Gunsight 5GA4251 A Prehistoric Horizon Calendar Site



Dominquez Archaeological Research Group

Brian O'Neil Cheryl Harrison Holly Shelton Gunsight is a prehistoric stone ring site in Middle Park, Colorado consisting of 30 stone features divided into five localities (A-E). From Medicine Wheels, we inherited: true circles, flattened circles, ellipses/ovals, and eggshapes, all associated with astronomical observations. At Gunsight we have combinations of shapes: oval, egg, lens, L and J shapes, and irregular polygons. A real mix and match scenario. Is this a reflection of different techniques by different groups and/or at different times, for observation of different celestial bodies or events? Our solar investigation focused on Feature 13 and tested against the US Naval Observatory Astronomical Applications database for fall equinox and summer solstice sun rise/set positions.



Feature 13 is composed of 40 cobbles arranged in an outer egg-shape configuration of 14 cobbles and an inner oval-shape of 14 cobbles. Both share a long axis oriented along a NNW to SSE line of 338^o and 158^o. The outer egg-shape long axis is 5.75m while the inner oval is 3.55m. The cross axis from the long axis center point, has azimuths of 248° and 68°. The eggshape cross axis is 5.50m long while the inner oval cross axis is 2.30m. Feature 13 encompasses an elliptical area of approximately 21.0m². The inner oval-shape cobbles tend to be more deeply buried than those of the outer egg-shape, and are suspected to be an older configuration. Cobble 1 is distinctive in the inner oval as it is a large upright stone extending 19cm above the present ground surface. East of this upright are three linear groupings of cobbles aligned northsouth.



Feature 13's plan map with actual solar observations gathered over several years of study.



Feature 13's cobbles were highlighted in the field with colored sand bags to distinguish the feature cobbles and outline from the surrounding vegetation and surface for this photograph. Blue and white cobbles indicate the inner oval shape; orange cobbles indicate the outer egg shape.

To test the solar calendar hypothesis for equinox sunrise (red arrow), instruments were placed at Cobble 1, and sighted along Cobbles 1, 9, between 11/12, and 13 of the inner oval.

First glimmer of the sun occurs at azimuth of 91^o, mid-solar diameter at 92°, and full solar diameter at 93°. A video of the equinox sunrise on September 20, 2012 is presented in the next slide.



The red arrow indicates the hypothesized equinox sunrise from Feature 13. The Black arrow points to Cobble 1.

Equinox Sunrise From Feature 13.



On September 23, 2015 instruments were set up along cobbles 34, 11/12, 9,1, and 37 at 273°, the hypothesized line-of-sight for equinox sunset from Feature 13.

Our observation of the setting sun indicated that the solar disk first touched the South Gunsight ridge horizon at 269°, with mid-solar diameter at 270°, and full set (last glimmer) at 271°.



A video of the event follows.

Equinox Sunset Video



Summer Solstice Sunrise



On June 22, 2013 the hypothesized solstice sunrise at 66° was tested from Feature 13. This involved three cobble sets with instruments placed over Cobbles 1 and 39. First glimmer occurred at 63°, mid-solar diameter at 66°, and full solar diameter occurred at 68°. A video of the event follows.

Summer Solstice Sunrise Video



Our summer solstice sunset hypothesis was tested on June 21, 2013.

Instrumentation was set up over Cobble 31 at 296° and Cobble 29 at 302°. By 7:17pm MST it became apparent that the 296° set up was too far south to be viable and the instrumentation was relocated over Cobble 30. At 7:24pm the lower left side of the full solar disk touched the top of the northern flank of south Gunsight ridge at 302°.



The sun then began an impressive visual display as the lower left edge of the solar disk slid down the silhouetted northern flank of the South Gunsight toward its' intersection with the far horizon line along the Gore Range at 7:28pm.

The mid-solar diameter was cut by the Gore Range horizon line at 7:32 pm at 304°. Full summer solstice sunset, occurred at 7:36pm.

A video of the event follows.



Summer Solstice Sunset



It is DARG's hypothesis that site location was chosen specifically for its fore-shortened horizon landmarks which provide specific points for the accurate observation of celestial events.

Both eastern and western horizons are presented here showing the reciprocal mirror image of an undulating horizon line composed of three humps and a peak.



Unlike a solely Plains Indian Tradition with far distant horizons, and a need to include fore and back-sights within a structure, Gunsight (5GA4251) is a Mountain Tradition phenomena, where foreshortened horizon landmarks are incorporated into a calendar. Highly nomadic cultures would have reasons to observe celestial objects, create and use a calendar for ceremonies and anticipating seasonal changes and subsistence strategies. Documentation of horizon alignments at 5GA4251, Feature 13 for equinox sunrise/sunset and summer solstice sunrise/sunset opened up a whole new dimension regarding the perception of simple cobble arrangements/alignments normally viewed as 'tipi rings' or the more generic 'stone circle' site type. Suggesting a congruity for the concept of nomadic cultures creating a calendar to cover at least three of the four seasons.

Indeed, the construction of an archaeoastronomy feature which includes both fore and back-sights as well as horizon features incorporated into a horizon calendar is not unique to 5GA4251. Dust Devil Gorge Medicine Wheel, 5MF4423 (Hauck and Mueller, 1999), represents our best analog. While it is rather small with an 8.4m diameter incorporating 119 cobbles in two concentric circles with four spokes roughly aligned to the cardinal directions from a single central cobble. Hauck's conclusion is that the wheel was constructed with a 98% correspondence to the solar/lunar rise/set patterns along the site's eastern and western horizon. Seven counting stones in each of the four axes correlate with the solar paths between the solstices. The eastern spoke corresponds to the equinox sunrise, while a peak to the southeast marks the winter solstice sunrise.

Summary and Conclusions

- Gunsight (5GA4251) is not a typical "tipi ring" site.
- Site location and specifically Feature 13 were chosen for its foreshortened horizon landmarks with mirrored East and West horizons.
- Cobble outlines for Feature 13 include an exterior egg-shape with an interior oval arrangement with an upright slab.
- Solar investigation focused on Feature 13.

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- The alignments matched the US Naval Observatory Astronomical Applications database for fall equinox and summer solstice sun rise/set positions.
 - An "observers' choice" of 2° between first glimmer and full solar disk was noted for sunrise as was first horizon contact and last glimmer at sunset.

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