Forum
The Enigma of Minor Standstills

J. McKim Malville
Department of Astrophysical and Planetary Sciences, University of Colorado
kim.malville@colorado.edu

Introduction

For many decades it has been an unrelenting puzzle in cultural astronomy how such an obscure and elusive phenomenon as minor lunar standstill could have been of interest to ancient societies. Its declination has become part of the “tool kit” of cultural astronomy, often regardless of whether minor standstills had any cultural meaning. In his discussion of minor standstill, Lionel Sims has developed a theory for the meaning of minor standstill in Neolithic cultures, using Stonehenge as a test bed for alternative models.

Sims draws upon the theory of dark/new Moon seclusion rituals linked metaphorically to death, blood, and rebirth developed by Knight (1991). A basic element of Knight’s theory is that hunter-gatherer women organized sex strikes and controlled their menstrual cycles to force men into sharing meat from the large game animals they had procured. Sims uses Knight’s model of lunar scheduling of hunting, feasting, menstruation, and sex to support his own ideas about minor lunar standstills at Stonehenge. In his model the dark Moon signalled an onset of sex strikes and was a time for celebratory dancing and singing. Unfortunately, Knight’s assertions about sexual divisions of labour among hunter-gatherers and the restricted access by women to food resources is not confirmed by ethnographic or ethnohistoric studies (Brumbach and Jarvenpa 2006). Hunter-gatherer women had direct access to small game, fish, shellfish, eggs, amphibians, and insects and have no problem in acquiring protein. They did not need to rely upon male hunters and big game. In societies where women handle the processing, preservation, and management of stored foods, women may actually have greater access to a variety of food supplies than do men. It is significant that hunter-gatherer women in general have better nutrition than agricultural women. Brumbach and Jarvenpa criticize anthropological theories such as that of Knight:

Facile arguments about women’s ‘marginalization’ […] wither in the face of […] behavioral realities (since most of the processing of hunting were managed by women; women were heavily engaged in converting carcasses into food). Ideas about prestige hierarchies are particularly prone to contamination by gender stereotypes and biases from our own culture. (Brumbach and Jarvenpa 2006, 525)
Considering the gulf of millennia between hunter-gatherers and the builders of Stonehenge, it is questionable that such theory should ever be applied to justify an interest in minor lunar standstill in the Neolithic.

Sims surely must be aware of the esoteric nature of minor standstills. They are difficult to identify because the Moon passes a point of northern or southern minor standstill setting or rising twice a month, year after year. In contrast to the major lunar standstill, where the Moon achieves a declination never attainable by the Sun, there is nothing unique about the minor standstill. Major standstills, however, can be memorable and visually dramatic when the Moon rises or sets on a significant feature of the horizon beyond the reach of the Sun. In contrast, knowledge of the location on the horizon and the date of minor standstill requires careful monitoring and recording of the Moon’s position on the horizon over several standstill cycles.

North proposed that Stonehenge was “meant to align on the minor southern lunar standstill”, based upon his belief that the minor standstill Moon at Stonehenge was observable at winter solstice through a narrow slit formed by the top of the Grand Triolith and stones of the Sarsen circle (North 1996, 471). North gives no quantitative justification for his conclusion that such a slit had a height of 0.25 Megalithic Yards (0.207 m) (North 1996, 472). If a slit as claimed by North did exist, the event of minor standstill at winter solstice would have been a very obscure event. Based upon North’s values, the small slit viewed from the distance of 75 m from the Heel Stone would have had a height of 9.5 arc minutes, less than one-third the diameter of the Moon. It would have been barely visible from the distance of the Heel Stone, not a likely object for a major ritual.

Sims proposes that the appearance of the dark Moon in the slit would herald the onset of the deepest darkness of the year at winter solstice. However, the Moon at minor standstill at winter solstice is close to the Sun and the area of the sky containing the invisible, dark Moon when viewed through the slit from the Heel Stone would have been that of a bright evening sky. For ritualists this would have been in contradistinction to the darkness of Knight’s model as portrayed by Sims:

The onset of ritual power with the period of dark moon which, arguably, Palaeolithic and Mesolithic hunting cultures had conferred on the moon is preserved and manipulated by combining the southern minor standstill moonsets with the setting winter solstice sunset. Not only does this generate the longest darkest night possible but, by bracketing this dark moon with the setting winter sun, each mimics the other in their properties of signalling the onset of darkness. (Sims 2006, 204)

A connection between a minor standstill and festivals of winter solstice is tenuous and ritually unnecessary. We now turn to the American Southwest, where there is evidence of pilgrimage and festivals associated with major lunar standstills but little substantial evidence for attention to minor standstill.

Major Standstills in the American Southwest

In the American Southwest, the major lunar standstill is an important event at two well-known sites of the Ancestral Pueblos: Chimney Rock (Malville 2004, 2008, 2015) and Mesa
Verde (Malville 1993, 2008). Chimney Rock is one of the most thoroughly documented sites of major lunar standstills in the Americas, where the major standstill Moon rises between twin rock towers (Figure 1; Ninnemann and Malville 2010). According to Florence Hawley Ellis, the anthropologist, the high mesa containing a Great House and the adjacent stone towers are a shrine used by the Day People of the Taos Pueblo, who initially lived in the area before migrating to the Rio Grande Valley (Eddy 1977, 1). The shrine was dedicated to the Twin War Gods. Natural stone pillars are often shrines to these war gods, according Ellis (Eddy 1977, 1). We do not know for certain, of course, but these towers may also have been worshipped as a shrine by the Ancestral Pueblos in the eleventh century AD. The rising of the sacred Moon between the sacred towers every 18.6 years could have been a powerful theophany for residents and visitors. Because the land is sacred (Swentzell 1997), the skyscape of Chimney Rock contains gods of both sky and earth. This theophany of the Moon conjoined with the towers may have led to the development of the area as a place of pilgrimage. This lunar standstill event does not appear to have been a case of a “super-Sun”, as suggested by Sims, but an event featuring the Moon itself.

**FIGURE 1a.** Moon rises during the period of major standstills at Chimney Rock. Discovery photo: 8th August, 1988, 10% waning crescent (photograph by author).
FIGURE 1b. Moon rises during the period of major standstills at Chimney Rock. First full Moon of the standstill period: 26th December, 2004 (photograph by Helen Richardson).

FIGURE 1c. Moon rises during the period of major standstills at Chimney Rock. Last full Moon of the standstill period: 23rd December, 2007 (photograph by Ron Sutcliff).

At Mesa Verde, as viewed from Cliff Palace, the Moon at southern major standstill sets over the walls of the Sun Temple on the opposite mesa. The interior of the Sun Temple contains two towers, which would have been initially visible from Cliff Palace before the construction of its surrounding high walls (Malville 1993; Munson 2011). There is the possibility of a dramatic pairing of sunrise near solstice with the major standstill moonset. For two to three years around major standstill, the full Moon near summer solstice would set over the Sun Temple as seen from Cliff Palace.
The two towers of the Sun Temple may have been intended as replicas of the twin towers of Chimney Rock, and hence considered to be shrines. Before construction of its enclosing well, the Moon could have set between the towers as viewed from the vicinity of the Square Tower of Cliff Palace, mimicking the event at Chimney Rock (Figure 3). The major standstill Moon sets over the Sun Temple throughout the spring, starting in January. Each month the phase of the setting Moon increases to become a full Moon near June solstice. Observers in Cliff Palace may have had a remarkable view of a celebrant on the Sun Temple facing sunrise, silhouetted against the setting full Moon. If that person held a reflecting device such as a mica or pyrite mirror, the flash of light would signal sunrise just as the Moon was setting.

**Figure 2.** Depiction of Sun Temple as viewed from the Square Tower of Cliff Palace. The presumed location of the standstill Moon between the towers is indicated.

**Figure 3.** Left: Documentation of major standstill full Moon setting over Sun Temple viewed from the Square Tower of Cliff Palace. Right: Sunset on winter solstice viewed from the Pecked Basin of Cliff Palace (photographs by John Ninnemann).

The setting of the major standstill Moon could have been viewed from the window on the third floor of the Square Tower. Today, one can look inside the tower and see four painted lines with 75 tick marks next to the window (Figure 4). If each tick mark...
corresponds to a year, the four lines may represent four standstill cycles. The tower was repaired in 1934–1935, at which time the pictograph apparently was repaired without reference to a photograph taken in 1902 – Munson 2014). The original pictograph had a sequence of 20, 20, 16, 16 tick marks contained along four lines, averaging 18, still close to the standstill cycle.

In addition to an alignment to the Moon, the Sun Temple also contains an alignment to December solstice sunset that connects to an observing platform marked with a pecked basin in its centre at the southern end of the Cliff Palace enclosure (Malville 2008).

![Figure 4. Pictograph on the Interior of the Four Storey Square Tower of Cliff Palace.](image)

**Minor Standstills in the American Southwest**

One of the major icons for astronomy in Chaco Canyon is the so-called Sun dagger of the three-slab site of Fajada Butte (Sofaer 2008; Malville 2014). The sandstone slabs are natural features, 2–3 m high, part of a single block that broke off the cliff, toppled over, and split along bedding planes. At June solstice, a shaft of light established by two of the three slabs falls on the spiral petroglyph on the rock wall behind the slabs. The vertical shaft of light crossing the centre of the spiral is a genuine marker of June solstice. The claims by Sofaer and colleagues that a diagonal pecked line crossing the spiral marks minor lunar standstill has generated considerable scepticism and remains in doubt (Zeilik 1985; Carlson 1987; Malville and Munro 2010) (Figure 5).

A recent recordation of the spiral by the Chaco Canyon Rock Art Survey led by Jane Kolber and Donna Yoder challenges the presence of a line marking minor standstill (Cornucopia 2013; Seibel 2013). The conclusion of the survey team is that the diagonal line is not an intentional feature of the petroglyph but is composed of a number of natural erosional features of the rock which the human eye has connected to produce a straight line. It appears to be an illusion, similar to that of the non-existent canals of Mars.
Sofaer (2008) has suggested that the back walls of a number of Great Houses are aligned to minor lunar standstills and that certain Great Houses contained long distance alignments to minor lunar standstill. A re-evaluation of these claims indicates that these alignments are not statistically significant, nor are they culturally likely (Malville and...
The significant axes of these Great Houses are front-facing towards the Sun before local noon. Back walls should not have been significant in establishing the cosmological meaning of these structures or the ethnicity of their inhabitants.

**Concluding Remarks**

The ultimate quest in most of cultural astronomy and archaeoastronomy is for meaning. In this forum our goal should be an understanding of why ancient peoples paid attention to minor lunar standstills. Among the Ancestral Pueblos, at Chimney Rock major lunar standstills may have been viewed as theophanies, in which the sacred Moon was conjoined on the horizon with a dramatic rock shrine. There is no evidence that minor lunar standstill had a particular significance or meaning amongst the Ancestral Pueblos. Sims has applied Knight’s theory of sex strikes and dark Moon rituals to North’s analysis of Stonehenge to provide meaning and cultural context to the phenomenon of minor standstill. However, there are gaps in his arguments such as questions about the credibility of Knight’s theory, details of North’s reconstruction, and the significance of an invisible new Moon in a slit of uncertain size. In the spirit of “trust but verify”, Sims should provide the details of his own independent determination of the height and altitude of the slit. He also needs to provide photographic documentation of the minor standstill Moon and winter solstice sunset as viewed from the Heel Stone. At present the proposal of North and Sims concerning minor lunar standstill at Stonehenge fails the basic requirement in archaeoastronomy that a putative astronomical phenomenon should be one that was actually visible.

Winter solstice festivals of the Ancestral Pueblos of the American Southwest provide an alternate hypothesis for rituals at Stonehenge. In Chaco Canyon it appears likely that ceremonies were held at the full Moon closest to December solstice. The period between new Moon and full Moon, the so-called light half of the month, is the best time for pilgrimage because the Moon’s illumination extends the day. In addition, the pairing of the weak (December solstice) Sun with the strong (full) Moon was apparently meaningful to the Pueblos.

If the opposite were true at Stonehenge and a pairing of weak with weak, dark with dark, death/rebirth of the Sun with death/rebirth of the Moon was important, a ceremony centred upon the three-day death/rebirth of the Moon closest to winter solstice may have been the important annual winter ceremony at Stonehenge. Such an alternate hypothesis finds credibility in the many references to the three-day death/rebirth cycle of the Moon (Krappe 1938; Eliade 1958, 1964). In the figure of the dark Moon, Jesus descends to the underworld and rises on the third day. Jonah emerged from the belly of the whale after three days. For three days and three nights the Sumerian Moon goddess, Inanna, hung as a corpse upon a hook in the lowest world until, revived by water and food, she ascended back into the upper world. In Vedic India, the souls who died into the old Moon were reincarnated three nights later in the returning crescent, falling into the wombs of their new mothers as Soma. The Siberian Yakuts say that “the future shaman ‘dies’ and lies in the tent for three days without eating or drinking” (Eliade 1964, 35–38). When the Buddha was dying, he compared his rebirth and renewal to that of the Moon.
Rituals of mourning for Adonis, who was gored to death by a boar, took place over three days before the god rose from the dead. There are few if any similar connections made in traditional societies between minor lunar standstill and death/rebirth. This alternate hypothesis has the advantages that both solar and lunar ceremonies would have been entirely public and could have been held every year without regard to the minor standstill Moon. The rebirth of the Moon as a slender young crescent in the evening would have provided the ancient celebrants at Stonehenge a visually compelling confirmation of the continuing cycle of death and rebirth and the victory of light over darkness.

References


