage test implications.....	29
Table 4. Use as ore smelting furnaces test implications.....	33
Table 5. Use as charcoal production ovens test implications.....	38
Table 6. Prehistoric Native American Test Implications.....	42
Figure 1. Crestone Hut #1.....	3
Figure 2. Crestone Hut #2 (With Tail).....	4
Figure 3. Crestone Hut #3 (North Door).....	5
Figure 4. Crestone Hut #4 (Pinion House).....	5
Figure 5. Site Map of the Crestone Huts (5SH4041) and the Lucky/Spanish Townsite.....	6
Figure 6. Location Map of Crestone Huts (5SH4041).....	7
Figure 7. Gunnison County railroad stone oven.....	21
Figure 8. Montana railroad stone oven.....	21

Figure 9. Washington railroad stone oven.....	22
Figure 10. Bread oven in California.....	25
Figure 11. Bread oven in California.....	25
Figure 12. 1930's rock oven in Pietralunga, Umbria, Italy.....	26
Figure 13. <i>Trulli</i> found in Apulia, Italy.....	26
Figure 14. Interior of a <i>trulli</i> , showing the corbelled construction style.....	27
Figure 15. Interior of Crestone Hut #4, showing the corbelled construction style.....	27
Figure 16. Example of a powder keg found near the Crestone huts.....	31
Figure 18. Explosives Magazine in Big Cypress Bayou, Texas.....	32
Figure 19. Reconstructed historic iron furnace in Shawnee National Forest, Illinois.....	36
Figure 20. Historic iron furnace in Bartow County, Georgia.....	36
Figure 21. Capitol City Charcoal Kilns.....	40
Figure 22. Bromide Charcoal Kilns.....	40
Figure 23. Stone constructions in Fayette County, West Virginia.....	46
Figure 24. East coast stone chambe.....	46
Figure 25. East coast cairn.....	47
Figure 26. Corbelled, circular structure found in Vermont.....	48
Figure 27. Manitou stone found in Hut #4.....	64
Figure 28. Biedell Stone Structure.....	64
Figure 29. Basque oven in Mono County, California.....	66

Introduction

Located a few miles outside of Crestone, Colorado, four stone huts have been the subject of local interest for many years (Donlan and Frye 2019). It is unknown what purpose these dome shaped structures were originally built for or who the builders were. To date, usage as baking ovens by railroad workers, explosives storage or ore smelting facilities for the nearby mining town of Lucky/Spanish, ovens for charcoal production, and past usage by Native American communities are the five main interpretations of the huts. Given the variety of interpretations, the goal of this research is to answer the question: Which interpretation of the function and origin of the stone huts near Crestone, Colorado has the most supporting evidence?

Much of the previous research on the huts has been done by local community members, such as Becky Donlan and Ken Frye with Native American Research and Preservation Inc., who have both devoted significant time to investigating the huts on their own. Based on their research, the most widely known interpretation is that these huts are of Native American origin, although others are partial to the explanations centered around industry in the area (Donlan and Frye 2019; Donlan personal communication 2019). In addition to community members' investment, more specific identification of these stone huts and their purpose would fill a gap in the historical record of Crestone, as the huts were likely constructed during a time of major development in Crestone and can provide insight on what activities people were engaging in during that time. If an association with a particular group or industry can be identified, then this research will also add to their documented history.

In order to answer the question of the huts' original function, test implications were developed for each interpretation (Tables 2, 3, 4, 5, and 6). In order to assess these interpretations, evidence was drawn from documentary sources, a review of previous research on

the huts, and interviews with local community members and other informants. Visual comparison of the Crestone huts to other highly likely stone structures associated with the interpretations was also used as a means of assessment. Overall, the most likely interpretation is that the stone huts were constructed by railroad workers to use as ovens during the mid 1800s to the early 1900s. The construction of baking ovens by railroad workers has been seen throughout the United States, especially in the west (Wegars 1991; Culpepper 1998; Rossillon 1984; Costello 1981). While this interpretation has the strongest evidence, there is substantial modern disturbance to the huts which makes a conclusive determination of their function and origin difficult and further research would aid in solidifying the huts' original function.

Description of the Crestone Huts

The four stone huts are located south of Crestone, Colorado within the Baca Grande community (see Figure 5). They are all comprised mainly of Crestone Conglomerate stone with some pegmatitic granite, which are both found locally (Mahan et al. 2015:54). All four huts are dome-shaped and constructed in a corbelled style. Corbelling is an architectural masonry technique where each layer of stones is slightly further out, resulting in a stable dome or arch (Davies and Jokinieme 2008:97). This architectural style is based on the Corbelling Theory, which discusses how, when placed in this pattern, the stones will not collapse inward (Foti et al. 2017:212). Due to the location of the huts within a residential area the huts have been disturbed over the years. Most notably, the top section of Hut #1 has been rebuilt by visitors to the huts (Donlan personal communication 2019). It is also likely that visitors have moved artifacts near the huts, which has been proposed as the reason for low artifact density near the huts (Niemetz et

al. 2010:6). A description of each hut is provided with the name for each used in a 2010 excavation report (Niemetz et al.) in parentheses.

Table 1. Crestone huts' dimensions and entrance orientations.

Hut	Dimensions (Niemetz et al. 2010 for Huts 2-4)	Entrance Dimensions	Entrance Orientation
Hut #1	.6 meters (m) in diameter, 1.9m tall	30.48 centimeters (cm) by 41.91 cm.	West
Hut #2 (With Tail)	7.6 m. in diameter, 3.2 m. tall	43.18 cm. by 38.1 cm.	South
Hut #3 (North Door)	8.8 m. in diameter, 1.4 m. tall	43.18 cm. by 58.42 cm.	South
Hut #4 (Pinion House)	10.2 m. in circumference, the rear is 1.05 m. tall, and the entrance side is 1.8 m. tall	35.56 cm. by 55.88 cm.	South

Hut #1 (Figure 1)

This hut has been the most extensively disturbed by visitors to the area, as the top section of the huts had fallen but was subsequently rebuilt by visitors. As a result, the original shape of this hut cannot be determined.



Figure 1. Crestone Hut #1.

Hut #2 (With Tail) [Figure 2]:

At this hut, in addition to the core dome-shaped structure, there is a line of rocks extending from the northern side of the hut and eventually pointing towards the east. Ken Frye (personal communication 2019) mentioned that there appears to be mud in between the stones on the inside of the hut. Frye also states that he found a projectile point to the south of this hut and inferred it to be thousands of years old (personal communication 2019). To the south of this hut, there is also a stone circle; however, it is undetermined whether this is a modern creation or contemporaneous with the huts. This hut is located 12.2 meters away from Hut #3 (Niemetz et al. 2015:59).



Figure 2. Crestone Hut #2 (With Tail).

Hut #3 (North Door) [Figure 3]:

While this hut still retains the same architectural style, the overall shape is squarer than the other three huts. It is located 24.4 meters away from Hut #4 (Niemetz et al. 2015:39). A grove of juniper and piñon trees is nearby.



Figure 3. Crestone Hut #3 (North Door).

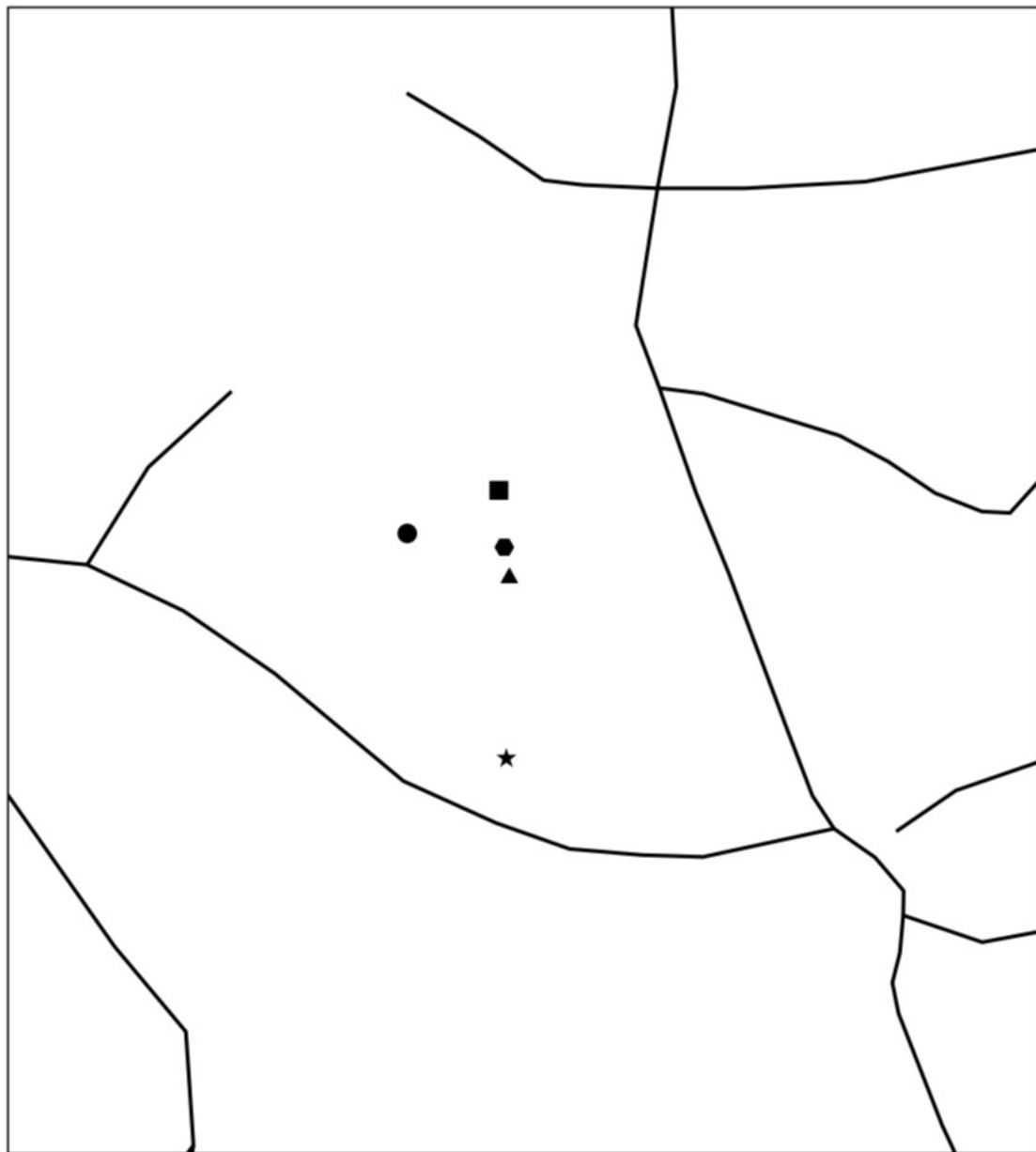
Hut #4 (Pinion House) [Figure 4]:

This hut is built on a slope (Niemetz et al. 2015:6). Unlike the other three huts, there are two small openings in the back wall, but these may have been the result of rocks shifting over time and not an intentional part of the structure.



Figure 4. Crestone Hut #4 (Pinion House).

Figure 5. Site Map of the Crestone Huts (5SH4041) and the Lucky/Spanish Townsite.



Legend

- Hut #1
- Hut #2
- Hut #3
- ▲ Hut #4
- ★ Lucky/Spanish Townsite
- Roads

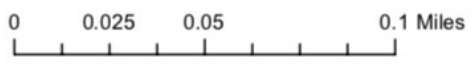
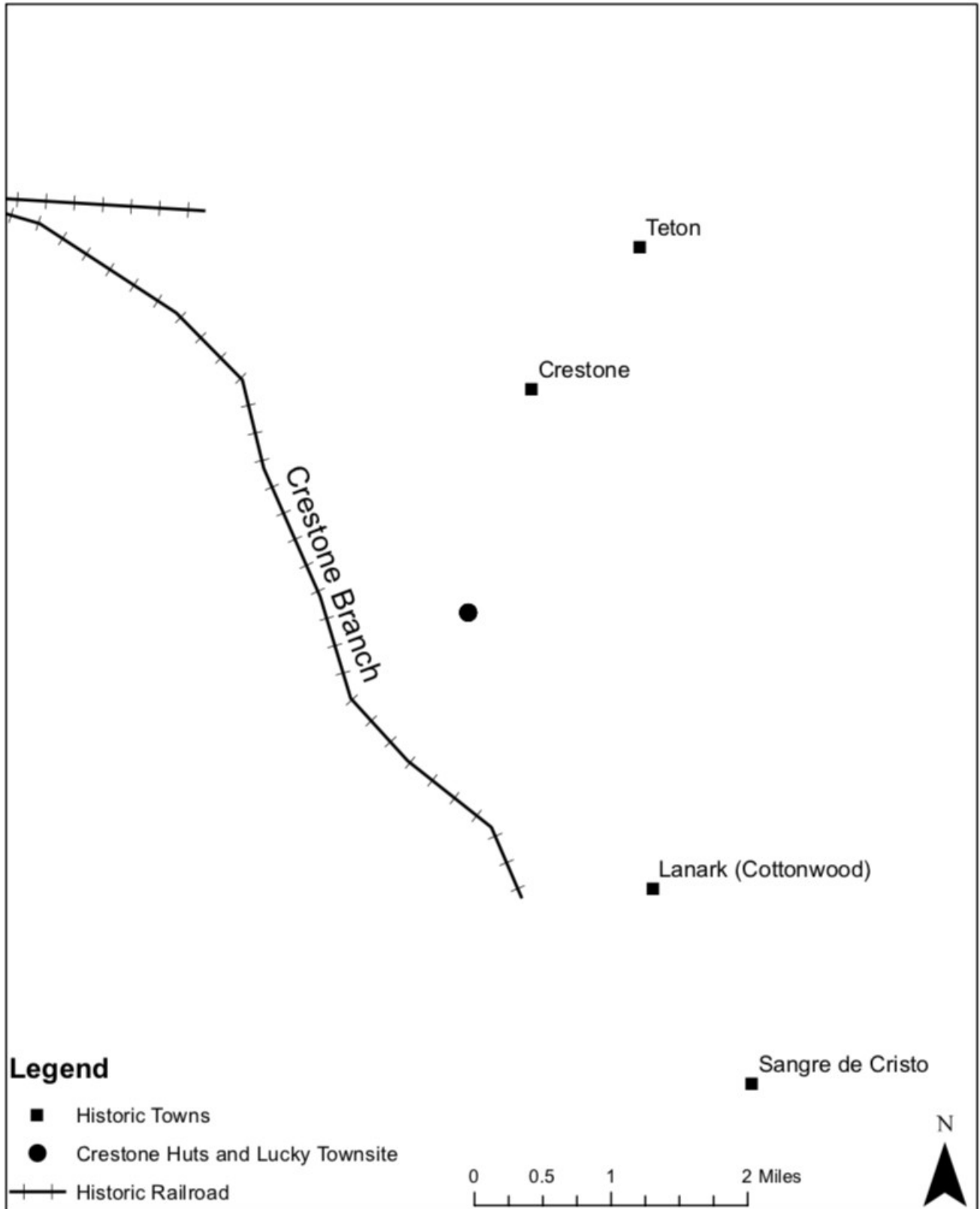


Figure 6. Location Map of Crestone Huts (5SH4041).



Previous Work on the Crestone Huts

Summary of Findings from the 2010 Excavation

In 2010, excavations took place at the huts that resulted in a report on file with the State Historic Preservation Office. The report was commissioned by Native American Research and Preservation, Inc. an organization run by Becky Donlan and Ken Frye. Donlan and Frye commissioned the report due to their personal interest in the site, as they have been independently researching the huts for many years. The Principal Investigator of this project was Adrian L. Niemetz, who was affiliated with Pikes Peak Community College (Niemetz et al. 2010:1). The primary goal of this project was to conduct an “archaeological assessment” of the Greenbelt T-2 Tract B area near Crestone, where the huts are located (Niemetz et al. 2010:3).

During the course of this research, five test pits were excavated around Hut #4 (Pinion House) and three test pits near Hut #3 (North Door) (Niemetz et al. 2010:4, 12, 15, 43). Five soil types were identified throughout the excavation units and non-organic ash was also found fifteen centimeters down in Unit 2 (Niemetz et al. 2010:27, 73). A variety of geologic materials were also noted, such as conglomerate, hornblende, pyrite, diorite, quartzite, granite, quartz, gneiss, sandstone, and serpentine (Niemetz et al. 2010:12-63). Excavation yielded many cultural artifacts and a list of all artifacts and the quantity of each artifact type can be found in the supplementary materials of Niemetz et al. (2010). Specific artifacts that support each interpretation will be discussed in the analysis section. The 2010 research incorporated a variety of methods including pedestrian survey, historical research, and photography (Niemetz et al. 2010:4).

Results of Optically Stimulated Luminescence Dating

In addition to Niemetz et al.'s (2010) investigation of the Crestone stone huts, Shannon Mahan of the U.S. Geological Survey also conducted optically stimulated luminescence (OSL) dating on the huts in 2011. OSL dating entails testing the soil, specifically the quartz grains, underneath the stones for a luminescence signal that can determine when the soil was last exposed to sunlight (Mahan et al. 2015:51; Preusser et al. 2008:96). A comprehensive overview of the methods of OSL dating can be found in Preusser et al. (2008) and Liritzis (2011).

Six samples in total were taken from underneath the large, non-supporting stones of Hut #4 (Pinion House) and Hut #1 (Mahan et al. 2015:54). The OSL dating concluded that the huts were likely constructed between 1860 and 1890 A.D. (Mahan et al. 2015:54, 55, 60). Specifically, the hut Mahan et al. (2015:56, 60) refer to as Hut #1 is 140 plus/minus 15 years and Hut #2 is 130 plus/minus 15 years. These ages were calculated using the Central Age Model (Mahan et al. 2015:56). The plus/minus 15-year uncertainty is reported at a 95% confidence interval with an error rate between 8 and 10% (Mahan et al. 2010:57; Mahan in Niemetz et al. 2010:97). Based on these results, Mahan et al. (2015:60) agree with Niemetz et al.'s (2010) suggestion that the huts are most likely associated with the railroad, although they also mention ore smelting for mining as another possible interpretation.

It is important to note that the local community members researching the stone huts have questioned the validity of this dating due to the potential of the wind in the San Luis Valley disturbing the soil and producing false results (Donlan personal communication 2019). Inaccurate OSL dates have frequently been cited in support of the interpretation that huts are

Native American constructions that predate the historic period (Donlan personal communication 2019). However, the sampling methodology is described in detail in Mahan et al.'s (2015) report and does not address possible contamination from soil particles outside of the sample area as a source of error. Shannon Mahan, who carried out the OSL dating at the Crestone huts, is also the U.S. Geological Survey's only luminescence dating specialist and has headed the USGS Luminescence Geochronology Lab since 1997 (U.S. Geological Survey). Given Mahan's expertise in this dating method and contamination not being mentioned as a possible source of error, it is unlikely that the OSL dates are inaccurate beyond the plus/minus 15 years.

As a whole, multiple studies have also tested the accuracy of dates obtained through OSL dating and shown them to be comparable to Carbon 14 dating. OSL dating has a similar error level, specifically referencing the possibility that OSL dating may underestimate the age, to be expected with other forms of dating (Murray and Olley 2002). An analysis of OSL dating on a site in Russia came to similar conclusions (Murray et al. 2007). Based on these studies, the methodology of OSL dating has been shown to provide sound and accurate dates.

Historical Archaeology and the Crestone Huts

This research on the Crestone huts utilizes the methodology of historical archaeology. Historical archaeology did not become a mainstream subsection of the discipline until the mid to late 1900s and Ivor Noël Hume is often credited with its development into a major category of archaeological work (Orser 2010:113). A basic definition of historical archaeology is that the practice uses archaeology and material culture in conjunction with written documents to answer research questions, instead of relying solely on the material culture (South 1977:1; Walker 1967:24). In the United States, historical archaeology is taken to refer to the period post-

European contact (Cotter 1976:151). The work pertaining to the Crestone huts is focused on the rise of industry in the mid to late 1800s, situating it time wise within historical archaeology. Furthermore, a significant portion of the evaluation of each interpretation was based on documentary evidence, as well as the archaeological record. As a result, this project meets the two major criteria to justify classification as historical archaeology.

Utilizing Inference to the Best Explanation

This project also implements the reasoning strategy of inference to the best explanation (Fogelin 2007:603). This methodological approach is an elaboration on hypothetico-deductive reasoning and has been referred to as “processual-plus”, situated somewhere between processual and post-processual archaeology (Fogelin 2007:604, 622). Essentially, inference to the best explanation is most akin to process of elimination, where explanations with less supporting lines of evidence are systematically eliminated (Fogelin 2007:606, 610, 620). Even if archaeologists are not explicitly implementing this methodology, inference to the best explanation is a common mode of thought that has been used for years (Fogelin 2007:604). In regard to the work on the Crestone huts, the methodology presented in this paper of evaluating evidence in support of each interpretation and eliminating those with less supporting evidence is a classic example of inference to the best explanation reasoning.

Previous Land Use of the Crestone Area

Given the uncertainty surrounding the huts’ function, the original builders may have lived in Crestone at a variety of stages in the area’s history or be associated with a variety of industries. Temporally, a construction date for the huts has been suggested ranging from the prehistoric

period to the early 1900s. Native American groups as well as those associated with the town's burgeoning industries from the 1800s on have been suggested as the original builders. As a result, background knowledge of many aspects of the Crestone area's occupational history and development is necessary. This section on previous land use in the Crestone area also serves as additional justification for the selection of the interpretations, as it provides evidence that the industries associated with the interpretations existed contemporaneously with the Crestone huts and are thus possible builders.

Early Native American Occupation

To date, much of the existing research on the Crestone huts has focused on establishing links between the huts and early Native American groups living in the area. However, a specific group inhabiting the region has not been identified as the potential builder. As such, if the huts are from this period, it is possible that any of the groups living in the region at this time could have built the huts.

One of the first documented archaeological traditions in the area is the "Paleo-Indian" tradition, which dates from 10,000 to 5500 B.C.E. (Guthrie et al. 1984:7). The next identifiable cultural stage is the Archaic stage from 5500 B.C.E. to 500 C.E., which is divided into Early, Middle, and Late Periods (Guthrie et al. 1984:7, 22-24). Following the Archaic Stage is typically the Formative Stage, and ceramic sherds and other material culture from this stage have been recovered in the San Luis Valley (Guthrie et al. 1984:7, 41, 42). Finally, the Protohistoric/Historic Stage dates from 500 to 1800 C.E. (Guthrie et al. 1984:7).

In addition to the previously mentioned cultural traditions, Athabascan migration from Canada and Alaska into the region has been suggested, and the group becomes archaeologically

visible in the mid 1600s C.E. (Seymour 2012; Huscher and Huscher 1942; Wilshusen and Glowacki 2018:317). One of the migration routes suggested runs directly through the San Luis Valley (Seymour 2012:152). A variety of stone construction in the San Luis Valley are thought to have been produced by Athabascans (Huscher and Huscher 1942). These constructions are discussed more fully in the Native American interpretation subsection of the results. Furthermore, comparisons are often drawn between the material culture of Athabascan and Ute sites (Seymour 2012:156). The Apache are also thought to be descended from this group and their language is within the Athabascan family (Wilshusen and Glowacki 2018:317; Tuttle and Sandoval 2002). Ultimately, the San Luis Valley has been occupied for centuries and local community members have often attributed the huts construction to these groups.

Historic Native American Occupation

The two main Native American groups occupying the Crestone area during the historic period were the Utes and the Jicarilla Apache (Jefferson et al. 1972; Opler 1971; SLV Museum Association). Given that the OSL dating places the construction period of the huts in the historic period, the modern indigenous groups occupying the region during that period are also potential builders of the huts.

Although it has been suggested that the arrival of the Ute resulted in the migration and decline of the Ancestral Puebloan tradition, oral history also states that the Ute have occupied the area “since the beginning of time” (Jefferson et al. 1972:91; Southern Ute Indian Tribe). Within the larger Ute tribe, the Capote band lived in the San Luis Valley, which, with the Mouache band, today comprises the federally recognized Southern Ute tribe (Jefferson et al. 1972:vii, viii; Southern Ute Indian Tribe; SLV Museum Association). In addition to the Ute, the Jicarilla

Apache also have a long history in Colorado and the San Luis Valley (Opler 1971:310). As discussed previously, the Apache are thought to be descended from the Athabascans due to their linguistic similarities (Wilshusen and Glowacki 2018:317; Tuttle and Sandoval 2002; Tiller 1983:4). The distinct cultural group known today as the Jicarilla Apache emerged around 1700 C.E. (Tiller 1983:4, 5). Within the Jicarilla Apache, there are two bands: the Llaneros, who lived in the Sangre de Cristos, and the Olleros, who lived west of the Rio Grande (Tiller 1983:4; Opler 1971:310, 311; Opler 1936:202, 203).

Mining at Crestone and Lucky/Spanish

Beginning in 1870, mining became an increasingly prominent industry in the Crestone area and the huts' association with this industry has also been suggested (Sisemore 1983:13, 15). William Gilpin's 1877 purchase of land in the Crestone area from the Denver and Rio Grande Railway Company ushered in an era of intense mining in the Crestone area, with gold as the main product (Simmons 1979:184). During this period, mining in the Crestone area was relatively unregulated (Simmons 1979:185). Unofficial mining largely ended in Crestone in 1890, and the Crestone Mining District was established in 1900 (Sisemore 1983: 18, 19). One of the largest mines in the Crestone area was the Independence mine, near Cottonwood, which was located approximately .93 miles away from the Crestone huts (Sisemore 1983:22; Harlan 1976:96; The Diggings). Additionally, several ore extraction mines were built in and around Crestone during the mid to late 1800's (Harlan 1976:107). Another short-lived mining boom came in 1900 when the San Luis Valley Land and Mining Company purchased the land (Sisemore 1983:76).

One of the main settlements in the Crestone area associated with mining is the small town of Lucky, sometimes also known as Spanish, which is located 100.8 meters from the stone huts (Simmons 1999:186; Calicutt in Niemetz et al. 2010). The development of Lucky/Spanish was motivated by the Demmick-Mattison Company's discovery of quartz nearby, and the company was subsequently purchased by George Adams in 1897 (Harlan 1976:112, 113). In 1898, George Adams had illegal miners evicted from the land following his victory in a Supreme Court case that sought to have the area designated as private land (Shaw v. Kellogg 1898; Christman and Short 2013:12, 13; Sisemore 1983:25). Given Adams' ownership, Lucky/Spanish was considered a legal settlement and was allowed to remain. The town served as a place to process ore coming in from the Independent mine nearby and, as of 1898, three hundred people were living in the town (Harlan 1976:112, 113). Although today the site of Lucky/Spanish consists of rusted cans and a dilapidated structure, at one point the town had a dance hall, a dairy, a barber shop, and a livery stable (Sisemore 1983:104; Harlan 1976:113). Eventually, mining began to slow in the area and by 1902 all of the mines in the Crestone area were no longer operating (Harlan 1976:106). It has been suggested that the huts were associated with the town and were used for explosives storage or ore smelting during the mining heyday (Donlan and Frye personal communication 2019).

The Railroad Industry in Crestone

From the beginning, the mining industry and the burgeoning railroad industry were intertwined, and the Crestone area is no exception (Fraser 1997). Construction in the San Luis Valley began during the late 19th century and was mainly comprised of narrow-gauge railroads (Zepelin 2019). In 1882, a railroad line to Moffat was established, and this remained the closest

railroad to Crestone and Lucky/Spanish for almost two decades (Harlan 1976:102; Simmons 1999:168). Eventually a railroad linking Moffat to Cottonwood, with a stop in Crestone, was constructed in 1901 in order to increase the productivity of mines in the area (Christman and Short 2013:15; Zepelin 2019; Ormes 1976:331; Sisemore 1983:28; Simmons 1999:169, 186; Harlan 1976). The segment from Moffat to Crestone was approximately 16.96 miles of track. (Poors Manual of Railroads 1914:1233). Part of the railroad line passed approximately a mile from the Crestone huts (see Figure 6). After 1921, the railroad was no longer in use (Harlan 1976:100).

Research Methodology

Development of Interpretations

Five interpretations as to the possible function of the huts are examined in this paper. The initial interpretations were based on Niemetz et al.'s report (2010:65-69) which lays out several broad interpretations for the huts such as a Celtic origins theory, the ancient origins theory, a historic origins theory, and a possible association with the railroad. A subsequent conversation with Becky Donlan aided in refining the interpretations. Donlan (personal communication 2019) addressed various interpretations that have been considered over the years such as the huts' association with Native American groups or the railroad, as well as their possible use for powder storage or as charcoal kilns. Additionally, documentary research on historic period stone constructions in the western United States influenced the selection of the railroad, charcoal production, and mining interpretations as stone structures were found in conjunction with these industries throughout the 1800's (Wegars 1991; Zeier 1987; Fell and Twitty 2006). Overall, the interpretations were developed based on prior academic research on the huts, conversations with

those who have personally researched the huts for years, and documentary research on industries that have used stone constructions.

Development of Test Implications

After determining the five interpretations, the next step was to develop test implications for each. These test implications were developed from reviewing literature discussing confirmed/highly probable stone constructions associated with each interpretation. Test implications that involved measurements or architectural style were developed based on the most common, representative type of construction within that category. If the type of structure used was highly variable, such as in the case of explosives storage, this is noted in the results section. The Native American test implications were also developed from conversations with Becky Donlan and Tim Fohl, an archaeologist based in Massachusetts who researches stone constructions on the east coast, in addition to documentary research. A detailed explanation of each source from which test implications were drawn is provided in the results subsections.

Collection of Evidence from the Crestone Huts

An initial visit to the Crestone huts in September 2019 also allowed me to visually inspect the huts as well as the Lucky/Spanish townsite nearby. During this visit, the huts, portions of the Lucky/Spanish townsite, and associated artifacts were photographed. No excavation occurred during this visit. A second visit to the huts occurred in February 2020. Again, no excavation occurred during this visit.

Results

Each interpretation was assessed based on how well the evidence matched with the test implications that were developed for each interpretation. The results from this analysis are presented in a table within each subsection. The main source of evidence was drawn from a physical inspection of the Crestone huts. Photos of other stone constructions were also drawn from documentary sources that described confirmed/highly probable stone structures for each interpretation and a comparison between these and the Crestone stone huts is present in the discussion of each interpretation. The sections discussing the huts' possible association with the railroad or Native American groups also contain anecdotal evidence. This section begins with discussing the most likely interpretation first, and then the other, less likely, interpretations are discussed throughout the rest of the section.

Analysis of Railroad Association Interpretation

The most likely interpretation is that the huts are associated with the railroad industry. Stone constructions associated with railroads have been found in many states, including Colorado (Wegars 1991; Rossillon 1984; Baumler 2013; Big Bend Railroad History 2008; Wegars 1993). Huts associated with railroads are usually thought to be ovens, and their construction has been attributed to a variety of ethnic groups, with Italian railroad workers being the most common (Wegars 1991; Rossillon 1984; Big Bend Railroad History 2008; Wegars 1993). There is also some evidence that suggests that Italian railroad workers could be responsible for the Crestone huts as they have in other cases where railroad ovens are found.

The test implications for this interpretation were developed based on an article (Wegars 1991) that examines domed rock ovens associated with railroads throughout the western United States. This article provides a list of the most common and frequently seen architectural characteristics of railroad-related domed rock ovens (Wegars 1991:37, 38). The description of

the common characteristics is based on photos of inferred railroad-related domed rock ovens, archaeological reports of railroad camps, and other archaeological journal articles that discuss the domed rock ovens in association with railroad camps (Wegars 1991). Given that the article discusses a variety of domed rock structures throughout the western United States, the characteristics provided were taken to be fairly representative of these structures. However, there is likely slight variation between domed rock ovens depending on the builders and the specific requirements needed at each site.

Table 2. Ovens used during railroad construction test implications.

Test Implications (Wegars 1991)	Evidence from Crestone Huts	Meets Expectations
Typically 1 to 2 meters in height, 1 to 3 meters in diameter	Huts range from 3.2 to 1.05 meters in height and 10.2 to 7.6 meters in diameter (Niemetz et al. 2010)	No
Built with local stone	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015:54)	Yes
Built using dry-laid masonry	Construction style used to build Crestone huts	Yes
Dome-shaped	Dome-shaped	Yes
Doorway in front with stone lintel	All 4 huts have a doorway, 2 of the huts have a lintel	Yes
Will appear unmortared	Crestone huts do not appear to have mortar	Yes
Likely will not have blackening on the inside	Crestone huts do not have blackening on the inside	Yes

The interpretation that the huts were related to the railroad is plausible, given the activity taking place in the region during the mid to late 1800's and early 1900's. Although the OSL date range was determined to be from 1860 to 1890, there is a 15-year window of uncertainty on either ends of those dates (Mahan et al. 2015:54, 60). The railroad line from Moffat to Cottonwood, which passes through Crestone, was built in 1901 and runs parallel to the town site of Lucky/Spanish (Ormes 1976:331; Christman and Short 2013:15; Zepelin 2019; Sisemore

1983:28; Calicutt in Niemetz et al. 2010:84). Given the window of uncertainty for the OSL dates, it is possible that the huts were built during the 1901 construction of the railroad.

Excavations in 2010 also resulted in the discovery of many historic period artifacts dating from the 1800's (Niemetz et al. 2010). Although these artifacts all date to the 1800's and were found near the huts, it is important to note that none were found directly inside of the huts. Therefore, it is impossible to tell whether they were placed there during the construction and use period of the huts, or at an earlier or later period. The artifacts found in several excavation units outside of Hut #3 and Hut #4 and include two penny wire nails dated to 1890 at the earliest, ceramic bowl fragments with an earliest date of 1810, an aluminum tack head with an earliest date of 1903, amethyst glass with an earliest date of 1854, a bottle cap with an early date of 1856, a .32 caliber cartridge with an early date of 1878, clear glass with an early date of 1864, and a horseshoe nail with an early date of 1890 (Niemetz et al. 2010:27, 43, 47, 53). The OSL dates do provide a more likely and/or certain construction date than the artifacts found around the huts, although the artifacts can be used as supplementary evidence.

Of the seven test implications, the Crestone huts meet six of the criteria. Although the Crestone huts do have a larger diameter than the ovens Wegars (1991) described, the construction style is the same. There is also no blackening on the inside of the Crestone huts, which Wegars (1991:38) states is a frequent occurrence in railroad ovens as the resulting ash was either purposely raked out or has dispersed over time. Additionally, the short occupation period of most camps has also been posited as another reason for the minimal blackening on the inside of railroad ovens (Wegars 1991:38). Ultimately, the Crestone huts meet six out of the seven test implications.

A visual comparison of the Crestone huts to inferred railroad ovens also suggests that this is the most likely interpretation. In Colorado, a stone oven was found at the Lake Fork Canyon railroad camp in Gunnison County (Figure 7) and in Summit County (Rossillon 1984; Buckles 1976 as cited in Wegars 1991:47). Ovens associated with the railroad have also been found in Montana (Figure 8), Washington (Figure 9), and Idaho (Baumler 2013; Big Bend Railroad History 2008; Wegars 1993).

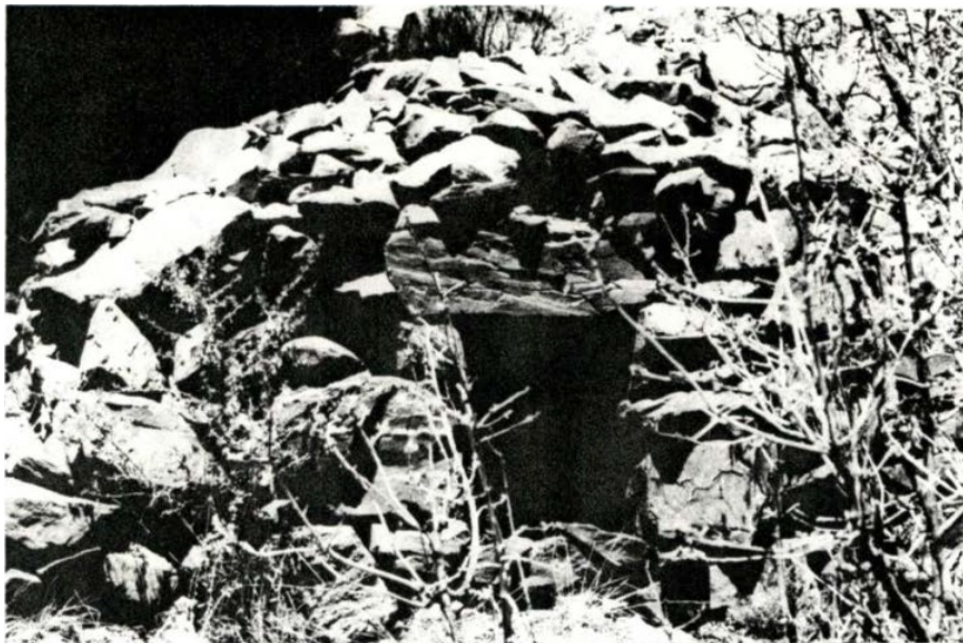


Figure 7. Gunnison County railroad stone oven. Credit: Rossillon (1984).



Figure 8. Montana railroad stone oven. Credit: Baumler (2013).



Figure 9. Washington railroad stone oven. Credit: Big Bend Railroad History (2008).

The Crestone huts' construction style is very similar to Figures 7, 8, and 9. They are all dome-shaped, made from dry-laid masonry, and have similarly shaped doorways. In all of the huts, the stones used are not smooth, such as brick, and appear to be locally sourced stone as in the case of the Crestone huts. Also, after seeing a picture of the huts, Priscilla Wegars, the author

of the article from which the test implications were drawn, thought they were likely Italian rock ovens (personal communication 2019). Overall, the Crestone huts appear very similar to other confirmed railroad-related ovens and Wegars' identification provides additional evidence for this interpretation.

Based on the Crestone huts' congruence with the test implications, the huts' construction overlapping with the railroad construction in the area based on the OSL dating, and the visual similarity to other inferred railroad ovens, it is likely that the Crestone huts were used as ovens for railroad workers.

Possible Italian influence

In many cases, the construction of historic period stone ovens has been attributed to Italian railroad workers who used the structures as ovens to make bread (Wegars 1991:44-49). Historically, railroad-related ovens have been attributed to a variety of different ethnic groups, such as Chinese, Scandinavian, Greek, and Italian immigrants (Wegars 1991:42-49). After reviewing the evidence in support of each interpretation for the ethnic origins of these structures, Wegars (1991:44-49, 55) concluded that Italians were most likely the primary builders. Additionally, Italian immigrants were present in Colorado during the time period of the huts' construction, although this was in addition to many other ethnic groups as well (Carter and Mehls 1984:96-98; Sherard 2005). This section will discuss the various lines of evidence that suggest that Italian immigrants may have built the Crestone huts.

Bread production was a main element of Italian culture into the 1800s, and a handbook on southern Italian lifeways describes the value placed on homemade bread (Williams 1938:53).

Bread was usually cooked in an outside stone oven, called a *forne*llo (Williams 1938:59). It has been suggested that Italian immigrants built stone ovens as a way to maintain their cultural identity (Culpepper 1998). The fact that bread was also a relatively inexpensive and easy food to prepare has been suggested as a reason the practice continued in the United States (Rossillon 1984:119). Additionally, bread was not typically available to buy in stores until the 1930s so many Italian immigrants relied on stone ovens to make their own bread (Costello 1998:66). Bread has a long history in Italy and it not implausible to think that Italian immigrants would want to bring this cultural tradition with them. The role of bread as an essential part of Italian-American culture can be seen even in modern representations and stories (Curto 2015).

Throughout the western United States, Italian immigrants frequently worked on the railroad and Colorado was no exception. Often, they were classified as contract laborers who most commonly worked on the railroads or in mines (Carter and Mehls 1984:96). The area of southeastern Colorado, including Saguache County where the huts are located, also experienced an influx of Italian immigrants from 1840 to 1945 (Carter and Mehls 1984:96). A record of Denver and Rio Grande Railway Employees states that many railroad employees were born in Italy and were old enough to have plausibly worked on the construction of the Moffat to Cottonwood line (Sherard 2005). However, as this record does not explicitly say what line the employees worked on, it is not definitively known if Italian railroad workers worked in the Crestone area, but it remains a possibility.

Many of the ovens discussed in the visual comparison have also been attributed to Italian immigrants. For example, the oven in Gunnison County, Colorado (Figure 7), is thought to have been constructed by Italian railroad workers given their “distinctive Mediterranean style” (Rossillon 1984:104). Rossillon, an employee of Midwest Archaeological Center and the author

of a report on a historic railroad camp in Marion, Colorado, cites the predominance of Italian railroad workers in the west as evidence for their involvement in constructing the ovens (1984:104). Consistent with the traditional interpretation that these ovens were used to bake bread, Rossillon (1984:56) suggests that the Gunnison County structures were used for this purpose. The ovens in Summit County, Colorado and Boundary County, Idaho are also thought to have been built by Italian immigrants (Buckles 1976 as cited in Wegars 1991:47; Wegars 1993:8). Additionally, although not associated with the railroad, oral histories from the descendants of Italian immigrants in Calaveras County, California, describe the use of outdoor, stone ovens to bake bread in the early 1900's (Figures 10 and 11; Costello 1998). The California ovens were often much larger than the Crestone huts, but represent a similar baking technique as to what would have likely been used in the Crestone huts, nonetheless.



Figure 10. Bread oven in California. Credit: Costello (1998).



Figure 11. Bread oven in California. Credit: Costello (1998).

In other cases where an Italian affiliation is suspected, the railroad ovens have been compared to huts found in Italy. The Crestone huts and other railroad-related ovens are constructed using a corbelled technique and Scheuermeier (as cited in Wegars 1991:45-46) describes the *trulli*, which are corbelled domes found in Apulia, Italy (Figure 13). Furthermore, Dr. Amanda Minervini, a professor in the Italian department at Colorado College, noted the Crestone huts' similar architectural style to stone structures found in her home region of Apulia (personal communication 2019).



Figure 12. 1930's rock oven in Pietralunga, Umbria, Italy. Credit: Dr. Jakob Stämpfli, Verlag Stämpfli et Cie, Bern (as cited in Wegars 1991:45).

The architectural style of Apulian *trulli* is discussed in detail by Miosi (2018). A visual comparison of typical Apulian *trulli* (Figures 13 and 14) reveals the similar techniques to the Crestone huts, specifically the corbelled technique which can most evidently be seen in the interior of the Crestone huts (Figure 15). The corbelled construction style, with each layer of stone progressively overhanging more and more to create a dome, can be seen in both Figure 14 and Figure 15 (Davies and Jokiniemi 2008:97; Foti et al. 2017:210).



Figure 13. *Trulli* found in Apulia, Italy. Credit: Miosi (2018:219).



Figure 14. Interior of a *trulli*, showing the corbelled construction style. Credit: Miosi (2018:219).



Figure 15. Interior of Crestone Hut #4, showing the corbelled construction style.

Although the Crestone huts are constructed in a less ornate manner, it is possible that some of the traditional construction styles used in Italy were adapted by immigrants to fit the materials at hand. There are certainly similarities in architectural styles between traditional Italian stone structures and the Crestone huts, although the Crestone huts are not open at the top as the *trulli* are. However, it is important to note that the construction of corbelled domes is a common architectural style that has been seen throughout the world and is utilized by many different cultural groups (Löbbecke 2013).

Conclusion

The most likely interpretation for the Crestone stone huts is that they are associated with the railroad and were possibly built by Italian immigrant railroad workers. Not only do the Crestone huts meet six of the seven test implications, they are also very visually similar to other confirmed railroad-related structures. Furthermore, there are documented huts in Italy that are constructed in the same architectural style and resemble the Crestone huts. Although the Italian connection appears likely based on a visual comparison of the confirmed Italian railroad ovens, no documentary sources mention Italian immigrants specifically working on the Moffat to Cottonwood line. Despite this, compared to the other interpretations, the idea that the huts are railroad-related has the most supporting evidence.

Analysis of Mining Interpretation

If the huts are related to mining, there are two possible interpretations for the huts' function: storage facilities for explosives or ovens for ore smelting. These interpretations were developed based on prior academic research on the huts, interviews with those who have

researched the huts for years, and documentary historical research on the use of kilns in other areas of Colorado. However, it is unlikely that any of these interpretations were the huts' intended purpose.

The OSL dating does support this interpretation as it suggests that the huts could have built during the period of continuous mining activity in the area from 1870 into the early 1900s (Harlan 1976:106; Sisemore 1983:13, 15). The plethora of historic artifacts further supports the interpretation that the huts were built in the mid to late 1800's and are possibly associated with mining (Niemetz et al. 2010). Based on the likely construction dates for the huts alone it is plausible that they were built in association with mining.

Explosives Storage

One of the main components needed for a mining operation is explosives, as they were used to move rock as needed for the mines (Fell and Twitty 2006:150). The use of explosives also required that mining operations built a safe place to store the explosives while not in use. These storage facilities are commonly known as explosives magazines (Fell and Twitty 2006:150).

Test implications for this interpretation were drawn mainly from a report on historic mining in Colorado developed for the National Park Service (Fell and Twitty 2006), a textbook detailing the explosives used for mining (International Library of Technology 1907), and personal communication with local community members. A section of the report for the National Park Service specifically discusses the mining technology used in Colorado from 1858 to 2006 (Fell and Twitty 2006). The section provides a list of the most common architectural characteristics of properly built explosives facilities (Fell and Twitty 2006:150). Two of the test implications were developed based on a general description of explosives magazines found in a

textbook targeted towards engineering and mining professionals (International Library of Technology 1907). The description of explosives magazines is not specific to Colorado, but rather discusses the general storage requirements for explosives, specifically gunpowder and dynamite used for mining purposes (International Library of Technology 1907:36-10, 36-21, 36-22). The final test implication of powder kegs in association is to be expected if this interpretation is correct, and local informants and the previous report (Niemetz et al. 2010) noted the presence of powder kegs in the area. While these test implications represent the most common characteristics of explosives magazines, explosives magazines were highly variable due to the large financial commitment needed to properly build magazines (Fell and Twitty 2006:151). Smaller scale operations often lacked the financial means to construct properly built magazines and utilized whatever materials they had in order to store their explosives, resulting in structures that do not conform to these test implications (Fell and Twitty 2006:151). It is possible this occurred at Lucky/Spanish due to the small size of the operation.

Table 3. Use as explosives storage test implications.

Test Implication	Evidence from Crestone Huts	Meets Expectations
Proximity to a historic mine/mining camp	Located 100.8 meters from Lucky/Spanish site	Yes
Powder kegs in association	Seven “Laflin & Rand Powder Co.” powder kegs were located in the area of the huts (Calicutt in Niemetz et al. 2010:79). These were manufactured between 1869 and 1912 (Hagley Museum and Library).	Yes
Typically 12 by 20 feet (Fell and Twitty 2006:150)	Huts range from 10.2 to 7.6 meters in diameter and from 3.2 to 1.05 meters tall (Niemetz et al. 2010)	No
Arched roofs (Fell and Twitty 2006:150)	Huts are dome-shaped with a circular roof, instead of a roof built on multiple, successive arches (Build; Trust for Architectural Easements)	No

Iron doors (Fell and Twitty 2006:150)	Not present on the Crestone huts	No
Constructed with brick or concrete (Fell and Twitty 2006:150)	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015:54)	No
Well-ventilated (International Library of Technology 1907:36-10, 36-21, 36-22)	One door, gaps between rock could provide ventilation	No
Ventilation able to be closed off (International Library of Technology 1907:36-10)	Door appears to be permanently open, but something could have been placed over it	Unable to be determined

Out of the eight test implications, the Crestone huts meet two. It is important to note that the test implication which describes how the ventilation systems must be able to be closed, was unable to be determined. It is possible that the opening on the front of the huts could have been closed off by placing something in front of it and this material is no longer visible. The huts do meet the test implication of being located near a historic mining camp as the Lucky/Spanish town site is 100.8 meters away. Powder kegs have also been found in the same area as the huts; however, none of the kegs were found inside the huts which makes determining their direct association with the huts difficult. During the September 2019 visit to the site, only a few powder kegs were observed, but it is possible that more were there in previous years and they have been moved by visitors to the site. The Crestone huts do not meet any of the architectural test implications and are constructed in a much simpler style than explosives magazines typically were. Overall, based on the lack of evidence supporting the Crestone huts' similarity to typical explosive magazine construction, it is unlikely that the huts were built for this purpose.



Figure 16. Example of a powder keg found near the Crestone huts.

Visual inspection of the Crestone huts compared to confirmed explosives magazines also suggests that huts were not built for this purpose. A confirmed explosives magazine from Victor, Colorado (Figure 17) and from Big Cypress Bayou, Texas (Figure 18) can be seen below.



Figure 17. Victor, CO explosives magazine. Credit: Western Mining History.



Figure 18. Explosives Magazine in Big Cypress Bayou, Texas. Credit: Preservation Texas (2014).

The Victor, Colorado explosives magazine is much larger than the huts and features more sophisticated architecture. The Crestone huts also do not feature an iron door, a brick roof, or mortared stone as seen here. Compared to the explosives magazine in Big Cypress Bayou, Texas the Crestone huts are not constructed with brick and are dome-shaped, rather than rectangular. Based on this visual comparison and the vastly different architectural styles, it seems unlikely that the Crestone huts were used to store explosives.

Although the style seen in Victor, Colorado is the most common, there was a significant range in the construction style of explosives magazine. As mentioned previously, it is possible that the Crestone huts were simply poorly built explosives magazines and that is why they do not meet the majority of the test implications. Further investigation of this interpretation could result in additional evidence in support of the huts' use as explosives magazines, but currently, there is stronger evidence for other interpretations.

Ore Smelting

One of the other possible interpretations for the Crestone huts is that they were used for ore smelting. Often with hard rock mining, the profitable metals need to be smelted in order to separate them from the crude ore (Fell and Twitty 2006:151). Typically, ore smelters contained a center fuel column where the crude ore, often mixed with lead, was poured around fuel (Fell and Twitty 2006:151). The crude ore was then heated which caused the ore to melt and then trickle down to a collection area in the furnace (Fell and Twitty 2006:151).

Test implications for ore smelters were drawn from the report on historic mining in Colorado developed for the National Park Service (Fell and Twitty 2006). As with the test implications for explosives magazines, a section in the report discusses the most common characteristics of ore smelting furnaces used in Colorado during the mid to late 1800s and early 1900s (Fell and Twitty 2006:151). Additionally, while not directly concerned with the furnaces' architecture, the test implications of an abundant source of water, well-graded roads, and acres of flat space are all very typical needs that ore smelting operations in Colorado required and that most ore smelting sites had (Fell and Twitty 2006:152). Again, it is important to note that although these characteristics are the most common and it is possible that smelting furnaces varied slightly by operation.

Table 4. Use as ore smelting furnaces test implications.

Test Implications	Evidence from Crestone Huts	Meets Expectations
Proximity to a historic mine/mining camp	Located 100.8 meters from Lucky/Spanish site	Yes
Constructed using cylindrical steel vessels in order to contain both the fuel and crude ore (Fell and Twitty 2006:151)	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015:54)	No
Typically 4 to 12 feet in diameter (Fell and Twitty 2006:151)	Huts range from 10.2 to 7.6 meters in diameter (Niemetz et al. 2010)	Yes
Near a source of abundant	No large water source near the	No

water (Fell and Twitty 2006:152)	Crestone huts	
Near well-graded roads (Fell and Twitty 2006:152)	Roads nearby are modern constructions and historic roads in the San Luis Valley were not built by Crestone (Sisemore 1999:154)	No
Near acres of flat space (Fell and Twitty 2006:152)	Uneven ground near the huts with small slopes	No
Built into a slope to utilize gravity to bring melted ore into collection area (Fell and Twitty 2006:152)	Huts are built on relatively flat ground, not into the side of a slope or hill	No

Out of the seven test implications, the huts meet two, making it very unlikely that they were used for this purpose. While as discussed throughout this section, the huts were located near the mining camp of Lucky/Spanish and mining was occurring in the region, the construction style of the Crestone huts is vastly different from typical smelting furnaces. In regard to building materials, the huts are made of stone whereas smelting furnaces were typically cylindrical steel vessels (Fell and Twitty 2006:151). However, ore smelting furnaces were typically four to twelve feet in diameter and all four of the huts are within this range (Fell and Twitty 2006:151, Niemetz et al. 2010). The Crestone huts are also not located in an area that has qualities desirable for smelting operations. Although the huts do not meet the majority of the test implications, gold ore was reportedly found in front of Hut #2 (Niemetz et al. 2010). Despite the gold ore, given that the huts do not meet the majority of the test implications, it is unlikely that they were used as smelting furnaces.

The impact of ore smelting productions can also be seen in the soil. This section specifically addresses the effect of smelting gold ore, which is the ore extracted from the Independence mine and processed at Lucky/Spanish (Harlan 1976:112). Often mining and the associated processes can cause heavy metals to leach into the surrounding soil (Abdul-Wahab

and Marikar 2011:305). Heavy metals can also affect ground water, as happened at the Smelertown processing facility in Salida, Colorado (Office of Solid Waste, U.S. Environmental Protection Agency 1995:37). Despite the smelting processes occurring at Smelertown beginning in 1902, the effects of heavy metal pollution continued to affect the surrounding environment into the late 1990s (Office of Solid Waste, U.S. Environmental Protection Agency 1995: 37, 38). Although the geologic analysis of the soil surrounding the Crestone huts is limited to that associated with the OSL dating, no contamination of the soil was reported during that dating process (Mahan et al. 2015). It is possible that additional geologic analysis of the soil would result in a similar type of pollution experienced at other smelting facilities.

Although there are intact, historic smelting furnaces throughout the United States no specific photos of the furnaces could be located. The photographs are of the overall site and building, rather than specific photos of machinery. However, although Fell and Twitty (2006) describe Colorado smelting furnaces as being made from steel, there are two examples of iron furnaces made from stone: one in the Shawnee National Forest in Illinois (Figure 19) and one in Bartow County, Georgia (Figure 20) (Hidden Springs Ranger District; Holmes).



Figure 19. Reconstructed historic iron furnace in Shawnee National Forest, Illinois. Credit: Hidden Springs Ranger District.



Figure 20. Historic iron furnace in Bartow County, Georgia. Credit: Roadside Georgia (2003).

Although made of stone unlike most smelting furnaces, these structures are much larger than the Crestone huts. The entrance is also much more pronounced, and the structures are rectangular, whereas the Crestone huts are dome shaped. The visual comparison of the huts does not suggest that the huts were used as ore smelting furnaces.

Conclusion

While usage as either explosives storage facilities or smelting furnaces have been suggested as possible interpretations for the Crestone huts, both of these interpretations are unlikely. The Crestone huts do not meet the majority of the test implications for both cases and the visual inspection reveals that typical explosives magazines and ore smelters are constructed differently. Although the huts' association with mining is a reasonable assumption given their proximity to Lucky/Spanish and the mining activity occurring in the region during this time period, ultimately the huts are unlikely to have been used for mining purposes.

Analysis of Charcoal Production Interpretation

Another interpretation is that the huts were used for charcoal production. The use of above ground ovens for this purpose in the mid to late 1800's has been documented in Nevada (see Zeier 1987) and at multiple sites in Colorado, such as the Capitol City and Bromide Charcoal Kilns. Charcoal production is often associated with mining, specifically the smelting process (Toole et al. 1961; Zeier 1987:81). Given the mining taking place in the Crestone region during the late 1800's, if the huts were used for charcoal production it was likely associated with this industry (Henderson 1926:208). The rest of this section will address the evidence in support of this interpretation of the huts' function.

Test implications for this interpretation were developed based on an assessment of confirmed charcoal kilns in Eureka, Nevada (Zeier 1986) as well as Toole et al.'s (1961) report "Charcoal Production, Marketing, and Use." Although charcoal production kilns have been found in other parts of Colorado, there is little literature that discusses the specific architecture of stone structures associated with charcoal production in Colorado. As a result, all of the test implications, except for one, were based on charcoal production in general throughout the United States. In an article focusing on the charcoal production industry in Eureka, Nevada and to some extent the larger Great Basin region, Zeier (1987:84) discusses the most common characteristics of surface kilns used for charcoal production in that area. Toole et al.'s (1961:iii) report was developed for the United States Department of Agriculture and provides an overview of charcoal production throughout the country, focusing on "masonry-type kilns". Although this report mostly focuses on charcoal production in the mid-1900s, there is a section dedicated to discussing the most common characteristics of beehive shaped kilns in the late 19th century (Toole et al. 1961:6).

Table 5. Use as charcoal production ovens test implications.

Test Implications	Evidence from Crestone Huts	Meets Expectations
Charcoal found in/around the huts	407 pieces of charcoal found around the huts (Niemetz et al. 2010)	Yes, but has not been dated to the same period as the huts
Concentration of pinion/juniper in the area (Zeier 1987)	113 pinion husks found around the huts, although these cannot be dated to a specific time period (Niemetz et al. 2010)	Yes, but has not been dated to the same period as the huts
Beehive shaped (Toole et al. 1961:6, Zeier 1987)	Huts are dome-shaped, with not as sharp a slope	No
16 to 26 feet in height (Zeier 1987)	Huts range from 3.2 to 1.05 meters tall (Niemetz et al. 2010)	No
Made of masonry blocks, bricks, field stones, and reinforced concrete (Toole et al. 1961:11)	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015:54)	No
Opening in the ceiling (Toole et al. 1961:6)	Not present on Crestone huts	No
Vent holes near the bottom (Zeier 1987)	Not present on Crestone huts	No
Smooth, no gaps between stones (History Colorado “Capitol City Charcoal Kilns”)	Some gaps between stones, outside is not smooth	No
Located near a perennial stream (Buckles 1978:883-884 as cited in Zeier 1987:84)	Spanish Creek is located 190 meters away.	Yes

Given that the primary reason for charcoal production was the mining industry, the huts should be constructed during the late 1800’s in order to support this interpretation. The OSL dates provided in Mahan et al. (2015) for the hut’s construction do place the huts as being built during the mid to late 1800’s and there many historical artifacts from this time period, which supports the interpretation that the huts could have been used as charcoal ovens (Niemetz et al. 2010).

Based on the Crestone huts' comparison to this set of test implications, it is unlikely that they were used for charcoal production. Out of the eight test implications, evidence from the Crestone huts only meets three of the eight. Two of the test implications that were met were the presence of charcoal in/around the huts and if there was a concentration of pinion or juniper in the area. Both of these test implications are focused on the actual burning of wood in order to produce the charcoal, rather than an architectural style as the other six are. Niemetz et al. (2010) did find 407 pieces of charcoal and 113 pinion husks around the huts. While on a surface level the presence of charcoal does support this interpretation, this charcoal has not been dated to a certain time period and the possibility that this is the remains of a modern campfire cannot be ruled out. On the same note, while charcoal production operations in the Great Basin commonly burned pinion in order to produce charcoal and it is plausible that this method was also practiced in the San Luis Valley, the pinion husks found near the huts also have not been dated to a particular time period (Zeier 1987:83). While technically the test implications are met, the presence of charcoal and pinion provides minimal support for the interpretation.

The huts also do not meet the rest of the test implications dealing with architecture as they are constructed in a very different style than typical charcoal kilns as described by both Zeier (1987) and the Toole et al. (1961) report. Beginning in the late 1800's, there was a shift from using earthen kilns to using beehive-shaped stone kilns (Toole et al. 1961:6). Although constructed of stone, the Crestone huts do not meet any of the other construction criteria typical of these beehive kilns. Ultimately, the Crestone stone huts do not meet five out of the eight test implications for charcoal production kilns.

The difference in construction between the Crestone huts and confirmed charcoal kilns also becomes apparent during a visual inspection. Charcoal kilns are present throughout

Colorado with two of the most well-known sites being the Capitol City Charcoal Kilns in Hinsdale County (Figure 20) and the Bromide Charcoal Kilns in Moffat County (Figure 21) (History Colorado “Capitol City Charcoal Kilns”; History Colorado “Bromide Charcoal Kilns”). The Capitol City Charcoal Kilns were built in 1877 and the Bromide Charcoal Kilns were built in 1898 and are representative of the typical construction style during this period (History Colorado “Capitol City Charcoal Kilns”; History Colorado “Bromide Charcoal Kilns”).



Figure 21. Capitol City Charcoal Kilns. Credit: History Colorado “Capitol City Charcoal Kilns”.



Figure 22. Bromide Charcoal Kilns. Credit: History Colorado “Bromide Charcoal Kilns”.

In comparison to these kilns, the Crestone stone huts are much smaller and do not have as large an opening in the front. The Crestone huts are also more rounded at the top as opposed to a more conical shape as in the above photos. Furthermore, the Capitol City Charcoal Kilns are built with brick and the surface of the kiln is smooth, whereas the Crestone huts are built with irregularly shaped stones and the outside is rough. The construction style is more similar to the Bromide Charcoal Kilns, although there is still a large size difference between the two. Both the Capitol City Charcoal Kilns and the Bromide Charcoal Kilns also have a very defined oval entrance which is lined with vertically placed stones. The Crestone huts have a relatively oval-shaped entrance, but the stones are horizontally, not vertically placed, at the entrance. Instead, the Crestone huts continue to have a corbelled pattern near the entrance. Overall, there is little resemblance between the Capitol City and Bromide Charcoal Kilns and the Crestone huts.

Based on both the incongruence with the test implications and the dissimilarity between confirmed charcoal kilns in the region and the Crestone huts, it is unlikely that the huts were built for charcoal production. Although this industry was operating in the mid to late 1800's and the huts were likely built during that time period, there is limited evidence otherwise to support this interpretation.

Analysis of Native American Construction Interpretation

Local community members who have been researching the huts are proponents of the interpretation that the huts were constructed by Native American groups for ceremonial purposes or for use as sweat lodges (Frye and Donlan 2016). In the 2010 report on the huts, this interpretation was referred to as the "ancient origins" theory, as much of the previous work has been focused on proving a connection with early Native American groups. Currently, stone

structures on the east coast that are thought to be related to Native American groups have been much more extensively documented than those in the west, although other stone structures in the San Luis Valley have been ascribed a Native American origin. Both the east coast and the other San Luis Valley structures are discussed in this section. Given that quantity of literature on the east coast structures much of the evidence, such as the visual comparison section, is focused on those. Interviews with Becky Donlan, a local community member, and Tim Fohl, an archaeologist working in Massachusetts, also were a main source of evidence for this interpretation.

Although the huts have often been ascribed a prehistoric origin, no specific group has been named as the most likely builder. Furthermore, much of the evidence that has been presented in support of this interpretation is not testable archaeologically. Due to both of those factors, only limited, general test implications were able to be developed. Evidence that should be noted but does not rise to the level of a test implications is still included in the narrative description below. One of the test implications was developed due to the expectation that artifacts predating a historic construction would be expected if the huts were used during the prehistoric period. The astronomical alignment test implication was developed from conversations with Tim Fohl as well as his written work on the subject. He states that these alignments can be seen on other Native American stone constructions (personal communication 2019; Fohl 2007).

Table 6. Prehistoric Native American Test Implications.

Test Implications	Evidence from Crestone Huts	Expectations Met?
Artifacts predating a historic construction	<ul style="list-style-type: none"> • Sherd of Taos ware and two sherds of Ute pottery with an approximate date of 750 C.E. (Niemetz et al. 2010) • Late Archaic projectile point with an approximate date of 1000 B.C.E. 	Yes

	(Niemetz et al. 2010:64)	
Astronomical alignments	Alignment to the winter solstice sunset and to the 260-day Mesoamerican calendar present	Yes

Although the OSL dating placed the huts in the historic period, those who believe that the huts are prehistoric Native American constructions believe that the OSL dating is inaccurate and that the sediment sample was compromised by the strong winds in the San Luis Valley (Donlan personal communication 2019). While there are numerous historic period artifacts in association with the huts, these have also been attributed to area's reuse by later occupants (Donlan personal communication 2019). In support of a prehistoric construction date, a sherd of Taos ware and two sherds of Ute pottery were found by Niemetz et al. (2010). All of the sherds had an approximate date of 750 C.E. An isolated find of a Late Archaic projectile point with an approximate date of 1000 B.C.E. was also found in the area (Niemetz et al. 2010:64). As with the historic period artifacts in the area, all of these prehistoric artifacts were found outside of the huts which weakens their association. Additionally, prehistoric artifacts are found throughout the landscape in the San Luis Valley which also casts doubt on these artifacts' direct association with the huts' construction. While they may be from the construction period of the huts, this is difficult to determine. Overall, the OSL dating does not suggest an affiliation with prehistoric Native American groups, although there are prehistoric artifacts found in the area.

Additional evidence that has been presented in support of a prehistoric interpretation includes a line of stones protruding from the back of Hut #2. This formation has been suggested to resemble a turtle, which is a symbol commonly used in Native American constructions (Donlan personal communication 2019; Fohl personal communication 2019; Fohl 2007:32). Another stone alignment named Snake Nest is located on private property and a direct line can

be drawn from the Crestone huts to Snake Nest (Donlan personal communication 2019). This alignment has been presented as further evidence that the huts were constructed by Native American groups. Although these alignments have been presented evidence to support a Native American origin and are important to note, they are not testable in terms of developing archaeologically based test implications.

Astronomical Alignments

The huts' astronomical alignments are a main piece of evidence presented by proponents of the "ancient origins" theory. Tim Fohl observed that the entrance of Hut #1 is aligned to the sunsets of August 12th and April 30th, dates that form the basis of the Mesoamerican calendar (Donlan and Frye 2019). Additionally, the entrance of Hut #4 is aligned to the winter solstice sunset. Astronomical alignments have been seen in other regions as well. In New England, multiple stone constructions, such as the Bear's Den site in Upton, Massachusetts and the King Philip's Rock site in Sharon, Massachusetts, that were possibly built by Native American groups also have astronomical alignments (Fohl personal communication 2019; Ballard and Mavor 2006). These two sites have been cited as evidence for Native American use of stone constructions in conjunction with astronomical alignments. Often these stone structures are ascribed a ceremonial purpose (Ballard and Mavor 2006). Additionally, some Native American sites near Cortez, Colorado, have been found to have astronomical alignments with solstices or attempts to align the structures with astronomical features (Fohl and Fohl 2007:32, 33). Given that many sites with astronomical alignments are thought to have been built by Native Americans, the Crestone huts' astronomical alignment to the winter solstice has been taken as evidence of their association with Native American groups.

Other Stone Constructions in the San Luis Valley

Other stone constructions in the San Luis Valley besides the Crestone huts have been documented in a 1943 report. Within the San Luis Valley, there are seven stone constructions, which the report calls hogans, that were generally described as having “curved walls of dry-laid masonry” (Huscher 1943:5). One specific structure was 3.9 meters in diameters and the entrance was .8 meters wide (Huscher 1943:10). While these dimensions are similar to the size of the Crestone huts, the stone construction described by Huscher (1943:10) had a depression in the floor that was .8 meters deep, a feature that is not present on the Crestone huts. Huscher (1943:10) also described a “light, conical roof analogous with [a] wikiup or tipi”, not a solid stone roof as is present on the Crestone huts. In terms of the builders of these stone constructions, Huscher (1943:70-88) suggests that they could have been constructed at any point over a 2,000-year period, although she believes that they were likely built by Athapaskan migrants. Ultimately, while both the Crestone huts and the structures described by Huscher (1943) are made of dry-laid masonry and have similar dimensions, the similarities stop there, making it unlikely that they were built by the same group.

Comparable Structures on the East Coast

The comparison of the Crestone huts to sites in the east that are thought to be Native American constructions is also a main line of evidence for this interpretation. For example, Tim Fohl has reported that the Narragansett tribe frequently builds stone structures similar to the Crestone huts (personal communication 2019). Many types of stone structures in the east have been attributed to Native American groups and a comprehensive listing can be found in Fohl

(2007). One of these east coast structures that most closely resembles the Crestone huts was found in Fayette County, West Virginia (Figure 23) (Smithsonian Institute, Bureau of Ethnology 1891:408; Donlan 2019). The Smithsonian Bureau of Ethnology report describes these stone constructions as “burial chambers” built by Native American groups (Smithsonian Institute, Bureau of Ethnology 1891:29, 408).

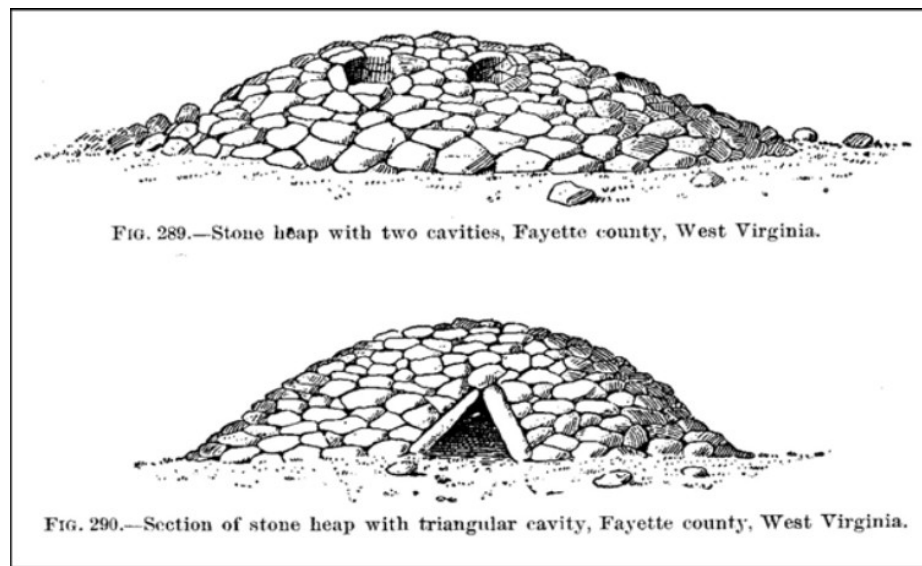


Figure 23. Stone constructions in Fayette County, West Virginia. Credit: Smithsonian Institute, Bureau of Ethnology (1891:408).

The Fayette county structures do resemble the Crestone huts in architectural style. Currently, there is no archaeological evidence that the Crestone huts were used for burials, but consultation with descendant communities may provide additional information. The Crestone huts can also be compared to stone chambers and cairns found in the east, with the stone chambers (Figure 24, Figure 25) most closely resembling the Crestone huts (Fohl 2007; Mavor and Dix 1989; Hoffman 2018).



Figure 24. East coast stone chamber. Credit: Hoffman (2018:Plate 13).

Hoffman equates many of these chambers to either the Algonquin terms *hassanegk*, meaning a cave lined with stones, or *pesuponck* which refers to a sweat lodge (Williams as cited in Hoffman 2018:89). Although suggested by local informants, the Crestone huts use as a sweat lodge is unlikely, as the internal size of the structures as well as the size of the openings (see Table 1) would make it difficult for multiple people to get in and out, as well as stay in the structure for prolonged periods. Hoffman (2018:89, Plate 11) also describes a cairn (Figure 25) that has a similar shape and construction style to the Crestone huts, although it is not hollow.



Figure 25. East coast cairn. Credit: Hoffman (2018:Plate 11).

Both Hoffman (2018) and Mavor and Dix (1989:83, 91) attribute the construction of these stone chambers to Native American groups in the region, rather than European settlers.

Giovanna Neudorfer (1980), the former Vermont State Archaeologist, also undertook a comprehensive study of stone chambers in the state to determine their origins. In her study, Neudorfer (1980:22) did record one corbelled, circular structure (Figure 26) which would be most architecturally similar to the Crestone huts. Overall, Neudorfer (1980) disagrees with Hoffman (2018) and Mavor and Dix's (1989) interpretation that the structures are of Native American origin. She concluded that the 52 total recorded structures, including the corbelled structure, are all most likely associated with settlers' occupation in the area during the 18th century and many functioned as root cellars (Neudorfer 1980:56).



Figure 26. Corbelled, circular structure found in Vermont. Credit: Neudorfer (1980).

While the majority of the sites used for comparison are found on the east coast, Fohl also reported that near Cortez, Colorado that there are hut-like structures which he believes were used

for vision quests by Native American groups (personal communication 2019). No additional information has been found on these structures.

Ambiguity of East Coast Structures

While those such as Fohl, Hoffman, Mavor, and Dix believe that it is possible that Native American groups built these structures, there has been reluctance to attribute these structures to Native American groups as opposed to historic settlers (Fohl personal communication 2019). For example, the Massachusetts Historic Commission has stated that stone structures are “not associated with the Native American settlement of Massachusetts” (Secretary of the Commonwealth of Massachusetts). This position is reinforced in the article “Stones That Speak: Forgotten Features of the Landscape” which provides historic period explanations for all possible rock structures in the area and a firm refutation of the possibility that Native American groups built these structures (Massachusetts Department of Conservation and Recreation 2007). Others have stated that a bias toward historic period archaeology and more “traditional archaeological resources” may have resulted in many rock structures being overlooked, especially the possibility that these structures are associated with Native American groups (Moore and Weiss 2016:44, 45, 47). They have also noted a lack of clear State Historic Preservation Office guidelines for how to record and document these features throughout many states (Moore and Weiss 2016). Although more research has been done on stone structures in the east and they function as the main source of comparison to the Crestone huts, there is still ambiguity over whether they were built by Native American groups (Moore and Weiss 2016).

Historic Native American Interpretation

As the OSL dates place the huts' construction in the historic period, it is possible that Native American groups occupying the region during this period were the original builders. The Ute and Jicarilla Apache were still occupying this land into the mid 1800's when the huts were likely built (Jefferson et al. 1973; Southern Ute Indian Tribe; Mahan et al. 2015). While it is chronologically possible that the huts were built by Native Americans in the historic period, there is currently little available documentary information relating to either the Ute or Jicarilla Apache building these types of structures and thus no test implications were developed for this interpretation. Traditionally, the Ute utilized wooden constructions, such as wickiups and tree platforms, rather than stone constructions (Martin et al. 2006; Horn 1999:3). The Jicarilla Apache have not been known to use stone constructions, although the larger Western Apache group has used stone to construct sweat lodges, ramadas, and storage structures (Opler 1936:205; Herr 2013:685). Despite their use of these structures, the Western Apache are not known to have lived in the San Luis Valley, making it unlikely that they were responsible for the Crestone huts. No documentary or photographic sources that detail the use of constructions similar to the Crestone huts by either the Ute or Jicarilla Apache groups has been found. As a result, it is currently inconclusive whether historic period Native Americans were responsible for the Crestone huts. Consultation with Ute and Jicarilla Apache community members is necessary for a more complete interpretation of the Crestone huts. It is possible that, although there is not clear archaeological evidence to indicate that the Ute or Jicarilla Apache were responsible for the huts, Native community members have knowledge of these structures.

Conclusion

As there is little evidence for these types of structures in the west and there is doubt regarding the east coast structures' affiliation with Native American groups, it is uncertain

whether the Crestone huts were built by Native Americans. It is important to note that the terrain and environment is significantly different on the east coast than in Colorado, which would likely result in differing construction styles between the two locations. While there is some similarity to the east coast structures and a definite astronomical alignment, a historic period function, such as the huts' associated with the railroad, is a more plausible interpretation.

Discussion

The results indicate that the Crestone stone huts were most likely associated with the railroad. The Crestone huts meet six out of seven test implications for this interpretation, whereas they only meet two or three for all of the other interpretations. In addition, the Crestone huts visually resemble other railroad ovens. The huts' vastly different construction style to stone structures associated with mining, charcoal production, or Native American groups indicate that these are not likely interpretations. Niemetz et al. (2010:68) also stated that there is a "high" possibility that, in their opinion, the huts were built by railroad workers. After conducting optically stimulated luminescence dating on the huts, Mahan et al. (2015) also proposed a historic period construction date for the huts, which aligns with railroad activity in the area.

Although it is likely that the Crestone huts are railroad-related, their specific association with Italian railroad workers is still ambiguous. While Italians are the main builders of many other railroad-related ovens and there are architectural similarities between the Crestone huts and Italian *trulli* and *fornellos*, there are few documentary records specifically linking Italian railroad workers to the Crestone area. Without this information, a definitive link between the Crestone huts and Italian railroad workers cannot be established and this association is still speculative.

Weaknesses

One limitation of this work is that the Crestone huts and the surrounding area have been disturbed by secondary cultural formation processes. In general, cultural formation processes are defined as “processes of human behavior that affect or transform artifacts after their initial period of use” (Schiffer 1987:7). For example, Hut #1 is known to have been rebuilt in the modern era and it is possible that rebuilding has also occurred to some extent on the other huts. Artifacts in the area may have also been disturbed and therefore their original provenience cannot be established. Additionally, there are differing resolutions of provenience that will influence the type of archaeological interpretation that can be drawn from artifacts (Lyman 2012:211, 212). As a result of disturbance to the area, artifacts found near the Crestone huts have a mid-level resolution, which means that although it is known they are from the general site, the specific area they originated from cannot be determined (Lyman 2012:211, 212). The removal of certain artifacts from the site can influence how the chronology of a site is interpreted (Schiffer 1987:116). For a full discussion of the effects of artifact removal see Schiffer (1987:114-120). It is also possible that the huts have been reused over the years, possibly obscuring clues to their original function. Ultimately the disturbance to the site and the possibility of unknown reuse of the huts, complicate the process of identifying the huts’ original function.

In addition to the disturbance caused by secondary cultural formation processes, there is also a gap in the documentary record in terms of specific information about the Crestone huts. No primary sources that directly mention the Crestone huts were able to be located. As a result, while utilizing test implications and a visual comparison of the huts was the best possible approach, there is an inherent level of uncertainty when using this method. Although the Crestone huts may be visually similar and meet many of the characteristics, without primary

documentation the interpretation that the huts were associated with the railroad is only an inference.

Additional Research Needed

Additional research on Italian immigrants working on the railroads throughout Colorado would aid in solidifying the huts' potential association with this group. Interviews with descendants of Italian railroad workers may reveal other information that is currently not documented and cannot be determined from material culture. Consultation with Ute and Jicarilla Apache descendant community members could also aid in illuminating the Crestone huts' potential connection to those groups.

Furthermore, there has been doubt over the validity of the OSL dating due to the thought that the test sediment could have been contaminated. In order to resolve this debate, an additional round of OSL dating could be done or an alternate technique known as surface luminescence dating could also possibly clarify the huts' likely construction dates. Due to time restrictions and other factors, surface luminescence dating was not able to be completed as part of this project.

Conclusion

The central goal for this paper was to explore which interpretation for the original function of the Crestone stone huts has the most supporting evidence. After the evaluation of five possible interpretations, it is most likely that the Crestone huts were built by railroad workers, and possibly by Italian immigrants. While there is certainly remaining ambiguity due to the modern disturbance of the site, this research has hopefully aided in advancing the research on the Crestone stone huts. Additional research on the industries of the San Luis Valley, and Crestone

specifically, would provide valuable information for the analysis of the Crestone stone huts. Furthermore, as much of the supporting documentation for various interpretations and visual comparisons was based on other stone structures, additional research on these types of sites throughout the western United States would be beneficial. Ultimately, although additional research is needed, this paper has advanced the study of the Crestone huts and provides an overview of possible interpretations for future researchers.

References

- Abdul-Wahab, Sabah Ahmed and Fouzul Ameer Marikar
 2011 The Environmental Impact of Gold Mines: Pollution by Heavy Metals. *Central European Journal of Engineering* 2(2):304-312.
- Ballard, Edwin C. and James W. Mavor Jr.
 2006 A Case for the Use of Above Surface Stone Constructs in a Native American Ceremonial Landscape in the Northeast. *NEARA Journal* 40(1):33-45.
- Baumler, Ellen
 2013 Mystery Ovens. *Montana Moments* (blog), April 29, 2013.
<http://ellenbaumler.blogspot.com/2013/04/mystery-ovens.html>, accessed 11/29/19.
- Big Bend Railroad History
 2008 The Great Northern Rock Ovens Between Quincy and Trinidad. *Big Bend Railroad History* (blog), July 28, 2008.
<http://www.bigbendrailroadhistory.com/2008/07/great-northern-between-quincy-and.html>, accessed 11/29/19.

Build

- n.d. Arched roof. Electronic document, <https://build.com.au/arched-roof>, accessed January 27, 2020
- Carter, Carol Joe and Steven F. Mehls
1984 *Colorado Southern Frontier Historic Context*. Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.
- Christman, Abbey and Melanie Short
2013 *The Baca Ranches: Baca National Wildlife Refuge – South Central Colorado*. The Center of Preservation Research, University of Colorado Denver. Submitted to U.S. Fish and Wildlife Service: Region 6.
- Costello, Julia G.
1981 Gold Rush Archaeology: Excavating the Mother Lode. *Archaeology* March/April: 18-26.
- Costello, Julia G.
1998 Bread Fresh from the Oven: Memories of Italian Breadbaking in the California Mother Lode. *Historical Archaeology* 32(1):66-73.
- Cotter, John L.
1976 Historical Archaeology: An Introduction. *Archaeology* 29(3):150-151.
- Culpepper, William Stacy
1998 Rock Bake Ovens: Material Culture Constructed to Preserve Social Heritage and a Medium for Assimilation. Master's thesis, Department of Anthropology, University of Montana, Missoula.
- Curto, Kathy
2015 Bread and Belonging. *Italian Americana* 33(2):200-207.
- Davies, Nikolas and Erkki Jokiniemi
2008 *Dictionary of Architecture and Building Construction*. Architectural Press, Oxford.
- The Diggings
n.d. Independence Silver Mine, Crestone, Colorado. Electronic document, <https://thediggings.com/mines/usgs10012939/map>, accessed February 4, 2020.
- Dixon, Kelly J. and Carrie Smith
2017 Rock Hearths and Rural Wood Camps in Jīnshān/Gām Saan: National Register of Historic Places Evaluations of 19th-Century Chinese Logging Operations at Heavenly Ski Resort in the Lake Tahoe Basin. In *Historical Archaeology Through a Western Lens*, edited by Mark Warner and Margaret Purser, pp. 138-173. Society of Historical Archaeology.

Donlan, Becky and Ken Frye

2019 The Mystery of the Stone Huts. *The Crestone Eagle*. 1 April. Crestone, CO.

Engleman, Jenny

2020 "Should I pick it up?": Unexploded ordnance, railroad stories, and charcoal production on the Pike-San Isabel National Forest. Paper presented at the 42nd Annual Meeting of the Colorado Council of Professional Archaeologists, Pueblo, Colorado.

Fell, James E. and Eric Twitty

2006 *The Mining Industry in Colorado*. James E. Fell and Mountain States Historical. Submitted to State Historic Preservation Office, Colorado Historical Society. Copies available from United States Department of the Interior, National Park Service.

Fohl, T.

2007 Sampler of ceremonial structures in New England.

Fohl, T. and N. Fohl

2007 Northeast and Southeast.

Fogelin, Lars

2007 Inference to the Best Explanation: A Common and Effective Form of Archaeological Reasoning. *American Antiquity* 72(4):603-625.

Foti, Pilade, Aginaldo Fraddosio, Nicola Lepore, Mario Daniele Piccioni

2017 On the Mechanics of Corbelled Domes: New Analytical and Computational Approaches. *Research on Engineering and Structures and Materials* 3:210-226.

Frye, Ken and Becky Donlan

2016 Ceremonial Areas of South Park & the San Luis Valley, Colorado.

Guthrie, Mark R., Powys Gadd, Renee Johnson, and Joseph J. Lischka

1984 *Colorado Mountains Prehistoric Context*. Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Hagley Museum and Library

n.d. Laflin & Rand Powder Co. Electronic document, <https://museumcollection.hagley.org/persons/2842>, accessed February 4, 2020.

Harlan, George

1976 *Postmarks and Places*. Adobe Village Press, Colorado.

Henderson, Charles W.

- 1926 *Mining in Colorado: A History of Discovery, Development, and Production*. Professional Paper No. 138. Department of the Interior, U.S. Geological Survey, Washington D.C.

Herr, Sarah A.

- 2013 In Search of Lost Landscapes: The Pre-Reservation Western Apache Archaeology of Central Arizona. *American Antiquity* 78(4):679-701.

Hidden Springs Ranger District

- 2008 Illinois Iron Furnace Historic Site. Electronic Document, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5106335.pdf, accessed January 10, 2019.

History Colorado

- 2016 Bromide Charcoal Kilns. *History Colorado*. Electronic document, <https://www.historycolorado.org/location/bromide-charcoal-kilns>, accessed 12/14/2019.

History Colorado

- n.d. Capitol City Charcoal Kilns. *History Colorado*. Electronic document, <https://www.historycolorado.org/location/capitol-city-charcoal-kilns>, accessed 12/14/2019.

Hoffman, Curtiss

- 2018 *Stone Prayers: Native American Stone Constructions of the Eastern Seaboard*. Arcadia Publishing, England.

Holmes, Mason

- n.d. No Title. Electronic document, Georgia Historical Society, <https://georgiahistory.com/wp-content/uploads/2019/06/Mark-Anthony-Coopers-Iron-Works-Mason-Holmes.pdf>, accessed January 11th, 2019.

Horn, Jonathon C.

- 1999 Ute Material Culture During the Historic Period as Represented by Sites in the Montrose Area. Paper presented at the Colorado Council of Professional Archaeologists Meeting, Glenwood Springs, CO.

Huscher, Betty H. And Harold A. Huscher

- 1942 Athapaskan Migration via the Intermontane Region. *American Antiquity* 8(1):80-88.

Huscher, Betty H.

- 1943 *The Hogan Builders of Colorado*. Colorado Archaeological Society, Gunnison.

International Library of Technology

- 1907 *Rock Boring, Rock Drilling, Explosives and Blasting, Coal-Cutting Machinery, Timbering, Timber Trees, Trackwork*. International Textbook Company, Scranton.
- Jefferson, James, Robert Delaney, and Gregory Thompson
1973 *The Southern Utes: A Tribal History*. Southern Ute Tribe, Ignacio.
- Liritzis, Ioannis
2011 Surface Dating by Luminescence: An Overview. *Geochronometria* 38(3):292-302.
- Löbbecke, Renate
2013 *Corbelled Domes*. Walther König, Köln.
- Lyman, R. Lee
2012 A Historical Sketch on the Concepts of Archaeological Association, Context, and Provenience. *Journal of Archaeological Method and Theory* 19:207-240.
- Mahan, Shannon A., Rebecca A. Donlan, and Barbara Kardos
2015 Luminescence dating of anthropogenic features in the San Luis Valley, Colorado: From stone huts to stone walls. *Quaternary International* 362:50-62.
- Martin, Curtis, Richard Ott, and Nicole Darnell
2006 *The Colorado Wickiup Project Volume III: Recordation and Re-evaluation of Twelve Aboriginal Wooden Structures in Eagle, Garfield, Mesa, and Rio Blanco Counties Colorado*. Dominquez Archaeological Group. Submitted to The Colorado Historical Society, Contract No. 2006-M1-013 and Bureau of Land Management, Contract No. 1422CA30007. Copies available from the Colorado Wickiup Project.
- Marvin, Judith and Julia Costello
2014 *CA-MNO-2476/H (UPDATE)*. Foothill Resources, Ltd. Submitted to the State of California Department of Parks and Recreation. Copies available from the State of California Department of Parks and Recreation.
- Massachusetts Department of Conservation and Recreation
2007 *Stones That Speak: Forgotten Features of the Landscape*. Terra Firma, Vol. 5. Massachusetts Department of Conservation and Recreation's Historic Landscape Preservation Initiative, Boston, MA.
- Mavor Jr., James W. and Byron E. Dix
1989 *Manitou: The Sacred Landscapes of New England's Native Civilization*. Inner Traditions International, Rochester.
- Miosi, Marco
2018 Lito-poesi: Per un'antropologia delle capanne in pietra a secco pugliese. *Anuac* 7(2):205-226

Moore, Charity M. and Matthew Victor Weiss

- 2016 The Continuing “Stone Mound Problem”: Identifying and Interpreting the Ambiguous Rock Piles of the Upper Ohio Valley. *Journal of Ohio Archaeology* 4:39-72.

Murray, Andrew Sean and Jon M. Olley

- 2002 Precision and Accuracy in the Optically Stimulated Luminescence Dating of Sedimentary Quartz: A Status Review. *Geochronometria* 21:1-16.

Murray, A.S., J.I. Svendsen, J. Mangerud, and V.I. Astakhov

- 2007 Testing the Accuracy of Quartz OSL Dating Using a Known-Age Eemian Site on the River Sula, Northern Russia. *Quaternary Geochronology* 2:102-109.

Neudorfer, Giovanna

- 1980 *Vermont's Stone Chambers: An Inquiry Into Their Past*. Vermont Historical Society, Barre.

Niemetz, Adrian L., Aaron Calicutt, Mark Izold, and Shannon Mahan

- 2010 *Crestone Stone Huts/Lucky Town site (5SH4041) and Isolated Find (5SH4042): An Archaeological Assessment, Crestone, Colorado, June-August 2010*. Pikes Peak Community College. Submitted to Native American Research and Preservation, Inc.

Office of Solid Waste, U.S. Environmental Protection Agency

- 1995 Human Health and Environmental Damages from Mining and Mineral Processing Wastes. Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Opler, M.E.

- 1936 A Summary of Jicarilla Apache Culture. *American Anthropologist* 38(2):202-223

Opler, Morris E.

- 1971 Jicarilla Apache Territory, Economy, and Society in 1850. *Southwestern Journal of Anthropology* 27(4):309-329.

Ormes, Robert M.

- 1976 *Tracking Ghost Railroads in Colorado: A Five-Part Guide to Abandoned and Scenic Lines*. Century One Press, Colorado Springs.

Orser Jr., Charles E.

- 2010 Twenty-First-Century Historical Archaeology. *Journal of Archaeological Research* 18(2):111-150.

Poor, H.V. and H.W. Poor

- 1914 Poor's Manual of Railroads, 1914. HathiTrust Digital Library.
<https://catalog.hathitrust.org/Record/000636903>, accessed January 28, 2020.

Preservation Texas

- 2014 Jefferson Ordnance Magazine. Electronic document,
<http://www.preservationtexas.org/jefferson-ordnance-magazine/>,
 accessed January 30, 2020.

Preusser, Frank, Detlev Degering, Markus Fuchs, Alexandra Hilgers, Annette Kadereit, Nicole Klasen, Matthias Krbetschek, Daniel Richter, and Joel Q.G. Spencer

- 2008 Luminescence dating: basics, methods and applications. *Eiszeitalter und Gegenwart Quaternary Science Journal* 57(1/2):95-149.

Roadside Georgia

- 2003 Cooper's Iron Works. *Roadside Georgia*, November 16th, 2003.
<http://roadsidegeorgia.com/site/cooperiron.html>, accessed January 10, 2020.

Rossillon, Mary P.

- 1984 *The Curecanti Archeological Project: The Archeology of Marion, an Historic Railroad Camp in Curecanti National Recreation Area, Colorado*. Midwest Archaeological Center Occasional Studies in Anthropology No. 9. United States Department of the Interior, National Park Service, and Midwest Archeological Center, Lincoln, Nebraska.

Schiffer, Michael B.

- 1987 *Formation Processes of the Archaeological Record*. University of Utah Press, Salt Lake City.

Secretary of the Commonwealth of Massachusetts

- n.d. Review and Compliance. Electronic document,
<http://www.sec.state.ma.us/mhc/mhcrevcom/revcomidx.htm>, accessed December 3, 2019.

Seymour, Deni J.

- 2012 Gateways for Athabascan Migration to the American Southwest. *Plains Anthropologist* 57(222):149-161.

Shaw v. Kellogg, 170 U.S. 312 (1898).

Sherard, Gerald E.

- 2005 Railway Employee Records for Colorado Volume III. Electronic document,
https://history.denverlibrary.org/sites/history/files/Railway_Employee_Records_for_Colorado-Volume_III.pdf, accessed January 9th, 2020.

SLV Museum Association

- N.d. The Utes — Los Indios del Valle. Electronic document, <https://www.museumtrail.org/the-utes.html>, accessed January 21, 2020.
- Simmons, Virginia McConnell
1979 *The San Luis Valley: Land of the Six-armed Cross*. Pruett Publishing Company, Boulder, Colo.
- Sisemore, Gladys
1983 *Drillin', Loadin', and Firin': in Crestone with the "old timers!"*. Self-published.
- Smithsonian Institute, Bureau of Ethnology
1891 Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution 12th 1890-1891. Smithsonian Libraries. <https://library.si.edu/digital-library/book/annualreportofbu1218901891smit>, accessed March 22, 2020.
- South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.
- Surveyor General's Office
1888 Luis Maria Baca grant no. 4, Saguache Co. Colorado. Electronic document, <https://digital.denverlibrary.org/digital/collection/p16079coll39/id/59>, accessed September 12, 2019.
- Toole, Arlie W., Paul H. Lane, Carl Arbogast Jr., Walton R. Smith, Ralph Peter, Edward G. Locke, Edward Beglinger, and E.C.O. Erickson
1961 *Charcoal Production, Marketing, and Use*. Forest Products Laboratory. Submitted to the United States Department of Agriculture and the Forest Service. Report No. 2213.
- Trust for Architectural Easements
n.d. Glossary of Architectural Terms. Electronic document, <https://architecturaltrust.org/outreach/education/glossary-of-architectural-terms/>, accessed January 27, 2020.
- Tuttle, Siri J. and Merton Sandoval
2002 Jicarilla Apache. *Journal of the International Phonetic Association* 32(1):105-112.
- U.S. Geological Survey
n.d. Shannon Mahan. Electronic document, https://www.usgs.gov/staff-profiles/shannon-mahan?qt-staff_profile_science_products=0#qt-staff_profile_science_products, accessed January 30, 2020.
- Walker, Iain C.
1967 Historic Archaeology – Methods and Principles. *Historical Archaeology* 1:23-34.

Wegars, Priscilla

- 1991 Who's Been Workin' on the Railroad?: An Examination of the Construction, Distribution, and Ethnic Origins of Domed Rock Ovens on Railroad-Related Sites. *Historical Archaeology* 25(1):37-65.

Wegars, Priscilla

- 1993 "Spokane & International Railroad Construction Camp." National Register of Historic Places Registration Form. Laboratory of Anthropology, University of Idaho.

Western Mining History

- n.d. Victor, CO. *Western Mining History*. <https://westernmininghistory.com/gallery-image/5802/5866/>, accessed January 6, 2019.

Williams, Phyllis H.

- 1938 South Italian Folkways in Europe and America: A Handbook for Social Workers, Visiting Nurses, School Teachers and Physicians. HathiTrust Digital Library. <https://babel.hathitrust.org/cgi/pt?id=mdp.39015032035233&view=1up&seq=13>, accessed February 5 2020.

Wilshusen, Richard H. and Donna Glowacki

- 2018 An Archaeological History of the Mesa Verde Region. In *The Oxford Handbook of Southwest Archaeology*, edited by Barbara J. Mills and Severin Fowles, pp. 307-322. Oxford University Press, Oxford.

Zeier, Charles D.

- 1987 Historic Charcoal Production near Eureka, Nevada: An Archaeological Perspective. *Historical Archaeology* 21(1):81-101.

Zepelin, Matt

- 2019 Crestone. *Colorado Encyclopedia*, November 13, 2019. <https://coloradoencyclopedia.org/article/crestone>, accessed September 9, 2019.

Appendix

Additional information that may aid future researchers interested in the Crestone huts is described below.

Additional Evidence of Native American Construction Interpretation

1. Several stone features are located in the vicinity of the Crestone huts. These include “stone piles, crescent cairns/*herraduras* and short stone lines” (Johnson as cited in Donlan and Frye 2019). David Johnson, the author of a section of the 2019 Crestone Eagle article, states that these other stone features are commonly associated with “Native American ceremonial landscapes” (Johnson as cited in Donlan and Frye 2019).

Astronomical alignments have also been suggested for a stone cross located near the Crestone huts (Donlan personal communication 2020).

2. David Johnson stated that the Crestone huts are turtle-shaped and that turtle-shaped stone structures are commonly found in association with these other ceremonial stone features.
3. David Johnson asserts that Native American sites are typically found in areas with a “higher permeability” of groundwater (Johnson as cited in Donlan and Frye 2019). After investigating the Crestone huts, Johnson concluded that they meet the criteria of being located along increased groundwater flows.
4. Tim Fohl has also noted that the presence of Manitou stones is an indication of a Native American association. Manitou stones are a specific class of stone often ascribed a spiritual meaning (Mavor and Dix 1989:332). These stones are most often taken to represent a human head and torso and have been attributed to a variety of Native American groups both on the east coast and in the west (Mavor and Dix 1989:332). A Manitou stone has been found inside of Hut #4 and is pictured below (Figure 27).



Figure 27. Manitou stone found in Hut #4. Credit: Tim Fohl.

5. Another stone structure (Figure 28), named the Biedell stone structure, has also been found in Saguache County, Colorado (Donlan and Frye personal communication 2020). Unlike the Crestone huts, it is a lone structure.



Figure 28. Biedell Stone Structure. Credit: Becky Donlan.

6. 3-D imaging of the Crestone huts is also ongoing and may provide additional insights to future researchers (Donlan personal communication 2020). For contact information regarding this 3-D imaging please reach out to the author.

Additional Examples of Similar Stone Constructions

Stone constructions similar to the Crestone huts have also been found near Leadville, Colorado and Lake Tahoe, California. Charcoal production kilns and bread ovens have been suggested as possible interpretations of the Leadville structures (Engleman 2020). Thomas Fuller, an employee of the Forest Service who has worked in the area, notes that Chinese immigrants and Basque shepherders have been suggested as the possible builders for the Lake Tahoe structures (Fuller personal communication 2020). Additional information on these

Chinese stone structures can be found in Dixon and Smith (2017). One example of a Basque oven can be found in Mono County, California (Marvin and Costello 2014). This oven is dome-shaped, made of brick, is 4.75 feet tall, and had a cast-iron door (Figure 29; Marvin and Costello 2014:5). Basque ovens were thought to have been used for both baking bread and roasting meat (Marvin and Costello 2014:4, 5). For a full description of this Basque oven and the surrounding site see Marvin and Costello's report on file with the California Department of Parks and Recreation (2014).



Figure 29. Basque oven in Mono County, California. Credit: Marvin and Costello (2014).

Additional Interpretations

Although this report looked at the most widely suggested interpretations of the Crestone huts, an additional interpretation is that the huts were used to store animal hides (Frye personal communication 2020). However, this may also be a case of re-use rather than the original purpose for building the huts. Limestone kilns have also been suggested as a possible interpretation for the Crestone huts (Anonymous personal communication 2020). An example of a limestone kiln in Colorado can be found on the United States Air Force Academy grounds

(Anonymous personal communication 2020). A report containing details on this structure was primarily authored by Thomas Wynn, a professor of anthropology at the University of Colorado – Colorado Springs. The report is held by the State Historic Preservation Office.

Additionally, Italian immigrants working in the mining industry have also been known to build outdoor stone ovens (Costello 1981). While this paper focuses on Italian immigrants associated with the railroad and their use of stone ovens, exploring the use of these ovens with the mining industry in Colorado may be another possible interpretation of the Crestone huts.