



DOI: 10.5281/zenodo.1478024

## STONE ROWS OF THE PRESELI HILLS

David A. Fisher, Ph.D.

*Independent Researcher*

Received: 02/02/2018

Accepted: 04/06/2018

*\*Corresponding author: (docfishers@gmail.com)*

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### ABSTRACT

It has been proven that many of the rhyolite and dolerite bluestones that reside within the Sarsen circle of Stonehenge originate from the Preseli Hills of Wales (Bevins, Ixer; 2013, 2014). Yet, no evidence can be found that the rows of stones that are circumjacent to the Preseli Hills have ever been investigated to determine if any orientations to features within the Hills exists, or, whether they may possess any astronomical orientation as occurs with Scottish stone rows (Thom, 1967; Fisher, 2013). References to these sites, are few (Burl, 1993; Williams, 1988) and information is somewhat anecdotal. To expand the knowledge base, five sites, each comprising of a pair of stones, were investigated by means of site visits and 3-dimensional computerisation in order to envisage any potential orientations, to either the Hills themselves or celestial events, during the period of the suspected construction of the Mid-Neolithic to early Bronze age time frame. The resultant investigation determined that not only do the sites have potential orientations toward the lunar minor and major limits, but concur with the concept of duality as proposed by Sims (2016).

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**KEYWORDS:** megalith, lunar limits, solar, orientation, Solstice, standstill

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## 1. INTRODUCTION

This research is part of an ongoing investigation into the lesser investigated Neolithic stone monuments of the British Isles; in particular the monuments comprising of 2 or 3 megaliths considered to be stone rows. Earlier research work investigated sites within the Argyll area of Scotland opening a completely new perspective on how the stones were used to view the phenomena of the rising and setting of the Sun and Moon by the Neolithic people who constructed the sites (Fisher 2013).

The stone rows under this investigation are those that surround the Preseli Hills of Wales, the hills that have been proven to be the source of dolerite and rhyolite stones situated within the Stonehenge monument. The specific sites investigated are: 1) Tafarn-y-Bwlch (aka Tre-Bwlch), 2) Penparke (aka Penlan Stones) to the north east of the hills, 3) Cwm Gawr (aka Cerrig Meibion Arthur) to the South, and 4) Dolau Maen (aka Waun Lwyd) with 5) Gors Fawr (aka Mynachlog-Ddu) to the south east, see Figure 1. There is a paucity of information regarding Welsh

stone rows (Anthony, 1973; Barber, 1982; 1986; Barber & Williams, 1989; Houlder, 1974; Houlder, Manig, 1966). Burl's (1993) descriptive catalogue was the source to identify the stone rows and verification was made against the RCAHMW (2016) online database.

Earlier reviews of Welsh sites, with two exceptions, a site known as Harold's Stone (Burl, p188) and Gors Fawr (Thom, p 101), have no mention or consideration of celestial association. Branwell (1875) describes most stones as menhirs, stones of reverence or foci for gatherings. George Williams (1988) mentions the varying shapes of the Welsh stones but provides no specific description of the shapes. Lewis (1966, p9) does note that amongst stone pairs a characteristic dimorphism occurs, one stone being larger and square topped, the other being slighter and often tapered. Lynch (2000, p110) does mention the bluestone of the Preseli Hills but only in the context of polished axe heads. As a result, this investigation applies a fresh perspective as to whether celestial orientations exist or do not exist.

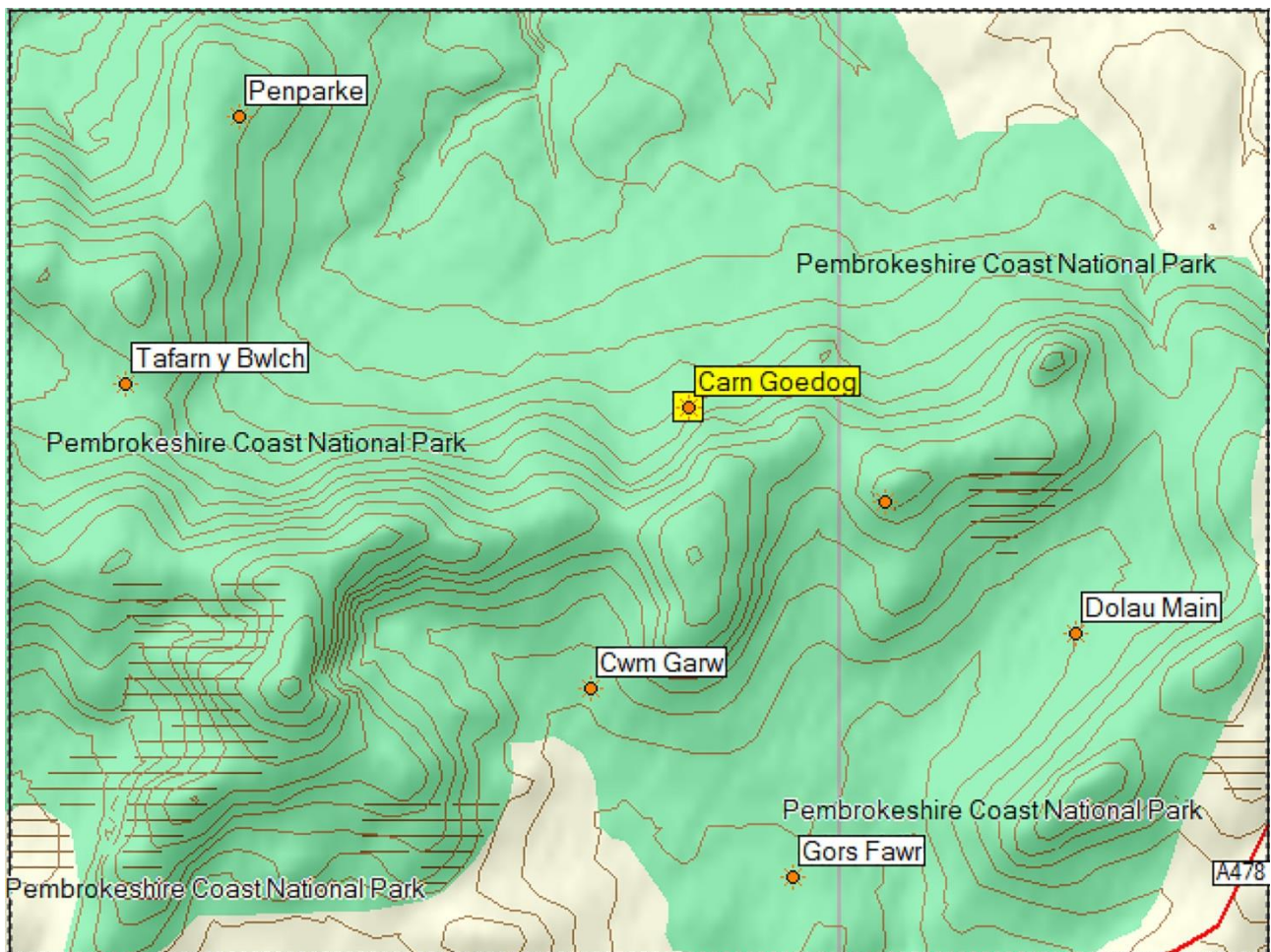


Figure 1. Location of Sites Surrounding the Preseli Hills

## 2. RESEARCH METHOD EMPLOYED

Each site listed above was visited and the physical dimensions, averaged GPS location readings, true bearings of each face and photographs of all faces of the stones were taken. The data collected was then utilised in the construction of 3 dimensional models of each stone. Ordnance Survey of Great Britain DTM tiles of the Preseli Hills and surrounding areas were converted into a 3 dimensional topography. Each stone model was then incorporated into 3-D landscape to their correct GPS location and set to their correct bearings at their respective locations. The completed site models were then interrogated for the days upon which the rising or setting of lunar minor and major limits (incorrectly termed a lunar standstill, see Fisher,2017) occurred in order to determine whether or not an orientation between, a bearing of a face of the stone or perpendicular to a face (i.e. viewing across the stone not along a face) and the Moon, as the Moon attained the horizon. A value of within  $\pm 1$  degree was considered to be of sufficient accuracy. The same approach was employed for the Sun, as to whether an orientation to a solstice or equinox is indicated by the stones. This interrogation was conducted via personally developed celestial software set to an arbitrary date of 2200 BCE. No subjective horizon point was chosen only the objective approach of testing the bearing of each stone face in possible association with a solar or lunar event at the horizon.

The plot plans within the figures that follow contain abbreviations for the orientations disclosed by the simulations, and two values for the bearings of an orientation. The first value is the simulation computed bearing, the second is the bearing measured on site. With regards to the abbreviations, the centre

letters are 'S', 'M' and 'm' which indicate solstice, major and minor respectively.

## 3. INTERROGATION RESULTS

All but one site have the surrounding horizon varying in height in all directions, therefore it was not anticipated that if there were any solar or lunar orientations that complimentary opposites (e.g. solstice rising and setting) would be forthcoming. An initial review of the data gathered for the sites was conducted and one feature appeared to be consistent. Each site, with the exception of Cwm Gawr, contained one stone that was triangular in shape that has two faces meeting at an acute angle rather than within  $\pm 10$  degrees of a right angle. This will be evident in the site plots shown below in the individual site results that follow.

### 3.1. Tafarn-Y-Bwlch Pillar Stones,

*N 51° 58' 5.4 " W 4° 47' 35.9"*

These two stones are heavily leaning toward the northwest and the buildup of peat over the centuries around the stones has probably been worn away by the sheep that roam the hills. The peat to the southeast side of the stones helps retain the stones in a somewhat upright position. As can be seen in Figure 2 an attempt appears to have been made to prevent further erosion of the peat and the possibility of the stones falling over by the placement of boulders at their base.

Within the simulation model the stones were set upright, but no change in orientation was made. Two potential orientations were extracted from the modeling, specifically the rising and setting of the Moon at its northern minor limit. No solar or specific horizon features were made evident.



Figure 2a Tafarn Y Bwlch Stones

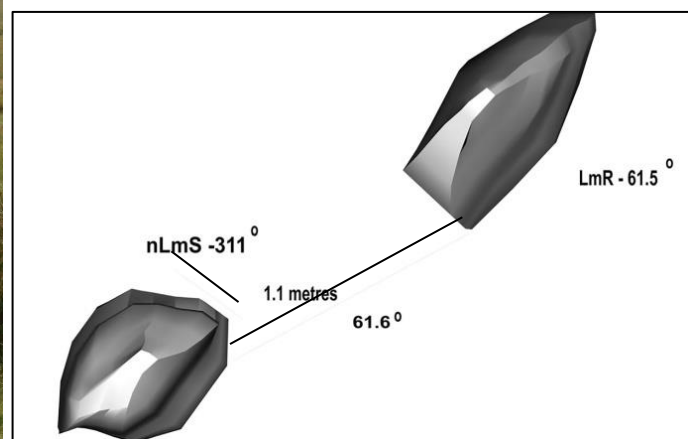


Figure 2b Tafarn Y Bwlch Plan

### 3.2. Gors Fawr

$N 51^{\circ} 55' 56.9'' W 4^{\circ} 42' 46''$

Gors Fawr is one of two sites examined which are in close proximity to a stone circle and situated within marshy wetlands. The stone circle is approximately 20 metres in diameter with most stones no taller than knee height. As mentioned in the introduction Thom (1967, p101) considered an orientation to the

Sun, but makes no specific statement as to which stone or which solar event. Burl (1993, p188) expands the discussion on orientation stating that an initial consideration was given to a midwinter sunset and a midsummer sunrise, but this was revised after horizon altitudes were reflected upon to an orientation toward a November Samhain sunset.



Figure 3a Gors Fawr Stones

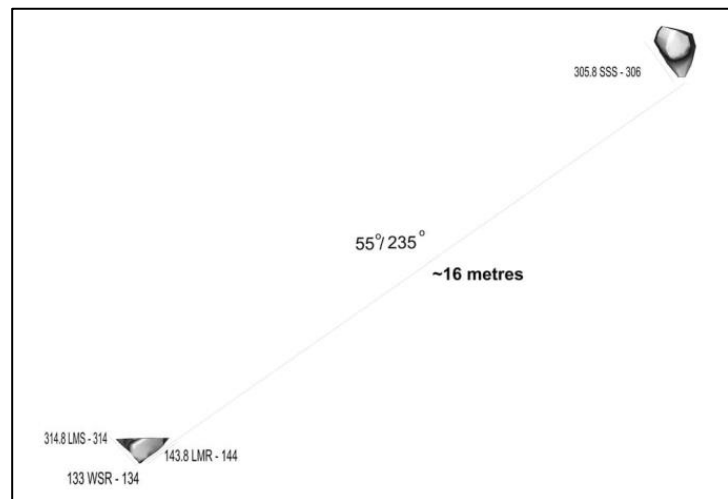


Figure 3b Gors Fawr Plan

The pronounced triangular stone, as shown in Figure 3a, during the simulations suggests multiple orientations, both a northern major limit rise and a northern major limit setting of the Moon (Figure 3b). It is interesting that due to the variable horizon that the southwest face of this triangular stone has both a major lunar setting and a solar orientation to the winter solstice sunrise of  $134^{\circ}$ . With the more northern stone only suggestive of a single solar orientation to the setting summer solstice Sun. This is the only site of the 5 investigated that is suggestive of any solar orientation.

### 3.3. PenParke (PenLan)

$N 51^{\circ} 59' 12.5'' W 4^{\circ} 46' 43.6''$

These stones are situated to the north west of the Preseli Hills and positioned to the east of the brow of

a hill, which obscures any view of the wide open view of the Cardigan Bay's watery horizon to the west. A stony outcrop is situated toward the north. Here again is a triangular stone with the potential of multiple orientations. This triangular stone is the one exception where the horizon altitudes permit a complimentary orientation toward the southern minor rise and the northern minor setting of the Moon, as well as an orientation toward the major limit to the lunar setting. The stone to the northeast has 2 faces with orientations, the northwest face toward the northern minor moon setting and the southeast face with an orientation toward the southern minor lunar rise. Again the emphasis is on the minor limits of the moon not the major limits.



Figure 4a PenParke Stones

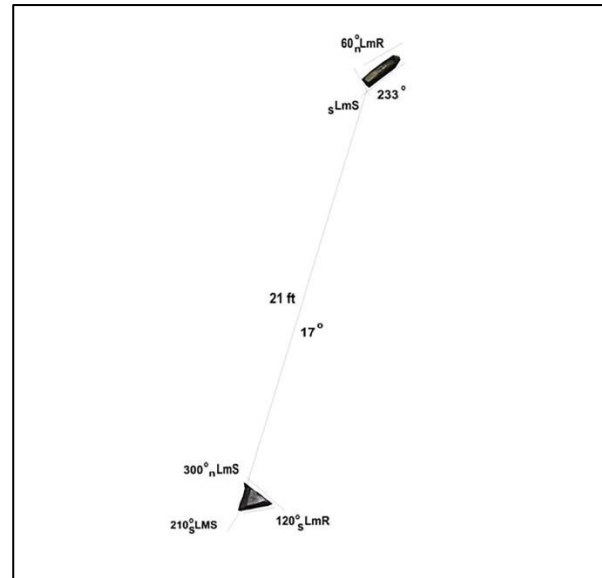


Figure 4b PenParke Plan

3.4. Cwm Gawr

$N 5^{\circ} 156' 43.6'' W 4^{\circ} 44' 17.5''$

This is the second site situated within marshy wetlands and in close proximity to a stone circle, the circle itself being approximately 8 metres in diameter and the stones within the circle similar in size to those at Gors Fawr; in this instance the circle is situated next to a brook. The stones at this site are aligned east west, both to each other and with regards to their individual geographic orientation. First thoughts are to equinoctial events but with an inclination to the horizon varying from +2 degrees in

the east to over +3 degrees to the west, any orientation toward the horizon at either 90 or 270 degrees could not be demonstrated by the simulation. The orientations could not equate to the Sun's position on the day of a vernal or autumnal equinox.

This site also differed from the other four under investigation, as both stones were rectangular in shape; neither stone possesses an edge that approaches an acute angle.



Figure 5a Cwm Gawr Stones

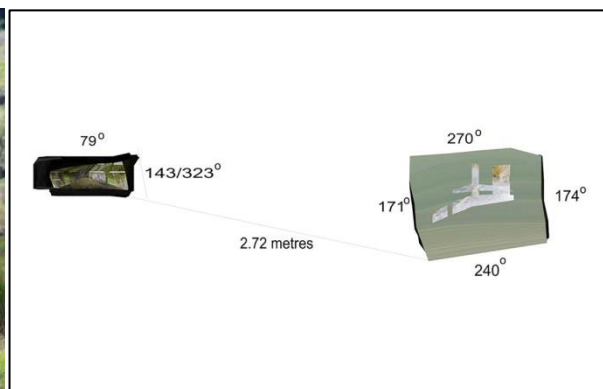


Figure 5b Cwm Gawr Plan

No orientations could be associated with this site.

3.5. Dolau Maen,

$N 51^{\circ} 56' 56.3'' W 4^{\circ} 40' 50.9''$

Dolau Maen is situated to the south east of the Preseli Hills almost diametrically opposite Tafarn y

Bwlch. This arrangement of stones contains orientations that emphasise the major rising and setting of the Moon with only the southern minor setting of the Moon being suggested by the southern stone.



Figure 6a Dolau Maen

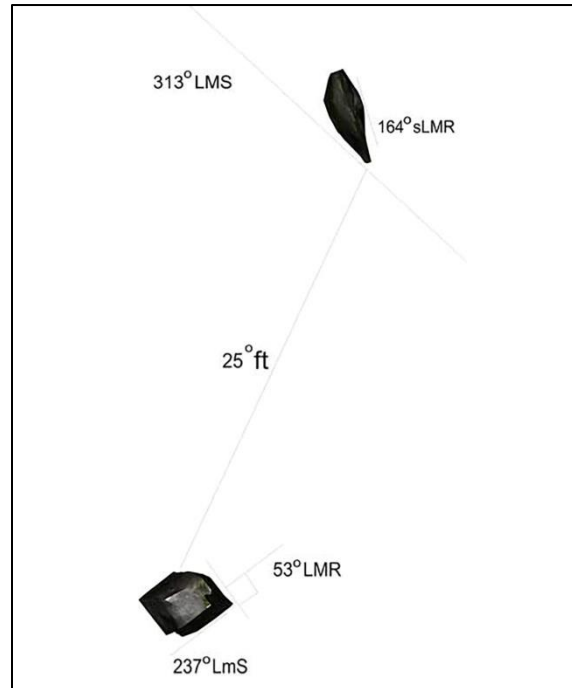


Figure 6b Dolau Maen

There is one aspect of this stone arrangement worthy of mention. The northernmost stone has a face indicating the setting point of the Moon at its northern major limit. Over the hill beyond this setting point is the quarry at Carn Goedog (highlighted in yellow in Figure 1) which has been identified (Bevin, 2014) as a major source of dolerite bluestones at Stonehenge (see Figure 7).

#### 4. SUMMARY

If Gors Fawr demonstrated only 1 orientation toward the Sun then this could be considered coincidental, but with 2 demonstrable orientations by two individual stones then a more deliberate intent may be concluded. Unlike the previous research (Fisher, 2013) no horizon feature such as the top of a hillock out of which a Sun rise or set was associated, nor a notch between two hills into which the Moon would set, could be simulated.

Six orientations to the major lunar limits are informative but seven orientations toward the minor lunar limits across 3 sites is a revelation and quite enlightening. It is the almost isosceles triangular shaped stones at PenParke and Gors Fawr that pro-

vide these primary orientations to the minor limits which suggests deliberate shaping and not serendipitous selection. The sites to the south and east of the Preseli Hills, Gors Fawr and Dolau Maen, show a preference to the major lunar rising and setting; whereas, those to the west, northwest, PenParke and Tafarn-Y-Bwlch, have a prevalence toward the minor rising and setting of the Moon.

If we consider that it is these triangular shaped stones at PenParke and Gors Fawr that provide the opposites in orientations and that those triangular stones reside on opposing sides of the Preseli Hills then this leads to two hypotheses. The first being, that the community across the region was connected and the second being that of duality. Duality as described in Sims (2018, in press) where "each monument horizon is paired with another monument's matching but reversed horizon, so horizon alignments are also combined asymmetrically with their reverse equivalent in paired monuments whose design categories overlap each other." Thus this research appears to concur with Sims' postulations.

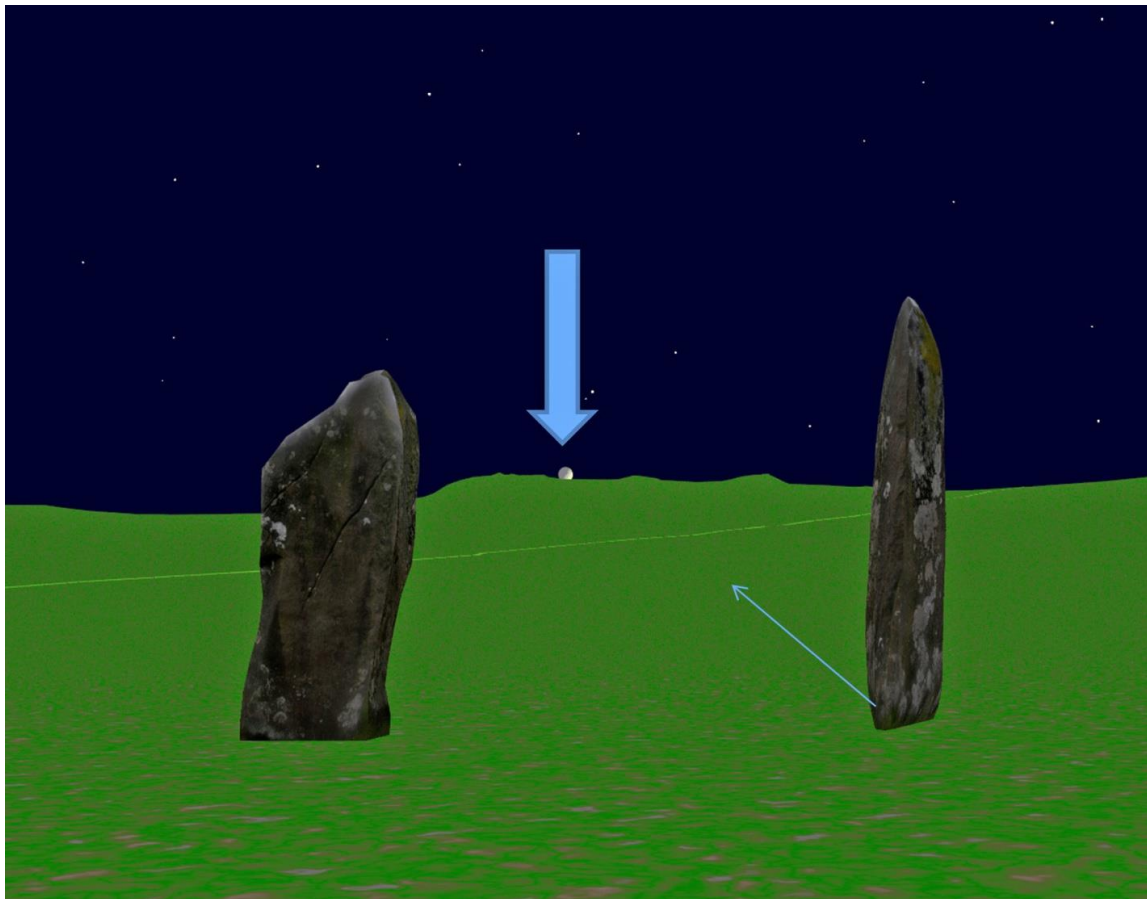


Figure 7 Lunar Major Setting at Dolau Maen

Table 1. Results Summary.

Site	Lunar								Solar			
	nMjrR	nMjrS	sMjrR	SMjrS	nMnrR	nMnrS	sMnrR	sMnrS	SSrise	SSset	WSrise	WSset
Gors Fawr	X	X	-	-	-	-	-	-	-	X	X	-
Dolau Maen	X	X	X	-	-	X	-	-	-	-	-	-
PenLan	-	-	-	X	X	X	X	X	-	-	-	-
Tafarn Bylch	-	-	-	-	X	X	-	-	-	-	-	-
Cwm Gawr	-	-	-	-	-	-	-	-	-	-	-	-

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