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LOST AND FOUND: REASSESSING THE CHEROKEE MOUNTAIN ROCK SHELTER COLLECTION

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ABSTRACT

In 1973, members of the Mountain and Plains Archaeological Organization published an article in *Plains Anthropologist* containing a brief description of an excavated a rock shelter on the privately owned Cherokee Ranch in Douglas County, near Sedalia, dating its occupation to the Late Ceramic and Protohistoric periods. The collections were turned over to the property owners and no further descriptions or analyses was carried out. Four decades later the collections were encountered in the storage area on the ranch. This article provides a more thorough description of the remains from the shelter including materials dating from the Late Prehistoric (AD 150-1540) and Protohistoric (AD 1540-1680) stages and potentially the Late Archaic period (ca. 2000 BC-AD 150) and indicating a regionally extensive range of social contacts.

INTRODUCTION

The Cherokee Mountain Rock Shelter site, 5DA1001, is located east-southeast of the town of Sedalia in Douglas County, Colorado, on private property owned and managed by the Cherokee Ranch and Castle Foundation (Figure 1). East Plum Creek, a major source of permanent water, is located approximately 2.3 km south-southwest of the site and flows in a west-northwesterly direction to eventually join the South Platte River.

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Figure 1. Topographic map segment showing location of site 5DA1001 on Cherokee Mountain (USGS Sedalia 7.5' Quadrangle).

The site was initially excavated in 1971 by a team of avocational archaeologists calling themselves the Mountain and Plains Archaeological Organization under the supervision of Charles E. Nelson and Bruce G. Stewart. They received permission to carry out the work from the then-landowner, Mildred ("Tweet") Kimball. This work was the basis of an article published in *Plains Anthropologist* (Nelson and Stewart 1973) describing the site and the finds in their excavated context.

The authors characterized the site as occurring within the boundaries of a shallow, south-facing rock shelter on the southern side of a sandstone bluff called Cherokee Mountain. In their abstract, Nelson and Stewart (1973:328) described the locus of their work:

> "…[the shelter] was formed in a sandstone conglomerate in an area of high bluffs and gently rolling hills. Three intermixed levels were excavated, with artifacts from each dating from the Late Prehistoric Period. A few sherds, suggestive of a Shoshonean occupation, were in the top two levels."

The publication includes a hand-drawn plan showing the shelter and areas excavated, a profile (reproduced here as Figure 7) showing the three "intermixed" excavation levels, lithic illustrations in the form of line drawings, and a photograph of other bone and stone artifacts. The authors mention investigation of two more sites during the same field season: one is a surface scatter on top of the Cherokee Mountain bluff, and a second is another southwest-facing rock shelter, higher than the first on the same bluff face. This second shelter was inspected, but because it was deemed not likely to produce cultural material it was not treated further at the time. It is not known if any materials were collected from either of these other two sites. No subsequent work was done on the lower rock shelter site by the group. At the end of the project, excavated materials were returned to the landowner at her request (Nelson and Stewart 1973:334-335). The authors state that two basin metates, one from Level 1 and one from Level 2, were reburied in the shelter.

Two decades later, the Colorado State Historic Preservation Office (SHPO) submitted a National Register of Historic Places (NRHP) nomination for the entire ranch, authored by Barbara Norgren (1994). The nomination includes a one-paragraph overview of the work done by Nelson and Stewart:

> "Evidence of early human occupation has been found high on the rocky slopes of Cherokee Mountain. Two prehistoric rock shelters were located on the southwest face of a rocky projection near the top of the mesa. The shelter has a fifteen-foot ceiling at the outer face and tapers back to the inner wall. The interior measures approximately 35 feet wide by 24 feet deep.… Late prehistoric cultural materials, recovered from three levels, appear to be from Shoshonean occupation from 1250 to 1590 A.D. They include projectile points, scrapers, knives, a drill, shards, shaft smoother, metates and manos, bone awls and bone deposits. The Colorado State Office of Archaeology and Historic Preservation reviewed the archaeological report and rated it a very significant prehistoric Colorado site eligible for listing in the National Register of Historic Places" (Norgren 1994:8; see also Colorado Encyclopedia Staff 2019).

Nevertheless, despite the recognition of the apparent NRHP-level importance of the site, it was not considered further in the nomination as only the ranching/homesteading operations covering the period from 1868 to 1944 were considered as contributing to the significance of the property (Norgren 1994).

In the late 1990s, when the Platte River Basin prehistoric context was written, a single paragraph was dedicated to the site. The artifact assemblage and its chronological placement were assigned to the Middle Ceramic period of the Late Prehistoric stage (Gilmore et al. 1999:251). The context authors accepted the identification of the ceramic sherds from the site as "Shoshonean." This ceramic type, more commonly known today as Intermountain pottery (Eighmy 1995), was thought to have its origins to the west of the Front Range. It should be noted that Nelson and Stewart (1973:334) included Utes in the category of Shoshonean peoples but stopped short of identifying the ceramics as having been made by Utes.

The Context mentioned an important link between the remains from the site and one of the important research questions posed for the Middle Ceramic period (Gilmore et al. 1999:292-294). Ceramics found in the Front Range during this period appeared to come from two traditions: the Intermountain pottery (from the west) and Upper Republican ceramics that have their origins in the Central Plains (Ellwood 1995:134-138). Upper Republican pottery seemed more common than Intermountain pottery, and it has been hypothesized that the stylistic differences may represent different ethnic groups moving into the Front Range (Gilmore et al. 1999:293).

REDISCOVERY OF THE COLLECTION

No further research was done on the collection after the original article in *Plains Anthropologist* was published (Nelson and Stewart 1973), and the collection remained in storage at the Cherokee Ranch Castle, the principal structure on the ranch. In March 2014, Dr. Allan Koch, professional geologist and volunteer for the Cherokee Ranch and Castle Foundation, was notified that a few boxes of archaeological material had been encountered in the basement storage area of the Castle. Realizing that the collection might be important, Koch learned of Nelson and Stewart's excavation of the Cherokee Mountain Rock Shelter and then notified the staff of the Office of the State Archaeologist of Colorado (OSAC). Mr. Tom Carr, then a staff member at OSAC, accompanied by avocational archaeologist Neil Hauser (who at the time was excavating the Blackfoot Cave site [5DA2358], also located in Douglas County) visited the site with Koch. On March 16, 2014, Koch met with T. Reid Farmer and Connie Farmer, both professional archaeologists in Colorado, and took them out to see the site. All of the archaeologists who visited at that time agreed that although the 1971 excavations completely cleared out the deposit from the back of the shelter to the drip line, the terrace outside the mouth of the shelter was untouched, and it was seen to have a high potential for buried cultural deposits. In addition, a broad apron, or talus slope, extends southward from the terrace and terminates on a relatively flat area (generally less than 5-degree slope to the south) measuring approximately 50 m (north/south) x 140 m (east/west). This area, which is referred to as the bench, is mostly covered in prairie grasses. Wherever the ground could be seen (not grass-covered), substantial amounts of worked lithic material were observed, suggesting that multiple prehistoric activities also occurred on the bench.

Almost all of the diagnostic materials reported in the 1973 article were relocated in the rediscovered collection. Included were finished tools; two carbon samples from different levels, collected but unanalyzed; a poorly provenienced sample of primarily large mammal bone; and an obsidian biface fragment. Missing from the rediscovered collection were the ground stone implements that were originally reported.

SUBSEQUENT WORK

Since the publication of Nelson and Stewart's article a great deal has been learned about the cultural and environmental contexts to which the original archaeological project relates. New data stemming from subsequent surveys and testing have increased our understanding of the site's history. In the fall of 2014, T. Reid Farmer (TRF) submitted a grant application to the State Historic Fund (SHF) for a reassessment of Cherokee Mountain Rock Shelter. The work to be done included:

- Reviewing the rediscovered collection from the 1971 excavations.
- Mapping of the site and the immediate surrounding landscape.
- Limited test excavation and surveying of the area around the site to obtain additional environmental and cultural data.

The assessment grant was awarded in the fall of 2014 and permission to work on the property was approved by the Cherokee Ranch and Castle Foundation Board. The Foundation participates in the Denver Metro Region's Scientific and Cultural Facilities District (SCFD) program, and one of its goals is to use the resources of the ranch to foster education in the region. A partnership was formed between TRF, appointed to the Foundation's Scientific Committee, and Jonathan Kent (JDK), a faculty member at Metropolitan State University of Denver (Metro State), to collaborate on the project. Beginning that same fall, JDK and TRF directed field school students and a few experienced volunteers in carrying out a survey of the area around the site and conducting excavations of several test units on the bench. These have proven to be long-term operations and are ongoing.

Additional analysis simultaneously began on the existing collection. Funds were obtained from a professional development grant (to JDK) from the College of Letters, Arts, and Sciences at Metro State for analysis of the two radiocarbon samples. The obsidian biface was submitted for sourcing (funded by TRF), and the faunal specimens were analyzed. Furthermore, in 2022, additional materials from the 1971 excavation in the form of lithic debitage were located, and an initial analysis was carried out. The results of these investigations are described below.

UPDATING SITE ENVIRONMENTAL INFORMATION

The View

A characteristic of the site worth mentioning at the outset is the spectacular view that immediately attracts one's attention upon arrival at the site. The view from the bench portion of the site to the southwest takes in the eastern front of the Rampart Range and, farther south, Pikes's Peak. In between, the western horizon displays buttes capped by the Wall Mountain Tuff. Farther northwest, the view includes much of the downstream portion of Plum Creek, and the Red Rocks area can be seen farther northwest. Finally, far to the north, Long's Peak to the northwest of Boulder can be discerned. This view would have provided several benefits to the occupants of the rock shelter, including spotting animals for hunting, access to other groups, and when needed, defensive tactical advantages.

Vegetation Update

New botanical data were obtained as the project began. In general, an impressive variety of wild plant resources is currently available on the bench and talus slope. The bench is mostly covered in a variety of prairie grasses, but there are also stands of scrub oak (*Quercus gambelii*) and three-leafed (or tri-lobed) sumac (*Rhus trilobata*). On both the bench and the talus slope, and around the sides of the rock shelter, are various species of sage (genus *Artemisia*), prickly pear cactus (genus *Opuntia*), wild mustard (family Brassicaceae), mullein (*Verbascum thapsus*), chenopods (genus *Chenopodium*), amaranth (genus *Amaranthus*), prickly poppy (*Argemone polyanthemos*), American plum (*Prunus americana*), thistles (genus *Cirsium*), Oregon grape (*Mahonia aquifolium*), and mountain mahogany (genus *Cercocarpus*) (identifications aided by Steve Dominguez and by information in Ellis 2011). Many of these plants are edible and/or are known to have other uses (see listings in www.plants.usa.gov). Some can produce dyes (e.g., three-leafed sumac), some have medicinal value (e.g., Oregon grape root), and several are known to have been used ceremonially (e.g., sage used for recent Ute ceremonies involving sweats; Young 1997:273). Present also are plants with strong and flexible wood useful for bows and other implements (e.g., scrub oak and mountain mahogany). Finally, some plants, such as the two just mentioned, are frequently browsed by local elk and deer (*Cervus* and *Odocoileus*). It is clear there was a rich diversity of plant and animal resources available to the occupants of the shelter. Unfortunately, the materials in the Nelson and Stewart collection did not include archaeobotanical samples except for wood implements and two charcoal samples, both of which were collected in 1971 (See "Chronology in the Rock Shelter," below).

Geoarchaeology Update

Geologist Allan Koch conducted extensive research on the geology and lithology of the Cherokee Ranch and published a definitive article on the topic (Koch et al. 2018). These data have enhanced our understanding of the rock shelter and other sites on the property.

The cap rock of the bluff is designated Castle Rock Conglomerate (CRC) and was likely formed during the Eocene between ca. 36-34 million years ago (mya) (Koch et al. 2018). The base of the Cherokee Mountain rests on top of an earlier deposit of Dawson Arkose, lying locally unconformably above the uppermost portion of the Denver Basin (Abbott and Cook 2012; Koch et al. 2018). After ca. 36 mya, heavy flooding began to the north near Coal Creek Canyon (in the Boulder area), at which time a large amount of CRC debris was washed southward. Clasts of rhyolite, derived from the Wall Mountain Tuff (see below), petrified wood and quartzite were subsequently cemented by silica, forming the CRC.

Immediately northeast of Cherokee Mountain is a smaller rise known locally as Racoon Knob (labeled on Figure 1). It is capped by a rhyolitic deposit of the Wall Mountain Tuff, deposited following an Eocene volcanic eruption near present-day Buena Vista which occurred prior to the formation of the CRC (Koch et al. 2018). As was discovered during the initial field survey of Racoon Knob, there is abundant evidence of quarrying and knapping of the rhyolite by prehistoric people. The easy availability of this material was probably one factor in attracting people to the site area.

To the south of the bench is a steep dropoff, at the base of which are sand bars from ancient streams. Stream-created sandbars can be seen below and to either side of the bench and elsewhere on the ranch. These streams have etched their way into the upper portion of the Dawson Arkose (Abbott and Cook 2012). In places the streams were tree-lined, and some of the trees have been silicified to form petrified wood, a commonly used raw material by indigenous peoples of the Front Range over at least the last 9,000 years. More recently published phytochemical and phytostructural studies by George Mustoe of petrified wood fossil logs at the base of Cherokee Mountain (see Mustoe and Viney 2017), and studies of their botanical origins in laurel trees (Wheeler and Michalski 2003), have been carried out.

As also discussed below, petrified wood, quartzite, and rhyolite make up the major portion of the lithic materials recovered in the finished tools in the 1971 collection and in the recent test excavations on the bench. Petrified wood and quartzite were also most abundant in the debitage from the Nelson and Stewart excavation (not analyzed until 2022 and reported in Sapp and Baucom 2023, as discussed below). As was true for rhyolite, petrified wood and quartzite were probably magnets that attracted people to the area. Interestingly, both rhyolite and petrified wood were also used by the original builders of the Cherokee Ranch Castle during the 1924-1926 construction directed by Denver Architect Burnham Hoyt (see Noel 2022; Colorado Encyclopedia Staff 2019).

Understanding the Rock Shelter Geology

Today, permanent water is available in at least one spring within less than 1 km from the site. There may well be more remaining to be identified. Natural crevasses within the CRC are the locus of such water resources. Furthermore, on top of the CRC above the site, water can be seen pooling in depressions for several weeks after a rainstorm. More water might well have been available in such places during wetter climatic episodes in the past.

Inside the rock shelter, it is evident that the shelter was formed within two portions of the conglomerate—a blockier upper portion that overlies and grades into a more heavily weathered and sandier lower portion (Farmer et al. 2019). This differs from some other shelters of the Front Range that are formed by differential weathering of the CRC and the underlying Dawson Arkose (e.g., Franktown Cave; Gilmore 2005).

Large boulders, cobbles, and gravels of variable size (Wentworth Scale) from the CRC are strewn down the talus slope and appear to have rolled a considerable distance southward from the cap rock. One hypothesis that has been considered is that the bench may have been formed by large blocks of the CRC cleaving from the main south face of Cherokee Mountain and then rotating as they slid down slope (Figure 2). This phenomenon is known to geologists as the formation of a “toreva block” (Reich 1937). The idea was suggested by Steve Dominguez who did augering on the bench as a part of the initial testing operations there. This hypothesis was offered as an explanation for the relatively deep mollic soils he observed in the auger columns on the bench (Figure 3). Such deep, organically rich soils are unusual on the sides of bluff formations in the Front Range. The idea is that the slippage downward of a large block of the CRC had an upper surface that inclined contrary to the slope (see Figure 3). This in turn allowed organically rich sediments that would normally wash down to the south to accumulate on the surface of the bench. In addition, the initial soil auger columns (Figure 4) revealed the presence of a buried “A” layer (paleosol) initially of unknown age. This “A” horizon appears in most of the auger holes excavated, especially those on the bench directly south of the rock shelter.

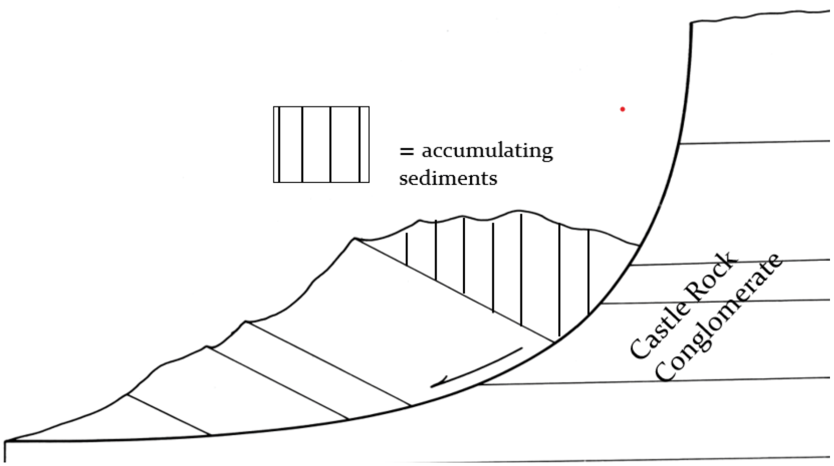


Figure 2. Toreva block model demonstrating how the “bench” may have been formed of sediments accumulating on top of slipped CRC blocks (based on Reich 1937).

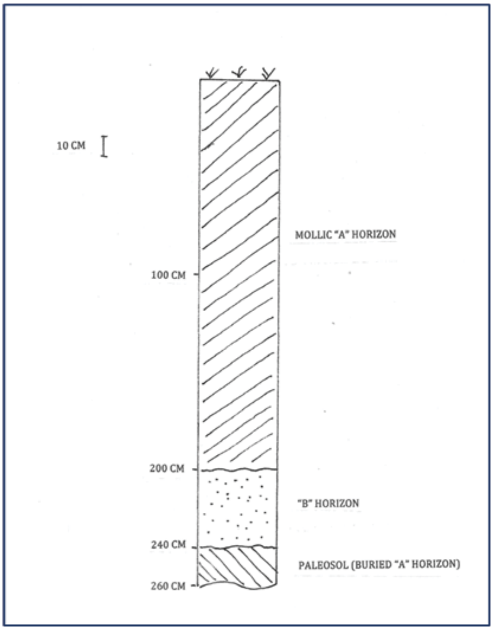


Figure 3. Initial auger sample (Sample #1) soil profile.

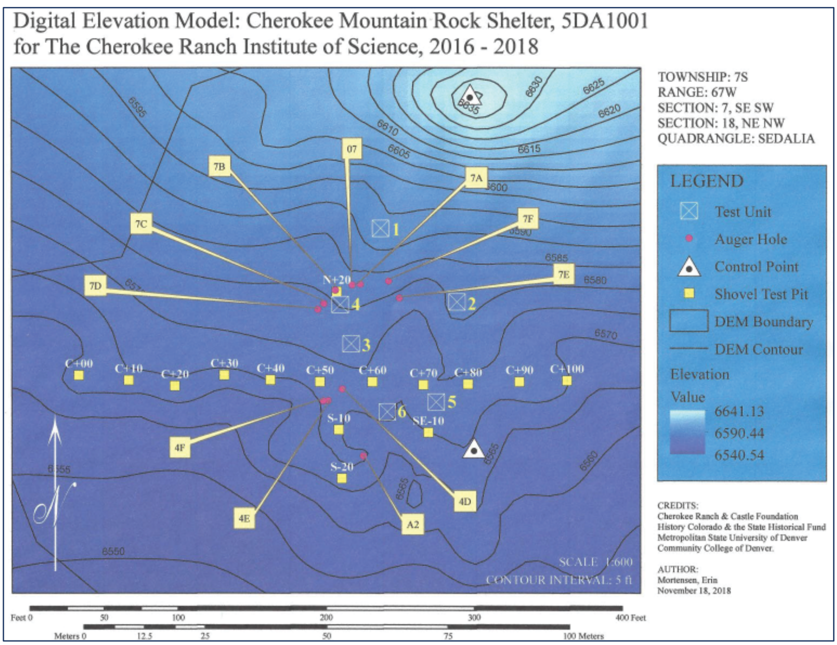


Figure 4. Digital Elevation Model of work on the bench as of late 2018. Shown are survey control points (triangles); auger holes (dots with label flags); shovel test pits (STPs, small squares); and numbered test units (large squares with Xs). Contour interval is 5 feet. (Prepared by Erin Mortensen)

ADDITIONAL AUGERING WORK, GIS, AND EXCAVATIONS ON THE BENCH

Figure 4 is a GIS-based digital elevation model created by Erin Mortensen in 2018. In light of the realization via initial augering that there were deep, mollic soils on the bench with at least one buried paleosol below, it was decided to expand the augering operations and excavate a series of shovel test pits (STPs) across the approximate center of the bench. These were laid out in an east/west and north/south array at 10-m intervals. The STPs on the east/west centerline are designated "C +00", "C +10" … "C +100." STPs to the north and south are designated "N +20", N +40" and "S -10", "S -20." Figure 4 also shows the location of six numbered test units, either 1 m x 2 m, or 2 m x 2 m in dimensions, on the bench. Their locations were determined based on the higher numbers of artifacts directly south of the rock shelter in the STPs. This excavation is ongoing. Finally, a soil auger was used to explore subsurface deposition (small circles with label flags in Figure 4). In addition to the auger hole locations shown, several were placed in the floors of STPs and numbered test units. The results of the auger operations are not yet finalized, and additional augering is contemplated.

The presently forming, upper mollic ("A" horizon) topsoil appears in all auger cores and excavations on the bench. In most of the auger holes, a buried, organically rich paleosol (another "A" horizon) was found (Figure 5). In Auger Hole #1, the upper part of which is shown in Figure 3, a deposit of charcoal was removed from a paleosol at a depth of 330 cm below the present ground surface. The charcoal was submitted (by TRF) to PaleoResearch Institute for dating. The charcoal was determined to date to 9890 ± 25 RCYBP, equivalent to a 2-sigma (probability = 95.4%) calendar date of 11,350–11,230 cal BP (see Figure 5). It is not yet known whether this charcoal is cultural or natural. However, as is sometimes said, "old dirt is good to find." The authors believe it is possible that

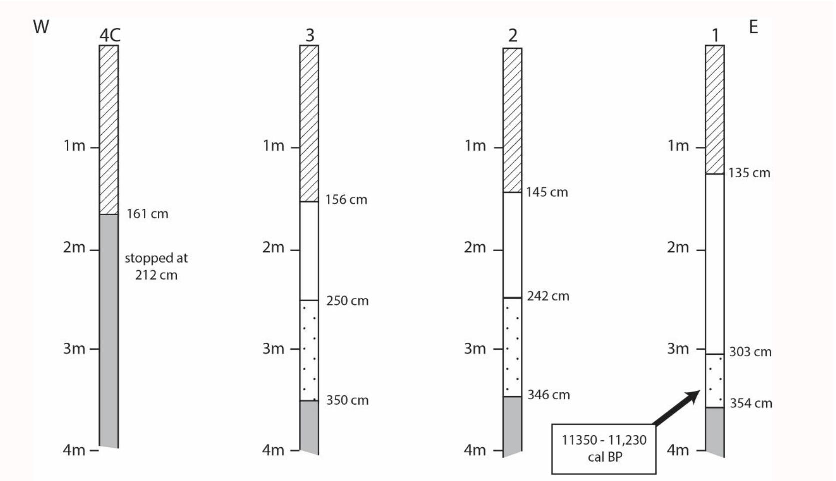


Figure 5. Schematic profiles of four auger sample columns from the bench (numbered as in Figure 4). Vertical scales indicate the depth below surface. Diagonal hachured areas are mollic soils (A horizons here). Stippled areas represent buried mollic A horizons, or paleosols). The location of the PRI 14C date is shown in the paleosol near the bottom of Auger Sample #1 at a depth of 330 cm.

there is a continuous sequence of deposition on the bench extending back in time to before the end of the Pleistocene epoch at 11,700 BP (Cohen et al. 2023). If so, pollen and phytolith analyses of the sequence of soils on the bench could provide useful data on vegetation and climatic changes dating back to the end of the last ice age.

CHRONOLOGY IN THE ROCK SHELTER

Radiometric Dates

In the 1973 article three numbered "occupation" deposits that were described as "somewhat mixed" were identified, and a profile was drawn (Nelson and Stewart 1973:329). The lowest was designated Level 1 and the most recent as Level 3. As mentioned, two wood charcoal samples were found in the collection, but no submittal for radiocarbon analysis had been made. Through the College of Letters, Arts, and Sciences at Metro State, funds from a professional development grant (to JDK) were obtained, and the samples were submitted to Beta Analytic. The original sample bags were each labeled with numbered layer designations. The label for Level 1 adds the word "profile." The results are shown in Table 1.

Table 1. Radiocarbon Dates from the Cherokee Mountain Rock Shelter.

Bag Label	Sample No.	Libby RCYBP	Calibrated (2-sigma) Calendar Date	$\delta^{13}C$ (‰)
Profile Level 1	BETA-463225	280 ± 30 BP	(54.3%) 512–1660 cal AD (38.2%) 1616–1666 cal AD	-24.5
Level 2	BETA-463224	940 ± 30 BP	(95.4%) 025–1160 cal AD	-21.0

The results were initially surprising because the lower numbered profile layer had a more recent radiocarbon-dated sample than does the upper layer. It is suspected that these charcoal sample labels refer to their position in the profile (not the published occupations), with the higher-positioned sample producing the more recent date.

The projectile points, tabulated according to the levels with which they were associated in the report, are assigned to the "Late Ceramic" period by Nelson and Stewart (1973:330). The sample labeled "PROFILE LEVEL 1" does have a date consistent with the finding of a sherd of Great Bend aspect pottery (described below). The radiocarbon date above suggests an age for Level 2 consistent with an Early Ceramic period date, i.e., AD 150-1150 (following Gilmore et al. 1999).

The radiocarbon analysis of the two samples also provides stable carbon isotope information. Note that for the first sample, the $\delta^{13}C$ value is -24.5%, while in the Level 2 sample the δ13C value is -21.0%. In general, living plants have three primary ways in which carbon-13 (^{13}C) isotopes are photosynthesized, and that affects the amounts of ^{13}C in the plants. Compared to an agreed-upon standard, C_3 plants have values of ^{13}C deviating negatively from the standard by between 25 to 29 parts per thousand (mils, or %), while C_4 plants have ranges between 12 and 16 parts per thousand, and CAM (Crassulacean Acid Metabolism) plants have values intermediate between the two (O'Leary 1988). In one study in Asian forested areas, living wood of the genera *Quercus* and *Pinus* showed δ13C values between -25.37 and -31.66% (Luo et al. 2022). However, O'Leary (1988) has noted that carbonization of plant tissues is likely to deplete ^{13}C levels. Although it was thought that the most likely source of the charcoal samples was wood from scrub oak (*Quercus gambelii*) or mountain mahogany (*Cercocarpus* sp.), both locally available, the stable carbon isotopes levels of the charcoal suggest that other species may have been involved.

Ceramics Update

All of the sherds described in the 1973 article were relocated. Nelson and Stewart (1973:334) stated that the ceramics were possibly Shoshonean. David Hill, who has studied a wide range of ceramics from the Plains and Southwest, examined the sherds in the collection and believes that most were made by groups whose origin is to the west of the Plains. This position is supported by ceramic studies carried out by Eighmy (1995) and Ellwood (1995). Hill specifically pointed out the evidence of paddle-and-anvil shaping and the kind of cord-marking on some sherds that indicates a Ute origin, rather than Shoshonean (although both are speakers of Numic languages).

One of the sherds, however, has a red slip with combed, vertical incised lines extending downward from the rim. Hill believes that particular sherd to be more correctly assignable to the Great Bend aspect of Missouri, Kansas, and Oklahoma. Blakeslee (2008) indicates that the Great Bend aspect "…begins about A.D. 1425 and lasts until the beginning of the 18th century. Most Great Bend populations left Kansas by A.D. 1720, and they emerge in Oklahoma and Texas as various bands of the Wichita confederation." Its pottery is characterized by mostly utilitarian vessels. The use of red slip on water jars is mentioned, as is the occasional use of parallel incisions on the exterior rims of some vessels. A more extensive treatment and images of sherds very similar to the 5DA1001 sherd is found in a discussion of what are termed "Plains Woodland Complexes" of western Kansas and adjacent areas of Nebraska and Colorado (Bozell 2006; see especially Figure 6.3, p. 99). These complexes would include the Great Bend aspect (Bozell 2006). It is worth noting that the Great Bend aspect is contemporaneous with the Dismal River aspect such as manifested at Franktown Cave (Gilmore 2005). The contemporaneity of the two distinct archaeological complexes in the Front Range of Douglas County is suggestive of at least two different groups of pottery makers in the region with origins to the east during the Middle Ceramic and Protohistoric periods, as well as Ute pottery makers as mentioned above.

Projectile Points Update

The projectile points recovered from the rock shelter that were illustrated in Nelson and Stewart (1973:332, Figure 4) were present in the relocated materials. Most were stylistically like Plains side-notched points produced during the Ceramic periods (Early and Middle) and Protohistoric period at other Front Range sites such as Franktown Cave (Gilmore 2005:Figure 14). The radiocarbon dates are consistent with Ceramic stage projectile point styles.

New chronological information was provided by the 2014 find of a mostly complete projectile point in the easternmost STP (C+100 on Figure 4), on the bench at a depth of 15 cm (Figure 6). It is triangular, missing the tip and the terminal angles at both shoulders. Its lateral margins are straight and side-notched, and it has a convex expanding stem. It is made of reddened petrified wood. It can be assigned to the Late Archaic period (1250 BC–AD 150, following Gilmore 2005), and compares well in size, shape, manufacture, and probable hafting method with the Besant Late Archaic points shown in Gilmore et al. (2019) from the Bayou Gulch site (5DA265). It may be a curated item, but alternatively may indicate an additional occupation episode for the bench along with the possibility of an even earlier human presence (see discussion above of ca. 11,400-year-old carbon sample from an auger test).

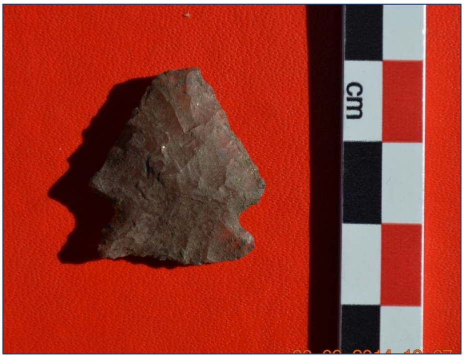


Figure 6. Projectile point from STP C+100, 15 cm below surface on bench.

FAUNAL REMAINS

The materials rediscovered from the 1971 excavations consist of almost 300 bones in various states of preservation. Nelson and Stewart (1973:328-329) mentioned several animals in the area that can be seen at present but did not analyze animal remains recovered archaeologically. Identification of the bones in the collection was carried out by JDK with the assistance of Metro State student Katherine Bergstrom. The initial inspection of the collection revealed that possible human cranial and post-cranial bones were included among the remains. At this point Dr. Chris Pink, a bio-archaeologist and forensic anthropologist at Metro State, was asked to confirm the presence of human remains and to conduct a preliminary analysis. She examined the entire collection and added a few more human bones to those initially shown her. The human remains were immediately separated from the other bones in the collection and were dealt with through OSAC, which in turn worked with the appropriate Native American population as required by state and federal laws. Dr. Pink's report is on file at OSAC, per legal requirements. The present article includes only the identification and analysis of the non-human bones.

The materials were first removed for observation from two large black trash bags and a smoked salmon box in which they had been stored. Many of the bones show fresh breaks, partially due to being severely friable (see Figure 7). A preliminary count of bone and bone fragments indicated approximately 290 specimens. They were subjected to preliminary sorting into bone types, resulting in the following subsets: long bones and probable long bones (n=160); flat bones and probable flat bones including ribs, skulls, vertebral epiphyses and spines (n=47); and unclassifiable specimens (n=83).

Figure 7. Bison bison (5DA.1001.F.20), right ulnar olecranon process (lateral view), epiphysis partially fused. Note severe friability of bone, characteristic of much of the sample.

Only one bone was complete, with the rest fragmented. Fragments were made up of both those showing recent, post-excavation breakage (green bone with no dirt along the break line) and those that were likely broken when recovered. Both burned and unburned bones were included. Skull fragments were interpreted to be likely derived from the same source, as they seemed similar in size and surface appearance (below). One rib from a very large mammal (cf. *Bison* sp.) was labeled with the words "PROFILE 1, LEVEL 3," possibly an indication of the excavation provenience from which at least some of the bones had been recovered. According to Nelson and Stewart (1973), this would be the uppermost level of the three numbered levels in the profile. After the initial sort, the bones were placed into separate cardboard boxes lined with acid-free tissue to prevent any additional deterioration of the material.

The approach to identification was standardized by making comparable observations for each specimen. These included the following variables:

- Taxon (class, order, genus, species, etc).
- Element (for example, femur, metacarpal).
- Portion of element (proximal, distal, posterior, proximo-lateral, etc.).
- Side (left or right).
- Condition (for example, weathering, trampling, erosion, sun bleaching).
- Age (adult, sub-adult).
- Cultural modifications (cut marks and location, deliberate abrasion and location).
- Other modifications (for example, carnivore punctures, rodent gnawing tooth marks).
- Burning.
- Where possible, measurements were taken of the bone elements mostly using techniques described in von den Driesch (1976).

Only 14 of the bones could be identified as to taxonomic category beyond those of the preliminary sorting (above). Faunal specimen numbers were assigned to each of these 14. The taxonomic identifications and accompanying observations and notes are as follows:

5DA.1001.F.1: *Bison* sp. right distal metacarpal; sex indeterminate. Identification was aided by (a) the anterior lateral epicondyle having a deep pit; (b) in the lateral condyle anterior view, the sagittal ridge uneven from the ridge to each side of distal end; and (c) showing double pits on posterior surface. These traits are diagnostic for subtribe Bovidae and bone size suggests bison (following Brown and Gustafson 1979:97, Figure 33, Feature A).

5DA.1001.F.2 (Figure 7): *Bison bison*; right ulna, proximal olecranon portion; the fusing proximal epiphysis suggests a time of death early in 5th year of life (Duffield 1973:33); length of olecranon process = 92.3 mm ("LO" in von den Driesch 1976:79-80).

5DA.1001.F.3: *Bison bison*; left radius, proximal portion; very friable, in two pieces (glued during current analysis); unburned; weather cracking appears, and the margins of the articular surface are eroded away.

5DA.1001.F.4 (Figure 8): *Lynx rufus* (bobcat); complete left radius; possible carnivore gnaw marks are apparent as depressions in the bone surface (following Fisher 1995); length = 132.6 mm ("L" in von den Driesch 1976:66). The carnivore gnawing on intact bobcat bone shows that some materials were not immediately buried. It also may imply that a non-human agent of deposition was in place when the shelter was not occupied by humans.

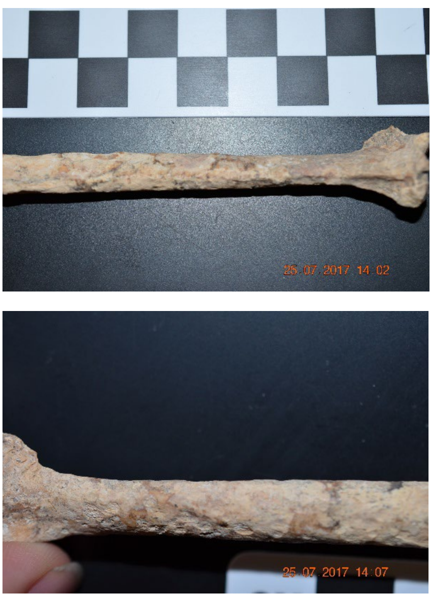


Figure 8. Lynx rufus (5DA.10001.F.4), left radius shaft and detail showing probable carnivore gnawing.

***5DA.1001.F.5*:** *Procyon lotor* (raccoon); left ulna, proximal olecranon and proximal part of semi-lunar notch; sex indeterminate; burned (carbonized); length = 27.6 mm ("LO" in von den Driesch 1976:79-80).
***5DA.1001.F.6*:** *Sylvilagus* spp. (rabbit); left humerus, distal one-fourth; adult; burned (carbonized).
5DA.1001.F.7: cf. Bovidae (bison/cow family); proximal right metacarpal, anterior portion; very fragmented, abraded, very friable, shows weather cracking; adult; unburned.
5DA.1001.F.8: cf. Artiodactyla (hooved mammal such as elk/deer/antelope); long bone; possibly adult; burned, with some areas more carbonized than others, suggesting some of the bone retained protective tissues (e.g., tendons, skin, or muscles) when burning occurred. One of the surfaces has a glossy, smoothed appearance, but whether this is due to heat or "pot polish" is unknown.
5DA.1001.F.9: Aves (owl-size bird); left femur, distal two-thirds: shaft and partial metaphysis; surface shows shallow scratches, likely from gnawing, but whether this is due to a carnivore or herbivore cannot be determined (no traces of rodent gnawing). Some polishing is visible, but as with 5DA1001.F.8, the cause cannot be determined. The action of digestive juices is another possibility in this case; unburned.
5DA.1001.F.10: Large Artiodactyla, possibly *Cervus* (elk) or *Bison*; left, central rib; longitudinal cracking on periosteum (outer bone) is likely postmortem (e.g., post-depositional weathering resulting in spalling); additional post-mortem damage is visible on both sternal and vertebral ends; interior (medial) side has words: "PROFILE 1 LEVEL 3" printed in black marker; possible mold growth on periosteal surface; unburned.
5DA.1001.F.11: Large Artiodactyla; rib, side indeterminate; lateral surface may exhibit illegible marker writing; mold growth is visible as in 5DA1001.F.10; unburned.
5DA.1001.F.1: Medium to large mammal; sternal end of left cranial rib, possibly #2, 3 or 4 (3 fragments bagged together); unburned.
5DA.1001.F.13: Medium-size mammal; rib, side indeterminate; burned (carbonized).
5DA.1001.F.14: *Sylvilagus* spp. (rabbit); complete metacarpal (right MCIV); adult; still shows blood staining and bone grease residue; likely to be intrusive.

The remaining specimens were bone fragments, possibly all mammalian, that could not be assigned to any more specific taxon. They are: Long bones – 129, of which 24 are burned (18.6%);Flat bones – 20, of which 3 are burned (15%); Indeterminate bones – 78, of which 12 are burned (15.4%).

The analysis showed a combination of taphonomic factors affecting the sample: some were likely cultural effects such as cut marks; some were possibly cultural or were post-depositional (gnawing, mold growth); and some were most likely due to post-excavation treatment (breakage). Because no analysis of faunal remains was mentioned by Nelson and Stewart, it can only be suggested that bison, rabbits, and other artiodactyls and smaller mammals were on the Late Prehistoric menu. Comparisons with other contemporary Front Range archaeofaunas would certainly be worthwhile.

LITHIC ARTIFACTS: NEW DATA

Debitage

One of the volunteers on the Cherokee Ranch and Castle, John McKinney, reports (personal communication to T. Reid Farmer, 2022) that Al Koch found an additional bag of materials, containing mostly lithic debitage, believed to be from the 1971 excavations. The materials were recently analyzed by two Metro State students, Jeffrey Sapp and Camryn Baucom, supervised by TRF and Michael Kolb (Metro State faculty). A paper on the analysis was presented at the 2023 Colorado Council of Professional Archaeologists annual meeting in Ouray (Sapp and Baucom 2023).

The analysis included frequencies and percentages of both counts (n) and weights (in grams, g) of different raw materials sorted into six categories: core; three flake reduction stages; whether the items are manuports; and fire-affected (Table 2). A total of 2,439 pieces were examined. These are divided among nine raw material types. The data show that quartzite, petrified wood and rhyolite are the most commonly occurring materials and account for the majority of tertiary flakes (interior flakes lacking cortex). Sapp and Baucom also commented on the high numbers (and weights) of tertiary flakes compared to other lithic reduction stages. Overall, these data were interpreted as indicating that a great deal of tool

Table 2. The Counts (n) and Weights (g) of All Unprovenienced Lithic Materials Collected from Cherokee Rock Shelter (5DA1001), Sorted by Material Type and Assemblege Category (from Sapp and Baucom 2023)

Material (n)	Core	Primary	Secondary	Tertiary	Manuports	Fire-Affected	TOTAL
Rhyolite	8	37	19	374	-	-	438 (18%)
Quartzite	8	77	65	787	-	36	973 (40%)
Silicified Sandstone	-	-	-	-	84	-	84 (3%)
Petrified wood	9	67	76	668	89	-	909 (38%)
Chert	-	-	-	9	-	-	9 (>1%)
Bridger Chert	-	-	-	1	-	-	1 (>1%)
Rock crystal	-	-	-	10	-	-	10 (>1%)
Obsidian	-	-	-	-	5	-	5 (>1%)
Metavolcanic	-	1	3	1	-	5	10 (>1%)
TOTAL	**25 (1%)**	**182 (7%)**	**163 (7%)**	**1,850 (76%)**	**178 (7%)**	**41 (2%)**	**2,439 (100%)**

Material (g)	Core	Primary	Secondary	Tertiary	Manuports	Fire-Affected	TOTAL g
Rhyolite	318	290	343	850	-	-	1,800 (20%)
Quartzite	327	403	483	874	-	302	2,389 (27%)
Silicified Sandstone	-	-	-	-	383	-	383 (4%)
Petrified wood	643	541	551	1,034	1,566	-	4,335 (48%)
Chert	-	-	-	7	-	-	7.4 (0%)
Bridger Basin Chert	-	-	-	-	-	-	0 (0%)
Rock crystal	-	-	-	7	-	-	7.3 (0%)
Obsidian	-	-	-	-	12	-	12.1 (0%)
Metavolcanic	-	8	25	4	-	-	36.1 (0%)
TOTAL	**1,288 (14%)**	**1,234 (14%)**	**1,377 (15%)**	**2,758 (31%)**	**1,949 (22%)**	**302 (4%)**	**8,969.9 (100%)**

production, maintenance and reworking took place, activities consistent with long-term, repeated use of the rock shelter.

Sapp and Beaucom noted that quartzite is the most common material in the collection (39.9%). At many other Front Range sites and elsewhere on the Cherokee Ranch property, surveys indicate that there are often higher frequencies of petrified wood and rhyolite than quartzite (e.g., Douglas County surveys by ERO [Jon Hedlund, personal communication to Jonathan D. Kent, 2019]; Gantt and Kalasz 2004; Gilmore 2005; Gilmore et al. 2019; Hedlund et al. 2019; Mutaw et al. 2012). In this sample, petrified wood is almost as abundant (37.3%). In addition to the widely available petrified wood in the Front Range, there is a relict petrified wood source (as noted previously here, comprised of silicified trunks and branches of laurel trees) that is exposed immediately south of the bench. Rhyolite from the Wall Mountain Tuff debitage is present both locally as volcanic deposits and incorporated secondarily into the CRC. The distribution of rhyolite and petrified wood elsewhere on the ranch is discussed in papers presented by Kayla Bellipanni and Caitlin Calvert (Bellipanni and Calvert 2021; Calvert and Bellipanni 2023).

Other Lithic Raw Materials

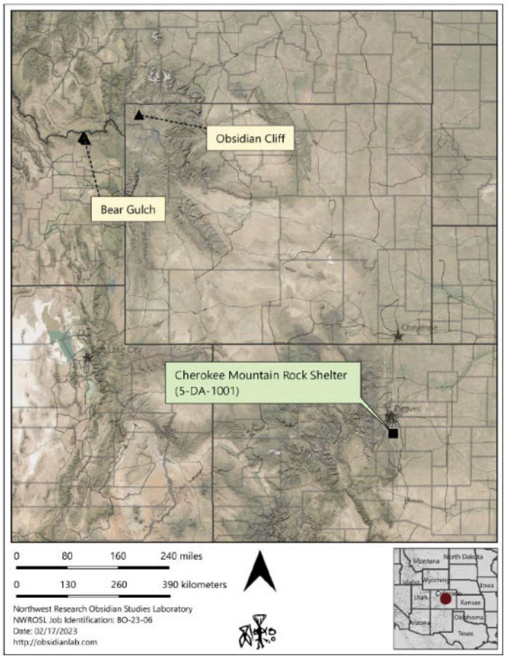
Other raw materials come from more distant sources, notably obsidian and Bridger Basin Chert. One obsidian biface, possibly part of a projectile point, and five pieces of obsidian debitage were included in the material from the shelter. These items were sent to the Northwest Research Obsidian Studies Laboratory for sourcing. The source areas for the debitage are in eastern Idaho (Bear Gulch; n=1) and northwestern Wyoming (Obsidian Cliff; n=4), while the biface is made from obsidian from the Beaver Creek source on the western edge of the San Luis Valley in Rio Grande County, Colorado. Beaver Creek is an affluent to Trout Creek and thence an affluent to the South Fork of the Rio Grande (See Figure 9A and 9B).

One tertiary piece of debitage is visually identified as Bridger Basin Chert, or Sand Wash Basin Chert. It is sometimes called “tiger chert” and is similar to the chert in the Paleoindian cache found on the Mahaffy property in Boulder, Colorado (Bamforth 2014, 2015). Its source is in Moffat County, Colorado and elsewhere in the northwestern part of Colorado and southwestern Wyoming (Landt 2020).

SUMMARY AND DISCUSSION

The rediscovery of the Cherokee Mountain Rock Shelter collection has stimulated new investigations and yielded data useful for understanding the human occupation of a portion of the Colorado Front Range. The study of the rediscovered collection from the excavation by Nelson and Stewart (1973) showed that most of the finished tools described in the report were present. Ceramics, projectile points, bifaces and poorly provenienced faunal remains were found and reassessed. The original report suggests that other metate fragments and two manos were also found, and they should have been present. The fate of these particular items is unknown.

The research described here has incorporated new geomorphological data, giving us a clearer picture of the formation of the rock shelter at the contact between two different portions of the Castle Rock Conglomerate. Surveying, augering, and



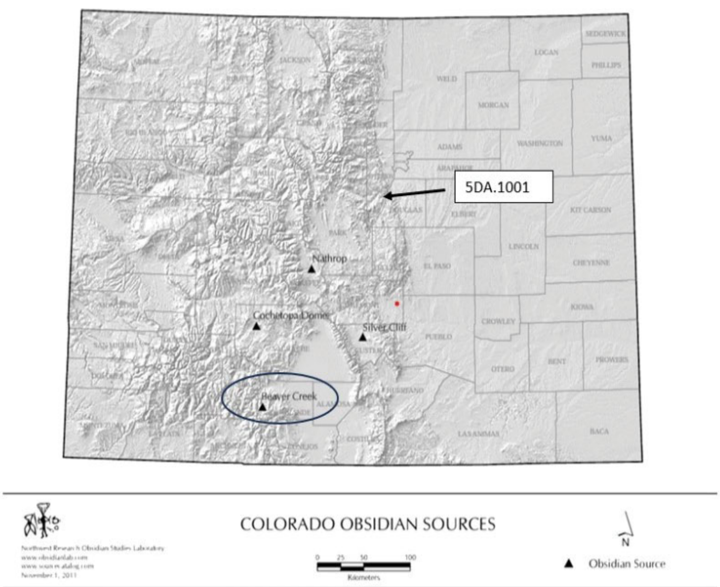


Figure 9. Obsidian sources. Top, regional map showing debitage sources at Bear Gulch, southeastern Idaho and Obsidian Cliff, northwestern Wyoming; bottom, map of Colorado showing Beaver Creek source. (Maps provided with analysis results by Northwest Research Obsidian Studies Laboratory)

shovel testing of the talus slope and bench south of the shelter revealed significant artifact deposits to a depth of at least 1.4 m in mollic soils. These soils also could have been conducive to the growth of an impressive variety of food, medicinal, and ceremonial plants. Floral remains from ongoing excavations (flotation, pollen and phytolith sampling) could provide valuable insights into both prehistoric climates and subsistence-related activities of prehistoric inhabitants. In wetter periods over the last several thousand years, such a wealth of plant resources might have been available to an even greater extent than at present. Such warmer and wetter conditions on the Front Range have been seen in other periods (e.g., Doerner 2007).

The formation of the bench, it now appears, was via the slippage of a toreva block from the south face of Cherokee Mountain. At a minimum, there is sufficient artifact density and subsurface depositional integrity to warrant additional investigation of both the talus slope and the bench, as well as the unexcavated areas on either side of the shelter. All three of these areas, the authors believe, should now be included in an expanded definition of site boundaries.

STPs and auger samples indicate that the heaviest concentration of material culture is directly to the south of the shelter on the talus slope and bench. Substantial amounts of charcoal and fire-affected rock are found in this area. Subsurface features are also present, to be described along with additional data on survey and excavations in a separate article. Some of the data on surveys of the Cherokee Ranch property have already been presented elsewhere (Bellipanni and Calvert 2021; Calvert and Bellipanni 2023; Farmer and Kent 2016; Farmer et al. 2019).

Radiocarbon samples produced two dates for the deposits in the shelter, one of which falls within the Middle Ceramic period (AD 150–1150). This date, if the association with the soils in Level 2 is valid, extends the possible range of occupation for the shelter. The other date, said to be from Level 1, would be within the time range of the Great Bend aspect ceramics and that of the Utes.

There is also evidence of a possible earlier occupation in the form of a projectile point dating to the Late Archaic (ca. 2000 BC–AD 150). Additional proof of this association is needed as there is always the possibility that the point is a curated item from elsewhere. The potential for even older occupations, perhaps contemporaneous with the buried "A" horizon paleosols on the bench, may indicate an antiquity of deposits extending at back to at least 11,000 years ago (cal BP). Again, testing of these lower deposits seems warranted. Even if these are non-cultural levels, the study of pollen and phytoliths from deep ancient cores on the bench would be worthwhile.

The analyzed faunal remains indicate that bison was on the menu as were several smaller animal species. Cut marks on bone are likely cultural, but there is considerable evidence of carnivore gnawing and mold growth, attesting to a complex suite of taphonomic factors in play. The ongoing excavations involve modern recovery methods that should allow for much more informative inferences on past lifeways.

The obsidian analysis of a biface indicates exploitation of the Beaver Creek source to the south of the site (San Luis Valley), whether directly or by exchange. The debitage sources are northwest of the site. This pattern of mixed northwestern and southwestern (predominantly New Mexican) obsidian source use is well documented for the Middle Ceramic period, but in the subsequent Protohistoric period the use of northwestern sources has been found to be very rare (Gilmore et al. 2019; Gilmore et al. 2021). The precise dating of the debitage might be at issue. If the debitage comes from the Protohistoric occupation, the presence of obsidian from northwestern sources would be an exception to the pattern. The debitage could be from the "mixed" occupation levels noted by the original excavators. Unfortunately, the issue is not currently resolvable.

What represents a different southern connection is the use of obsidian from the Beaver Creek source near the San Luis Valley. However, the obsidian biface is not dated. The Bridger Basin Chert debitage piece (identified macroscopically) also comes from the north where northwestern Colorado, southwestern Wyoming, and eastern Utah meet. This is the same material, so visually striking, represented in the Mahaffey Cache in Boulder, which dates to Paleoindian times (Bamforth 2015). The pottery suggests the possibility of a regionally extensive range of contacts, implying potential ties with Intermountain ceramic makers, perhaps to the west, and with Great Bend aspect pottery makers to the east (Farmer and Kent 2023). Nevertheless, the question of contemporaneity persists. It does appear that the occupants of the site were by no means permanently sedentary, yet they had considerable appreciation and knowledge of local resources while at the same time participating in both local and long-distance interactions. It is hoped that additional data from the ranch will clarify some of these issues.

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THE CRESTONE STRUCTURES: AN ARCHAEOLOGICAL EXPLORATION OF STONE CREATIONS IN THE SAN LUIS VALLEY

SHELBY M. PATRICK

ABSTRACT

Outside of Crestone, Colorado, a group of stone structures has been the subject of local lore for many years. Despite the speculation surrounding the structures, there has yet to be a conclusive determination of their function or origin. Proposed interpretations of the structures have ranged from an association with local Native American groups to explosives storage facilities, ore smelting facilities, charcoal production facilities, and use as bread ovens by railroad workers. By examining historical documents and artifacts associated with the structures, analyzing the architecture, and interviewing local community members, this paper assesses these various interpretations to determine the structures' most likely origin and function. Of the six theories, the interpretation with the most supporting evidence is that the Crestone structures are ovens built by railroad workers during the construction of the Moffat to Lanark/Cottonwood line in the early 1900s.

INTRODUCTION

In Crestone, Colorado, located in Saguache County, four stone structures on the southern edge of town have been the subject of local interest for many years. To date, much of the previous research on this site (5SH4041) has been conducted by local community members, such as Becky Donlan and Ken Frye with Native American Research and Preservation Inc., and the prevailing interpretation has been that the structures are of Native American origin (Donlan and Frye 2019). However, the town of Crestone had a vibrant industrial presence in the historic period, and the possibility that the structures are associated with early mining and railroad activities has yet to be thoroughly explored (Simmons 1979; Sisemore 1983).

This paper presents an evaluation of six interpretations of the origin and function of the structures: construction by prehistoric Native American groups, construction by historic period Ute or Jicarilla Apache groups, use as explosives storage, use as ore smelting facilities, use as charcoal production facilities, and use as bread ovens by railroad workers. Test implications were developed for each of these interpretations, and evidence from the Crestone structures was compared to expected findings to determine the most likely origin and function. Of the six interpretations, it is most likely that these structures are associated with the expansion of the railroad in the area during the early 1900s and were used as bread ovens by railroad workers. A specific association with Italian immigrants is also possible although additional research would be needed to confirm this connection. Ultimately, the Crestone structures have driven much local interest, and the results presented here aim to further clarify their potential origin and function.

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DESCRIPTION OF THE CRESTONE STRUCTURES

The four stone structures (Figures 1 through 4) are located south of Crestone, Colorado, within the Baca Grande community (Figure 5). They comprise mainly Crestone Conglomerate stone with some pegmatitic granite, both of which are found locally (Mahan et al. 2015). All four structures are dome-shaped and constructed in a corbelled style, an architectural masonry technique in which each layer of stones is slightly further out, resulting in a stable dome or arch (Davies and Jokiniemi 2008). The dimensions and orientation of the structures can be found in Table 1. The structures are located in a residential area that has been substantially disturbed. Most notably, the top section of Structure #1 has been rebuilt by visitors (Becky Donlan, personal communication 2019). There is a low density of artifacts near the structures, which has previously been attributed to the removal of artifacts by visitors (Niemetz et al. 2010).

Structure #1

This structure is 0.6 m in diameter and 1.9 m tall, with a westward orientation. The entrance measures 30.48 cm by 41.91 cm. Of the four structures, this has been the most extensively disturbed, as the top section had fallen but was subsequently rebuilt (Becky Donlan, personal communication 2019). As a result, the original shape of this structure cannot be determined.

Figure 1. Crestone Structure #1.

Structure #2 (With Tail)

Structure #2, named "With Tail" by Niemetz et al. (2010), is 7.6 m in diameter and 3.2 m tall, with an entrance measuring 43.18 cm by 38.1 cm. The entrance faces south. Several other stone lines and circles can be found nearby; however, whether these are contemporaneous with the structures or are more modern creations is undetermined. Ken Frye (personal communication, 2019) also states that a projectile point was located near this structure, but no definitive date has been established for this artifact.

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

Structure #3 (North Door)

Structure #3, also known as "North Door," is 8.8 m in diameter and 1.4 m tall. The entrance has a southern orientation and is 43.18 cm by 58.42 cm. While this structure retains the same architectural style, the overall shape is more square than the other three structures.

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

Structure #4 (Piñon House)

The final structure ("Piñon House") is 10.2 m in circumference, the rear side is 1.05 m tall, and the entrance side is 1.8 m tall. Similar to Structures #2 and #3, the entrance faces south, and measures 35.56 cm by 55.88 cm. There are two small openings in the rear wall of this structure, but it is unclear if these openings were intentionally made at the time of construction or are the result of rocks shifting over time.

Figure 4. Crestone Structure #4 (Piñon House).

Table 1. Dimensions and Entrance Orientations of the Crestone Structures.

Structure	Dimensions (Niemetz et al. 2010 for Structures 2-4)	Entrance Dimensions	Entrance Orientation
Structure #1	0.6 m in diameter, 1.9 m tall	30.48 cm x 41.91 cm	West
Structure #2 (With Tail)	7.6 m in diameter, 3.2 m tall	43.18 cm x 38.1 cm	South
Structure #3 (North Door)	8.8 m in diameter, 1.4 m tall	43.18 cm x 58.42 cm	South
Structure #4 (Piñon House)	10.2 m in circumference, rear is 1.05 m tall, entrance side is 1.8 m tall	35.56 cm x 55.88 cm	South

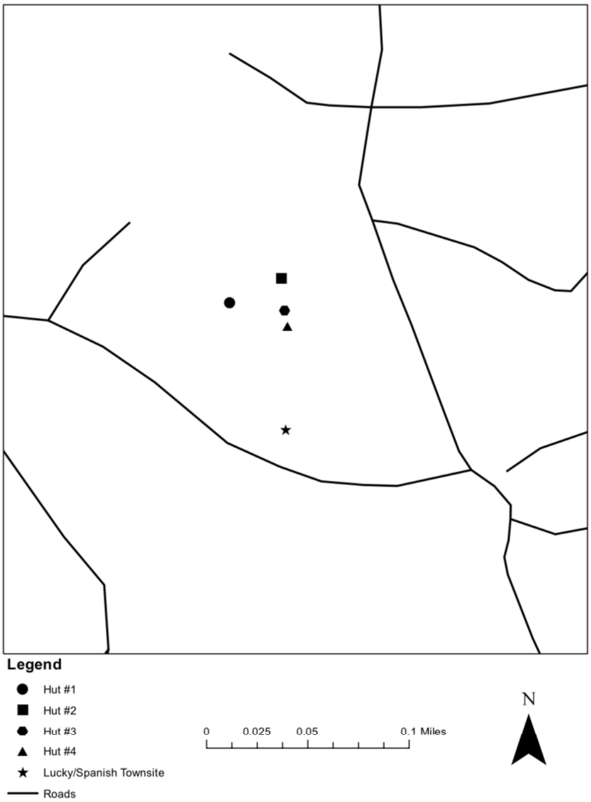

Figure 5. Map showing the Crestone structure locations.

PREVIOUS WORK ON THE STRUCTURES

2010 Excavations

Excavations were conducted in 2010 as part of an archaeological assessment of the Greenbelt T-2 Tract B area near Crestone, where the structures are located. The resulting report (Niemetz et al. 2010) was commissioned by Native American Research and Preservation, Inc., an organization run by Becky Donlan and Ken Frye, who have been independently researching the structures for many years. The principal investigator of this project was Adrian L. Niemetz, who was affiliated with Pikes Peak Community College.

Five test pits were excavated around Structure #4, and three test pits near Structure #3 (Niemetz et al. 2010). Five soil types were identified throughout the excavation units and non-organic ash was also found 15 cm down in Unit 2 (Niemetz et al. 2010). 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). Artifacts were found in several excavation units and include three 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). Niemetz et al. (2010) also identified an Archaic-age (5500 BC to AD 550) projectile point, a Taos ware sherd, and two Ute pottery sherds. Depending on whether the Taos ware is Taos Black-and-white or Taos Micaceous, this could have been manufactured from AD 900 into the modern period (Ellis and Brody 1964). The sherds of Ute pottery also have the potential to be either prehistoric or historical, and more information would be needed to solidify a manufacturing date. A list of all artifacts and the quantity of each type can be found in the supplementary materials of Niemetz et al. (2010). It was concluded that the structures were likely associated with early railroad activities in the Crestone area.

Optically Stimulated Luminescence Dating

In addition to investigation of the Crestone structures by Niemetz et al. (2010), Shannon Mahan of the U.S. Geological Survey conducted optically stimulated luminescence (OSL) dating in 2011. OSL dating entails testing the soil, specifically the quartz grains, underneath the stones for a luminescence signal to determine when the soil was last exposed to sunlight (Mahan et al. 2015; Preusser et al. 2008). A comprehensive overview of OSL dating methods 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 Structure #4 and Structure #1. The OSL dating concluded that the structures were likely constructed between AD 1860 and 1890 (Mahan et al. 2015). Specifically, samples from Structure #4 returned a date of 140 ± 15 BP and samples from Structure #1 returned a date of 130 ± 15 BP. These ages were calculated using the Central Age Model, and the ± 15-year uncertainty is reported at a 95% confidence interval. Based on these results, Mahan et al. (2015) agree with the suggestion of Niemetz et al. (2010) that the structures are most likely associated with the railroad. However, they also mention ore smelting for mining as another possible interpretation.

It is important to note that the local community members researching the stone structures have questioned the validity of this dating due to the potential of the wind in the San Luis Valley to disturb the soil and therefore produce false results (Becky Donlan, personal communication 2019). This was not cited as a potential source of error in Mahan et al. (2015), and additional testing would aid in confirming the accuracy of these dates.

HISTORICAL LAND USE IN THE CRESTONE AREA

Given the dates derived from the OSL study and the majority of the artifacts found during the 2010 excavation, a likely construction date for the structures is between the late 1800s and the early 1900s. However, the presence of an Archaic projectile point, as well as Taos ware and Ute ceramics, cannot be discounted. Therefore, the full scope of the region's history must be considered to develop a list of potential origins and functions for the Crestone structures.

In the mountainous region of Colorado, where the Crestone structures are located, the Archaic tradition is identified as the period from 5500 BC to AD 500 and can be further divided into Early, Middle, and Late periods (Martorano et al. 1999). The subsequent occupation stage is the Formative, characterized by agriculture and sedentary settlements, although there is debate as to the extent of this cultural shift within the area. Ceramic sherds, corn remnants, and stylistically different projectile points have been recovered in the San Luis Valley and provide some evidence of the Formative stage in this period, although the ultimate extent and time frame are still unknown. Therefore, the Formative stage is typically not distinguished from the Archaic stage in this region. The Late Prehistoric stage follows from AD 500 to 1600. The period from AD 1600 into the late nineteenth century is known as the Protohistoric stage. Martorano et al. (1999) mark its conclusion when local Native American groups were forcibly sent to reservations. The two main Native American groups occupying the Crestone area during the Protohistoric period were the Ute and the Jicarilla Apache (Jefferson et al. 1972; Opler 1971; SLV Museum Association 2020).

Beginning in 1870, mining became an increasingly prominent industry in the Crestone area (Sisemore 1983). 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, with gold as the main product. During this period, mining in the Crestone area was relatively unregulated (Simmons 1979). One of the largest mines in the Crestone area was the Independence mine, located approximately 1.5 km from the Crestone structures near the historical town of Lanark/Cottonwood (*The Diggings* 2020; Harlan 1976; Sisemore 1983). Additionally, several ore extraction mines were built in and around Crestone during the middle to late 1800s (Harlan 1976).

One of the main settlements in the Crestone area associated with mining was the small town of Lucky, sometimes also known as Spanish, which was located 100 m from the stone structures (Niemetz et al. 2010; Simmons 1979). The development of Lucky/Spanish was motivated by the Demmick-Mattison Company's discovery of quartz nearby (Harlan 1976). George Adams subsequently purchased the company in 1897 (Harlan 1976). In 1898, 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 (Christman and Short 2013; Sisemore 1983). Given Adams's ownership, Lucky/Spanish was considered a legal settlement and was allowed to remain. The town served as a place to process ore from the Independent Mine nearby; as of 1898, 300 people lived there (Harlan 1976). Although today the site of Lucky/Spanish consists of rusted cans and a dilapidated structure, at one point the town had a dance hall, dairy, barber shop, and livery stable (Harlan 1976; Sisemore 1983). The Crestone Mining District was established in 1900, and another short-lived mining boom came in 1900 when the San Luis Valley Land and Mining Company purchased the land (Sisemore 1983). Eventually, mining began to slow in the area, and by 1902 none of the mines in the Crestone area were operating (Harlan 1976).

Railroad construction in the San Luis Valley began during the late nineteenth century and mainly comprised narrow-gauge railroads (Zepelin 2019). A railroad line to Moffat was established in 1882, and this remained the closest railroad to Crestone and Lucky/Spanish for almost two decades (Harlan 1976; Simmons 1979). Eventually a railroad linking Moffat to Lanark/Cottonwood, with a stop in Crestone, was constructed in 1901 to increase the productivity of mines in the area (Harlan 1976; Ormes 1976). The segment from Moffat to Crestone was 27.3 km in length, with part of the railroad line passing approximately 1.6 km from the Crestone structures (Figure 6; Poor and Poor 1914:1233). The railroad was no longer in use after 1921 (Harlan 1976).

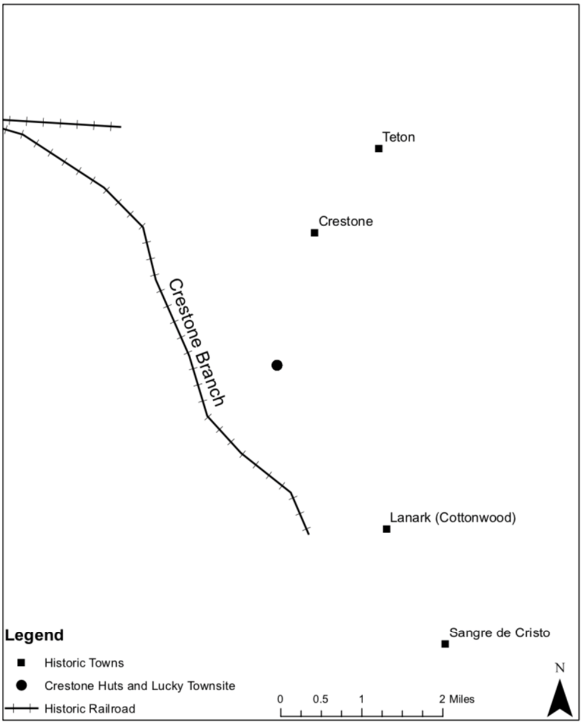

Figure 6. Map of Crestone structures in relation to the historic railroad and towns.

POSSIBLE ORIGINS OF THE STRUCTURES

Six possible interpretations as to the structures' origins and functions are examined in this paper: construction by prehistoric Native American groups, construction by historic period Ute or Jicarilla Apache groups, explosives storage, use as ore smelting facilities, use as charcoal production facilities, and use as bread ovens by railroad workers. Local residents are proponents of the Native American construction theory, whereas Niemetz et al. (2010) and Mahan et al. (2015) have suggested that the structures could be associated with mining and railroad operations in the area during the late 1800s and early 1900s. Specifically, these investigators have noted the presence of charcoal and have proposed that it could be from explosives storage, ore smelting, charcoal production, or use as ovens.

After identifying the six predominant interpretations, the next step was to develop test implications for each. These test implications were developed after reviewing literature discussing confirmed or 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 following section.

RESULTS

Prehistoric and Historic Native American Origin

Overall, there is limited evidence that these structures have a prehistoric origin. The OSL dating places the construction firmly in the late 1800s to early 1900s, and only one confirmed artifact from the prehistoric period was found near the structures. The one confirmed and three potential prehistoric artifacts were found outside of the structures, which weakens their association, although this is also true for the historic period artifacts that were found. Additionally, prehistoric artifacts are found throughout the San Luis Valley landscape, which casts doubt on these artifacts' direct association with the structures. Overall, the OSL dating does not suggest an affiliation with prehistoric Native American groups, and there is a paucity of prehistoric artifacts compared to items from the historic period. It is unlikely that these structures have a prehistoric origin.

As the OSL dates place construction in the historic period, it is possible that Native American groups occupying the region during this period were the original builders. There is currently little available documentary information relating to either the Ute or Jicarilla Apache having built 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 (Horn 1999; Martin et al. 2006). The Jicarilla Apache have not been known to use stone constructions although the larger Western Apache group has used stone to build sweat lodges, ramadas, and storage structures (Herr 2013; Opler 1936). Despite their use of stone structures, the Western Apache are not known to have lived in the San Luis Valley, making it highly unlikely that they were responsible for the Crestone structures (MNA 2020). No documentary or photographic sources have been found detailing the use of constructions similar to the Crestone structures by the Ute or Jicarilla Apache groups. Therefore it is unlikely that either the Ute or Jicarilla Apache were responsible for the Crestone structures. Still, consultation with Ute and Jicarilla Apache community members could provide additional information.

Explosives Storage

One of the main components needed for a mining operation is explosives to move rock as needed (Fell and Twitty 2006). The use of explosives required that mining operations build a safe place to store the explosives while not in use. These storage facilities are commonly known as explosives magazines. Test implications for this interpretation (Table 2) were developed from a report on historic mining in Colorado developed for the National Park Service (Fell and Twitty 2006) and a textbook detailing the explosives used for mining (International Library of Technology 1907).

Out of the eight test implications, the Crestone structures meet two. As noted, the structures are near a historical mining town, and powder kegs have been found in association (Figure 7). However, the structures are over 3 km from where the Independent Mine would have been located at Lanark/Cottonwood

Table 2. Explosives Storage Test Implications

Test Implication	Evidence from Crestone Structures	Meets Expectations
Proximity to a historic mine/mining camp	Located 100.8 m from Lucky/Spanish site	Yes
Powder kegs in association	Seven "Laflin & Rand Powder Co." powder kegs located in area of structures (Niemetz et al. 2010), manufactured between 1869 and 1912 (Hagley Museum and Library 2020)	Yes
Typically 3.65 x 6.1 m (Fell and Twitty 2006)	Structures range from 10.2 to 7.6 m in diameter and from 3.2 to 1.05 m tall (Niemetz et al. 2010)	No
Arched roofs (Fell and Twitty 2006)	Structures are dome-shaped with circular roof	No
Iron doors (Fell and Twitty 2006)	Not present on the Crestone structures	No
Constructed with brick or concrete (Fell and Twitty 2006)	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015)	No
Well-ventilated (International Library of Technology 1907)	One door, gaps between rock could provide ventilation	No
Ventilation able to be closed off (International Library of Technology 1907)	Door appears to be permanently open, but something could have been placed over it	Unable to be determined

Figure 7. Powder keg found near the Crestone structures.

(Figure 6), and workers would likely have stored explosives much closer to the actual operation. The Crestone structures also do not meet any of the architectural test implications and are constructed in a much simpler style than typical explosives magazines. While it is unlikely that the structures functioned as explosives storage, it is important to note that explosives magazines could be highly variable in form due to the significant financial commitment needed to build them properly (Fell and Twitty 2006). Smaller-scale operations often lacked the financial means to construct magazines properly and utilized whatever materials they had on hand to store their explosives, resulting in structures that do not conform to these test implications (Fell and Twitty 2006). It is possible that this occurred at Lucky/Spanish due to the small size of the operation.

Ore Smelting

Often, with hard rock mining, the profitable metals must be smelted to separate them from the crude ore (Fell and Twitty 2006). Ore smelters typically contained a center fuel column where the crude ore, often mixed with lead, was poured around fuel. The crude ore was then heated, which caused the ore to melt and trickle down to a collection area in the furnace. Test implications for ore smelting facilities (Table 3) were drawn from the report on historic mining in Colorado developed for the National Park Service (Fell and Twitty 2006).

Out of the seven test implications, the structures meet just two, making it very unlikely that they were used for this purpose. While the structures were located near the mining camp of Lucky/Spanish, and mining was occurring in the region, the construction style of the Crestone structures is vastly different from typical smelting furnaces. No photos of smelting furnaces in Colorado could be located, but comparison to facilities in Illinois and Georgia show a distinct

Table 3. Ore Smelting Facilities Test Implications

Test Implications (Fell and Twitty 2006)	Evidence from the Crestone Structures	Meets Expectations
Proximity to a historic mine/mining camp	Located 100.8 meters from Lucky/Spanish site	Yes
Constructed using cylindrical steel vessels to contain both fuel and crude ore	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015)	No
Typically 1.2 to 3.65 m in diameter	Structures range from 10.2 to 7.6 m in diameter (Niemetz et al. 2010)	Yes
Near source of abundant water	No large water source near the Crestone structures	No
Near well-graded roads	Roads nearby are modern constructions and historic roads built in the San Luis Valley did not pass by Crestone or Lucky/Spanish (Sisemore 1983)	No
Near acres of flat space	Uneven ground near the structures with small slopes	No
Built into a slope to utilize gravity to bring melted ore into collection area	Structures are built on relatively flat ground, not into the side of a slope or hill	No

difference in construction style, with the Illinois and Georgia facilities significantly larger in width and height and having a more rectangular shape (Hidden Springs Ranger District 2008; *Roadside Georgia* 2003).

Although the structures do not meet most of the test implications, gold ore, extracted from the Independent Mine and processed at Lucky/Spanish, was reportedly found in front of Structure #2 (Harlan 1976; Niemetz et al. 2010). Additional soil testing for heavy metals could provide more information on whether the structures were smelting facilities, as mining and the associated processes can cause heavy metals to leach into the surrounding soil (Abdul-Wahab and Marikar 2011). Heavy metals can also affect groundwater, as happened at the Smeltertown processing facility in nearby Salida, Colorado (EPA 1995). Despite the smelting processes occurring at Smeltertown beginning in 1902, heavy metal pollution continued to affect the surrounding environment into the late 1990s (EPA 1995). Although the geologic analysis of the soil surrounding the Crestone structures is limited to that associated with the OSL dating, no soil contamination was reported during that dating process (Mahan et al. 2015). Additional geologic analysis of the soil could result in the discovery of similar pollution experienced at other smelting facilities, thus providing evidence that the structures were used as smelting facilities.

Charcoal Production

Charcoal production is often associated with mining, specifically the smelting process (Toole et al. 1961; Zeier 1987). The use of above-ground ovens for this purpose in the middle to late 1800s has been documented at multiple sites in Colorado, such as the Capitol City and Bromide charcoal kilns (History Colorado 2016, 2019). Test implications for this interpretation (Table 4) were developed based on an assessment of confirmed charcoal kilns in Eureka, Nevada (Zeier 1987), as well as the report by Toole et al. (1961). Although charcoal production kilns have been found in other parts of Colorado, there is little discussion in the literature about the specific architecture of stone structures associated with charcoal production.

Evidence from the Crestone structures only meets three of the eight test implications. Two of the test implications that were met are the presence of charcoal in and around the structures and a concentration of piñon or juniper in the area. Niemetz et al. (2010) did find 407 pieces of charcoal and 113 piñon husks around the structures. While at one level the presence of charcoal supports this interpretation, this charcoal has not been dated to a specific time period and the possibility that it resulted from a modern campfire cannot be ruled out. On the same note, while charcoal production operations in the Great Basin commonly burned piñon to produce charcoal, and it is plausible that this method was also practiced in the San Luis Valley, the piñon husks found near the structures also have not been dated (Zeier 1987). While technically the two test implications are met, the presence of charcoal and piñon provides minimal support for the interpretation. The structures 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 described by Zeier (1987) and Toole et al. (1961).

The differences in construction between the Crestone structures and confirmed charcoal kilns also become apparent during a visual inspection.

Table 4. Charcoal Production Test Implications

Test Implications	Evidence from Crestone Structures	Meets Expectations
Charcoal found in/around structures	407 pieces of charcoal found around the structures (Niemetz et al. 2010)	Yes, but has not been dated to the same period as the structures
Concentration of piñon/juniper in the area (Zeier 1987)	113 piñon husks found around the structures (Niemetz et al. 2010)	Yes, but has not been dated to the same period as the structures
Beehive shaped (Toole et al. 1961; Zeier 1987)	Structures are dome-shaped	No
4.9 to 7.9 m in height (Zeier 1987)	Structures range from 3.2 to 1.05 m tall (Niemetz et al. 2010)	No
Made of masonry blocks, bricks, field stones, and reinforced concrete (Toole et al. 1961)	Constructed using primarily Crestone Conglomerate (Mahan et al. 2015)	No
Opening in the ceiling (Toole et al. 1961)	Not present on Crestone structures	No
Vent holes near the bottom (Zeier 1987)	Not present on Crestone structures	No
Smooth, no gaps between stones (History Colorado 2016, 2019)	Some gaps between stones, outside is not smooth	No
Located near a perennial stream (Buckles 1978, as cited in Zeier 1987)	Spanish Creek is located 190 m away	Yes

Charcoal kilns are present throughout Colorado, two of the best-known sites being the Capitol City kilns in Hinsdale County, built in 1877, and the Bromide kilns in Moffat County, built in 1898 (History Colorado 2016, 2019). Compared to these kilns, the Crestone structures are much smaller, do not have as large an opening in the front, and have a rounded rather than conical shape. Furthermore, the Capitol City charcoal kilns are built with brick, and the kiln surfaces are smooth, whereas the Crestone structures are built with irregularly shaped stones and the outsides are rough. The Capitol City charcoal kilns and the Bromide charcoal kilns also have very defined oval entrances lined with vertically placed stones. The Crestone structures have a relatively oval-shaped entrance, but the stones continue to display a corbelled pattern near the entrance. Overall, there is little resemblance between the Capitol City and Bromide charcoal kilns and the Crestone structures. The Piedmont charcoal kilns in Uinta County, Wyoming (Figure 8) also demonstrate the typical construction style of charcoal kilns in the late 1800s and are dissimilar to the Crestone structures.

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

Figure 8. Piedmont charcoal kilns in Uinta County, Wyoming, constructed in 1869. (Photograph courtesy of the Historic American Buildings Survey, Library of Congress, call number: HABS WYO,21-PIED,1-)

Bread Ovens

The final interpretation is that the structures were bread ovens built by railroad workers associated with the Moffat to Cottonwood line, which was constructed in 1901 and passed through Crestone and ran parallel to the townsite of Lucky/Spanish. Stone constructions associated with railroads have been found in many states, including Colorado (Baumler 2013; *Big Bend Railroad History* 2008; Rossillon 1984; Wegars 1991, 1993). Stone structures associated with railroads are usually thought to be ovens, and their construction has been attributed to various ethnic groups, with Italian railroad workers being the most common (*Big Bend Railroad History* 2008; Rossillon 1984; Wegars 1991, 1993). The test implications for this interpretation (Table 5) were developed based on Wegars's (1991) article that examines domed rock ovens associated with railroads throughout the western United States. This article lists the most common and frequently seen architectural characteristics of railroad-related domed rock ovens.

Of the seven test implications, the Crestone structures meet six of the criteria. Although the Crestone structures have a larger diameter than the ovens described by Wegars, the construction style is the same. A visual comparison of the Crestone structures 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, and another was found in Summit County (Buckles 1976, as cited in Wegars 1991; Rossillon 1984). Ovens associated with the railroad have also been found in Montana, Washington, and Idaho (Baumler 2013; *Big Bend Railroad History* 2008; Wegars 1993). The Crestone structures' construction style is very similar to these other railroad-associated ovens as they are all dome-shaped, made from dry-laid masonry, and have similarly shaped doorways. In all structures the stones used are not smooth, such as brick, and appear to be locally sourced stone as in the case of the Crestone structures. Based on the Crestone structures' congruence with the test implications, their 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 most likely that the Crestone structures were used as ovens for railroad workers.

Table 5. Bread Oven Test Implications

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

Railroad-related ovens have been attributed historically to various ethnic groups, such as Chinese, Scandinavians, Greeks, and Italians, but Italian immigrants have been identified as the most common builders (Wegars 1991). Homemade bread production was a central element of Italian culture into the 1800s, and bread was usually cooked in an outside stone oven called a *fornello* (Williams 1938). It has been suggested that Italian immigrants in the United States built stone ovens to maintain their cultural identity and produce a relatively inexpensive food (Culpepper 1998; Rossillon 1984). Bread was not typically available in stores until the 1930s, so many Italian immigrants relied on stone ovens to make their own bread (Costello 1998). The role of bread as an essential part of Italian-American culture can be seen even in modern representations and stories (Curto 2015). Bread has a long history in Italy, and it is plausible that Italian immigrants would have wanted to bring this cultural tradition of outdoor stone ovens with them.

Italian immigrants frequently worked on the railroads throughout the western United States, and Colorado was no exception. Southeastern Colorado, including Saguache County where the structures are located, experienced an influx of Italian immigrants in the late 1800s and early 1900s (Church et al. 2007). A record of Denver and Rio Grande Railway employees states that many 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 were in the Crestone area.

Many of the ovens discussed in the visual comparison have also been attributed to Italian immigrants. For example, the oven in Gunnison County, Colorado, is thought to have been constructed by Italian railroad workers, given its “distinctive Mediterranean style” (Rossillon 1984:104). 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; Wegars 1993). The Crestone structures can be compared further to traditional Italian outdoor bread ovens such as those in Figures 9 and 10. While located in Nevada and Louisiana, respectively, these structures bear a resemblance to the Crestone structures. The oven shown in Figure 9 is remarkably similar in construction, both in shape and material. While the Crestone structures are less polished than the oven in Figure 10, it is possible that railroad workers in the Crestone area would have adapted the traditional construction style to make use of the materials at hand, in this case local stone instead of brick.

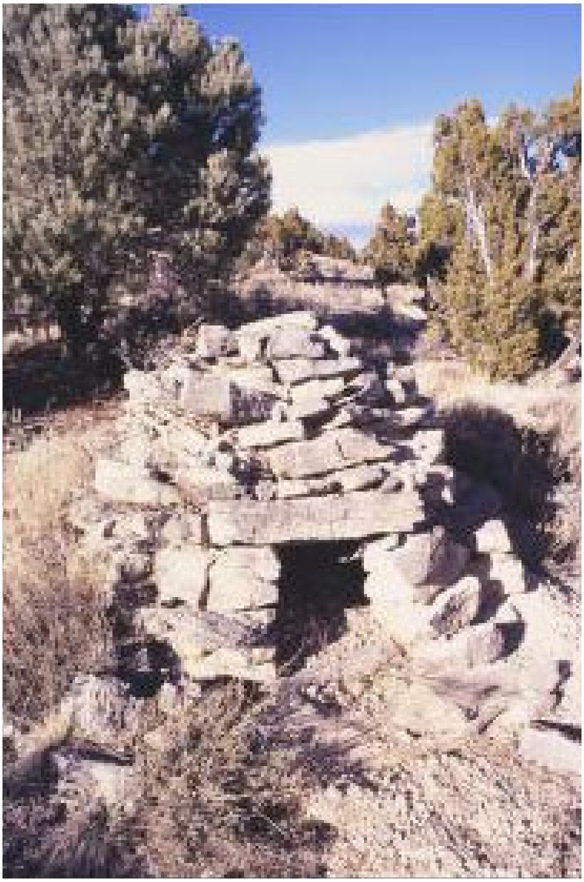

Figure 9. Fornello in a Catholic cemetery, Eureka, Nevada, 1989. (Photograph courtesy of the American Folklife Center, Library of Congress, call number: AFC 1989/022: BO-C011; photographer, Owen Blanton)

Figure 10. Oven of Italian strawberry grower in Louisiana, 1939 (Photograph courtesy of the Farm Security Administration–Office of War Information Photography Collection, Library of Congress, call number: LC-USF34-032741-D [P&P] LOT 1700; photographer, Russell Lee)

DISCUSSION

This study indicates that the Crestone stone structures were most associated with the railroad and functioned as bread ovens. The Crestone structures meet six out of seven test implications for this interpretation, whereas they only meet two to three for the other interpretations. In addition, the Crestone structures visually resemble other railroad-associated ovens. The vastly different construction style of the Crestone structures when compared to stone structures associated with mining, charcoal production, or Native American groups suggests that they are not related to these industries or groups. Although the Crestone structures are probably railroad-related, their specific association with Italian railroad workers is still ambiguous. While Italians were the main builders of many other railroad-related ovens, and there are architectural similarities between the Crestone structures and Italian *fornellos*, there are few documentary records specifically linking Italian railroad workers to the Crestone area. Without this information, a definitive link between the Crestone structures and Italian railroad workers cannot be established, and this association is still speculative.

One limitation of this work is that secondary cultural formation processes have disturbed the Crestone structures and the surrounding area. For example, Structure #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 structures. Artifacts in the area may have also been disturbed; therefore, their original provenience cannot be established. It is also possible that the structures have been reused over the years, possibly obscuring clues to their original function.

In addition to the disturbance caused by secondary cultural formation processes, there is a gap in the documentary record regarding specific information about the Crestone structures. No primary sources that directly mention the Crestone structures could be located. As a result, while utilizing test implications and a visual comparison of the structures was the best possible approach, this method has inherent uncertainty. Although the Crestone structures may be visually similar and meet many of the characteristics, without primary documentation the interpretation that the structures were associated with the railroad is only an inference.

Additional research on Italian immigrants working on the railroads throughout Colorado would aid in solidifying the potential association of the structures with this group. Interviews with descendants of Italian railroad workers might 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 potential connections to those groups.

CONCLUSION

The central goal of this paper was to explore which interpretation of the original function of the Crestone stone structures has the most supporting evidence. After evaluating the possible interpretations, it is most likely that the Crestone structures were built by railroad workers, possibly Italian immigrants. While there is certainly remaining ambiguity due to the modern disturbance of the site, this study has aided in advancing the research on the Crestone stone structures. Additional research on the industries of the San Luis Valley, and Crestone specifically, would provide valuable information for analyzing the Crestone stone structures. 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. While further research is needed, this paper provides an overview of possible interpretations to be considered by future researchers.

ACKNOWLEDGMENTS

Thank you to Becky Donlan, Ken Frye, Angie Krall, Tim Fohl, and Barbara Maat for sharing their research and thoughts on the Crestone structures. Many thanks as well to Adrian Niemetz and his family for donating his work on the structures for future researchers to use. I would especially like to thank Dr. Scott Ingram at Colorado College for his support and encouragement throughout the duration of this project. Funding for this project was provided by the Kathleen Jones Memorial Fund (Colorado College, Department of Anthropology).

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JACK E. SMITH (1929 – 2023)

SUSAN M. COLLINS

Jack Smith lived in the Pearl Street house that his father purchased in 1932, and Jack passed away peacefully in his sleep there on October 7, 2023. A professional archaeologist, he served for 15 years as Chief of Research at Mesa Verde National Park. Previously, he lived in California and New Mexico, and over the course of his life traveled extensively around the world.

Jack was born on June 22, 1929, the son of George E. Smith and Leone E. Brierley Smith, both members of early Boulder families who came to Boulder to mine gold and coal. He attended Boulder High School and graduated from the University of Colorado with a History major in 1952. In 1953, he enlisted in the Army Corps of Engineers as a cartographer. Posted to the Presidio in San Francisco, he made maps and signs, and interpreted aerial photographs until his discharge in 1955. He went on to earn a Ph.D. in Anthropology at the University of California in Los Angeles in 1965. During this time, he learned archaeology, ultimately supervising projects in California and the Great Basin, west Mexico, and western New Mexico, as a staff member of UCLA and then the Museum of New Mexico.

On completing his graduate education, Jack was hired by the University of Colorado, Denver campus. In 1966, Jack received a Fulbright award to study

Jack Smith and Rosie in 1984.

Jack Smith on January 1, 1989 recording temperatures in a kiva.

Chinese culture in Taiwan. Jack taught a broad range of anthropology courses at the CU-Denver campus, from Southwestern archaeology to the ethnography of China. Over the course of 15 years, Jack built the anthropology program at UCD. Most summers, he joined the University of Colorado research program at Mesa Verde National Park, serving as a field supervisor on multiple projects that both trained students and served National Park Service management needs. In 1980, he shifted from academia to join the National Park Service full-time as Chief Archaeologist and Director of Research at the park. He retired in 1994 and received the Department of Interior Meritorious Service Award for accomplishments in archaeology and preservation.

Jack Smith contributed to many charitable organizations, especially nature conservation groups. In his retirement, he served as a board member for Historic Boulder and the Wright Paleohydrological Institute. While he was physically able, he volunteered with the Columbia Cemetery Conservation Corps. With deep local roots, Jack was an archaeologist and historian with worldwide interests. He was well-read and well-traveled, and he served as a teacher to many people, both in the classroom and field situations.

Jack's adventurous life was not conducive to family stability; by the age of 40, he had been married three times. His wives were: Frances Louise Redman, Frances Conor, and Ann Noordenbos. The second half of his life saw a 47-

year engagement to Susan Collins, his surviving common-law spouse. Jack is survived by two adult children, David Forsyth of Gardinerville, Nevada, and Caitlin Cunningham of Petaluma, California. There are five grandchildren. He was preceded in death by his parents and his brother, Dale Shockey of Wichita, Kansas.

It was Jack's desire to be buried with the simplest possible ritual. A simple ceremony was held at Columbia Cemetery on the day of interment, January 5, 2024, officiated by the Reverend David Schwartz of the Unitarian Universalist Church of Boulder. The ceremony was attended by many of Jack's colleagues, former students, and friends.

(Originally published by *The Daily Camera* [Boulder, Colorado] on Oct. 15, 2023; with additions.)

Jack Smith in 2009 at Michaelmas Cay on the Great Barrier Reef, Australia.

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WILLIAM (BILL) HAMMOND (1931 – 2021)

JACK C. WARNER

William (Bill) Hammond, M.D., a member of the Denver Chapter of the Colorado Archaeological Society (CAS) for over 40 years and the 2014 recipient of the CAS Ivol Hagar Award for outstanding long-term contributions to CAS, passed away on February 4, 1921, after a long illness. Bill was born to be an archaeologist, although he was a medical doctor by profession.

Bill Hammond was born on May 7, 1931, in Columbus, Ohio. He was a graduate of Cornell University and the Rochester School of Medicine, and did his residency at Case Western Reserve University and the University of Washington. He served in the U.S. Air Force for two years and then became a faculty member in the Department of Pathology and the University of Colorado School of Medicine. During much of his time there he was Director of Clinical Laboratories at the Denver VA Medical Center (*The Denver Post* 2021).

Bill Hammond receiving the Ivol Hager Award from Denver Chapter President, Jack Warner, October 2014

Bill was a Past President of the Denver Chapter of CAS and held several other Chapter offices. He was very active in field archaeology and was the original person to propose the PAAC lithics course. Bill was very involved in archaeological fieldwork at the Lowry Bombing Range, the Plains Conservation Center, the Paleoindian Gault site in Texas, and several of the prehistoric sites on Ken-Caryl Ranch west of Denver. He is particularly known for his team leadership, fieldwork, and laboratory work on the Early Archaic Swallow site.

Bill authored and co-authored several publications and scientific talks. The Fall 2020 issue of *Southwestern Lore* is devoted to Bill's Swallow site report.

Bill continued to be active doing archaeological research and mentoring CAS members until the end. He was always available to consult with the Ken-Caryl Ranch Historical Society's archaeological committee. In the weeks before his death, Bill was consulting on some of the latest finds and analyzing their meaning among the other prehistoric sites previously excavated there. During this work, Bill told me that he had lived a good life and knew the end was near. He told me he was most proud of this lifetime work in archaeology and the legacy of knowledge he had left behind. Bill is survived by his wife Virginia. He had four children and three grandchildren.

(Originally published in the Denver CAS *Newsletter*, February 6, 2021; with additions)

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BOOK REVIEW

King Ranch: A Legacy in Art. By Noe Perez, edited by Bob Kinnan, William E. Reaves, and Linda J. Reaves, with contributions by Ron Tyler and Bruce M. Shackelford. Texas A&M University Press, College Station, 2021. 160 pages, 94 color and 9 black-and-white illustrations, 5 maps, index. ISBN 978-1-62349-952-5, US $35.00 (cloth).

Reviewed by Pamela Krch, Colorado Mesa University

This lovely book, a paean to South Texas's King Ranch, highlights the painter Noe Perez's work to illustrate the beauty and vastness of the region. In addition, the volume includes a brief history of the King family, a look at the development of the ranch and its influence on the industry as well as on material culture, followed by a short summary of the evolution of the genre of Texas impressionism. Concluding the text is a lengthy collection of Perez's studies and paintings representing the ranch. Overall, the book—while pleasing to the eye and generally informative regarding the appeal of this regional artistic style—initially seems somewhat disjointed; or perhaps fails to completely conform to any one mission. Does this volume purport to be a panegyric to the King Ranch, a survey of Perez's work, or an homage to South Texas? Regardless, in its inherent value as an attractive book, full of beautiful images, *King Ranch* does not disappoint.

The renowned Texas artist Noe Perez curates his pictures in this volume, all of them completed between the years 2015 and 2020, depicting the various holdings of the ranch. His lyrical work, most of it displaying a bright palette, well represents the Texas impressionist style. Moreover, Perez succeeds in both capturing the sheer enormity of the land and the unique and varied architecture contained therein. Interestingly, however, the painting that spoke most to me was the Hopper-esque *Las Palmas Guest House*; with its uncharacteristically somber background and unearthly illuminated walls, the image conveyed the isolation that must also accompany such a vast property.

The reader is aided in their appreciation of Perez's art through Ron Tyler's essay on the rise of Texas impressionism, alongside his more general history of the region's geography and early European colonization. Tyler, former director of the Amon Carter Museum of American Art, writes in an accessible manner that even the layperson art afficionado can understand, placing Perez's portfolio in the long tradition of Texas art. American and European artists, arriving in the late nineteenth century, found the light and loose style ideal for portraying the South Texas landscape. As Tyler points out, although the impressionist genre had already begun to fade in popularity by the early twentieth century in other parts of the United States, in Texas it not only remained popular, but served to boost Texas patriotism.

Indeed, the King family, as described in the chapter written by Bruce M. Shackelford, worked and continue to work to assiduously promote South Texas and the "Running W" brand. The family's long tradition of supporting regional artists began early on, beginning with Captain Richard King's wife, Henrietta Chamberlain King, and her patronage of the Irish-Texas painter James F. McCan. King and her son-in-law, ranch manager Robert Kleberg, Sr., enthusiastically promoted the turn-of the-century arts and crafts movement, too, turning to the famed Tiffany Studios to design the interior of their iconic Main House, completed in 1915. Likewise, descendants of the ranch's founders contributed to western culture through their sponsorship of artisans such as master weaver Emiliano García, as well as via innovations in saddlery, bits and spurs, and ranch wear.

Lest we forget, however, King Ranch now stands as a multinational corporation with much of its profits gained from oil wells, tourism, Running W merchandise, and recreational hunting alongside major agribusiness interests. While the myths of the Wild West and Texas cattle ranching persist in the American imagination, the reality is that King Ranch has come far from its "dear, old Santa Gertrudis" roots. With this in mind, the least successful section of *King Ranch* is the syrupy history of the King family penned by ranch historian, Bob Kinnan. Certainly, founder Richard King's accomplishments were remarkable, and that is a story worth telling with all of its warts and ugliness intact. Kinnan's repeated emphasis on the Captain's and Henrietta's sterling qualities becomes tedious within a few pages. As a historian of the American West, I think I can safely assert that no mid-nineteenth-century individual succeeded in accumulating hundreds of thousands of acres of land without possessing a certain amount of ruthlessness.

Still, that one complaint aside, this remains a beautiful book that would hold interest for fans of the American West as well as western art lovers more specifically. Is it, as asked previously in this review, a promotion of the King Ranch, a collection celebrating Noe Perez's work, or a tribute to South Texas? After considering the possibility, it seems that *King Ranch* is, indeed, all three of those things. After all, the iconic ranch, located in a unique region of the western landscape, is perfectly represented by the traditionally Texas-based production of Noe Perez.

BOOK REVIEW

Fluted Points of the Far West. Michael F. Rondeau. University of Utah Press, Salt Lake City, 2023. 244 pages. ISBN 9781647691134, US $70.00 (hardcover); ISBN 9781647691110, US $56.00 (ebook).

Reviewed by Spencer R. Pelton, Office of the Wyoming State Archaeologist

Fluted Points of the Far West is the culmination of 20 years of research by author Michael F. Rondeau, who spent that time poring over literature and traveling across the region to compile detailed descriptive reports of Paleoindian artifacts for his CalFLUTED project. The Far West, as Rondeau defines it for this book, subsumes the U.S. states of California, Oregon, Nevada, and Utah, a region in which evidence for the first Americans has been notoriously hard to find. Fluted spear points have always been rare and underreported in the Far West to the extent that most Paleoindian archaeologists have concluded that the region was a backwater of the earliest Americans. Rondeau disagreed, saw a fluted point record in need of more intensive study, and took it upon himself to fill the gap, producing the first comprehensive study of fluted point occurrences in the region.

Fluted Points of the Far West includes 241 pages of black-and-white tables, maps, and line drawings presented in 21 chapters and two appendixes that collectively report information for just over 1,000 artifacts. Rondeau is assisted in several chapters by regional contributors including John W. Dougherty, Daron Duke, Nicole D. George, Nathanial Nelson, Patrick O'Grady, and Scott P. Thomas. However, Rondeau appears to have done the bulk of the heavy lifting in getting this book to publication. The book is loosely organized into four sections. The first six chapters provide background by introducing the CalFLUTED research project, presenting a brief North American prehistory, reviewing previous fluted point studies in the Far West, proposing a means of systematically identifying fluted points, and discussing fluted point variability and radiocarbon dating.

The next eight chapters, 7 through 14, comprise the bulk of the book, each chapter addressing specific fluted point attributes documented during the CalFLUTED project. After a summary of the sample (Chapter 7), this section continues with detailed evaluations of fluted point size, morphological trends, basal flaking, use damage and repair, preforms (what Rondeau calls "unfinished fluted bifaces"), margin grinding, and flute scratching. Each chapter is accompanied by detailed data tables, illustrations, and terminologies, which make them a valuable resource for comparative studies.

The third section, comprising Chapters 15 through 18, summarizes each of the attributes detailed in the second section for each of the four states included in the study. Rondeau also reviews previous fluted point studies, summarizes evidence from major sites, and highlights future research possibilities for each state. Each chapter is accompanied by maps tabulating fluted point counts for each county, maps that will surely be referenced often for large-scale studies of fluted point occurrences in the West.

The final section, Chapters 19 through 21, wraps everything up with discussions of other early Paleoindian point styles in the Far West (Chapter 19), a review and discussion of the preceding chapters (20), and a concluding chapter (21). The text is followed by Appendix A, comprising 13 pages of high-quality artifact line drawings referenced throughout the book, and Appendix B, which includes a detailed reference list for artifacts cited throughout the book, organized by state.

Fluted Points of the Far West is a huge accomplishment. Rondeau saw a niche and ran with it, leaving us today with not only the most detailed study of fluted points in the West, but one of the most comprehensive studies ever produced for *any* region on this topic. This book is about as definitive a statement on fluted points as archaeologists are likely to find for many years. I am especially fond of the ample use of data tables and line illustrations, which will serve as a great reference for contextualizing fluted point research.

Do not go into this book expecting to find any major new theoretical insights about the earliest people in the Far West. This is a book about fluted points and fluted points alone, containing more detailed nuances about how they were made, hafted, resharpened, broken, recycled, burned, and weathered than most readers will have ever thought possible. Given this parochial scope, I was disappointed that the book contained so little metric data that would have allowed for more comprehensive artifact comparisons. The detailed attributes documented by Rondeau are almost solely categorical or ordinal with few measures of length, width, thickness, or other continuously distributed metric attributes. The sole exception is a chapter on fluted point size, in which Rondeau presents summary attributes for complete specimens. A third appendix presenting metric data for individual artifacts would have been a welcome addition.

Despite some minor criticisms, I would highly recommend this book for those whose research is deeply invested in fluted points, including any Paleoindian lithic specialists nationwide and flint knappers, who would get a lot out of Rondeau's detailed descriptions of fluted point production. I would argue that this book is required on those bookshelves as one of the best fluted point studies ever produced. I suspect that those with a passing interest in Paleoindians, or Paleoindian specialists for whom lithic technology is not central to their research, would find the book less useful.

BOOK REVIEW

Research, Education, and American Indian Partnerships at the Crow Canyon Archaeological Center. Susan C. Ryan, editor. University Press of Colorado, Denver, 2023. xvi + 378 pages, figures, tables, index. ISBN 978-1-64642-458-0, US $104.00 (hardcover).

Reviewed by John Seebach, Associate Professor of Archaeology, Colorado Mesa University

Crow Canyon Archaeological Center's (CCAC) impact on our knowledge about the pre-Hispanic history of the Central Mesa Verde Region cannot be overstated. *Research, Education, and American Indian Partnerships at the Crow Canyon Archaeological Center* celebrates the center's legacy and ponders the future of Southwestern archaeology. Divided into five sections, the first three contend with CCAC's history and mission, illustrating its pathbreaking partnerships with Indigenous co-investigators and its emphasis on public education. Sections 4 and 5 present contemporary analyses of data collected by CCAC and affiliates.

CCAC's founders were visionary, and this volume captures how their vision has grown over the last four decades. It also captures tensions between stated needs and present practice. The book is anchored by four programmatic statements: the opening by Ryan (Chapter 1), Perry's summative chapter (Chapter 23), an incisive piece by Ortman (Chapter 6), and Suina's indictment of past anthropological practice (Chapter 7). All are united by a call to make archaeology *relevant* to contemporary problems we, but particularly Indigenous communities, face today. The research sections do not explicitly refer to this kind of relevance, hence the tension, but they do powerfully illustrate the interpretive power of the datasets CCAC has built.

Ortman and Perry remind us that Southwestern archaeology is the history of marginalized peoples, and that we cannot justify further excavation as a simple intellectual pursuit. Ortman stresses the need for archaeologists to approach archaeological heritage as Indigenous peoples do—respectfully as <u>living</u> mnemonics of history and continued presence. That archaeologists do not do so regularly is a sentiment woven into the book's third section. It is gently there in the description of the Pueblo Farming Project (Ermigotti et al., Chapter 4), wherein Hopi co-investigators note archaeologists simply count crop yields and ignore the spiritual aspects of maize cultivation. Suina is less gentle. He reminds readers that Puebloan peoples conceive of knowledge acquisition differently than Euroamerican peoples. Some Puebloan knowledge, including some uncovered through archaeology, is not meant for outsider consumption. Indeed, Suina characterizes some anthropological works and their continued availability as "open wounds" (p. 112). The onus is on researchers to help close them through respectful and reciprocal work by, for, and with Indigenous communities.

Examples are given: Ermigotti et al. show how indigenous farming techniques produce sizeable harvests at CCAC today, even during our current drought conditions. From this study, we understand drought alone cannot account for the famed AD thirteenth century depopulation of the region. Using these experimental results drawn from ancestral technology, can we predict what might occur during today's worsening droughts, and can modern Southwesterners buffer these conditions using insights from the Puebloan past? This is the kind of relevance called for by Ortman and others, and, when done in the spirit of helping future generations, provides a means to help close the wounds Suina describes.

Further healing can be achieved through education. Franklin (Chapter 8) stresses that interdisciplinary archaeology suits many state-mandated K-12 learning outcomes, providing hands-on engagement with the past and highlighting non-Euroamerican histories. Colorado educators should take advantage of this if/when possible. Suina is echoed here too. In prior classes at CCAC, all students ground maize using traditional methods. Indigenous advisors cautioned that this activity was inappropriate for male students, and thenceforth the activity was left off the syllabus. Similarly, CCAC's reconstruction of a PIII-style building did not include a kiva because of the knowledge-holder specific activities held in these spaces. Students are educated in both instances about the cultural contexts surrounding these absences and educators believe this leads to greater appreciation of other cultures' worldviews and critical thought about why the absence is necessary.

Sections 4 and 5 present the results of numerous CCAC and affiliated research projects. Section 4 tackles the community concept and depopulation, while Section 5 investigates long-term human-environmental interactions. Macro-level population histories unite the proceedings. Adler and Hegmon's (Chapter 16) comparison of Mesa Verdean and Northern Rio Grande termination practices is a thoughtful treatise on the social conditions that lead to different expressions of this widespread Puebloan practice. Potter et al. feature similar comparative work at villages on the Ute Mountain Piedmont (Chapter 13), while Throgmorton et al. (Chapter 11) provide a diachronic view of the P1 "collapse" prior to the establishment of Chacoan centers in the area. Bellorado and Windes (Chapter 18) present new dendrochronology dates indicating Cedar Mesa was not depopulated as early as once thought. Synthesizing CCAC data, Kuckelman explores depopulation at the regional scale (Chapter 19). In Section 5, Schollmeyer and Driver's work (Chapter 21) finds an increased dietary use of lagomorphs from BMIII to PIII. This is argued to be potentially due to habitat modification negatively affecting deer availability, namely the clearing of land for agriculture, starting approximately AD 700. Badenhorst et al. test this "garden hunting hypothesis" (Chapter 20) and find that the use of domestic turkeys makes garden hunting of wild game difficult to assess.

This interesting book catches CCAC at an inflection point in its history. The contemporary relevance called for in Sections 1-3 is not necessarily made explicit in Sections 4-5. It is almost as if the section order should be reversed, i.e., the second half is where CCAC has been, with the first half aiming where they want to (or should) go—a greater emphasis on Indigenous-led research. Perry is generous in her summation, stating that Sections 4 and 5 have "the potential to contribute meaningfully to current priorities of many Indigenous communities and interest groups" (p. 364). Her examples are two papers (Chapters 10 and

14), where Schleher and colleagues describe the critical importance of social integration strategies in communities marked by immigrant influxes, with obvious lessons for the globe today. Perry also notes the volume is testament to the unbroken link between pre-Hispanic and modern Puebloan people, and how these links provide important lessons about resilience and Indigenous history that dispel still-prevalent stereotypes about Indigenous peoples. Finally, she charges that relevance must include reparation for historical archaeological practice through ever more integrative and reciprocally beneficial collaboration. History shows that if anyone can meet these goals, Crow Canyon can. This volume shows just how vital a resource CCAC is. From the scope of its projects to its educational mission and ground-breaking collaborative work, the archaeological community would be so much poorer without Crow Canyon leading the way.

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