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Rethinking symbols and images, art and
artefacts from history and prehistory

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TESTING STONEHENGE EXPERIMENTALLY USING A REPLICA FULL-SIZE ALTAR STONE POSITIONED AT THE FOCUS OF THE MONUMENT

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Abstract: A replica replacement for the Altar Stone was constructed of the same bulk, height and width as the original stone which has for centuries lain fallen, sunken and unavailable. The replica was positioned very close to where the Altar Stone formerly stood, and the sightlines to it were viewed and analysed by direct observation and photography. The conclusion is that the light of the rising sun at midsummer entered the monument four millennia ago (as it still does today) and illuminated the front of the Altar Stone making it sparkle because of its mica light-reflecting platelets. Four minutes later the shadow of the Heel Stone fell upon the Altar Stone. This spectacle could be an action manifestation expressing divine fertility belief—as known from historical and classical sources—of the *hieros gamos* or the 'Marriage of the Gods'.

At midwinter sunset the light of the setting sun could only fall upon a very narrow vertical strip of the standing Altar Stone because of blockage by orthostat Stone 55 of the Great Trilithon.

Key Words: Altar Stone, Heel Stone, hierogamy, Neolithic, replica, Stonehenge

Introduction

Of the surviving megaliths at Stonehenge the two most important are the Heel Stone which is external to the monument (Fig. 1) and the ill-named Altar Stone which has sunk into the ground under the weight of heavier stones that felled it when they toppled.

Other key stones are the pairs numbered Stones 55 and 56 and Stones 1 and 30, because these together define the axis of the monument. At the same time the Stonehenge axis is the bisector of the nearest section of the long ditch-and-bank avenue. Both the axis and the avenue correspond with the azimuth of the midsummer sunrise as it was 4500 years ago. Fig. 2 is a map of the monument.

This emphasises that the sun rose over the distant horizon on midsummer morning and shines down the avenue straight into the monument, as it still does, through the trilithon opening between Stones 1 and 30. Sunlight then fell upon the Altar Stone standing vertical and erect as intended when Stonehenge was planned and built. Being a rich mica-filled megalith, it would have sparkled in the sunshine especially if freshly scraped or wetted. Midsummer is the only time of the year when the light of the rising sun can fall squarely on the front of the Altar Stone (cf. Meaden 1997). In total contrast, in the week of midwinter only a narrow beam of sunlight can fall on part of the *back* of the Altar Stone, having passed between Stones 15 and 16 and then between 55 and 56.

The test situation is clarified by **Figs. 3 to 5** that locate the



Fig. 1. The leaning Heel Stone, present height 4.7 m. If restored to the vertical, the height is estimated to be 5.2 m

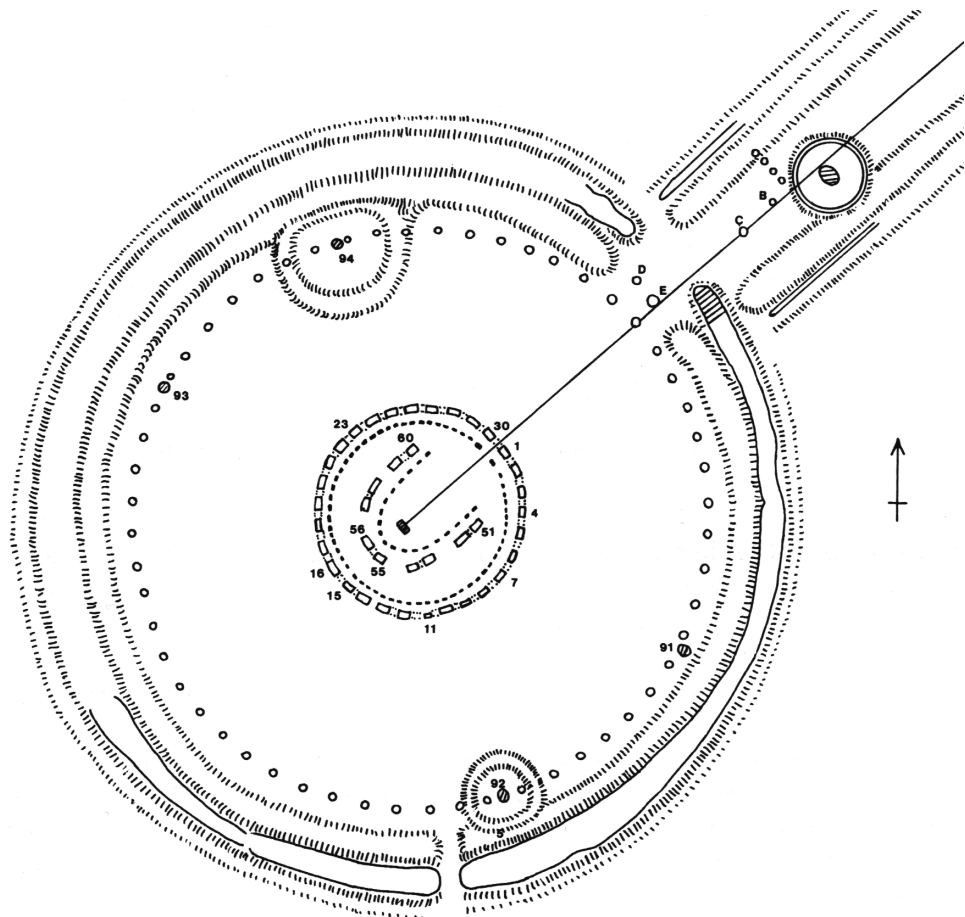


Fig. 2. Map of Stonehenge restored. Note how the paired stones numbered 56/55 and 30/01 define the axis of the monument. This is also a bisector of the Avenue on the final approach to Stonehenge.



Fig. 3 and Fig. 4. The replica of the Altar Stone is set in position



Fig. 5. The midsummer sun begins to rise on the Stonehenge axis before being eclipsed behind the Heel Stone whose shadow enters the monument and reaches the Altar Stone.

position of the Altar Stone using the replica. The latter was constructed from three cardboard boxes especially made for the occasion by a box manufacturer. The boxes were carried into Stonehenge folded, and then unfolded to stand on the Stonehenge axis as near as possible to where the Altar Stone formerly stood. Each box measured 1m by 1m by 0.5 m, and the total height was 3m which is the same as the unavailable Altar Stone.

Midsummer sunrise

Midsummer photographs were taken on 24 June for which the sunrise azimuth is practically the same as for the day of the solstice which is 21 (or 22) June. The difference in azimuth is a mere tenth of a degree of arc, as it also is for 18 June.

When it was erected, it is likely that the Heel Stone stood vertically (Atkinson 1956, Cleal et al. 1995), not leaning as it does now. When upright it stood half a metre higher. Also 4500 years ago, because of subsequent changes in Earth's ecliptic due to the precession of the equinoxes, the sun rose half a degree further towards north than it does now.

Allowances for these changes, as needed for constructive photography, can be made by the observer squatting in the middle of the monument in front of the Altar Stone instead of standing. The top of the Heel Stone is visible above the horizon as the planners intended (Fig. 5). The midsummer sun then rises a little to the north as further intended, i.e. to the left as viewed from the monument (Fig. 5).



Fig. 6. At the moment of sunrise if the sunshine is weak the Heel Stone shadow is feeble too although it still necessarily enters the medial trilithon arch. A few minutes later, as in this example of 18 June, the sun has got brighter and the shadow has strengthened.

When looking in the reverse direction at midsummer, from a standing position alongside the Heel Stone, one can watch the effect of the Heel Stone's shadow as it crosses the landscape in the foreground of the monument. The darkness of the shadow depends on the strength of the shining sun, but the shadow is always there if the sun is not concealed by cloud. On clear-sky days the shadow is very strong. Even on sunrise days in the week of midsummer if the sunshine is weak the author has seen a faint shadow entering the monument. The next figure illustrates (Fig. 6) and the caption helps to explain.

Just after sunrise on 18 June the shadow had entered the monument between stone numbers 1 and 30, but on this occasion the shadow was too weak to show up photographically. Nonetheless, a little later with brighter sunshine—as shown in Fig. 6—the shadow has strengthened while shifting to the right but is still touching Stone 30. This stone is the right hand (western) orthostat of the trilithon arch through which the sun's rays—followed by the Heel Stone shadow—had earlier passed.

By contrast, on the best days, when the sun shines powerfully because the air is clear at the horizon, the Heel Stone's dark shadow plainly penetrates the monument (cf. the example of Fig. 7 for 24 June).

The ill-named Slaughter Stone plays no role in this, neither positively nor negatively. It lies—because deliberately buried in antiquity—half way between the Heel Stone and the stones of the great circles. The stone had been buried by cutting a deep enough trench of appropriate shape in the chalk. The stone had perhaps been used in a test experiment to enhance the Heel Stone's shadow, but following a change of plan (was this a failed experiment?) it was interred so



Fig. 7. On a clear-sky morning in midsummer week the bright sun casts a strong shadow through the medial trilithon arch to the centre of the monument.

as to be out of sight and not interfere with the true throw of the Heel Stone's shadow. The Slaughter Stone is visible today only because of the activities of careless excavators in recent centuries.

Midwinter sunset

In midwinter week the sun sets in the opposite direction to that of midsummer sunrise. Observers *today*, if standing on the Stonehenge axis outside Stonehenge *at the north-east*, can watch and photograph the setting sun as demonstrated by Fig. 8. However, contrast this with Fig. 3 where the replica Altar Stone blocks this view—as did the original Altar Stone when it was upright. From this angle the original sky watchers standing on the axis *could never have seen* the sun setting.

Next, consider people watching from the south-western side outside Stonehenge. The line from the sun to the Altar Stone, as sunset approaches, is wholly blocked by the eastern orthostat (number 55) of the Great Trilithon. Then, a few minutes before sunset the blocking shadow of this orthostat (which has been moving to the right, i.e. eastwards) begins to leave the Altar Stone, allowing the downward-moving sun to shine feebly on no more than a narrow strip of the western side of the rear of the Altar Stone.

Carved face

There is a major image purposefully carved into a trilithon orthostat at Stonehenge. This human face is on the west-

facing *side* of Stone 54 (Fig. 9, Fig. 10). The image is readily visible when shadows are cast if the sun is shining between 1300 and 1430 British Summer Time or 1200 and 1330 GMT wintertime. The fine image is optimum in the summer months when the sun is high in the sky because this emphasises the eyebrows, nose and lips of the face. The carving had been overlooked until first reported by the author (Meaden 1999).

Conclusions

It is shown that the planners and builders of Stonehenge arranged that in midsummer week the light of the rising sun would fall upon the upright Altar Stone—as it still visibly does 4500 years later when a replica Altar Stone is in position. It is also certain that the shadow of the Heel Stone continues to penetrate the monument and reach the Altar Stone because this has been witnessed. The Heel Stone and its shadow are phallic. The passage through trilithons along the Stonehenge axis to arrive at the Altar Stone appears to be vulvar and vaginal.

In the time of the Neolithic and the Bronze Age when successful fertility of grain, beasts and women was paramount for farming societies throughout the Eurasian Continent, it is probable that one feature of a Mother Earth related religion was the idea of episodic mating between Sky Father and Earth Mother. The concept and practice of ritual hierogamy is well known in later historical times for the classical countries of the Mediterranean and the Near East and Middle East (Frazer 1922, Campbell 1974, Eliade 1958). For both Stonehenge and Avebury it appears that



Fig. 8. The setting sun at midwinter when viewed today along the Stonehenge axis from a position alongside the Heel Stone—but in antiquity the partner stone to the surviving orthostat of the great trilithon had not yet fallen, and the Altar Stone was also in the way and still standing.



Fig. 9 and Fig. 10. A true carving of a face on the side of Stone 54 at Stonehenge.

a re-enactment of the Sacred Marriage was arranged as a visual spectacle that could be witnessed by many people, and that it took place at the summer solstice.

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