

Neolithic Solar Ritual at Stonehenge Mad Midsummer or Bleak Midwinter?

Kate Prendergast looks at the arguments for and against the primary solstitial orientations of the world's most famous stone circle.

THE SOLSTICE FESTIVAL AT STONEHENGE PASSED off peacefully for the second year running last summer. So harmonious, in fact, were relations between revellers and the authorities, the odd voice was even heard on indie media sites complaining that the whole event was in danger of verging on the conformist: the Last Night of the Proms for the rave generation, perhaps. But for the time being at least, the celebrations are still a genuinely open and free event; and spontaneous drumming and dancing in the centre of the circle at dawn is certainly more akin to my musical taste than yet another hopeless rendition of Rule Britannia. But, however much we debate the party politics of the event – and these are politics that *should* be debated – the question this article hopes to address relates to a different debate: to the timing rather than the content of such an occasion. To put it simply, was the time of year our Neolithic ancestors gathered at Stonehenge to do their thing the same time that some of us gather to do ours?

A complex construction

The answer to this is complex – and controversial. Gerald Hawkins recognised back in the 1960s that, from an astronomical point of view, Stonehenge is an extremely complex construction, and recent work on alignments at the site are confirming that there are not one, but several major solar and lunar orientations at Stonehenge, some of which are highly sophisticated (see for example, North 1996, Burl 2000, Sims 2002). Nonetheless, despite our advancing understanding of the technical sophistication of astronomical orientation at Stonehenge, several key alignments seem to be more important than others. The question is, which ones? This assumption

itself forms the basis of the summer solstice festival, since the belief that the primary orientation at Stonehenge is to the summer solstice rising sun has been prevalent since the 18th century onwards, when it was first suggested by the antiquarian William Stukeley. As Aubrey Burl has pointed out, this belief is false; a fact that has been reiterated repeatedly by a series of commentators for the last thirty years or more. Yet, it continues to be perpetuated in popular culture, and midsummer celebrations at the site – once the preserve of latter-day Druids and more recently appropriated by neo-pagans - now even receive official sanction.

The modern popular belief is that, from a viewing point at the centre of the circle, the summer solstice sun can be seen to rise over the Heel Stone at dawn. That Stonehenge should be primarily oriented to the summer solstice sunrise was first suggested by the antiquarian William Stukeley in the early 18th century, although interestingly, Stukeley deduced this from the NE-SW axis of the monument, rather than from the position of the Heel Stone itself. The Heel Stone was first identified as a possible foresight for this orientation by Dr. John Smith in the late 18th century, and by the late 19th century, belief that this was the central alignment at Stonehenge had become widely accepted (Burl 2000: 130-1).

In fact, as commentators as diverse as Lockyer and Atkinson have pointed out, viewed from the centre of the monument, the summer solstice sun does not rise over the Heel Stone at dawn, but over a degree and nearly 2m to the left. This supposed alignment at Stonehenge thus never has, and never will exist: it is a figment of the antiquarian and popular imagination.

The Heel Stone

As Burl makes clear, the Heel Stone (with or without its potential partner) is a crucial monolith within the entire monument. It appears to have been the first monolith to be erected at Stonehenge and was thus associated with the pre-sarsen phases of the monument that otherwise consisted of timber circles and earthen banks and ditches. Moreover, the Heel Stone is a central stone within the monumental design, since it is located near to the entrance, and on the major axis of Stonehenge, thus defining a series of observation points. Therefore its role – including its potential alignment – is of great significance in the context of any primary alignments at the site as a whole.

Burl gives us two explanations for astronomical alignments in relation to the Heel Stone. The first draws on the work of Peter Newham, who argues that the Heel Stone, along with the timber causeway posts and A posts also positioned at the northeast entrance, formed part of a series of alignments, looking out from the monument, to the rising northern moon in the northeast (2000:132-3). Newham and Burl argue that the timber posts represented sighting devices tracking the moon's northerly risings, from its minor to its major rising position on the horizon and back again over the 18.6 years it takes to complete its cycle. The Heel Stone is oriented

exactly mid-way between the moon's minor and major rising positions, while the A posts – which succeeded the causeway posts – tracked more closely the moon's progress from the mid-way point to its most northerly rising. Thus, according to Burl, the Heel Stone was associated with a lunar rather than a solar orientation in the early phases of the monument's history.

The second is associated with the changes that occurred when Stonehenge was modified with the erection of the bluestone circles in the positions they are in today (phase IIIv in the revised sequences). At this point, the avenue was widened. This resulted in a modification of the axis of the avenue of about 4° to the east of the original axis. This, Burl argues, not only brought the axis itself much closer into line with the summer solstice sunrise than before, it also brought the Heel Stone more closely into this alignment too. Burl suggests that this claim is strengthened by evidence for other, roughly contemporaneous, modifications to the monument. The Slaughter Stone – positioned about 31m to the southwest of the Heel Stone and now prostrate – has been dated to phase III of Stonehenge. The Slaughter Stone was once almost certainly accompanied by a partner, and these two stones straddled the new axis of the monument. Burl suggests that the Slaughter Stone, and its partner were positioned in relation

*Stonehenge on
the winter
solstice,
looking
southwest
towards the
setting sun.
(Photo: Robin
Scagell/Galaxy
Picture
Library)*



to the Heel Stone and its partner, as part of the new orientation to the summer solstice rising sun:

The sun would have shone between the Heel Stone and its partner and then between the Slaughter Stone and its partner, then between stones 1 and 30 of the sarsen circle and 31 and 49 of the inner bluestone ring, pouring down a thin tunnel of stones like the passage of a chambered tomb up to the Altar Stone at the heart of Stonehenge. Astronomically this did happen. If it was designed to do so it is a revelation of considerable astronomical sophistication (Burl 2000:147).

According to Burl therefore, modern summer solstice revellers should continue to party, safe in the knowledge that the timing of their festivities directly echo those of our ancestors – albeit ancestors dating to the end rather than to the beginning of the third millennium! Perhaps more significantly, this evidence may suggest a shift in ritual practices associated with the later phases of Stonehenge; away from a lunar based towards a solar based ritual calendar. This is indeed what Burl suggests. However, there is a third, crucial aspect to the Heel Stone orientation. This is the orientation at Stonehenge recently detailed by astronomer John North, in his book *Stonehenge: Neolithic Man and the Cosmos* (1996).

A central axis

In determining primary orientations at Stonehenge, the most important factor that needs to be taken into

account is its axis of symmetry. Stonehenge is aligned on a northeast-southwest axis. This axis is defined by the Avenue and runs between the Heel Stone and its possible once-standing partner, along two further standing stones and between a facade of timber uprights located close to the Heel Stones. It continues through the entrance to the enclosure, along the edge of the Slaughter Stone, and through two further standing stones which once stood at the enclosure entrance. It then runs directly through the inner circle settings: across the Altar Stone - the central stone and the focal point of the monument - and through the Grand Trilithon, the central trilithon in the inner sarsen horseshoe.

As we have seen, this axis has long been taken as the basis on which to argue that the primary orientation of the monument looks out towards the rising of the summer solstice sun in the northeast. But in fact, as Julian Richards has argued, the axis of the monument may perhaps best seen as designed to highlight the viewing of astronomical phenomena from the northeast, looking into the monument towards the SW. As one of the first archaeologists to comment on the significance of this perspective, Richards observes that:

“Much depends on our perceptions of the use of space within Stonehenge, traditionally viewed as somewhere to look out of on 21 June with

Stonehenge on the summer solstice. The sun rises to the east of the Heel Stone. Along the axis of Stonehenge II the sun rises west of the stone.



the sun rising over the Heel Stone. The alternative is to look *into* Stonehenge on 21 December, either from the entrance or from the open side of the horseshoes, when the view is of the midwinter sun setting between the two uprights of the great trilithon” (1991:127-8).

It is exactly this orientation, looking from the northeast entrance of the monument to the southwest, and to the winter solstice setting sun, that Professor North highlighted and detailed in his book. Since then, it is an orientation that has been acknowledged by several writers. Ruggles argues that this orientation was established at Stonehenge when the first monoliths were erected: the Heel Stone, the first bluestone circle and the sarsen rings. It was at this point, Ruggles argues, that *both* a summer solstice and a winter solstice alignment were incorporated into Stonehenge: “At Stonehenge itself, the transformation of the monument into stone was accompanied by a shift of several degrees in its axis to bring this in line with summer solstice sunrise to the north-east and winter solstice sunset in the south-west” (1999:138).

However, there are several problems with this argument. The first is that it contradicts the claim that the summer solstice alignment was incorporated at a later stage, i.e. with the modification to the avenue that took place around phase 3v. Second, as Ruggles himself points out, it depends on believing the Heel Stone had a partner in order to frame such an event – which has not been proved - and it gives us no explanation for the emphasis within the monument itself on the Altar Stone and trilithons. Moreover, it does not explain the original function of the Heel Stone – the first stone in the sequence of monoliths. Ruggles sums up these weaknesses as follows:

“If the Altar Stone was the focus of attention and the Heel Stone and its companion marked the ceremonial entrance to the monument, it is certainly just as plausible, and arguably more so, that the alignment of particular symbolic value was that of the Altar Stone with the direction of mid-winter sunset in the south-west” (1999:138).

Lionel Sims has put it even more strongly:

“The claim [for a summer solstice rising sun alignment in the northeast] accounts for very few details of the monument. It only needs two posts to establish any single alignment. This is not a promising explanation of why we have a

complex of stones laid out in concentric circles and arcs all of graded height, a quadrangle, and in crucial locations (but not the centre!) additional standing stones like the Heel, Slaughter and Altar Stones. These other properties of the monument would have to be explained by separate and additional theories to that of a summer solstice alignment” (2002:7).

Winter solstice sunset

If the claims for a summer solstice rising sun orientation at Stonehenge are – at best – confusing, those for a winter solstice setting sun orientation seem far more persuasive. John North gives us a convincing explanation of the position of the Heel Stone, the axis of the monument and the extraordinary elaboration of monolithic architecture in the later phases of Stonehenge, and has established in great detail the claim alluded to by both Richards and Ruggles: namely that the primary orientation at Stonehenge is not to the summer solstice rising sun, but to the winter solstice sunset. Not only does North argue that “the most fundamental alignment of all at Stonehenge” is its orientation on the winter solstice setting sun, and that it is to the winter solstice sun that the construction and axis of the monument is primarily oriented; but that while “it reached to a higher state of perfection in the sarsen monument”, this alignment was already enshrined in the entrances, standing stones and timbers of the earlier monument (1996:458).

We can see how the setting midwinter sun was the primary celestial event on which Stonehenge was aligned from both the degree of precision and of elaboration this orientation received within the entire design of the monument. Firstly, it is clear that this orientation is enshrined in the axial layout of the sarsen monument, as it is precisely defined by the positions of the Heel Stone, the Altar Stone and the Grand Trilithon. At a viewing position from the Heel Stone, looking through the entrance and into the centre of the monument the solstice sun can be observed entering the window framed by the two uprights of the Grand Trilithon above the Altar Stone, approximately 20 minutes before its final midwinter setting:

“The last glint of the upper limb of the setting midwinter sun was observed to the left of stone 56 of the grand trilithon, setting over an artificial horizon barely masking the natural horizon. The observer stood just behind and to the right of the Heel Stone...and used its (northwest) edge to delimit the line of sight” (North 1996:459).

Moreover, as North argues, the design of the outer sarsen ring and inner trilithons acted to block residual rays, with the effect of highlighting the dramatic display of the solstice sunset orientation. From a viewing position from the Heel Stone looking southwest, the monument appears, not as an open series of stone circles, but as an almost solid block of stone. As a result: "To an observer anywhere along the line of the axis of the monument, from the Heel Stone to the entrance (say level with the Slaughter Stone), when the sun was low in the southwest, the monument was seen only as a dark mass, pierced by the light of sun or sky through a single central (axial) slit" (1996:453).

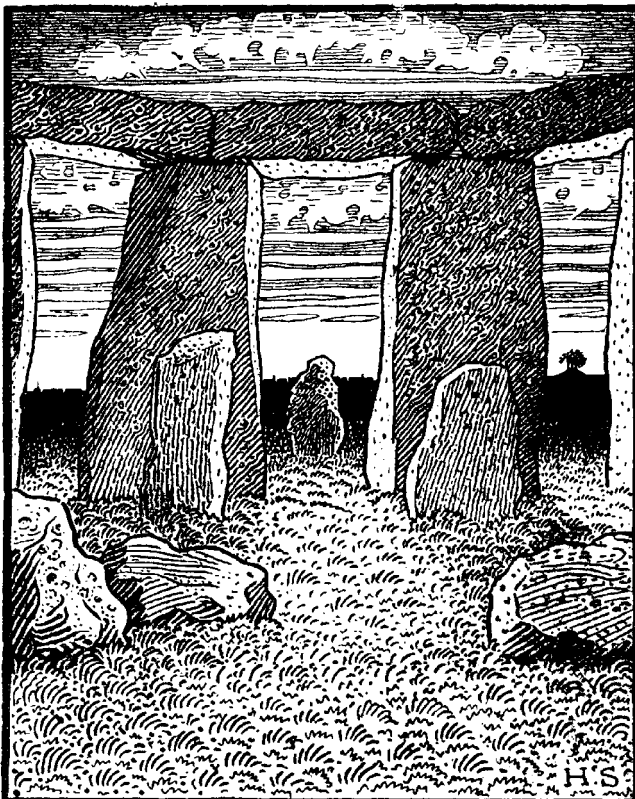
into the gap between the two sarsens of the Grand Trilithon. It is worth noting that neither of these effects, remarkable for both their precision and enhancement: the creation of the illusion of a solid monument; nor a series of levelled horizons into or out of which celestial phenomena rise or set are found looking at the northeast horizon and at the summer solstice rising sun (Sims 2002:7-8).

We need also to be aware of the relationship between the architectural engineering and ritual orchestration in relation to the winter solstice orientation at Stonehenge. North notes that as the winter solstice sun set in the southwest, an observer could keep the sun in view for several minutes while walking down the Avenue from the Heel Stone into the centre of the circle (1996:453-4). This was presumably intended to maximise the drama of ritual procession, down the Avenue, past the Heel Stone and into the monument itself, during the primary celestial event on which the monument is aligned. Such an effect is enhanced by the fact that the trilithons are stepped in height towards the Grand Trilithon, the central focus of the monument located in the southwest. Thus the ways in which the monument framed and emphasised both the setting winter sun, and the

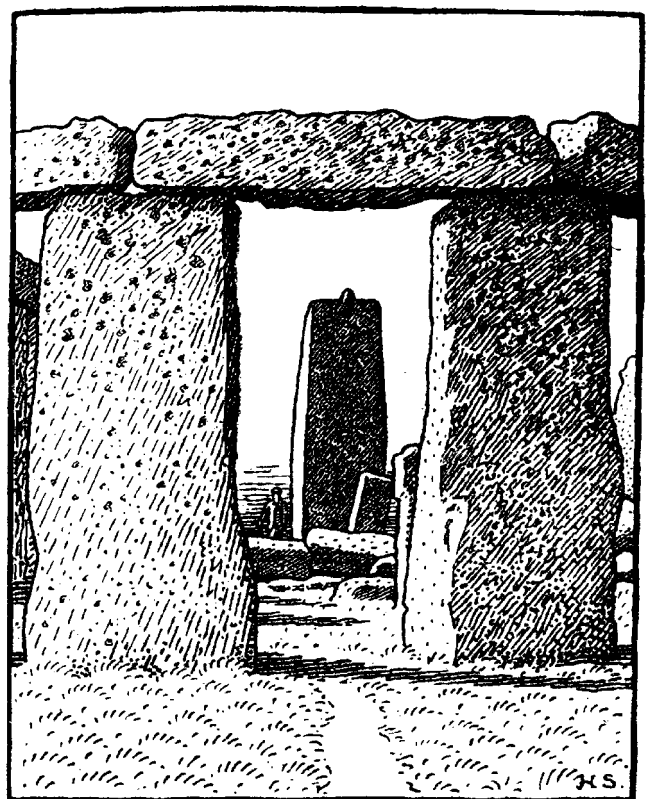
Views of Stonehenge along the monument's northeast and southwest axis, from Frank Stevens' Stonehenge Today & Yesterday (1933).

Artificial horizons

The sarsen circle was also designed to create an artificial horizon: despite the fact that it stands on ground that slopes by half a metre across its diameter, the top surfaces of the lintels are level to within an error of eight centimetres across the 30 metre diameter of the circle. Again, from a viewing position at the Heel Stone, this created a level horizon to observe the solstice sunset. In addition, the Altar Stone also provides a flat and level base – another artificial horizon – into which the sun appears to set once it has passed



Stonehenge. Looking N.E. from the altar stone towards the heel stone.



The central Entrance of Stonehenge. Looking S.W.

movements of those who participated in this event by processional entry into the site can be seen as complementary processes, each designed to synchronise and give meaning to the other.

From the available evidence and analysis, it therefore seems clear that the primary orientation of Stonehenge is not to the summer solstice rising sun at all, but to the winter solstice setting sun. North argues that this orientation was present at the earliest stages of the monument; certainly, the evidence that it was the orientation to which the monument was primarily dedicated and which received the most intense elaboration from its monumental stages seems incontrovertible. This raises several questions. It clearly suggests, as Ruggles implies, that any orientation to the summer solstice rising sun is fortuitous rather than intentional – and if intentional, secondary to the main alignment to the winter solstice setting sun. It also indicates that the central orientations incorporated at Stonehenge from its earliest to its latest phases were to the winter sun and to the moon. This is corroborated, not only by Newham and North's findings about orientations at the early phases of Stonehenge, but also by North's observation that the Heel Stone-Grand Trilithon alignment "was set up with a double function, for observing two extremes, one of the sun and one of the moon" (1996:473).

"The grand trilithon was designed so as to allow for two key observations from the Heel Stone, one of the midwinter setting sun from its base, the other of the setting moon at minor stand still at its top...as the moon set, its last glint within the slit would have gradually shifted, day by day, from the right hand to the left, and it would then have reversed. At other times it would not have reversed, and would have gone on setting further and further to the south. If this second type of behaviour was regarded as 'normal', than a minor stand-still has a touch of the miraculous about it, and perhaps this was the reason for paying so much attention to it" (North 1996:474).

Winter solar, lunar extreme

That the Heel Stone-Grand Trilithon axis has a dual winter solstice-lunar extreme orientation indicates the builders of Stonehenge were concerned to establish and elaborate celestial cosmologies of considerable complexity relating to the symbolism of solar and lunar cycles. Sims has argued that a combined winter solar and lunar extreme orientation in the window of the Grand Trilithon was carefully selected among a whole range of potential combinations of orientations, for the purpose of conflating solar and lunar cycles - with potentially highly complex implications for the history and politics of Neolithic ritual (2002). Moreover, these observations do not exhaust the possible orientations (or even combination of orientations) that may exist at the monument, although they do appear to be dominant within the wider number of potential astronomical alignments at the site as a whole.

Clearly, Stonehenge is a monument that incorporates astronomical knowledge of great sophistication; and we are only beginning to understand the full extent of such knowledge and its potential relationship to Neolithic ritual. Nevertheless, however sophisticated the cosmologies of the builders and users of the monument, they were also still primarily concerned to mark the major moments in the turning of the seasonal year, with a particular focus on the darkest time in natural and perhaps ritual terms – the winter solstice (Prendergast 1998).

Our contemporary desire to party at Stonehenge on summer solstice indicates the degree to which such moments in the seasonal year are still understood by us as times of real power. Perhaps what is needed then, as an answer to the original question this article posed, is for the powers that be to allow a second festival at Stonehenge on 21 December. We could then gather to watch the death of the sun through the 'gateway' of the Grand Trilithon and witness the rising of the moon and stars on the longest night of the year. This would undoubtedly represent a darker and more sombre ritual than the triumphant celebration of the rise of the sun at midsummer. A midwinter ritual at Stonehenge would not only fully connect us to those who built and used it, but also give a much needed ritual alternative to a time dominated by modern festive consumerist excess.

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