



10.5281/zenodo.207269

# PHENOMENOLOGY OF SHADOW

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**Received: 29/02/2015**

**Accepted: 01/04/2016**

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## **ABSTRACT**

Experiencing the landscape and skyscape in which for example an astronomically relevant ancient site is located allows for a deep exploration of possible meanings of embedded alignments. In Skyscape Archaeology phenomenology of the landscape is commonly used. Following from this approach and similar to the phenomenology of nature inspired by Goethe, a deep and detailed engagement with a site and standing stones can offer the opportunity to tap into meanings so far overlooked.

The following will illustrate how the experience of shadows cast by and on a standing stone at Gardom's Edge can add to an archaeoastronomical narrative. During the summer solstice the stone seems to lose its shadow or embody it in stone. When looking at anthropological evidence, the shadow can be an essential part of any living being. It becomes clear that a monument with a lost shadow has gained an added dimension of power and liminality; thereby possibly constraining its position within the landscape. Using this example, a more general phenomenology of shadows will be developed that can allow other researchers to find their way into a deeper and richer engagement with a site or monument. Ultimately, it will allow another avenue towards skyscape archaeology.

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**KEYWORDS:** Gardom's Edge, Cultural Astronomy, Skyscapes, Landscapes, Standing Stones.

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## 1. INTRODUCTION

Shadows are fascinating features to observe, watch, and understand. They are intrinsically difficult to depict and model. But their understanding has supported many aspects within astronomy. However, the appeal of shadows goes even further and ventures far into the deeper reaches of our soul. A look at how shadows are defined in the Oxford Dictionary (2016) reveals shadows as “the dark shape that somebody/something’s form makes on a surface, for example on the ground, when they are between the light and the surface” but also “the strong (usually bad) influence of somebody/something”. It can go as far as referring to something non-real when talking about chasing shadows. Additionally, to this duality real versus non-real and scientific versus psychological, shadows are an ideal way to connect the sky above with what is on the ground. They offer an ideal opportunity to explore the conjunction of land and sky through the eyes of an individual shaped by their culture. As such shadows are a way into the skyscape experience.

The skyscape has been defined by Silva (2015 : 3) as a single view of the sky framed by terrestrial objects and the land. Especially the close interconnection between all the components in both Sky and Land in the context of the individual viewing it brings forth a skyscape experience. Such an experience is defined and accessed through the sense of place discovered at the location. Here the place is explored through deep engagement unlocking both temporal dimensions, memories and emotional attachments. Thereby revealing how past and current people shaped and were shaped by the skyscape.

The engagement with the landscape and then the skyscape would have to be prolonged and extensive. It would need to cover in a holistic way many of the phenomena defining the place experience. In this fashion it would offer for the viewer a personal insight and exploration what *being* (in the Heideggerian sense, Harman (2013)) means to them. This close interaction can best be described as a dialogue between someone watching the skyscape and the skyscape itself. What is perceived in one view over a period of time is a multitude of symbols and metaphors that are not presented in a linear manner. The non-instructive way of exploration can best be described with the concept of a dialectic landscape initially put forward by Robert Smithson (1996 : 165) and developed in this context by Daniel Brown (2015). It calls upon the importance of negotiating the constellations of moments (Benjamin, 2009) by yourself and in a manner similar to Walters Bild atlas (Johnson, 2012 : 18).

Shadows can support this deep interaction and lead towards an additional experience of the skyscape. How this can be achieved is outlined for example in Goethe’s ideas with respect to what he termed delicate imperism (Seamon, 1998 : 24). Where a researcher has to engage deeply with a phenomenon and stay within the phenomenon during their explorations. His warning that generalisation would counter what has been explored and detract from the actual phenomenon, leads to the importance of a single site analysis. Large samples of sites and phenomena would be of no use to this approach and yield no usable data.

In the following paper, the phenomenon of Shadow will be outlined in more detail allowing for some categorisation and a more in depth analysis of their meanings. A brief case study of a single standing stone at Gardom’s Edge will outline an application of such a phenomenological exploration in the context of landscape phenomenology. It will then conclude how shadow phenomena offer cultural astronomy a new opportunity towards the skyscape experience.

## 2. SHADOW PHENOMENA

This section will outline how shadows are experienced and lead to some classification. The author would advise to use the description given as a guide for self-exploration. Therefore, a walk during a sunny day past shadows of trees and lamp posts should offer the ideal environment to ponder upon shadow phenomena.

### 2.1 Shadows categorised

Movement while exploring shadows helps noting their features and being immersed in the actual shadow rather than distracted by the surface it is falling upon. During a swift walk it will be noted how shadows seemingly develop a life of their own and interact with other shadows.

Firstly, a shadow of oneself will be noticed. It is clear that it is one’s own shadow, since it is literally attached to the object casting it, as is the shadow of the tree in panel A of figure 1. As outlined by Casati (2007 : 20), in shadow theatres these shadows are referred to as floor shadows.

During your walk it will become clear and easily determinable which shadow belongs to which object by following it to its origin. However, there might be the brief passage of a bird’s shadow in front of yours or an intricate shadow pattern cast half way up a tree trunk (shown in panel B in figure 1 and indicated by an arrow). Turning around we will now struggle to decide which of the several birds might have been casting the shadow or where the branches causing the shadow display are actually located. Such detached shadows, whereby the shadow of the ob-

ject has no contact with the object casting it, are referred to in shadow theatre as vertical shadows.

Noting the rough bark of the trees in panel A figure 1 or texture of a garden brick wall you might have passed will lead you to notice that you were aware of the feel of the surface without actually touching it. It might be purely the colour change that has allowed you to note such structure. But your walk will soon give you ample opportunity to note several more cases where this might not be the case. Again it has been the shadows that allowed you to explore the texture. Here the shadows are cast by the object onto the object itself. Especially noticeable at the edge of illuminated and unilluminated sides of objects.

Overall, we have experienced three categories of shadows: Textures, attached and detached shadows.

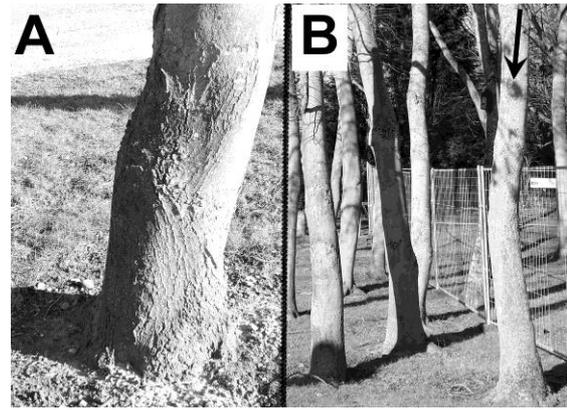


Figure 1. Shadows captured during a walk. Panel A showing both attached floor shadow of a tree as well as shadow textures displaying tree bark structure. Panel B indicates by the arrow a detached shadow from an unknown object.

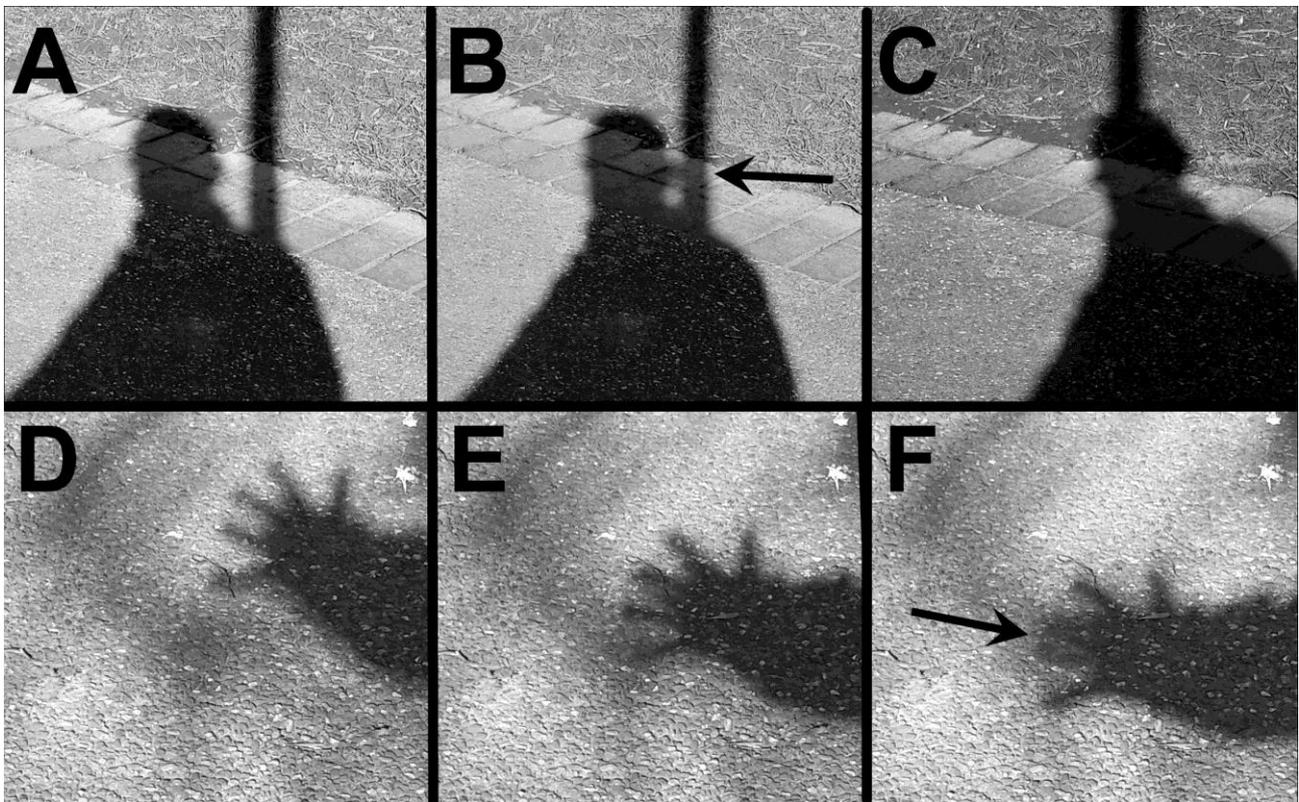


Figure 2. Penumbral shadow phenomena hard to explain using common geometric optics and a point light source. Panel A - C indicate the tendency of penumbral shadows to stick. Note the shadow bridge indicated by the arrow in panel B. Panel D - F display how the shadow of a hand moving through structured tree branch shadows leads to distortions and apparent movement of both hand and branches not carried out by the actual objects. Both upper and lower panels display perceived power of shadows and their seemingly material character.

But all shadows especially attached and detached illustrate that shadows are not sharply defined, but can be separated into shadow zones.

Your attached shadow will be much more blurred around your head than at your feet. Note the blurred shadow borders in panel A-C in figure 2 around the head. The blurred region is referred to as halfshadow or penumbra, opposed to the full shadow or um-

bra. The presence of penumbra is a result of the finite size of the light source. Only point sources, for example halogen light bulbs, cast well defined shadows. All other natural sources such as the Sun, Moon and even fire result in penumbra.

Especially the movement will have allowed you to note the clear presence of the penumbra but as soon as your shadow passes into the trees or a lamppost

(see panel A-C in figure 2) you notice a stretching of the shadow attaching itself a bit longer to the lamp-post (panel B in figure 2 indicates this by an arrow). You might also note jumping, merging and snapping of your shadow with branches as you pass through the trees (shown in panel D-F in figure 2 through the movement of a hand). An effect clearly noted in the penumbra structure.

Here the exploration can now go further in focusing upon the edges of the penumbra while walking. Soon the surface will blur and average out unevenities. The penumbra will now seemingly be enclosed by a brighter and darker edge on the lighter and darker side. Astonished one might stand still and the effect becomes harder to detect. Picking up the pace again it becomes repeatable. What we have seen can be explained as the eye's ability to carry out edge enhancement illustrating again that shadow casting and shadow watching reveal far more complex effects than can be explained by basic geometric optics. Although the effects can all be explained using physiology and properties of extended light sources, the experience is still one of wonder and feeling of shadows having a life of their own.

## 2.2 Shadows and beyond

Especially walking through the shadows of branches and noting the passage of one's shadow through the network of shadows shows how the shadow does indeed interact with other shadows. It appears that our shadow needs to pick its path through the branches moving them to one side and avoiding others. The impression here is of a shadow having real substance.

Therefore, shadows open up the realm of deeper meaning and metaphors throughout our and other cultures. Or as Casati (2007 : 29) puts it:

"Shadows seem to inhabit a part of the mind that opens onto the objects department - shadows are physical things - and also opens onto the psychic department - shadows are images of the soul. In reflecting upon the strange behaviour of shadows, both departments are put to work. This duplicity is probably where we can find the cognitive explanation to the rich metaphors and stories about shadows."

Shadow stories are known to all of us. We have Peter Schlemihl (Wiese, 1956) selling his shadow to the devil, Vampire's shadow moving as if detached from the vampire itself, for example in *Nosferatu* and Bram Stokers *Dracula* (Stoker, 1897). But most commonly known is how Peter Pan loses his shadow and claims it back. But these are all western European stories based on rather modern cultures.

Lawrence E. Sullivan (1988) describes how the Baniwa people, south American Indians from the

Amazon region, project their souls as shadows. Shadows are a spiritual dimension of the material human. But also spirits are seen to project material shadows. Especially their shaman use shadows and reflections to undergo deep self-reflection during their apprenticeship. As a result, the shaman does not possess an ordinary shadow, but has a celestial spirit that casts no shadow. It can be interpreted that one's projection or likeness in time is cast upon another reality or that the essence of a human can be explored when noting one is the shadow cast by the sacred. This deep phenomenological engagement is summarised by Lawrence E Sullivan (1988 : 261) as

"The existence of the shadow-soul, then guarantees individuals a direct connection to the world of fully manifest light - the omniscient, omnipresent, and omnipotent mode of being that humans experience in their inner being as a dark absence constitutive of their own soul"

So shadows can either be the representation of the negative of one character or they can represent a powerful way to explore what it means to *be* in a Heideggerian (Harman, 2013) way. They also can be seen as the location of a soul. Overall they are powerful phenomena that connect the sky and the land through what inhabits the land, for example trees, stones, animals and humans.

Even in terms of our everyday life shadows are part of structuring everyone's life through one of the largest shadows we can explore on Earth: Day and Night. But also in the context of archaeoastronomy and so called horizon astronomy, heliacal rising is of interest or in general rising and setting occurrences. All of these can be seen as interactions of celestial actors with a shadow, obscuring and revealing them.

## 3. CASE STUDY: GARDOM'S EDGE

To illustrate how shadow phenomena can be included in a narrative of archaeoastronomical interest the case of a standing stone at Gardom's Edge in the Peak District, England, will be briefly outlined.

Gardom's Edge is a high plateau with a clearly visible gritstone scarp above the river Derwent valley. The plateau itself is rich in early human activity including Mesolithic stone tools, rock art, Neolithic enclosure, and Bronze Age field systems. A detailed overview of the Gardom's Edge archaeological landscape is given in Barnatt (2002). The standing stone is unique since such examples of singular monoliths are rarely found in this area of the Peak District and there are no other counterparts at Gardom's Edge. The shape of the stone depicted in figure 3 is triangular including a sloped flat north facing side and shows overall signs of considerable erosion indicating an age of several millennia in its upright position (Brown et al, 2015). The base of the

stone shows clear sign of being supported by packing stones indicating an intentional erection. A relative date for erection can only be estimated and to have been contemporary with the creation of the rock art and Neolithic enclosure found in close proximity. Their age can be approximated to about 2,000 BC. A detailed survey has taken place at Gardom's Edge covering especially the enclosure, rock art and signs of settlements (Barnatt et al, 2002). However, the standing stone was excluded from excavations given the concerns about its stability, showing some slight lean towards the West. Furthermore, no results regarding dateable material has been published as of yet. Until the work carried out by the author, no astronomical explanation for the erection of the standing stone was put forward.

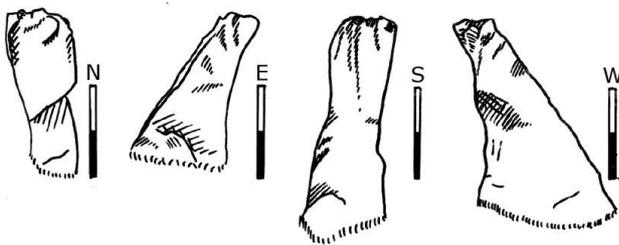


Figure 3. Cross-sections sketched of the standing stone at Gardom's Edge. Each panel indicates a 1m scale as well as the direction when viewing the stone. Note the unusual triangular shape.

### 3.1 Special Features

Sims put forward a frame work under which archaeoastronomy and cultural astronomy can ensure their validity and strengthen their methodology (Sims, 2015 : 255). This includes attempting to explain so called special features if not covered through other narratives and testing the theory explaining them. Such a special feature is the triangular shape, described as strange and impressive (Harris, 2005 : 56) offering different views on cross-sections depending on the view point (figure 3). Usually standing stones are upright and either tall and slender pillars or wide and thin diamonds especially well illustrated at Avebury (Keiller & Piggott 1936). However, at Gardom's Edge the stone is neither and the slope does not result from a leaning initially upright position. The shape seems to have been specifically chosen for its smooth, flat and sloping side with the other sides being vertical in its current position. Previous interpretations generally described this as a marker stone for rituals and its shape might have been not important or indicate a somehow special direction given its leaning appearance (Harris, 2005 : 56). No further explanation or interpretation was given.

The author undertook a detailed survey of both orientation and shape of the rock itself (Brown et al,

2015) and has concluded that the stone was erected in a very precise way with the slope of the north facing side oriented to within 2 degrees in a North-South direction, sloping up towards South. Furthermore, the angle between the slope and the horizontal is on average  $58 \pm 3$  degrees. Both these characteristics allow for an astronomical interpretation when realizing that the maximum altitude the Sun can achieve over the entire year at this geographic location is 60 degrees altitude due South for the approximated date of 2,000 BC.

Therefore the author has described an impressive light and shadow display taking place over the year at this standing stone, during which the north facing side encounters varying amount of illumination: During the winter-half of the year this side remains in shadow, from the equinox until just before the summer solstice it will be illuminated only during periods in the morning and evening leaving it in shadow during midday, and around the time of the summer solstice the side will remain always illuminated by the Sun throughout the entire day. This period of total illumination is limited to a precise period at the summer solstice and could not have been achieved through any other alignment of the stone.

Additional work being carried out by the author is illustrating that the special shape of the stone points towards its location to have been chosen intentionally as well. The shape of the standing stone can be described in geological terms as rather angular and 2.2 m tall above ground. The entire area of Gardom's edge is littered with boulders and a survey of a 500 square meter area close to the stone showed that large boulders of this size are rare but not unusual, especially bearing in mind that human activity would have reduced their occurrence. However, when including the angularity of the boulders it becomes clear that large boulders are predominantly more rounded. The people erecting the standing stones could have well-chosen a large boulder but this would have been inadequate in shape for their intentions and required reshaping. Larger angular stones can be found closer to the edges of the plateau some 200 meters to the West or 600 meters to the East which could have easily been erected where they were found (see figure 4). But a stone seems to have been chosen at the edges of the plateau and then transported a short distance to its current position. This indicates a clear intention not only of the choice of shape, which can be astronomically motivated, but also its intended location.

### 3.2 Landscape phenomenology

The impressions gathered while walking in a landscape are key to analyzing and feeling your way

into a landscape. The explored properties including for example intervisibility of monuments and natural features are part of what has been described as Landscape Phenomenology. The author has chosen this approach to address the issue of the intentional location of the standing stone. Findings are summarised in figure 4 and described in the following.

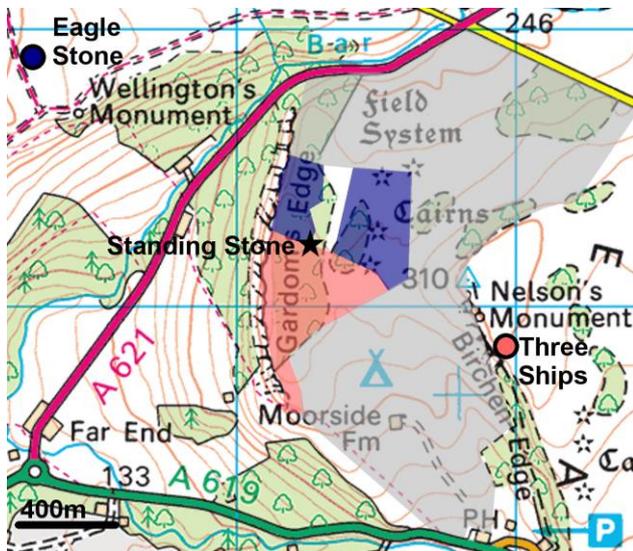


Figure 4. An OS map of the landscape surrounding Gardom's Edge. The location of the standing stone is indicated by a star. Both Eagle Stone and the Three Ships are marked by circles filled either in blue or pink. The shaded pink area indicates where the Three Ships can be viewed from. The shaded blue area indicates where the Eagle Stone can be seen. A grey shaded area indicates so far unsurveyed regions. Note that the standing stone is located in a region where neither Three Ships nor Eagle Stone are visible. But instead of placing it in the centre of this area, a liminal location has been selected close to a viewing junction of both Three Ships and Eagle Stone.

During several months working at Gardom's Edge and walking up to the plateau it became evident that a set of rock formation on Birchen Edge overlooking Gardom's Edge were not only striking, but also varied in visibility. The entire profile of Birchen Edge is smooth apart from the rock features which have already been previously identified as imposing and impressive. In the past they were named the Three Ships (indicated in figure 4 by a pink filled dot) to commemorate the battle of Trafalgar and the names of Nelson's leading battle ships engraved onto their sides. Additionally, a very large rock formation known as the Eagle Stone (indicated in figure 4 by a blue filled dot) can be seen on the opposite plateau when standing at the edge of Gardom's Edge. The large rock, probably regarded as a sacred site by ancient people (Barnatt, 1978 : 67), is in close proximity to a ring cairn and a cairnfield. The Eagle Stone's visibility becomes less prominent

when moving towards the standing stone and Birchen Edge.

The author has carried out a detailed GPS supported visibility study surrounding the region of the standing stone (regions yet to be covered are marked in grey in figure 4) and has concluded that the location of the standing stone is at an interesting visibility interface or liminal space (note the location being at a junction of visibility in figure 4). It lies just North of an area from which the Three Ships can be observed and also lies just East of the area from which the Eagle Stone can be viewed. The location of the standing stone could therefore have been chosen with regard to the liminal visibility experience of these two natural monuments: Curiously folklore claims that the Eagle Stone (thought to be named after Aigle a Celtic god (Firth, 1908 : 324)) when climbed would have proven your fitness for marriage (although widely stated no source of this could be located). Such a possible link to strength and fertility could be a powerful narrative when combined with an astronomical interpretation. Other folklore lists it as a cock crow stone, revolving when the cock crows in the morning (Addy, 1895 : 56). No folklore regarding the Three Ships is recorded to the author's knowledge.

### 3.2 Shadow Interpretation

To explore a shadow inspired narrative in addition to the phenomenon recorded on site, a three dimensional computer model of the shadow play observed on the standing stone was developed by the author including the eroded surface of the stone itself, its orientation, and the position of the Sun at 2,000 BC. The data supported the findings of previous surveys outlining the full illumination occurring only around the summer solstice. It further showed that the Sun might only just be able to illuminate the north facing side at that time, being located exactly in the plane defined by this side. Combined with an ability to actually see the full shadow of the stone and its changes during a day led to a further interpretation of its alignment: As the stone only just has its north facing side illuminated, it will be its own shadow and not cast any shadow at all.

This was a vital turn in reinterpreting the standing stone. In clearer words, during the summer solstice the stone seems to lose its shadow or embody it in stone. The stone has no shadow and one might be reminded of the shaman of the Baniwa people. The stone not casting a shadow makes it home to a celestial spirit. Although, this initially seems to be drawn out of context their reaction to shadows might be very similar to people that erected this standing stone and chose the location, and fall in line to the reader's previous shadow explorations.

The wider landscape around the standing stone is structured by the visibility of the Eagle Stone and the Three Ships, both can be seen as Genii Loci (Norberg-Schulz, 1980) of the place they define. However, as outlined above, the standing stone is located not only anywhere within the non-place without Genii Loci (the non-shaded area in figure 4 at the centre), but in a liminal place, a junction where both of these natural monuments just cannot be seen. Therefore, this location is ideal to locate a new Genii Loci for the non-place using the described shadow phenomena.

#### 4. SUMMARY

The phenomenon of Shadow has been used to explore skylscapes and how a deep engagement with skylscapes is required to gain a better understanding of meaning expressed in archaeoastronomical sites of interest.

As such shadows illustrate the combination of sky, land and people in a manner that should be explored similar to Goethe's delicate empiricism (Seamon, 1998), while remaining within the phenomena exploring and understanding it. A walk during a sunny day was used to categorise shadows in an experiential way and also reveal their deep duality and richness in metaphors justifying their use as symbols of power. Their full appreciation while remaining in the phenomenon leads to self-exploration and a deeper place experience. This approach resembles another way into skylscapes echoing the Baiwan Shaman's path to self-knowledge.

#### ACKNOWLEDGEMENTS

DB would like to thank SST NTU as well as the Royal Astronomical Society for their financial support.

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Having outlined shadow phenomena and their power, the case study of the Gardom's Edge standing stone was used to illustrate how a site that initially might be explained using an archaeoastronomical approach, can far better be explained using shadow phenomena. Especially here the intentional creation of a shadowless stone in a liminal location, becoming a Genii Loci of a non-place. This does not weaken the archaeoastronomical approach used to explore the site. It however ensures that the standing stone was used as a marker for a summer solstice time not by tilting and possible shaping the stone in a correct manner, achieving desired angles. This might have been achieved in a manner of ways, for example using approaches similar to a gnomon. But rather, the shadow phenomena were used to empower the stone, revealing its meaning during the time of the summer solstice. Possibly a subtle difference, but important as it successfully removes it from our scientific approach to a phenomenological holistic viewpoint possibly more in tune with the people erecting the stone 2,000 BC.

Most importantly, the author would like to stress that his insight could only have been gathered through prolonged watching and remaining within the phenomenon. Just the isolated measurement of angles and alignments alone should not be taken as the definitive way to explore a site. Skyscape needs to be explored through watching and shadows offer an interesting way in entering skylscapes that offer many interesting features for archaeoastronomy and cultural astronomy.

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