

A prehistoric Native American pictograph that signals the summer solstice

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Abstract

The current article examines a 90 cm. tall, prehistoric Native American pictograph painted in red ochre which depicts a red Anthropomorph wearing a "V"-shaped headdress. For a seven-day period at the summer solstice the face and headdress of the red Anthropomorph are illuminated with sunlight. The authors proffer photographic, archaeological, and iconographic evidence confirming that the pictograph was made by the prehistoric, agriculturally-reliant Fremont culture of Utah (USA) circa AD 1100 – 1300, and that it was indeed a summer solstice indicator. Because genetic and cultural data verify that some Fremont people were ancestors to the Native Americans that occupy the modern pueblos in Arizona and New Mexico, we gather late-nineteenth and early-twentieth century ethnography from the latter pueblos to show that the summer solstice marked a major shift in agrarian practices—from field preparation and sowing to rain-making and crop fruition. Additional rock art iconography associates the red "Anthropomorph-with-V-shaped-headdress" motif with headhunting, a practice that, according to Pueblo Indian ethnography, was necessary for rain-making and abundant harvests. We then trace this historic Pueblo Indian conception to prehistoric head-taking pictographs aligned with the summer solstice and the seasonal shift it signaled towards rain-making through ritualized headhunting.

Keywords: archaeoastronomy, Fremont culture, solar, calendar, rock art, pictograph, headhunting.

Introduction and Object of the Study

Positioned under a rock overhang in a narrow canyon in the high desert of northeastern Utah (USA) stands a 90 cm. tall pictograph painted in red ochre. The pictograph depicts a red Anthropomorph adorned with a trapezoidal-shaped headdress with dual protrusions that resemble the "oars" of a rowboat (Figure 1); a resemblance that has compelled the authors to nickname the image the "Oar-Headed-Anthropomorph". Since the early 1980s local enthusiasts of prehistoric Native American rock art have noticed that the headdress and face of the red Anthropomorph become fully illuminated at summer solstice, which led to the supposition that this pictograph was a June solstice indicator that had been painted by prehistoric indigenes (Seager, 2001, pp. 13-14; Pratt and Pratt, 1997, p. 8, Figs. 53-58). Ironically, although this pictograph has been documented in numerous rock art publications, and the summer solstice

sunlight-shadow alignment appears in S. Cole's *Legacy on Stone* (2009, p. 251, Fig. 111k), little in the way of archaeoastronomical analysis has been attempted.

At summer solstice 2019 Bureau of Land Management archaeologist D. Christensen and Utah Cultural Astronomy Project archaeologist J. McHugh had the opportunity to observe and photograph the intriguing sunlight-shadow display that occurs at the pictograph from 6:08 to 6:41 AM. They shared their findings with archaeoastronomer J. Lundwall, and the trio collected additional still-frame photos and video at the 2020 and 2021 summer solstice in collaboration with Tom Howells, a local field researcher with the Utah Rock Art Research Association (URARA).

The purpose of the current article is to:

1. Provide photographic evidence substantiating that the red "Oar-Headed-Anthropomorph" pictograph does indeed represent a prehistoric summer solstice indicator used by the agriculturally-dependent Fremont people.
2. Utilize relevant ethnographic data to shed light on the pictograph's potential function and meaning.
3. Discuss additional aspects of the panel that may have calendrical information encoded within in it.

Note that this article is written for international scholars who may be unfamiliar with specific features of Southwestern Archaeology in the United States, including its prehistoric cultures, chronologies, geographic reference points, and ethnic and linguistic relationships to the modern Pueblo Indians of New Mexico and Arizona. The following paper applies the definitions of Native American rock art from P. Schaafsma (1980, p. 1), where a *pictograph* refers to a prehistoric drawing on rock that has been made by applying paint pigment (i.e., rock paintings); and a *petroglyph* refers to an image that has been created through the incising, pecking, or cutting-away of rock.

Methods and Calculations

GPS coordinates were taken by Bureau of Land Management archaeologists D. Christensen¹ and P. Stavish² with a *Trimble GeoXT*. Azimuth bearings were taken with a hand-held sighting compass, and are therefore listed as \approx °.

Summer Solstice Sunlight-Shadow Phenomena at the red "Oar-Headed-Anthropomorph" Pictograph Panel

Located in a narrow, roughly north-south facing canyon on private land 4.8 km. from the small town of Vernal, Utah, USA is a prehistoric Native American rock art panel identified as #42UN76 in the Office of Public Archaeology (OPA) records. Although the panel is comprised of multiple icons including an elk and concentric circles, the most prominent image depicts an approximately 90 cm. tall Anthropomorph painted in red ochre and adorned with a distinct headdress whose dual protrusions resemble the "oars" of a rowboat. The red Anthropomorph holds an unnaturally bent fringed-staff in its left hand (most fringed-staffs in Fremont rock art are straight, e.g., Figure 15). A short distance to the right of the Anthropomorph stand two, contemporaneous, rectilinear objects also painted in red ochre (Figure 1; Figure 2). Potentially

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significant aspects of the panel include the red Anthropomorph's right arm, which was painted over a preexisting petroglyph depicting a concentric circle, and at least three other concentric circle petroglyphs situated immediately beside the red Anthropomorph's left foot and fringed-staff (Figure 2).



Figure 1. The red "Oar-Headed-Anthropomorph" rock art panel is comprised of other motifs, including an elk (lower left) and concentric circle petroglyphs. The "Oar-Headed-Anthropomorph" is adorned with a headdress consisting of a trapezoidal-shaped cap and dual protrusions which resemble rowing "oars." The Anthropomorph holds a fringed-staff in his left hand. The pictograph's image has been defaced in historic times by at least five bullet holes (photo J. McHugh).



Figure 2. Closer inspection illustrates that the fringed-staff displays an unnatural curve. Note that the Anthropomorph's right arm was painted over a preexisting concentric circle petroglyph, and that two concentric circle petroglyphs stand to the right of the staff while another concentric circle petroglyph is positioned beside the Anthropomorph's left leg (photo J. McHugh).

On the summer solstice of 2019 our team photographed the sunlight-shadow effect that occurs at this site. At 6:08 AM the first glimmer of sunlight enters the rock art panel above the red Anthropomorph. Over the next twelve minutes the sunlight descends closer to the headdress of the Anthropomorph (Figure 3; Figure 4).



Figure 3. Lighting at 6:10 AM (photo J. McHugh).



Figure 4. Lighting at 6:14 AM (photo J. McHugh).



Figure 5. Lighting at 6:21 AM the red Anthropomorph's face, head, and headdress are filled with summer solstice sunlight (photo J. McHugh).

At 6:21 AM the headdress and head of the red Anthropomorph are entirely infused with sunlight, a phenomenon created by a distinct cleft on the eastern ridgeline of this narrow canyon (Figure 5). The shaft of sunlight then moves down the red Anthropomorph's left side and arm until the sunlight-shadow line closely aligns with its fringed-staff at 6:27 AM, as sunlight simultaneously begins to touch the two, red rectilinear shapes to the left of the Anthropomorph (Figure 6). The sunlight then descends from the fringed-staff until the red Anthropomorph appears to be "standing" on the summer solstice sunlight-shadow line at 6:40 AM (Figure 7). A three-minute, time-lapse video of the June solstice phenomenon can be viewed at the link in the footnote³.



Figure 6. Lighting at 6:27 AM the red Anthropomorph's fringed-staff closely mirrors the shadowed curve of the horizon line, while sunlight simultaneously begins to touch the dual, red rectilinear shapes to the left (photo J. McHugh).



Figure 7. Lighting at 6:40 AM. The Anthropomorph is illuminated by the summer solstice sunrise and appears to be "standing" on the shadow of the earthly horizon (photo J. McHugh).

³ A wide and close-up angle of the summer solstice phenomenon are presented by J. Lundwall at: <https://www.youtube.com/watch?v=44KAWjQHkbo>



Figure 8. The headdress of the red Anthropomorph becomes filled with sunlight at 6:21 AM on the summer solstice (photo T. Howells).

Clearly, the preminent phenomenon at this rock art panel is the *full illumination* of the red Anthropomorph's face and headdress with summer solstice sunlight as shown in Figures 5 and 8. This sunlight-shadow phenomenon is created by a pronounced ≈ 28 cm. cleft in the opposing rock wall of the canyon, which projects this "V"-shaped sunlight-shadow configuration onto the face and headdress of the "Oar-Headed-Anthropomorph located 14 m. to the west (Figure 9, Figure 10). Since the azimuth of the summer solstice sunrise has changed only $\approx 10'$ since AD 1100, we can assume that the same phenomenon was observed in antiquity as it is today.



Figure 9. At summer solstice sunlight shines through an ≈ 28 cm. "V"-shaped cleft at the rim of the eastern side of the canyon, illuminating the headdress and face of the red "Oar-Headed-Anthropomorph" positioned ≈ 14 m. away. (photo J. McHugh)

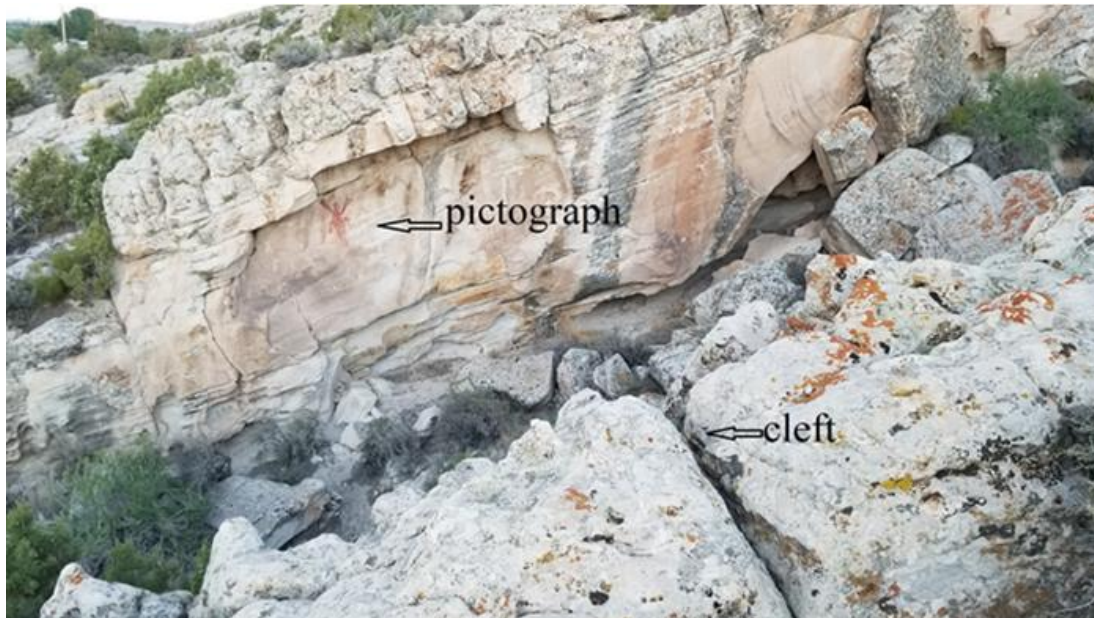


Figure 10. June solstice sunlight passes through an ≈ 28 cm. "V"-shaped cleft in the eastern canyon wall, filling the "oar"-shaped headdress and face of the red Anthropomorph ≈ 14 m. to the west. (photo J. McHugh)

To verify that the "illuminated head and headdress" phenomenon was not the product of happenstance, our team photographed the greatest amount of sunlight illumination visible from 2 through 24 June 2020 and 2021. Fifteen days before the summer solstice (5 June) the head and headdress were far from full illumination (Figure 11a). Figure 11b shows the closest the headdress came to full illumination on 11 June. Even four days before the solstice (16 June) the headdress was not entirely filled with light, as slivers of shadow can be detected along both of the red Anthropomorph's "oars" (Figure 11c).



Figures 11. Lighting of anthropomorph: **a** – fifteen days before the summer solstice sunlight does not fill the red Anthropomorph's face and headdress 5 June 2020, 6:17 AM (photo J. McHugh); **b** – the headdress and face are not fully illuminated nine days before the solstice 11 June 2021, 6:19 AM (photo T. Howells); **c** – the face and headdress are almost, but not fully, illuminated four days before the solstice 16 June 2021, 6:21 AM. (photo T. Howells).

Thus, direct observation confirms the red "Oar-Headed-Anthropomorph" pictograph is fully illuminated *three days before* and *three days after* the summer solstice, i.e., 17 through 23 June. Since the illumination of the head and headdress is produced by the sunlight-shadow line created when early morning sunlight passes through a distinct notch in the opposing wall of this narrow

canyon, the most parsimonious explanation indicates that the Red Anthropomorph was painted with the preexisting knowledge of the course the summer solstice's sunlight-shadow line takes as it moves through that notch and down the face of the canyon wall upon which the pictograph was painted. This implies that the full illumination of the "Oar-Headed-Anthropomorph" pictograph's face and headdress was intentional, and served to signal the summer solstice event.

We will now explore stylistic rock art data and archaeological evidence which exposes the cultural identity of the pictograph's artist.

The "Oar-Headed-Anthropomorph" Motif in Prehistoric Fremont Indian Rock Art

The red Anthropomorph pictograph image was painted in what Native American rock art scholars categorize as "Classic Vernal Style",⁴ which is attributed to the prehistoric Fremont culture of Utah (Castleton, 1984, p. 33-34; Cole, 2009, p. 249-252, Fig. 111k; see Schaafsma, 1990, p. 171-176, Figs. 127-133). In his assessment of this rock art panel in 1975, K. Castleton notes that there was no archaeological association, "but there are numerous sites in the area" (Castleton, 1984, p. 34). Using radiocarbon and tree-ring dates at associated archaeological sites, Cole places the Classic Vernal Style at circa AD 550-1300 (2009, pp. 250-252). As described above, the principal figure depicts a red Anthropomorph wearing a trapezoidal-shaped cap adorned with two, "oar"-shaped protrusions; a resemblance that has compelled the authors to nickname this motif the "Oar-Headed-Anthropomorph". This distinctive motif is wide-spread throughout northeastern Utah, and is just as frequently depicted in petroglyphs (Castleton, 1984, pp. 33-34; Cole 2009, pp. 173-200; Schaafsma, 1990, pp. 163-181). The "Oar-Headed Anthropomorph" motif is especially prominent at the McConkie Ranch archaeological site located approximately 10 kilometers away from the "Oar-Headed-Anthropomorph" summer solstice panel (Figure 12; Figure 13).



Figure 12. "Oar-Headed-Anthropomorph" carrying either a severed head (or flayed face-scalp) affixed to its left arm. Note the "Weeping Eye" motif depicted on the face of the severed head (McConkie Ranch, Utah, USA) (photo J. Lundwall).

⁴ "Vernal" refers to a small town in northeastern Utah, USA.



Figure 13. An "Oar-Headed-Anthropomorph" carrying a stone knife in his left hand and another item, possibly a scalp-stretcher, in his right. Note that the headdress is painted red (McConkie Ranch Utah; photo J. Lundwall).

Since a pithouse at McConkie Ranch dated to circa AD 1300 (Cole, 2009, pp. 249-252), and the red "Oar-Headed-Anthropomorph" pictograph is painted over a preexisting (i.e., older) array of concentric circle petroglyphs, we contend that this summer solstice marker dates to the latest phase of the Fremont occupation: circa AD 1100-1300.

Relevant to the current article is that the "Oar-Headed-Anthropomorph" motif is frequently associated with headhunting (e.g., Figure 12; Figure 13; Figure 15).

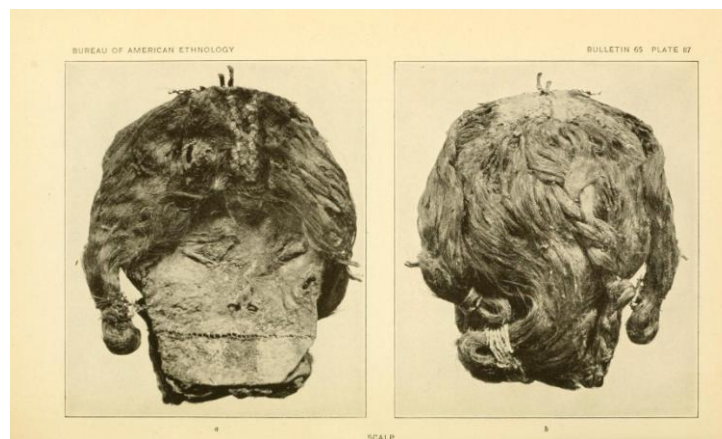


Figure 14. Flayed facial-scalp from excavation in northeastern Arizona, USA, dating to the Basketmaker II period, circa 1500 BC – AD 400. Note the loop at the top of the skull used to display the face-scalp as in Figure 12 (Kidder and Guernsey, 1919, Plate 87; photo courtesy of the Bureau of American Ethnology).

Figure 12 depicts an "Oar-Headed-Anthropomorph" with either a full head-scalp or severed head dangling from its left elbow. Figure 13 displays an "Oar-Headed-Anthropomorph" carrying a scalping knife in his left hand and a circular object with protrusions that might depict the "scalp stretchers" that were used to display the scalp or flayed face and head of a victim (Howard and Janetski, 1992, pp. 125-132, Figs. 1-5). Such flayed facial-scalps have been retrieved in prehistoric Native American archaeological sites, the one in Figure 14 dating to circa 1500 BC – AD 400 (Kidder and Guernsey, 1919, pp. 190-192, Plate 87a, b).



Figure 15. A pair of red "Oar-Headed-Anthropomorphs" identical to the one that marks the summer solstice. The upper "Oar-Headed-Anthropomorph" (50 cm.) holds a stone knife and severed head in its left hand and a *perfectly straight* fringed-staff in its right hand. The lower "Oar-Headed Anthropomorph" (60 cm.) holds a stone knife in its left hand and the severed head of a victim in its right. The necklace and waist sash of the lower figure are ancient. The holes on and around the two "Headhunter" figures are due to modern defacement by gunfire (photo J. McHugh).

Moreover, the red "Oar-Headed-Headhunter" pictographs in Figure 15 were painted on a sandstone cliff face whose orientation points directly at the 6:27 AM June solstice sunrise (Figure 16). That is, when an observer stands with the red "Headhunter" pictographs flush to his

back he is oriented along a cliff wall whose bearing (337° NW – 157° SE) faces $\approx 67^\circ$ azimuth, the point where the summer solstice sunrise emerges over the horizon (Figure 17). Hence, like the "Oar-Headed-Anthropomorph" that marks the summer solstice less than a kilometer to the east, the two "Oar-Headed-Headhunters" seem to be intentionally aligned with the summer solstice sunrise.



Figure 16. These "Oar-Headed-Headhunter" pictographs are painted on a cliff wall that is oriented towards the exact spot where the summer solstice sun rises over the ridgeline (20 June 2021, 6:27:53 AM) (photo J. McHugh).

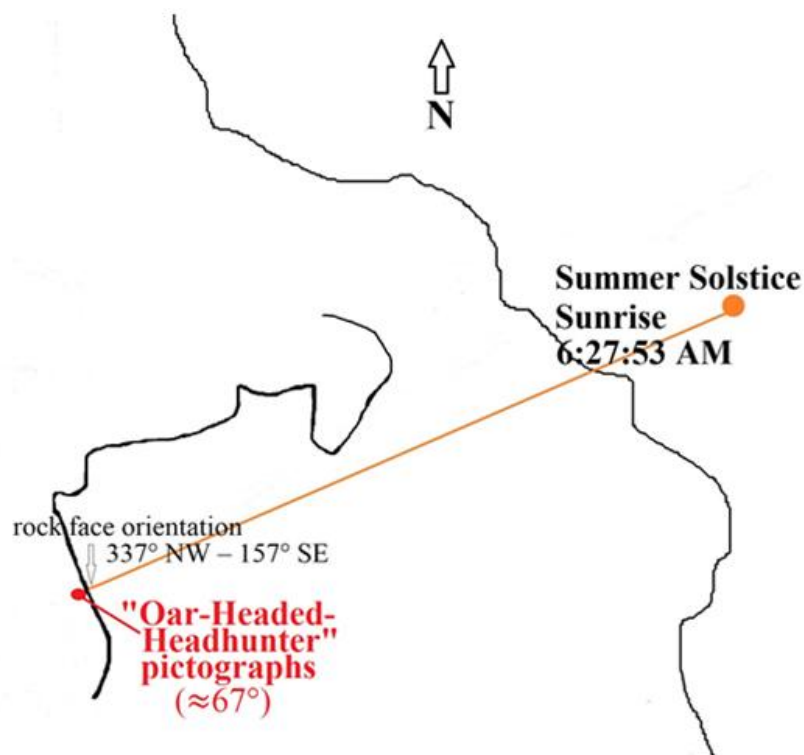


Figure 17. The "Oar-Headed" Headhunters are painted on a cliff wall oriented towards the summer solstice sunrise, $\approx 67^\circ$ (photo J. McHugh).

Circumstantial evidence suggests that the "Oar-Headed-Anthropomorph" motif bears a connection to both head-taking and the summer solstice. This spurs an obvious question: Why might headhunting and the summer solstice be important to the prehistoric Fremont people? The answer appears to lie with precepts held by the indigenes that painted the "Oar-Headed-Anthropomorph" pictographs; knowledge and convictions that were later reported in the ethnography of their modern descendants.

The "Ancestral Puebloan" Fremont People

The Fremont people were one of the prehistoric, agriculturally-dependent Native American cultures living in the American Southwest from about AD 400 to 1300 (Alison, 2016⁵; Janetski, 2008; Madsen and Simms, 1998; Simms, 2016, p. 185-228; Simms and Gohier, 2010). Fremont cultural adaptations and lifestyle resembled that of the better known Anasazi culture to the south (Figure 18).



Figure 18. Distribution of the prehistoric Anasazi and Fremont cultures throughout the American Southwest. (photo J. Lundwall)

However, artifact assemblages collected during archaeological excavations exposed some key cultural differences. These disparities included: the Fremont people's use of moccasins as opposed to the Anasazi's use of sandals, a unique form of basketry labeled "one-rod-and-bundle", a drab form of gray-ware pottery, a distinct style of rock art, the use of clay figurines in their religious ideology, and a heavier reliance on hunting and gathering than the Anasazi (Madsen and Simms, 1998, pp. 255-277).

Although the Fremont people were contemporaneous and culturally similar to their Anasazi neighbors to the south, it is the Anasazi who, for more than a century, have gained international notoriety for their intriguing architectural styles, which includes extensive cliff dwellings at archaeological ruins such as Mesa Verde, Colorado (Figure 19) and massive, abandoned pueblos at sites like Chaco Canyon, New Mexico (Figure 20).

⁵ An concise overview of Fremont culture is presented by Brigham Young University professor of Archaeology, James Alison, at: https://www.youtube.com/watch?v=K_m5aWGNjwo

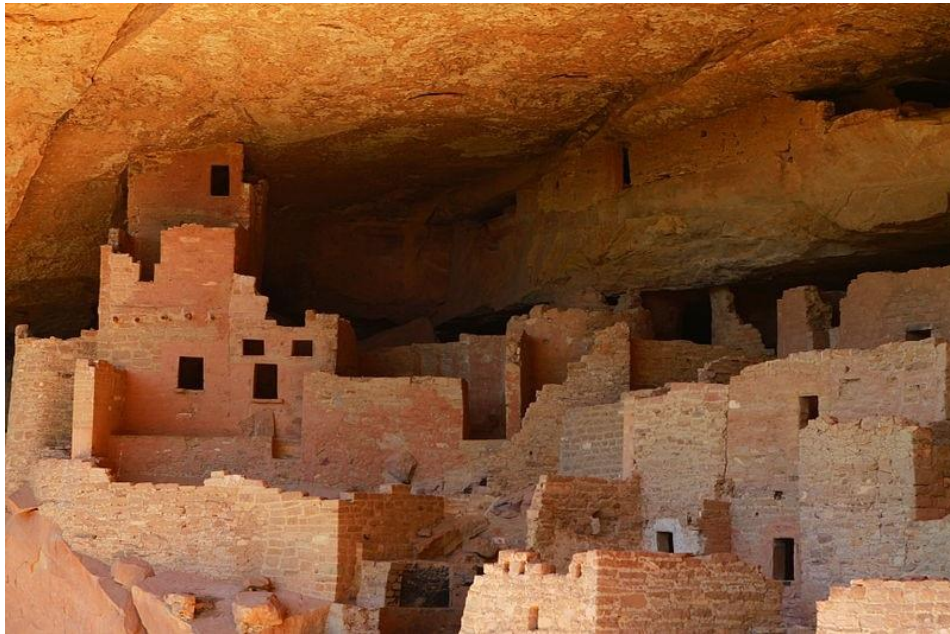


Figure 19. Anasazi cliff dwellings like the ones shown here at Mesa Verde, Colorado were abandoned by circa AD 1300 (photo Public Domain, Wikipedia Commons).



Figure 20. Eleventh century AD ruins from Pueblo Bonito in Chaco Canyon, New Mexico. (photo J. Lundwall).

Although Fremont architectural styles were far less grandiose than that of their southerly Anasazi neighbors, today both cultures are referred to as *Ancestral Puebloan*, as they are ethnically related to the modern Native American tribes that inhabit the pueblos of Arizona and New Mexico (Figure 21). The latter point is substantiated with mitochondrial DNA (mtDNA) evidence: haplogroup frequencies indicate that the occupants at modern Jemez Pueblo, New Mexico were derived from the same maternal lineage as the prehistoric Fremont (Carlyle et al., 2000, pp. 94-95, 96-97, Table 5, Figs. 2-3; see Simms, 2008, pp. 185-228).

And here lies one of the great mysteries of Southwestern American Archaeology: although the Ancestral Puebloan people developed thriving, agrarian-based communities for more than six centuries, all sites in Utah and Colorado were abandoned by circa AD 1300 (Janetski, 2008; Marwitt, 1986, pp. 161-172; Simms, 2008, pp. 231-235; Simms and Gohier, 2010). Archaeological evidence indicates that Fremont and Anasazi immigrants migrated southward during the Protohistoric Period (circa AD 1300-1600), until coalescing into the large modern pueblo sites in Arizona and New Mexico shown by the map in Figure 21, and exemplified by modern pueblos such as the one at Taos shown in Figure 22 (Cordell and McBrinn, 2012, pp. 223-277; Lipe, 1995, pp. 143-169; Widdison, 1991). It is the Native American occupants of these large pueblos that the Spanish colonists first encountered in AD 1540.



Figure 21. Location of modern pueblos in Arizona and New Mexico, USA.



Figure 22. Taos Pueblo (New Mexico, USA) as it appeared in October, 2010. Taos is one of the large pueblos erected by southward immigrating Ancestral Puebloan peoples after the abandonment of smaller villages in Utah and Colorado around AD 1300 (photo J. McHugh).

Archaeological and genetic data indicates that after the abandonment of farming in Utah circa AD 1300, some Fremont people migrated into the protohistoric and modern pueblo villages in New Mexico and Arizona, evinced by their hereditary relationship to the occupants at Jemez Pueblo. This becomes pertinent to the red "Oar-Headed-Anthropomorph" summer solstice pictograph because much ethnographic data was collected at those pueblos in the late nineteenth and early twentieth centuries (e.g., Bunzel 1932; Cushing, 1981; Hill and Lange, 1982; Lange, 1959; Parsons, 1939; 1932; 1925; Reagan, 1917; Stephen, 1936; Stevenson, 1904; Titiev, 1944; White, 1942). One would expect, therefore, that at least some degree of cultural continuity exists between the prehistoric Fremont people and the inhabitants of the modern pueblos of Arizona and New Mexico.

Thus, the authors hypothesize that the ancient Fremont artist(s) that painted the red "Oar-Headed-Anthropomorph" summer solstice pictograph (Figures 1–8) and identical "Headhunter" pictographs which also face the summer solstice (Figure 15), had embraced some of the precepts regarding the Sun and the manner in which it was utilized for calendrical purposes as reported in the ethnographies of the modern Pueblos.

Concepts of the Sun, Solstices, and Calendar-keeping in Pueblo Indian Ethnography

In his analysis of historic Pueblo Indian solar observation as the basis for their calendar, astronomer M. Zeilik was struck by their desire to retain the ways of their ancestors (1985a, p. S1). The Puebloan Indians' stalwart desire to maintain the ancient manner of solar observation and its intrinsic relationship to religion and farming is reported by ethnographer A.M. Stephen. In 1883 the Hopi Indian chief in charge of the purification and fertility ceremony of Powamu stated:

When my people had learned to build houses and men had grown accustomed to life in the 'Estufa' [kiva⁶], Masau [the god of the Underworld] came and taught them many things concerning growth of plants and trees and instructed them about planting beans when the moon should be at a certain age and after the sun had come a certain distance on his way back to the north. *Many, many days this has been the custom and we have no right to forsake the ways of our fathers*" (unpublished notebook of A.M. Stephen in McCluskey, 1981, p. 173, brackets, italics inserted).

Historian S. McCluskey adds the following astute comment regarding solar calendrics, "This little passage mentions coordinated observations of the sun and the moon, the connection of these observations to the planting of crops (in this case a ritual planting for the Powamu festival), and two of the factors that lend importance to these observations: respect for the customs of their ancestors and the ultimate source of these customs in a divine revelation by [the Underworld deity] Masau. *The astronomical observations described did not provide new knowledge, but they were the stable empirical core of an agricultural and ceremonial calendar based upon a traditional body of knowledge and techniques*" (McCluskey, 1981, p. 173, brackets, italics inserted).

In general, Pueblo Indians share the conviction that bountiful harvests and tribal amicability depend upon a positive reciprocal relationship with the deities and supernatural spirit-beings

⁶ "Estufa" is the Spanish term for "kiva", the round, subterranean structures used in communal ceremonies and religious rituals. A general description of the kiva's development with photographs can be found at: <https://en.wikipedia.org/wiki/Kiva>.

(i.e., kachinas), which are impersonated in religious dances, ceremonies, and rituals (Adams, 2000, pp. 35-46; Eggan, 2000, pp. 7-16; Schaafsma, 2000a, pp. 63-79; Waters, 1986, pp. 125-247). Successful execution of this ritual cycle was, and still is, believed to insure bountiful moisture, agricultural abundance, and societal harmony. During these dances and ceremonies Pueblo Indian religious officers dress in elaborate costumes to impersonate the spirit-beings (kachinas) and deities (Figure 23).



Figure 23. Hopi Indian kachina dancers enacting a rain-making ceremony in 1903 at the Hopi Pueblo village of Shongopavi, Arizona (photo Wikipedia Commons⁷).

Yet the religious-ceremonial calendar was inextricably interconnected with the agricultural cycle. Zeilik writes that, "Agriculture and religion are so intertwined in the Pueblos that they reinforce each other" (1985a, p. S3). He goes on to explain that, "Sun watching sets the calendar for two main purposes: to establish the ritual cycle and to set a planting calendar" (Zeilik, 1985a, p. S12; see Williamson, 1984, pp. 77-111). The inextricable connection between the ceremonial and agricultural activities is underscored by the declaration of an old farmer at San Ildefonso Pueblo in the 1930s: "There are two livings, agriculture and religion" (Whitman, 1940, p. 399). The functionality of such Puebloan concepts is readily apparent. In the harsh, desert climate of the American Southwest, the agriculturally-dependent Pueblo Indians need to establish a highly accurate calendar that specifies the precise time that field-preparation, sowing, and reaping should occur. The successfulness of these agricultural practices are insured by accompanying religious ceremonies that stave against late-Spring and early-Autumn frosts, while simultaneously eliciting rain at crucial times during crop maturation.

⁷https://commons.wikimedia.org/wiki/File:The_Kachina_dance_to_the_rain-god,_Hopi_Indian_village,_Shongopavi,_Arizona,_by_Underwood_%26_Underwood_2.jpg#filelinks

Puebloan ethnography indicates that the Sun is conceptualized as a deity, and that the solar calendar was forged by solar observations made by a religious officer or "Sun-priest", with the most important calendrical dates being the solstices (Krupp, 1994, pp. 152-156; McCluskey, 1982, pp. 34-40; Parsons, 1939, pp. 122-123, 493-549, 554-556; Williamson, 1984, pp. 77-111; Zeilik, 1985a, pp. S4-S6). This is exemplified in the ethnography from Zuñi Pueblo, where the Sun-priest (Figure 24) went by the title *pekwin*, "speaking-place" (Zeilik, 1985a, S4; see: Cushing, 1981, pp. 116-117, 318-321; Stevenson, 1904, pp. 108-141). A similar concept was reported by Stephen, who learned that the calendar stick at Hopi Pueblo was called *tala'vaiyi*, "Sun speech" (Figure 25; Stephen, 1936, p. 312, Fig. 186; Zeilik, 1991, pp. 95-97, Fig. 1, pp. 102-103, Fig. 2).



Figure 24. Zuñi Pueblo Sun-priest or *pekwin*, as he appeared circa 1896 (Stevenson, 1904, pl. XVIII; photo courtesy of the *Smithsonian Institution Bureau of American Ethnology*).

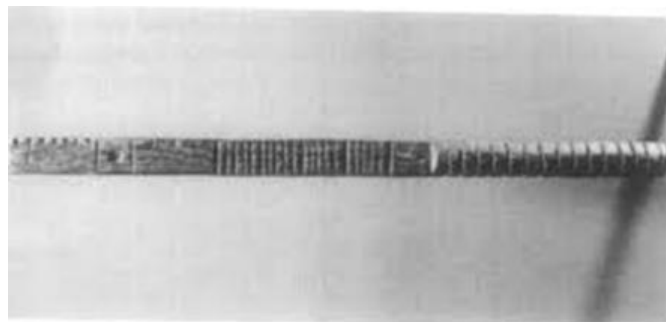


Figure 25. Hopi Indian calendar stick, circa early-twentieth century. (collected by J. Fewkes; photo courtesy of A. Marshack)

Hence, ethnographic data preserves the archaic notion that the deified Sun was "speaking" to the Sun-priest during his solar observations.

Puebloan ethnography indicates that the Sun-priest ordinarily made solar horizon observations at sunrise or sunset from a specified observation site that was often unremarkable, its locality known only to the sun-priest and religious officers ritually associated with him (Zeilik, 1985a, pp. S3, S12, S15-S19; e.g. McHugh, et. al., 2021, pp. 173-185). Yet other instances indicate that solar observations were taken from a more elaborately marked locality or shrine. For example, at Zuñi Sun-priest/*pekwin* made his summer solstice observations from a Sun-shrine at the nearby ruined pueblo of *Ma'tsakia* (Figure 26). Ethnographic data recorded at Zuñi Pueblo in the 1920s indicates that the Sun-priest/*pekwin*'s ability to identify the solstice accurately was a process that took eight years to master (Benedict, 1969, II, p. 66-67). Such non-mathematical solar observations are demonstrably precise. McCluskey has shown that the Hopi Sun-priest maintained an accuracy of dating the winter solstice to within 10 arcminutes of the actual event (1982, p. 42).



Figure 26. The Zuñi sun-priest/*pekwin* ascertained the Sun's summer solstice position from a shrine at the nearby ruin of *Ma'tsakia*. Note the stone slab depicting the Sun's image stationed within this Sun-shrine (Stevenson, 1904, Fig. 3; photo courtesy of the *Smithsonian Institution Bureau of American Ethnology*).

In fact, the need to make accurate solar observation to regulate religious ceremonies which ensure agricultural success was so deeply embedded in Pueblo Indian cognition that it appears to be inextricably entwined within another solar construct: the pan-Puebloan conception of the "sacred directions". These four sacred directions are not based on the European notion of compass directions consisting of true North, South, East, and West. It took A. M. Stephen more than two years of cohabiting with the Hopi Indians to realize that, "The Hopi orientation bears no relation to [European concepts of] North and South, but to the points on the horizon which mark the places of sunrise and sunset at the summer and winter solstices" (Stephen in McCluskey, 1982, p. 32, brackets inserted; see Williamson, 1984, p. 82). Thus, the very manner in which Pueblo Indians ceremonially orient themselves in the world is grounded in the knowledge of the four positions the Sun-god takes while rising and setting at his solstice standstills.

Moreover, when the anthropomorphized Sun-god reaches the rising and setting points of the solstices he is said to have reached his summer and winter "house", where he then spends four days, the solar standstill we today comprehend scientifically as the solstices (McCluskey, 1982, p. 35; Parsons, 1939, pp. 180, 200, 212; Stephen, 1936, p. 61; Titiev 1944, pp. 146, 173, n. 24). This pre-scientific perception of the Sun-god as a divine "Old Man" that needed to be swayed with prayers, dances, and rituals to remain on his correct course along the horizon line is summarized by F.H. Ellis, "Since it appeared that the Sun hesitated a few days in his southern 'house', the Pueblos deemed it wise to put on a ceremony which would spur his decision to again take up his march northward" (1975, p. 62; see Hill and Lange, 1982, p. 252; Lange, 1959, pp. 262, 321; Parsons, 1939, pp. 179-180; Williamson, 1984, p. 79). If such winter solstice ceremonies, rituals, and dances were not enacted, the Pueblo Indians believe the Sun-god would continue to move southward on the horizon until rolling off the edge of the world – plunging the Puebloan peoples' millennia-old agrarian lifestyle into one of frigid cold, darkness, and death (Zeilik, 1985a, p. S12).

Although the ethnography clearly shows that Puebloan people understood that a similar four-day, solar standstill occurred at the June solstice (Parsons, 1939, p. 200), its import appears less dire. Williamson summarizes the function of the summer solstice Sun in Pueblo Indian thought:

The summer solstice is a time of ritual dances for the Pueblo, part of the object being to celebrate the turning of the sun and to encourage him to remain northward and high in the sky for a long period in order to provide the warmth and light for the crops. *Still, the primary purpose is to encourage the kachina spirits to bring the rain*" (1984, p. 78, italics added).

Moreover, although ethnographic accounts indicate that the majority of the solstice observations were founded on horizon line observations at sunrise or sunset, four examples evince that the solstice was marked by sunlight-shadow lines on walls or floors (Zeilik, 1985a, p. S9, Table 4; see Ellis, 1975, pp. 70-76). During his years at Zuñi Pueblo (1879-1884), F. Cushing noted that the Zuñi Sun-priest/*pekwin* must be accurate in his solstice and equinox observation dates, "... for many are the houses in Zuñi with scores on their walls or ancient plates embedded therein, while opposite, a convenient window or small port-hole lets in the light of the rising sun, which shines but two mornings in the three hundred and sixty-five on the sample place" (1981, p. 117).

The authors propose that, because the agriculturally-dependent Fremont people were of Ancestral Puebloan ethnicity and cultural affiliation, they too conceptualized the Sun as a deity and possessed Sun-priests akin to the Zuñi *pekwin* shown in Figure 24. In keeping with Puebloan cultural tradition, prehistoric Fremont Sun-priests would need to construct solar observation stations like the Zuñi Indian summer solstice marker at *Ma'tsakia* (Figure 26) – to regulate the interconnected array of agrarian and ceremonial activities necessary to ensure a bountiful harvest and amical societal relations.

Use of Ancestral Puebloan Rock Art Motifs as Solstitial and Equinoctial Markers

Although Cushing appears to be one of the few ethnographers who record the manner in which sunlight-shadow phenomenon were used as calendrical markers for solstitial and equinoctial events (1981, p. 117; Ellis, 1975, p. 75), unequivocal use of petroglyphs and pictographs as solstice and equinox indicators at abandoned, pre-1300 AD Ancestral Puebloan

sites in Utah, Colorado, and the greater Four Corners area⁸ is abundant (e.g., Carlson and Judge, 1987; Krupp, 1994, pp. 152-156, 190-194; Malville, 1983; Munson, et al., 2014; Sofaer, et al., 2008; Williamson, 1984, pp. 77-150). The quintessential example of this practice is found at the late-13th century AD, Chaco Canyon petroglyph known informally as the "Sun Dagger" (Sofaer, et. al, 2008; for the late-Pueblo III Period date see Malville, 2014, p. 38). This 34 cm. wide spiral-shaped petroglyph is positioned on a sandstone ledge 135 meters above the canyon floor. Pecked in slightly above and to the left of the large spiral stands a smaller spiral with an elongated end. At summer solstice the large spiral petroglyph is bisected by a beam of sunlight as shown in Figure 27a (Sofaer, 2008, pp. 28-29, Fig. 7a,b,c,d,e)⁹. Figure 27c shows the sunlight-shadow alignment at winter solstice – two "daggers" of sunlight touch the sides of the large spiral (Sofaer, 2008, pp. 29-30, 31, Fig. 9c). At the equinoxes, a "dagger" of light bisects the large spiral halfway between its center and right side, while a small shaft of light bisects the smaller spiral above it as shown in Figure 27b (Sofaer, 2008, pp. 28-29, 30-31, Fig. 9b).



Figure 27. The sunlight-shadow phenomenon at the circa AD 1250-1300 "Sun-dagger" petroglyph panel, Chaco Canyon New Mexico: a – summer solstice; b – equinoxes; c – winter solstice (Figure modified from *PlanetQuest: The History of Astronomy*¹⁰; "Sun-dagger" petroglyph photo not available, but see time-lapse video link, Footnote 9).

The pervasive use of sunlight-shadow lines on rock art motifs that functioned to signal the solstices and equinoxes at abandoned, prehistoric Ancestral Puebloan archaeological sites implies that the illumination of the face and headdress of the Fremont "Oar-Headed-Anthropomorph" (Figure 5; Figure 8) signaled the summer solstice in the same way that the bisection of the "Sun Dagger" heralded this same calendrical event (Figure 27a).

We will now explore the major shift in the agricultural and religious practices that occur at the June solstice in Pueblo Indian ethnography.

The Summer Solstice, Head-taking, Rain-making, and Crop Fertility in Pueblo Indian Ethnology

In his analysis of the Hopi Indian solar calendar S. McCluskey makes an observation the authors find instructive:

The ceremonial chant relates to the fact that the planting of the crops from mid-April until mid-June is integrated into the Hopi calendar by the observation of sunrise against a series

⁸ "Four Corners" is a colloquial, geographical term referring to the place in the southwestern portion of the USA where the states of Utah, Colorado, New Mexico, and Arizona meet. See map above, Figure 18.

⁹ For a time-lapse video of the summer solstice alignment at the "Sun Dagger" (excerpted from: C. Sagan, *Cosmos*, Episode 3, "The Harmony of the Worlds", 1980) see:

<https://www.youtube.com/watch?v=IIqdhU5Lw2A>

¹⁰ <https://www.planetquest.org/learn/sundagger.html>

of landmarks across the distant valley. This sequence of planting ends with *the coming of the summer solstice which signifies ... a major turning in the year from a season of preparation and planting to a season of fruition and harvesting* (1977, p. 176, italics inserted).

Although McCluskey was referring only to the Hopi Pueblos in Arizona, pan-Puebloan ethnography indicates an abrupt transition from agricultural preparation and sowing prior to the summer solstice, to activities and ceremonies focused on crop-maturation and reaping after its occurrence. The prehistoric, maize-dependent Fremont artist(s) that painted the "Oar-Headed-Anthropomorph" summer solstice marker presumably enacted a similar change in behavioral focus. Specifically, the ethnography indicates that summer solstice signaled a shift to meteorological concerns necessary for healthy crop maturation. Parsons reports that, "Summer solstice ritual among Hopi ... is merely to honor the Sun, incidentally to slow up his journey back to winter; but the horizon observation dates a series of ceremonies ... At Zuñi and elsewhere the summer solstice observations initiates rain retreats and kachina dances" (1939, p. 497, italics added; Ibid., pp. 554-556; Ellis, 1975, p. 72). Pertinent here is the pan-Puebloan penchant to initiate religious ceremonies following the June solstice which are focused on weather control, and, more specifically, to bring rain in amounts conducive to crop maturation (Ellis, 1975, pp. 65-66; Parsons, 1939, p. 495).

One of the ceremonial acts that was believed to induce rainfall and agricultural abundance in Pueblo Indian thought was head or scalp-taking. All of the historic Pueblos possess scalp societies, i.e., initiated warrior-fraternities that ceremonially killed and scalped victims then performed rituals that spiritually indoctrinated the scalps into the society as sacred relics that bring rain (Parsons, 1939, pp. 31, 126, 171, 483, 621, 992; Schaafsma, 2000b, pp. 154-157; Stevenson, 1904, pp. 578-608; White, 1942, p. 132). In 1901-1902 observations at Zuñi Pueblo, Stevenson reported that the "scalp ceremonial is still held every three or four years ... to please the Gods of War, that they will intercede with the Sun Father and Council of War Gods for rain ..." (1904, p. 578). Parsons recounts examples of this idea at the Tewa-speaking pueblos, where scalps are described as *Po'se'e*, "Light Rain", and prognosticate precipitation (1929, p. 138). During her time at Zuñi Pueblo in the 1920s, R. Bunzel recounts how, after the enemy's scalp has been erected upon a pole in the town plaza (Figure 28), the Sun-priest/*pekwin* addressed the community in a prayer describing the manner by which the enemy-victim was slain. The Sun-priest proclaimed, "With bloody head the enemy reached the end of his life", which segues into a description of how the Zuñi Beast Bow-priest, "tore from the enemy his *water-filled covering* [scalp] (Bunzel, 1932, pp. 678, 686-687; italics, brackets inserted). Later in that same prayer agricultural fertility is overtly described when the Sun-priest/*pekwin* refers to the victim's scalp as a "water being" and a "seed being" (Bunzel, 1932, p. 679). Salient to the current article is that the Zuñi Pueblo religious officer in charge of making the solstice observations – the Sun-priest – *also* conceptualized the enemy's scalp as a "water-filled covering", a "water being", and a "seed being". We infer that the Sun-priest who painted the Fremont "Oar-Headed-Anthropomorph" summer solstice pictograph shared similar conceptualizations.

Correspondingly, in their comparison between historic head/scalp-taking in Puebloan ethnology and the flayed-heads displayed on scalp-stretchers uncovered at prehistoric Ancestral Puebloan archaeological sites in eastern Utah, J. Howard and J.C. Janetski comment, "Common to all accounts is the symbolic relationship between the taking of scalps, societal well-being, and water or precipitation in some form" (1992, p. 131).

We argue that ethnography from the historic Pueblos offers a glimmer into the manner by which prehistoric Ancestral Puebloan people came to view heads/scalps as "rain-makers". To comprehend this seemingly incongruous association, we must first recall what ethnographers and anthropologists have emphasized regarding Pueblo Indians' proclivity to "think by analogy", i.e., their aptness to take on analogous resemblances as a kind of explanation of a relationship between two scientifically unrelated objects or phenomena (Parsons, 1939, pp. 88-97; Sekaquaptewa and Washburn, 2004, p. 468). We propose that such analogous thinking may explain how prehistoric Ancestral Puebloan people had – in deep antiquity – come to envision scalp/head-taking as a practice that could induce rain. Specifically, archaeological evidence indicates grisly massacres and evidence of torture in prehistoric Ancestral Puebloan society – the *perimortem* (i.e., "at or near the time of death") dismemberment and/or flaying of arms, hands, legs, feet, and heads—which surely inflicted unfathomable amounts of fear and pain in its victims (Hurst and Turner, 1993, pp. 143-191; Wilcox and Haas, 1994, pp. 226-229; McNitt, 1966, p. 68; Morris, 1925, pp. 263-299; Morris, 1939, p. 19).

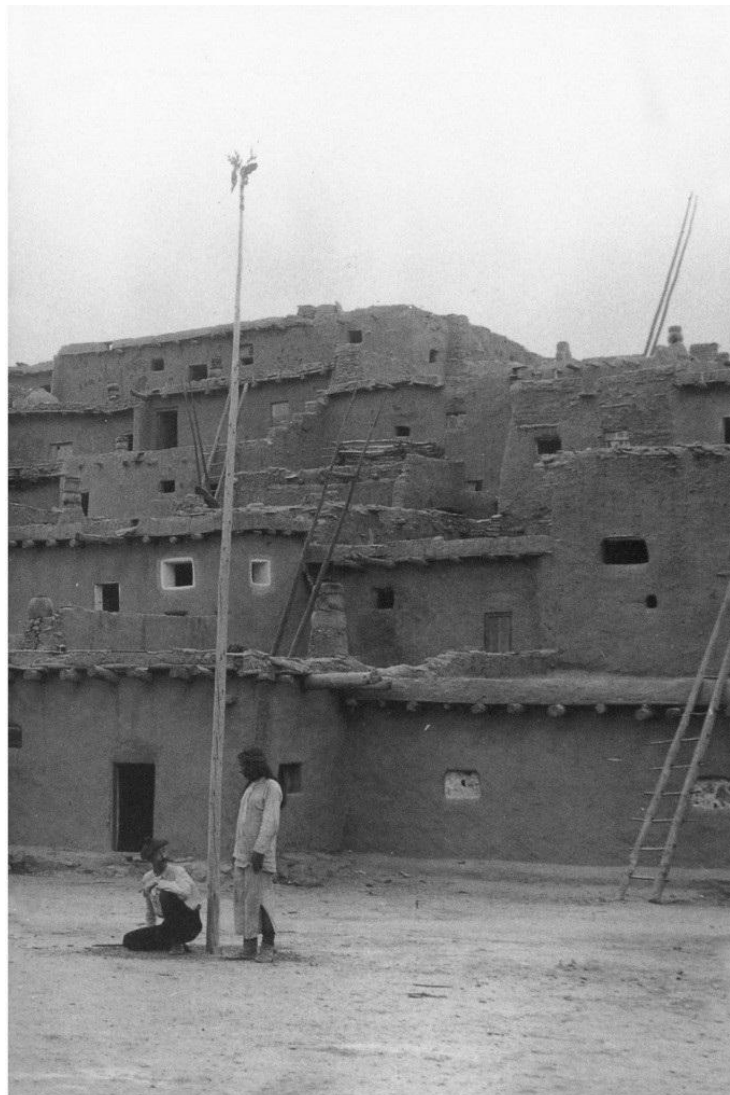


Figure 28. Scalp pole erected in the plaza at Zuni Pueblo, New Mexico, 1888. A victim's scalp is visible at the top (Hemenway Archaeological Expedition, 1888; Wikipedia Commons¹¹).

¹¹ https://commons.wikimedia.org/wiki/File:Zuni_Indian_main_plaza,_Zuni_Pueblo,_1888_2.jpg

Indeed, W.B. Hurst and C.G. Turner discuss an early (circa 1500 BC – AD 400) Ancestral Puebloan site in southeastern Utah which indicates the massacre of ninety individuals in which the victims had been "massively beaten, mutilated, scalped, and probably tortured" (1990, p. 171), as well as cuts along the mastoid process indicative of facial-scalp flaying or decapitation similar to the decapitated, flayed facial-scalp shown in Figures 12, 14, and 15 (Ibid., pp. 172, 173, 179, 180, 183, 186, 187, 188; Figs. 8.25, 8.26). While enduring such gruesome tortures victims surely cried tears of horror and agony. We suggest that this may be the impetus for the "Weeping Eye" motif prevalent among Pueblo Indian warriors who marked vertical lines beneath their eyes before battle, iconography evidenced on the facial-scalps dangling from the "Oar-Headed-Anthropomorph" in Figure 12 (Schaafsma, 2000b, p. 56, Fig. 3.18).

Thus, we propose that the "Weeping-Eye" motif depicted on the decapitated heads and facial-scalps in prehistoric Fremont rock art derives from the idea that the "tears of pain and terror" experienced during excruciatingly torturous deaths had, in deep antiquity, come to serve as a numinous analog powerful enough to invoke a meteorological phenomenon with a similar appearance: drops of rain. Ethnographic support for this concept is found at the Pueblos of Nambé and Isleta. At the former, the scalps are called *Po'se'e*/"Light-Rains" and the people say that, "We are going to have a little rain, the *Pos'se'e*/Scalps are crying" (Parson, 1929, p. 138).

Furthermore, Parsons emphasizes that "Throughout Pueblo tales or myths *heads*, not scalps, are referred to in killing or fighting episodes" (1939, p. 352; Stephen, 1936, p. xxix), a concept present in the oral legends recorded at Picuris and Isleta Pueblos, New Mexico, where the Sun-god is depicted as a decapitator (Harrington, 1928, p. 315; Parsons, 1932, pp. 390-392). Moreover, headless bodies—the apparent victims of intentional decapitation during warfare—have been documented in archaeological excavation and as rock art motifs from Ancestral Puebloan archaeological sites dating circa 1500 BC – AD 1300, in addition to the full facial-scalp retrieved in excavations by Kidder and Guernsey (Figure 14) and similar ones documented by Howard and Janetski (1992, pp. 125-132; see Farmer, 1997, pp. 394-402; Kidder and Guernsey, 1919, pp. 190-192, Plate 87a,b; Hurst and Turner, 1993, 143-191; Roberts, 1931, pp. 23-24, 169; Schaafsma, 2007, pp. 90-123, Figs. 5.2-5.10; Wilcox and Haas, 1994, pp. 211-238). Finally, Puebloan ethnology indicates that the act of human sacrifice was the very mechanism that propelled the defied Sun-disc across the sky (Lomatuway'ma, et al., 1993, pp. 19-21; Malotki and Lomatuway'ma, 1987, pp. 93-95; Parsons, 1939, pp. 212, 240-241; see Bourke, 1884, p. 196).

Thus, in historic Puebloan religious ideology the Sun-deity was known to decapitate victims, an act that was replicated by warriors of the scalp societies whose severed heads and flayed facial-scalps were believed to summon rain and, resultantly, copious harvests. These concepts appear to have a direct correlate among the prehistoric Fremont culture—evinced by the depictions of decapitated heads or flayed face-scalps in rock art and their presence in archaeological excavation.

Additional facets of Puebloan ethnography may shed light on some of the other symbolic features of the red "Oar-Headed-Anthropomorph" summer solstice pictograph. For instance, at Taos Pueblo scalps were painted red (Parsons, 1939, pp. 299, 351, 644-645), which is the color of the "Oar-Headed-Anthropomorph" June solstice pictograph and the identical "Headhunter" pictographs with the same solstice alignment (Figure 15). Similarly, the basketry discs used to display associated flayed face-scalps from eastern Utah were also painted red (Howard and Janetski, 1992, pp. 125, 127). Stephen notes that, at the Hopi Pueblos, red was associated with the rays of the Sun-god (1936, pp. 216, 312), an identical association documented at Santa Ana

Pueblo (White, 1942, p. 331, Fig. 14) Finally, the fringes dangling from the staff held by the red "Oar-Headed-Anthropomorph" at the summer solstice panel invokes the image of falling rain, as similar fringes are said to do in Hopi religious iconography (Voth, 1905, p. 117; see Ellis, 1975, p. 61; Patterson, 1992, p. 165).

The Predictive Aspect of Sun-watching Encoded in the "Oar-Headed-Anthropomorph" Summer Solstice Marker

In his analysis of historic Pueblo Indian Sun-watching, Zeilik emphasizes the Sun-priest's *predictive* or *anticipatory* role in calendar-keeping (1985a, pp. S3, S15-S19; 1985b, pp. S88-S89; see Ellis, 1975, p. 72). Specifically, because all Pueblo Indian solstices and equinoxes are associated with ceremonies that are deemed essential to ensure agricultural abundance and communal harmony, the Sun-priest must be able to accurately *predict* the time of the solstices and equinoxes many days in advance. He explains, "All Puebloan ceremonies demand preparation time. The leaders of religious societies in particular and all of the people in the pueblo must have time to prepare offerings, special foods, altars, costumes for dances, and to practice songs and dances for the upcoming rituals. The participants must also prepare to be in the right frame of mind for the ceremony, so that their hearts may be good and their words may follow a straight path" (Zeilik, 1985a, pp. S15-S16). To accurately predict the impending solstice, Sun-priests utilized some kind of conspicuous solar alignment that was known to occur *a specific number of days before the solar standstills*. Once this pre-solstice alignment occurred, the Sun-priest knew the exact number of ensuing days to the solstices. The Sun-priest would then use some form of tally system to count down to the solstice, such as the unknitting of a chord, painted-line counts, stone or bone counters, or notches on a calendar-stick (Figure 25; Zeilik, 1985a, p. S18; Zeilik, 1991, pp. 95-97, Fig. 1, pp. 102-103, Fig. 2; Cushing, 1981, pp. 117, 250; Ellis, 1975, pp. 61, 63; Parsons, 1939, pp. 747-748). The ethnographic data analyzed by Zeilik indicated that 12-days was the average duration of time between the Sun-priest's announcement of an upcoming solstitial ceremony and the occurrence of the solstice; the actual number days varying slightly according to each pueblo (Zeilik, 1985a, p. S16). The pertinent point here is that Sun-priests utilized some kind of pre-solstice, solar alignment to *predict* the exact day of the June or December solstice.

The authors find the Sun-priests' utilization of a distinct, solar alignment to predict the solstice by a precise number of days intriguing, especially in light of the unusually bent fringed-staff in the left hand of the red "Oar-Headed-Anthropomorph". In Fremont rock art fringed-staffs are typically straight, resembling the one seen in Figure 15. However, the red "Oar-Headed-Anthropomorph" in the solstice pictograph is holding a fringed-staff that depicts an unnatural bend. In fact, the fringed-staff appears to be bent in a manner that deliberately matches the sunlight-shadow line cast when the sun's rays pass through the conspicuous notch on the eastern wall of the canyon. Team member T. Howells showed that the curve of the fringed-staff corresponded precisely with the sunlight-shadow line projected at 6:25 AM on 10 June 2021 (Figure 29). This alignment was closely repeated on 11 June. However, by 12 June the curve of the sunlight-shadow line becomes slightly misaligned with the fringed-staff; a misalignment that becomes more pronounced each successive day leading up to the summer solstice (Figure 30a,b,c).



Figure 29. The curve of the sunlight-shadow line perfectly matches the curve of the fringed staff ten days before the summer solstice (10 June 2021, 6:25 AM). (photo T. Howells)



Figure 30. The sunlight-shadow line: **a** – is not aligned with the fringed-staff on 2 June (photo J. McHugh); **b** – is not aligned with the fringed-staff on 5 June (photo T. Howells); **c** – cast on the summer solstice, 20 June, is slightly misaligned with the fringed-staff (photo J. McHugh).

In sum, our team's photographic record confirms that the fringed staff *does not align* with the sunlight-shadow line on 2 June, but moves incrementally closer to a perfect alignment each successive day through 9 June. The sunlight-shadow line perfectly aligns with the curve of the fringed-staff on 10–11 June. By 12 June the fringed-staff and sunlight-shadow line become

slightly misaligned. This misalignment becomes more pronounced each subsequent day leading up to the summer solstice (Figure 30a,b,c).

We therefore interpret the peculiar bend in the fringed-staff as a deliberate attempt to encode *predictive* astronomical knowledge into the pictograph. Specifically, the Fremont Sun-priest would have known that the summer solstice would occur ten days after the fringed-staff's alignment with the sunlight-shadow line (Figure 29). Such predictive wisdom would have allowed the Sun-priest to anticipate the June solstice by 10 days, thereby enabling him to publically announce the commencement of ceremonial preparations leading up to the solar standstill.

Conclusion

The authors maintain that the proffered photographic, iconographic, archaeological, and ethnographic data confirms that the seven-day, full illumination of the red "Oar-Headed-Anthropomorph" pictograph's face and headdress at the summer solstice was the functional purpose of this rock art panel, and that it indeed functioned as a summer solstice indicator (Figure 5; Figure 8). Furthermore, we also contend that the near perfect sunlight-shadow alignment with the fringed-staff held by the "Oar-Headed-Anthropomorph" ten days prior to the June solstice (Figure 29) served as anticipatory wisdom which allowed the Sun-priest to predict the time of the upcoming summer solstice while simultaneously allowing his community to begin ceremonial preparations for this significant calendrical event.

The authors also argue that the nearby, identical "Headhunter" pictographs that also face the solstice sunrise (Figure 15) may have been associated with a Fremont scalp or headhunting religious society allied with the Sun-god, in which adherents emulated the personified Sun-deity's role as "decapitator" in Pueblo Indian mythology. Heads, or facial-scalps, were taken from victims whose death was believed to impel the Sun-god on his path through the sky and thus hold the seasons in place. More crucially, the decapitated heads (or flayed face-scalps) functioned to bring rain to the ripening crops at the hottest part of the year, thereby ensuring a bountiful harvest. We suggest that the latter concept arose in deep Ancestral Puebloan antiquity, with the idea that the tears of agony and horror shed during the torture, dismemberment, and decapitation of victims served as a numinous analog for the similarly-appearing meteorological phenomenon of rainfall. In this way the shedding of tears during head-taking functioned as a form of sympathetic magic that induced a similar meteorological phenomenon: drops of rain for the maturing crops.

Other aspects of the panel that accord with Pueblo Indian ethnography and Ancestral Puebloan archaeology are the red color of the "Oar-Headed-Anthropomorph" summer solstice pictograph (Figures 1 – 8) and the nearby, identical "Headhunter" pictographs (Figure 15) which also align with the summer solstice sunrise. Pueblo Indians painted enemy-victims' severed scalps red, and scalp-stretchers found in Ancestral Puebloan archaeological contexts were also painted red, a color that was associated with the Sun's rays in ethnography.

Finally, the fringed-staff correlates with the fringes sewn into Pueblo Indian garments, as well as "Fringe" motifs found in Ancestral Puebloan rock art, which symbolize rain. This correlates with the rain-inducing ceremonies that are commenced at the modern Pueblos *after* the occurrence of the summer solstice.

Future Research

Current and future analyses of the red "Oar-Headed-Anthropomorph" hope to resolve the following questions:

1. Do sunlight-shadow alignments at the red "Oar-Headed-Anthropomorph" also signal the equinoxes and winter solstice?
2. What function do the contemporaneous, red, rectilinear shapes located to the left of the "Oar-Headed-Anthropomorph" serve in this rock art panel?
3. Are there additional sunlight-shadow phenomena which marked significant ceremonial or calendrical information for the agriculturally-reliant Fremont people? How might they be discerned?
4. How many "Oar-Headed-Anthropomorphs" depicted in northeastern Utah rock art face the summer solstice sunrise?

A final observation relating to our future research is worth discussing. The red "Oar-Headed-Anthropomorph" is painted over and among an older array of four "Concentric Circle" motifs that include two other images (see Figure 2; Figure 29). We find this significant because historic Pueblo Indians consider "Concentric Circles" images in rock art as their ancestral representation of the Sun-god (Ellis, 1975, pp. 59, 70-76, Figs. 28.1, 28.2; Zeilik, 1985b, p. S95). Might the "Concentric Circles" and associated petroglyphs carved beneath the "Oar-Headed-Anthropomorph" summer solstice pictograph expose the workings of an older Fremont solar time-reckoning system? If so, it may explain the highly circumscribed (7-days) duration of time that the headdress of the red "Oar-Headed-Anthropomorph" is illuminated; a phenomenon that had surely been derived from preexisting knowledge of the sunlight-shadow alignment's precise movement across this canyon wall at June solstice. We infer that the "Concentric Circle" petroglyphs will lead to new discoveries regarding solar calendar-keeping and associated rock art motifs in Fremont culture.

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