

Forum Reply

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González-García collaboratively engages with some of the conceptual and interpretive problems of minor lunar standstills, whereas Malville disagrees fundamentally with my view. Let us look at the particulars of each critique.

Malville claims that minor standstills are an esoteric puzzle. In quite a different vein when addressing my observation that lunar standstills have different properties to the Sun's solstices, González-García inadvertently directly contradicts Malville's claim that the minor standstill is esoteric or difficult to observe. He says in this Forum that "it is easier to find the Moon near its extremes than the Sun!" For decades now, many like Malville have suggested that unlike the major standstill, the Moon's horizon positions swing through its minor range limits throughout the nodal cycle, leaving little distinctive trace. This view ignores the Moon's horizon limits for the year or two around the geocentric declination of the minor standstill. González-García shows that since the Moon's horizon range is reduced during these two minor standstill years there is a proportionately greater bunching of the lunistice range at these limits, making them distinctive within the Draconic cycle, more noticeable than the major standstill and a stronger signal of horizon standstill positions than the Sun's solstices.

Malville suggests that my use of John North's finding of an upper window aligned on the southern minor standstill moonsets in the Grand Trilithon at Stonehenge is flawed. He suggests that it does not exist, claims that North provides no quantitative data for this window, and that even if present it is too small to frame the Moon's orb. Since Malville gives his own calculations for the size of the window, one wonders why he doubts its existence and North, contra Malville's claim, does give the architecture of this feature in great detail (North 1996, 441–451). The Stonehenge upper window is of similar form and proportions to the Newgrange roof box (O'Kelly 1982, 93–96), but the Stonehenge window is aligned on the southern minor standstill and not the winter solstice sunrise as at Newgrange. Neither Malville nor any archaeoastronomer to my knowledge has ever objected to the Newgrange roof box alignment on the solstice Sun, but he does not seem conceptually equipped to accept the very same feature when it is associated

with the minor standstill of the Moon. The intention of my originating forum piece is to address why disciplinary problems in the conceptual vocabulary of lunar standstills leads colleagues like Malville to deny the defining architecture of Stonehenge's largest stones yet accept the "same" architecture when associated with the solstices.

It is arguably the case that Stonehenge is the acme of the architectural culmination of a wider cosmology general to the period. Its precise architecture makes it a useful test bed for the various archaeoastronomical interpretations possible that will inform hypotheses for other monuments of different design. These details suggest that we need to be cautious, while still accepting González-García's finding on the ease of observing the minor standstill. Unlike the Sun's limiting horizon range repeating for seven or more consecutive days, the Moon's two limiting horizon positions at every month is interrupted by 13 or so days while it journeys back and forth across the horizon between these horizon positions. By constructing cumulative annual frequencies of the Moon's lunistics, González-García abolishes these sidereal Moon's distinctive syncopated and time-lapsed movements. The changes in the Sun's azimuths for the week before and after the winter solstice in 2014 were less than 0.1° , while the changes for the Moon's azimuths range from one to over seven degrees *each day*. The archaeology of Stonehenge specifies two windows to the sky along its axis from each side of the Heel Stone. Therefore, the Sun would set in the lower window for 14 consecutive evenings around the winter solstice whereas the Moon sets in the upper window just once, not two or three times, each 27.3-day sidereal month in time-lapsed snapshots during a minor standstill. These are gross differences between lunar standstills and solstices.

González-García defines lunar standstills by the 18.61-year Draconic cycle and considers that this long-term cycle length disallows lunar phases synchronising with solstices, since this is governed by the 19-year Metonic cycle. The detailed binary archaeology of Stonehenge is very clear – the upper window at Stonehenge defines the view of the minor standstill and the lower window defines the winter solstice sunsets. We certainly would not see the 18.61-year nodal point estimate, which is an unobservable heliocentric abstraction that, as Thom suggested and believed, requires "extrapolation devices" (Thom 1971, 83–90). Figure 5 of my originating Forum piece shows that for the year before and after the nodal extreme of the southern minor standstill of 2490 BC the declination values of the Moon at their range limits are within a 1° band. Therefore, for about two years during the minor standstill, southern-setting lunistics appear in the Stonehenge upper window. Instead of choosing one of them, as does Ruggles (1999, 138) with full Moon, the lunar-solar conflation model requires us, like the ancients, to see all of them: a reversed suite of lunar phases in a 27.3-day sidereal syncopated sequence. When the Sun is in the lower window at winter solstice only, dark Moon is simultaneously in the upper window (my Figure 4 above). This is not just the case for the southern minor standstill but also for the southern major standstill at winter solstice and the major and minor northern standstills at summer solstice. González-García's Table 1 fails to note dark Moon on 16th June overlapping with the week of the summer solstice at the northern minor standstill. For double alignments

on solstices and standstills on the same azimuth at different altitudes, then dark Moon always coincides with the Sun's solstices. González-García generously admits that if a standstill lasts for two years then this synchrony will always happen. We have to be true to the precepts of *skyscape archaeology* and reconstruct the "astronomical" abstractions of prehistory through the detailed archaeology, not through the modern abstractions of celestial mechanics.

Malville rejects my use of Knight's model of cultural origins on the grounds that women do not need to "force" men into sharing their hunted meat with them with seclusion strategies, since they are able to access protein sources like small game without men. This is not sex-strike theory. As Sahlins pointed out many years ago, "the greatest reform in history" was when instead of sex organising society as amongst primates, with the establishment of earliest culture, society must organise sex (Sahlins 1964, 65). Sex-strike theory shows, using the methods of Darwinism, that under conditions of resource stress the mathematics of reproductive success favours those female coalitions that can collectively seclude themselves from heterosexual sex, only suspending that withdrawal once the hunted game has been surrendered to women. The model predicts that the monthly cycles of the Moon are appropriated for hunters' assisted night vision, completion of the hunt at full Moon and women's menstrual seclusion during the three or so days of dark Moon (Knight 1991).

Malville believes that millennia separate hunter-gatherers from the builders of Stonehenge, and so rules out any consideration of the ritual life of hunter-gatherers when interpreting Neolithic monuments. First, the sex-strike lunar model applies in the initial cultural situation for as long as monthly big game hunts are viable survival strategies. Once this economic necessity is undermined, as it was with mega-fauna extinctions by the Solutrean period in Europe, then a series of transformations were made to this template in attempts to preserve while innovating their ritual cycle (Sims 2006, and forthcoming). It is not the pristine model that spans 30 millennia as Malville implies, but the transformed model through solarisation or asterisation. Second, Malville seems unaware that the builders of Stonehenge *were* hunter-gatherers who had in addition adopted cattle herding (Stevens and Fuller 2012) and that the recent "continuity paradigm" emphasises continuity between the Palaeolithic and Neolithic, not discontinuity (Silva and Frank 2013). Rituals follow a time-resistant syntax which is amenable to transformations which reflect the changing economic requirements from hunting to pastoralism to agriculture.

González-García suggests that my model of lunar-solar conflation predicts a shift from lunar to solar alignments over time, and that the evidence of late Neolithic "lunar" Recumbent Stone Circles contradicts my claim. This is not my model. In my forum piece I predict a shift from a lunar scheduled ritual system entrained on *direct observation of the transiting synodic Moon* and its later Neolithic displacement onto *horizon alignments on the sidereal Moon* linked to the Sun's solstices. In the shift from the synodic to the sidereal Moon lunar phases are reversed, syncopated and attenuated to a solar timescale – they are quite different Moons! Neither Malville nor González-García acknowledges this difference between synodic and sidereal lunar properties. I have argued that this cultural

move is the confiscation of monthly lunar phases to an estranging logic of reversal and elite male pastoralist dominance.

While González-García is prepared to accept that my lunar transformational template *may* be “elucidating and insightful” but needs a stronger evidence base, Malville is of the view that two pieces of evidence from prehistoric structures of the Ancestral Pueblo in the American Southwest decisively refute any such even-handed approach. In his Figure 1 in this Forum he shows images of full Moon rising between the two pillars of Chimney Rock when seen from the back-sight of the Great House. In his earlier publications Malville claims that from here “every 18.6 years the Moon at major northern standstill rises between the chimneys, a feat that the Sun can never achieve”, and that these photos capture this event on 26th December, 2004 (Malville 2008, 8, 89, 93–4; 2015, 40–2). First, notice how in these photos the Moon is shifted to the right-hand side of the gap between the two pillars. Second, if, as Malville claims, the Moon does this every 18.6 years, then 26th December, 2004 is not the correct year. The geocentric extreme for the northern major standstill was on 8th March 2006 (+28°37'57.5") – 15 months later. Now in this forum Malville speaks of “First full Moon of the standstill *period* 26th December, 2004 [...] Last full Moon of the standstill *period*: 23rd December, 2007”. Instead of the precision of 18.6 years we now have a standstill *period*, rather than an 18.61-year point cycle, that lasts 37 months. There is arbitrariness in these asymmetric period limits. The first is 15 months before the geocentric extreme and the second is 22 months after it. Does that mean a lunar standstill “period” is 30 months either side of the extreme or 44 months? Under critique Malville has altered his understanding of the Draconic cycle from a point recurring every 18.61 years to a period up to nearly four years! And what criteria are drawn upon to justify these dates and full Moons around the winter solstice? There are no structures north of Chimney Rock that could possibly be a back-sight to see winter solstice sunrise framed by the two pillars (see Malville 2015, 40). However, there is another possible solstice alignment upon Chimney Rock: from a viewing point to the south of site 5AA8 on Peterson Ridge, where there are a number of smaller archaeological sites (Malville 2015, 47). This suggests that another back-sight that did indeed invest the Sun with the feat of rising “behind the merged double chimneys” (Malville 2015, 42) (Figure 1) was possible. They would have achieved lunar-solar sidereal conflation not by creating a double horizon along a single axis as at Stonehenge, but by creating two back-sights. In short there are no criteria in this archaeology to choose winter solstice views of the major standstill Moon at Chimney Rock, but there are for the summer solstice major standstill.

Following these elementary procedures in archaeoastronomical fieldwork to justify an intentional alignment we now find in the middle of the “standstill period” on the 25th June 2006 – not at either end of it – the Moon rises just over one lunar diameter further north (at +28°26'28.4" rather than +27°08'09.8" as on 26th December 2004 [SkyMap]) and therefore now centred between the two pillars. This archaeologically indicated azimuth during the summer solstice in the middle of the major standstill generates *dark* Moon, not full Moon at the northern standstill. While for Malville it makes no sense to have an alignment on dark Moon, it makes perfect sense for a reversing cosmology masquerading as respecting the ancient seclusion rituals of matrilineal coalitions at dark

Moon. So just as at Stonehenge where there is no back-sight in the centre of the circle that justifies a claim for that monument being aligned on summer solstice sunrise, so at Chimney Rock there is nothing in archaeoastronomy that justifies a claim for a winter solstice sunrise alignment to then construct the artifice of a full Moon.



FIGURE 1. Sunrise on Peterson Ridge at June Solstice, *Journal of Skyscape Archaeology*, 1 (1): 42 © Equinox Publishing Ltd 2015.

Turning from Chimney Rock, similar criticisms apply to Malville's example of Mesa Verde. According to Malville the full Moon sets between the two towers of the Sun Temple when seen from Cliff Palace. He shows how a central sliver of the Moon's orb will be seen descending into a very narrow slit between the two towers which subtend an angle less than 8' of arc – or just one-quarter of the lunar disc. Therefore, whereas a Stonehenge "slit" is not acceptable, a narrower Sun Temple "slit" is! And again, the issue of what archaeology can be used to justify a back-sight onto such a Moon confounds Malville's interpretation. The only two back-sights he names are the Square Tower in Cliff Palace for viewing the southern major standstill Moon and the Pecked Basin of Cliff Palace for viewing winter solstice sunset. Since these are the only two back-sights for viewing between the slit in the Sun Temple, then the only lunar-solar alignment justified by the archaeology are the southern major standstill Moon at winter solstice – when both enter the slit it is dark Moon not full Moon. In this Forum, Malville suggests that "a celebrant [...] silhouetted against the setting full Moon [...] held a reflecting device [...] the flash of light would signal [summer] sunrise just as the Moon was setting". Apparently we no longer need back-sights in our field archaeoastronomy since they are now dispensed with by mirrors at the foresights.

The bracketing we have found at Chimney Rock and Mesa Verde for dark Moon at summer and winter solstices for northern and southern major standstills respectively

is also true for minor standstills. However, Malville rejects any significance to the minor standstill of the Moon and cites the Sun Dagger feature of the three-slab site on Fajadu Bute as his main evidence in this Forum for this view. This feature is a noonday “dagger” of solar light every summer solstice, framed and focused by the edges of two of three upright slabs leaning against the cliff face of Fajadu Bute, that falls through the centre of a 9½-turn spiral petroglyph carved onto the rock face. Malville accepts in this Forum that this is a “genuine marker of June solstice”. Malville also claims that these three stones are “natural features”, and that “a diagonal pecked line crossing the spiral marks minor lunar standstill [sic]” is not intentional but a product of natural erosion and the line is as illusionary as “the non-existent canals of Mars”.

For those unfamiliar with the site archaeology of Fajada Bute I would refer you to the scholarly publication of Anna Sofaer (2008) and, in this Forum, to Figure 2 below. Malville fails to adequately describe the archaeology of this site at which two spirals, not one, display five Sun daggers, not one. At winter solstice the large spiral of 9½ turns is framed either side with two Sun daggers and is itself absent of light, and at the equinoxes a single dagger falls in the mid-space of the nine turns and another dagger falls through the centre of the smaller 2½-turn spiral. It will be noticed that if Malville is prepared to accept that the one summer solstice Sun dagger is “genuine”, then one wonders how he can believe that two at winter solstice in addition to one at the equinoxes are not genuine. In addition to this the Moon casts a sharp shadow-line on the left edge of the large spiral at the major standstill, through the centre of the same spiral at minor standstill and over both spirals at mid-position of the standstill cycle. These shadows marking the centre and left tangent of the large spiral, which occur during the minor and major standstills, coincide with the 9½ turns of the spiral marks which exactly mark the number of years between the minor and major standstill. And lastly, Malville fails to inform the reader that the diagonal pecked line through the spiral is not just one marking the minor standstill but that a *second* pecked line also marks the major standstill (Sofaer 2008, 53). Nevertheless, Malville believes that this, and presumably the second one on the major standstill that he does not mention, are both natural erosional features.

Let us pause a moment to consider what we are being asked to believe. Perhaps one pecked line or one lunar-defined sharp shadow line might accidentally fall on exactly the correct position of a 9½-turn spiral petroglyph that locates the year of the minor standstill. But what is the probability of this happening with two pecked lines or two lunar shadow lines, both pairs of which scribe exactly the correct positions on that same petroglyph for the major standstill and the minor standstill markers and in parallel to each other? Malville claims that the three-stone site at Fajada Bute is a natural feature – the result of a fall of sandstone rock breaking into three similar pillars along their bedding planes and ending upright and in parallel over a spiral petroglyph that in fact is two spiral petroglyphs, which then accidentally create light and shadow effects for three solstices, three lunar standstill markers and exactly the combinations of solstices and standstills that culminate to dark Moon! In sum, Malville fails to mention all these features in which “the northern lunar standstill cannot be seen near the date of the summer solstice” (Malville 2008, 78) – because of course it is dark Moon – and for this reason he refuses to accept

the patent symbolism of a spiral marked by the shadows of the Draconic cycle which includes the minor standstill. Combined with the absence of light on the spiral at winter solstice this symphony of cosmological symbolism is precisely the same as at Neolithic Stonehenge. The probabilities of this all happening by accident are vanishingly small and far more unlikely than there being canals on Mars.

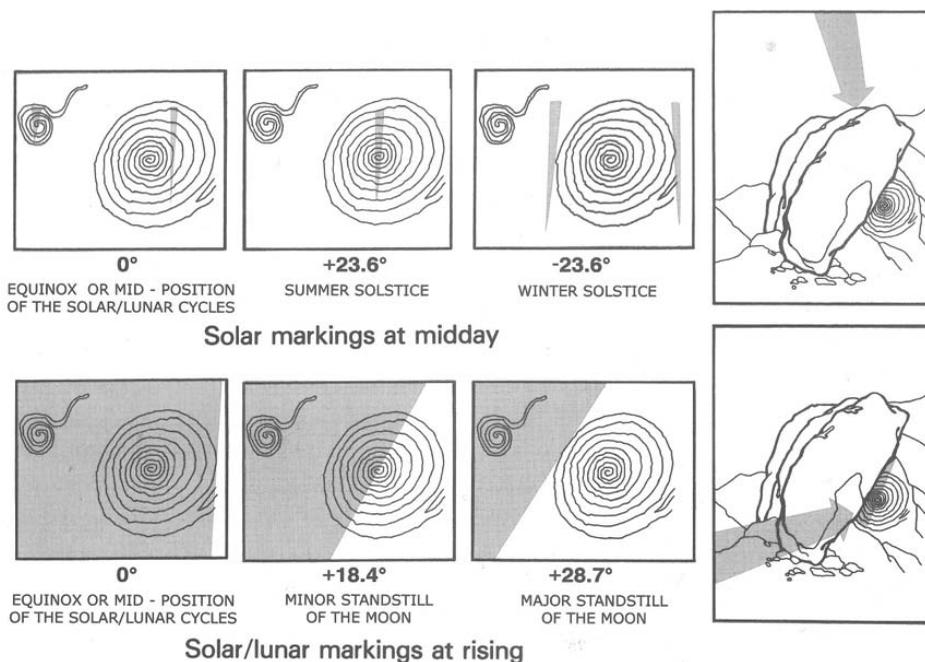


FIGURE 2. Solar and Lunar markings at Fajuda Bute three slab site (Sofaer 2008, 52).

Conclusion

González-García comes from that tradition in archaeoastronomy which from the 1970s on successfully defended the discipline against an overly sceptical archaeology establishment by robust field methods, statistical testing of aggregated data sets and a cautious inductivism that, in my view, under-conceptualised lunar standstills. The discipline presently owes its existence to this body of scholarship. In the evident need to move on to an interpretive framework, Malville's use of the widely accepted supra-solar horizon range understanding of lunar standstills creates anomalies as soon as one part of it asserts anything. In what looks like a case of paradigm fatigue, skyscape archaeology needs to address this weakness.

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