WATCHING THE SUN

How the Ancients Connected with the Sun in Cornwall

Editors: Carolyn Kennett (FRAS) and Cheryl Straffon (AKC)

Carolyn Kennett . Calum MacIntosh . Caeia March . Cheryl Straffon
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Watching the Sun a Mayes Creative Project

We are very excited to have collaborated with Cheryl Straffon and Meyn Mamvro to bring together over 30 years of solar inspired articles for you to read. We are sure there is something new here to inspire you to get out into the landscape and explore what is a most wonderful collection of ancient sites on our doorstep. As you will discover, the sites in Cornwall with solar links range from the Neolithic to the Iron Age and it is astounding to think that people have have followed the motion of the Sun for over 4000 years.

The initial intention had been to launch this with a talk and a hard copy booklet, but because of the challenges involved around Covid-19 we are now delighted to bring this to you as a free download in PDF format; we will then launch the physical booklet later in the year, with a joint talk held in Cornwall with Carolyn Kennett and Cheryl Straffon.

This is just a small part of our Watching the Sun project. We are currently working with a diverse range of artists, musicians, scientists, heritage experts and the Royal Astronomical Society in London. We also are working locally with a number of schools and hard to reach community groups to help share a little sunshine.

Watching the Sun is a project run by Mayes Creative, celebrating the rich heritage Cornwall and the Isles of Scilly have with solar astronomy. Delving into the past, this project will look at everything from ancient links to the Sun, medieval manuscripts of eclipses drawn in Bodmin, to the discovery of the solar cycle and what the beginnings of our most recent solar cycle 25 means for cosmic ray detection.

As always, a huge thankyou to our funders and supporters, especially National Lottery players who have provided much of the funding of this project through Heritage lottery Fund and Arts Council England. Thanks also to Feast and Cornwall Council for additional funding support.

If you would like to know more about our activities, please follow us on Twitter, Instagram or Facebook – you can find us at @mayescreative or via our website at www.mayescreative.com

Dr Joanna Mayes and Carolyn Kennett (FRAS)

Mayes Creative

Meyn Mamvro

Meyn Mamvro (‘Stones of our Motherland’), the magazine of ancient stones and sacred sites in Cornwall, started publication in 1986, and from the very beginning, one of its interests was the relationship of the Neolithic, Bronze Age and Iron Age sites to the cycles of Sun and Moon. This interest is known as archaeo-astronomy or astro-archaeology, and over the years it has become a more mainstream part of archaeology, as well as a topic of interest for those “amateur” researchers who would like to gain a greater insight into the minds and spiritual practices of the people who built the megalithic sites, an area of research sometimes known as “earth mysteries” or “earth energies”.

As founder and editor of Meyn Mamvro, I have always tried to provide a balance of different ideas, theories and approaches to the ancient sites, but one of my own personal interests has been about the societies who constructed the monuments, many of which we can still see about us in the landscape of Cornwall. I have been fortunate in that my interest seems to be shared by many others: indeed, the first article in this booklet is by Ian Cooke from issue no.2 in 1987 about his theories of the orientation of Iron Age fogous (underground chambers) to the rising and setting Sun. Other articles were to follow, by myself and others, about how the prehistoric peoples seemed to perform ceremonies around the 'Wheel of the Year' in celebration of the Sun's cyclical changes and its effect on the people of the societies or tribes. We do not know precisely what they believed or what they did in their ceremonies, but enough hints remain in the folklore of this country for us to make reasonable guesses of how the Sun was so important in their lives.

The total eclipse of the Sun in August 1999 in Cornwall was a rare event that provided the opportunity for a number of articles on the topic, some of which are reproduced in this booklet. Some other celestial phenomena linked to the Sun are explored in another contribution, together with personal experiences at a dolmen site at the Winter Solstice sunset, and, finally, some exciting new research at a stone circle in West Penwith by archaeo-astronomer Carolyn Kennett. I am delighted that all these articles, many of which relate to each other and give different perspectives on the solar year, have now been brought together in this booklet, and I hope that the ideas and research, together with the beautiful photographs, will provide a great deal of interest in our prehistoric past and the people who built the ancient sites, with their own particular love for, and interest in, the Sun.

With best wishes

Cheryl Straffon (AKC)

Meyn Mamvro Editor  www.meynmamvro.co.uk
Mother and Sun – the Cornish Fogou

By Ian Cooke  From Meyn Mamvro no.2 (1987)

Probably the most intriguing aspect of the Cornish fogou, and the one which continues to provoke the liveliest debates, is to what possible use these strange man-made ‘caves’ could have been put. There are several features built into the structure of fogous, which are very difficult to explain outside of some kind of ceremonial purpose: the tiny restrictive ‘creep’ doorways and passages leading into much larger tunnels and chambers; the obvious degree of permanence intended for the structure when compared with the relatively flimsy dwellings of the inhabitants; and the most odd features of all – the curvature and orientation of the main passageway.

This curved passage, which can vary from the almost straight to a right-angled bend, is the distinguishing feature of the fogou, whether completely underground or at ground level; and out of eleven sites for which there are sufficient visible remains or detailed old plans, all but three (Pendeen, Porthmeor and the ruinous site at Lower Boscaswell) have their passage curved from the north-east to the south-west, and this will bend to the right when viewed from the southern end. These two peculiarities I think give the clue to its original primary function, and make no sense if the fogou had been intended as a “village cold-store” or hide-out, two uses still often applied to them.

As most ancient stone structures have some kind of built-in link with the Sun or Moon, I was determined to find out whether the north-eastern end of the passages had a definite relationship with the rising midsummer Sun. When worked out at home they certainly seemed to, but I wanted to check it out ‘on site’. I decided to test my theory by going to a fogou at dawn around the time of the summer solstice, and chose Carn Euny, since the end of the original covered passage (before the extension into the adjacent courtyard house about the 1st century BCE) was both open to the sky and had its side walling intact. Only a low wall and a few small bushes obscured parts of the skyline.

The chosen morning was completely clear of any cloud but the air felt rather cold for the time of year, and as I waited down the fogou passage I could see the faint ‘fingernail’ of the waning crescent Moon low in the eastern sky. By half past five (BST) the top of Chapel Carn Brea and the fields beyond St. Buryan were bathed in a soft orange glow, and ten minutes later the eye-piercing glaze of the Sun appeared above the horizon. As it rose rapidly upwards it became obvious to me that someone, over 2000 years earlier, had deliberately marked the position where this end of the fogou should be placed so that the underground covered passageway would later ‘receive’ the first rays of the rising midsummer Sun: the time of year when the Sun reached its climax of power, after which the waning half of the year would begin, as the neighbouring hilltops blazed with the light of the solstice bonfires.
A year later (1986) I tried to experiment again, this time at the above-ground fogou of Porthmeor. I had the same results, and although the higher ground to the north-east meant that the Sun appeared about 20 minutes later, I felt that my theories had been satisfactorily confirmed. Nevertheless, there was one very obvious exception to this ‘rule’ which spoilt my whole neat arrangement – the site of Pendeen Vau. The northern end of the fogou faced to the north-west, nowhere near to the sunrise position. A little detective work revealed its secret. The long passage had been built to face the position where the Sun would appear to hover above the sea before it ‘died’ beyond the western horizon on the long midsummer evenings. Everything was beginning to fall into a definite pattern.

The southern ends of the passages show a much wider variation of their orientations, and unfortunately many sites seem to be more ruinous at this end, making accurate recording difficult. However, there does seem to be a definite preference for the south-western position of the setting midwinter Sun. The four annual directions of solstice sunrise and sunset were commonly used in many megalithic ceremonial structures thousands of years before the appearance of the Iron Age fogou, and the continuity of culture shows the great strength of local traditions from the Neolithic right through prehistory to the beginnings of Christianity.

The interpretation of the curvature and directions of the fogou passages is of course open to individual preferences. Suffice to point out that most, if not all, of the ancient stone sites were concerned in some way with the continuity of all life from birth to death and back to rebirth; and that caves, wells and other ‘holes’ in the ground have traditionally been considered as entrances or exits into or out of the body of Mother Earth. The Sun penetrates her ‘skin’ to provide the ‘male’ energy needed by Her to remain fertile and permit crops, vegetation and animal life to grow to maturity before the onset of winter.
The Solar Ritual Cycle

By Cheryl Straffon  From Meyn Mamvro no.10 (1989)

The rebirth of the Sun takes place at the Winter Solstice, which is the shortest day, either December 20th, 21st or 22nd (it varies from year to year depending on precise sunrise and sunset times). The ritual surrounding this day/night is to do with the anticipation of that re-birth and the joy and celebration when it occurs. As such, it was taken over by Christianity, which at this time celebrates the birth of the Son, Jesus Christ, an almost exact parallel to the birth of the Sun God/dess.

As Barbara Smoker says:

“The Christian nativity scene is originally pagan, representing the rebirth of the sun-god on earth”.

The concept is nicely summed up in the seasonal song “Light” by Aeolian Songspell:

“Then born from the night of long shadows
Warm grows the light of the sun,
Strong grows the oak from the holly
As the earthyear turns and wakes the newborn one”.

It was the first indication that winter would come to an end and the animal and plant life on which humanity depended for its existence would flourish anew. So everyone celebrated, and above all it was an occasion of religious rejoicing. This rejoicing included the Celtic midwinter bonfires and the burning of the Yule log, or mock/block as it was called in Cornwall, usually ignited with a piece of the previous year’s log, sometimes with the figure of a man on it, perhaps a folk memory of the Sun God itself. “The placing of the Yule log on the fire on Christmas Eve and the appearance of the little Christmas tree the next morning, Christmas fires, and the lighting of candles perpetuate other pagan customs, encouraging the sun in its weakest hour with their heat and light”.

Other aspects of Christmas also owe their origins to pagan customs, such as the evergreen plants, symbols of immortality or the continuity of life. The holly was known as the ‘witch’s tree’, a memory of pagan times, the mistletoe was the sacred plant of the Druids, and is even now not permitted to be taken into churches, and the ivy was home for the wren who was hunted at Christmas, a folk custom supposed to bring fertility to the fields and good luck to everyone. The wren was the totem symbol for the Celtic God Bran, Lord of Midwinter, and its sacrifice was supposed to bring fertility, a natural part of the life-cycle where death leads to new birth through the ceaseless round of the seasons. The ceremony of Hunting the Wren was prevalent in all Celtic lands, and in Cornwall it continued as a general bird-shoot on St. Stephens Day (Dec 26th) and in Penzance on Feasten Monday, the day after Advent Sunday, the time of Madron Feast Day.
Feasting on special kinds of meat at this winter time is pagan in origin and symbolism. Even the mince pies at Christmas (originally looked upon with disfavour by the Church as having been derived from the consecrated cakes of pagans, formerly baked in a coffin-shaped pastry case), and the flaming sun-shaped Christmas pudding, have pagan roots. Over-indulgent eating and drinking at this time was an important symbolic gesture. After the lean winter months the Sun had been reborn and good times were ahead. Perhaps even local festivals like Tom Bawcock’s Eve at Mousehole on December 23rd, where stargazy pie is served, are ancient memories of the ending of the period of famine, and the old custom of wassailing (encouraging the apple orchards to bear fruit again in the forthcoming year) is still practised in Bodmin and other places over the Christmas/New Year period.

Thus, Christmas or Yule (to give it the original pagan name) was originally the mid-winter festival. Yule, meaning ‘the wheel’ (the universal solar symbol) signified the turning point of the year, when the Sun was checked on its downward movement and began to roll back like a wheel. It was the time when the earth was reborn with the returning light, and the theme of death and rebirth was commonly featured in the Guise dancing that used to take place in Cornish villages over the Yuletide period, revived in recent years by the Montol festival in Penzance. A variation of this could be found in St. Ives in the 1960s when the “Cock Robin Boys” were still active, causing mischief on Christmas Eve. The time and the name are both significant: the winter solstice/Yule is traditionally the time when the robin gives way to the wren, as licensed foolery has always been a part of all ritual festivals.

The days of increasing light next become symbolically important at the Spring Equinox, one of only two times in the solar year when day and night are of equal length. This occurs on March 19th, 20th or 21st, which is actually the day before the earliest day on which Easter can occur. Easter itself, named after the pagan Goddess Eostre (the Dawn Goddess) is obviously a Christianisation of the old Equinox festival, being calculated by the first Sunday after the first full Moon after March 21st. The association of Eostre with the daily birth of the Sun eventually made her the symbol of re-birth in general, hence the current use of eggs at Easter to symbolise the birth of a new annual cycle. Remnants of this can be seen in the old custom at Polperro where the inhabitants rose very early on Easter Day “to see the sun dance”, and the rebirth of light from dark is well illustrated in these lines from Aeolian Songspell:

“Now is the light and the darkness in balance
And the Goddess walks in the path of light.
See the sun stir the seed of the morning
And the green world wakes to the song of changes”.

A spring festival takes place about this time in Cornwall, that of hurling. This custom was once a feature of most village feast days and is believed to have originated as a pagan festival in honour of Spring. Nowadays, it is held mainly in St. Ives and St. Columb Major, where it takes place on Shrove Tuesday and the following Saturday week. The match consists of a challenge between the Town men and the Country men for the silver ball, an obvious Sun symbol, especially as it was originally coated with gold.
Many Saints Days and Feast Days which occur around this time are associated with Celtic gods and goddesses: for example Tan (St. Agnes), a fire god; St. Teath, protectress of corn; (G)Wennap, horse goddess; Endellion, sea god; and Grade, Creed and Sancreed, which may be aspects of the goddess Ceridwen. Of Sancreed, Dexter says: "It has a feast on Whit Sunday, a moon date and a time of horse worship. The Church itself is in a circular enclosure ... and it seems as though both church and vicarage are on pagan sites".

After the Spring Equinox, the hours of light get longer than the hours of darkness until on June 20th, 21st or 22nd, the longest day, the Summer Solstice is celebrated. Perhaps the most well-known of the pagan festivals nowadays, thanks to the well-publicised gathering at Stonehenge, it is a time of maximum power and energy.

"Twelve times round the stones we dance
When the sun is still above us.
Seven spirals unfurl their force
And the sleepers awake beneath us.
Dragon lines across the earth
Come alive at the Summer Solstice,
Horned hunter thunders the ground
And the sky at the Summer Solstice"

[ Aeolian Songspell ]

The horned hunter referred to is Herne, God of the woodlands and groves. In another guise he is the Green Man, the spirit of the vegetation, at this most fertile time of the year. On Oak Apple Day (May 28th/29th) in Looe and in other parts of East Cornwall, it was the custom to wear an oak leaf, and in St. Germans there was a ceremony around a large walnut tree, both surely memories of Herne and the Green Man. Yet paradoxically at the height of his powers the Green Man would be sacrificed in order for the fertility of the cycle to continue. This was symbolised in the idea of the Lord of the Waxing Year now being usurped by his twin brother the Lord of the Waning Year. At the time of the most potency of the Sun, the days are about to get shorter as the power of the Sun lessens.

This was the time when bonfires were lit on all the high places and hilltops of Cornwall, which still takes place on certain spots on June 23rd. Youths paraded through the towns with burning torches which they swung about their heads in a circular motion; tar barrels were lit in the streets; cattle were driven deosil (clockwise) towards the Sun; and young couples leapt through the flames to ensure good luck and fertility. The ashes of the fire were regarded as magic charms against misfortune and the ‘evil eye’, although to reach full effectiveness some living creature must originally have been consumed by the flames, a remnant of the sacrificial theme.

Certain holy wells were supposed to be endowed with special healing powers at this time, and the importance of water in the midsummer rituals was carried over into Christianity when the date was dedicated to the beheaded John the Baptist – ceremonially killed on demand of Salome’s mother. "Fire, giving off heat and light in imitation of the sun, is thus closely associated with water at midsummer, so ensuring the two essential requirements for continuing plant growth".

Also at midnight on Midsummer Eve all the witches in West Cornwall used to meet at Trewa near Zennor to renew their vows. This was obviously a memory of the actual pagan midsummer solstice ritual. Zennor still possesses the Witches or Giants Rock, which if touched nine times at midnight, in one version, keeps away ill-luck and prevents people being "over-looked" (ill wished), and in another version turns the supplicant into a witch herself! Clearly the power of the witches, that is, practitioners of the Old Craft, was thought to be most potent at this time. This is still remembered at St. Cleer in East Cornwall, where there has been an annual ceremony on June 23rd (St. John’s Eve) called the Banishing of the Witches, which in years past consisted of crowning a bonfire with a witch’s broom and hat while a sickle with a handle of newly-cut oak was thrown into the flames.

The worshipping of the Sun on the hill tops is still reflected in the old name for St. Michael’s Mount, Din-sul (sun-hill), St. Michael being the successor of the sun-god. Furthermore, of the 18 former parishes in West Cornwall, no less than 12 have feasts or fairs on or about the dates of Sun worship.
Some of these are at the time of the Spring Equinox; others, such as Pendeen's midsummer festival, with its history of making loud explosions on high hilltops, are obviously remnants of midsummer solstice celebrations; and yet others come at the Autumn Equinox, on or around September 21st, 22nd or 23rd, the other period of equal day and night.

At this time the Lord of Light is giving way to the Dark Lord, who in his other guise as the God Bran will rule the winter months. It is a time when the harvest has been gathered in for the coming winter months, and to celebrate this, the old Cornish festival of Crying the Neck has been revived by the Old Cornwall Society. It is now a rather sedate affair, but originally the reaper, who cut the last sheaf of corn (the Neck) would run as hard as he could to the farmhouse, where he would try to enter and kiss the maid, a remembrance of the original fertility motif of the festival. The Neck would be hung up and decorated, for it was supposed to contain the spirit of the harvest, the Goddess herself.

“The Goddess bids her love farewell, The sun fades from the sky. Alone within the hollow hills She sleeps but never dies In the season of repose.

She was the dreamseed of the Spring, She was the ear of corn, And brown, she waits in a furrowed field For life to be reborn From the season of repose”.

[Æolian Songspell]

And so the cycle turns and we move round to the deep dark days of the Winter Solstice, when again the Sun will be reborn and bring back life to the Earth Mother. The ritual cycle ends, but never ends.

REFERENCES
4 Courtney, M., 1890. Cornish Feasts and Folklore.

Cheryl Straffon is a writer and author of a number of books on Cornish ancient sites and prehistoric spirituality, including 'Pagan Cornwall: Land of the Goddess' and 'Between the Realms: Cornish myth and magic'.
Solar Aligned Sites in Cornwall

This article is based on two previous papers:

**Sightlines to the Sun** by Cheryl Straffon and Calum MacIntosh,
*Meyn Mamvro* no.12 (1990)

**Turning the Wheel of the Sun** by Cheryl Straffon
*Meyn Mamvro* no.39 (1999)

**Edited and updated by Cheryl Straffon & Carolyn Kennett**

To our megalithic ancestors, the passage of the Sun on its annual round was of supreme importance. The times of the year that mark the 8 points on the cycle were noted and celebrated, and the observation of the Sun rising out of the body of mother earth or sinking into her nurturing folds would have been times for reverence and ritual. We know for certain that these occasions were celebrated at places like Newgrange (Ireland), Maes Howe (Orkney), Gavrinis (Brittany), etc, and it seems likely that they were also celebrated at sites in Cornwall.

These eight events are marked by major festivals, four of which are solar in origin (the two solstices and two equinoxes) and may date from the Neolithic and Bronze Ages; and four of which may be pastoral in origin (the cross-quarter festivals) and may date from the Celtic/Iron Age period, but may conceivably also date back to an earlier time. Put together, they now constitute the 8-fold pagan Wheel of the Year. They are as follows:

<table>
<thead>
<tr>
<th>Festival</th>
<th>Date</th>
<th>Sunrise °</th>
<th>Sunset °</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imbolc</td>
<td>Feb 1st approx.</td>
<td>112.5</td>
<td>247.5</td>
</tr>
<tr>
<td>Spring Equinox</td>
<td>March 19th/20th/21st</td>
<td>90</td>
<td>270</td>
</tr>
<tr>
<td>Beltane</td>
<td>May 1st approx.</td>
<td>77.5</td>
<td>292.5</td>
</tr>
<tr>
<td>Midsummer Solstice</td>
<td>June 20th/21st/22nd</td>
<td>50</td>
<td>310</td>
</tr>
<tr>
<td>Lughnasad</td>
<td>Aug 1st approx.</td>
<td>77.5</td>
<td>292.5</td>
</tr>
<tr>
<td>Autumn Equinox</td>
<td>Sept 21st/22nd/23rd</td>
<td>90</td>
<td>270</td>
</tr>
<tr>
<td>Samhain</td>
<td>Nov 1st approx.</td>
<td>112.5</td>
<td>247.5</td>
</tr>
<tr>
<td>Midwinter Solstice</td>
<td>Dec 20th/21st/22nd/23rd</td>
<td>130</td>
<td>230</td>
</tr>
</tbody>
</table>

At this level, the astronomical functions are easy to understand, and stand the test of modern observation (with some adjustment to take into account the small change in the tilt of the Earth). During its cycle the Sun will appear at the horizon displacing slightly each day. This is at its most rapid around the equinoxes, but at the solstice the Sun will appear to stand still for a number of days as the daily displacement at the extremes of the cycle is too small for us to observe.

The article will first look at the special relationship stone circles have with the Sun and then broaden the quest by outlining all kinds of sites which are aligned to the Sun in Cornwall.

**Stone Circles and the Sun**

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**Stone Circles and the Sun**

Some 900 circle sites are known here in the British Isles, and many similar sites exist worldwide. Although Daniel Defoe would no longer be right in saying, as he did of Boscawen-ûn circle, that all we know about them is that they are there, the total of undisputed facts is relatively small. The split between new wave and orthodox archaeology is such that even the number of stones sometimes cannot be agreed!
Here is a brief summary of more or less agreed assertions:

Circles were built between from the Neolithic through most of the Bronze Age, roughly from about 2500BCE to 1400BCE. The larger circles tend to be older because they were built in established population centres, near the best land. The smaller circles are to be found in the marginal uplands, presumably serving, and calling upon the labour of, smaller groups. The circles most likely had a religious or ceremonial function, perhaps concerned with the rites of the dead. The communal effort in building them, and the nature of some of the archaeological finds, suggests they were probably the main community focus, with trading and judicial events also perhaps taking place there, analogous with the role of the mediaeval church. The stones were often brought over great distances, stones from afar being often preferred over those close to hand, and quartz stones were popular. Circles were not built on ridges or hilltops, but usually on a raised shelf of land, either in a valley, or on the lower slopes of hills and downs. The sites were laid out with some surveying precision, and the various shapes used imply a basic knowledge of geometry. The circles fell into disuse as the climate worsened, to be replaced, oddly enough, by a water cult.

Many of the circle sites can be used to observe basic solar and lunar events, sufficient to construct a calendar capable of serving agriculture. Archaeo-astronomy (or astro-archaeology) has a basic proposition, namely that megalithic sites were laid out to observe certain celestial events, mainly solar and lunar. One thesis is that the maintenance of an agricultural calendar was the main purpose of these works. Another purpose could have been to predict shifts in the earth's electro-magnetic fields.

The basic method was to align a major site, often a circle, with a further point, say a barrow, cairn or notch on nearby ridges. Sometimes, the line would start from the circle centre, but other points are also used, which the archaeo-astronomer Alexander Thom explained by reference to the circle's geometry. Often a standing stone will mark the direction of the line. In some barrows and entrance graves, light boxes or entrances were used to focus the beam of light, which may then fall on particular carved stones or rock art. A number of British megalithic sites were capable of recording all or part of the solar year. At this level, the astronomical functions are easy to understand, and stand the test of modern observation, with some adjustment taking into account changing ground levels and slight alterations over the millennia in the position of the Sun relevant to any fixed point on the Earth.

Although stone circles seem to take centre stage in research into alignments, there are a number of other megalithic sites which also have been positioned with the solar calendar in mind. These include: Neolithic dolmens, Bronze Age chambered tombs, standing stones, etc, and may even have been observed in Iron Age fogous. The following list is not exhaustive and is just to give a flavour of what is out there and where people can go to watch some of the important solar festivals marked.

Beltane [May 1] and Lammas/Lughnasad [Aug 1]

There is an alignment at Stannon Circle on Bodmin Moor that occurs around May 10th, the old May Day (before the calendars were altered in 1752). When viewed from the circle, the Sun rises out of a prominent notch on top of Rough Tor, which dominates the horizon to the ENE.

Distinctive triangular stone at Stannon stone circle, aligned to notch in Rough Tor (Image credit: Cheryl Straffon)

It was also suggested by Norman Lockyer (1836-1920), that an observer standing at Gün Rith standing stone in West Penwith and looking at the Merry Maidens stone circle at the end of April, would have seen the rising of the Pleiades star system, giving an advance warning of the onset of the Beltane festival.
**Summer Solstice [June 20-22]**

The carving on the rear of the central stone at Boscawen-ûn was deliberately placed to be illuminated in full at the summer solstice sunrise. From the circle the pointed hedgerow standing stone in the lane to the nearby Boscawen-ûn farm is on the summer solstice sunrise line. A fallen menhir in the lane near the stone circle possibly acted as a midpoint marker between the two positions.

Sunrise on the longest day can be observed from the Treen common enclosure circle, where the Sun rises from a notch over Zennor Hill. Also near Zennor from Trendrine Barrow the Sun will rise over Trevalgan Hill, a breast shaped hill also known locally as Buttermilk Hill, a memory perhaps of the Earth Mother. At Tregeseal stone circle, a number of barrows have been positioned to the northeast of the circle complex behind which the Sun will rise.

Over on Bodmin Moor Craddock Moor circle has been positioned to watch the rising Sun on the longest day from behind the Cheesewring.

The setting Sun at midsummer has a large number of alignments around Cornwall. A particularly nice one can be observed at Nine Maidens where there is a stump of a standing stone on the line of the setting Sun.

**Equinox Spring [March 19-21] Autumn [September 21-23]**

On Bodmin Moor a number of sites have been positioned so the setting Sun can be seen over Brown Willy. These include Goodaver circle (the view now obscured by plantations), Craddock Moor circle and a single standing stone laying prostrate above the Hurlers stone circle. A propped stone (formerly known as a pseudo quoit) at Leskernick Hill had the midsummer solstice Sun setting behind it in 3700 BCE when viewed from a kind of viewing platform near the southern circle.

Midsummer solstice sunset at Leskernick Propped Stone on Bodmin Moor. (Image credit: Chris Tilley)

Much later within the Romano-British period unique fogous were built in some courtyard house villages in west Cornwall. Ian McNeil Cooke suggests that the northerly passages in a number of these were positioned to face the rising summer solstice Sun.

Midsummer solstice sunset from Nine Maidens stone circle at Boskednan (Image Credit: Ian Cooke)

Bodmin Moor has a number of equinox aligned sites. Many of these are circle sites. At the Hurlers there is a loose arrangement with the rising Sun over Kit Hill when viewed from the central circle. At Fernacre the rising Sun at these dates can be seen emerging from behind Brown Willy, and similarly over Kilmar Tor from Goodaver circle (the view now obscured by plantations).

The sunset at the equinox can be seen setting over Brown Willy when watched from Leskernick North circle. In west Cornwall the framing station positioned on Little Galva, frames a rolling sunset along the saddleback of Carn Galva.
**Samhain [Nov 1] Imbolc [Feb 1]**

On Bodmin Moor, when viewed from Goodaver stone circle the Sun would have risen over Stowe’s Hill at this time (the view now obscured by plantations).

In West Penwith, the quartz stone at Boscawen-ûn has been positioned in the southwest of the circle. When viewed from the opposite site of the circle the setting Sun sets in between the central leaning stone and the quartz stone, viewed through a notch in a stone.

At Chun Castle the rising Sun can be seen emerging from the stone circle Nine Maidens, and vice versa for the setting Sun.

Pennaunce chambered tomb is aligned with the rising Sun at this time.

**Winter Solstice [Dec 20-23]**

There are more winter solstice alignments than any other solar alignments here in Cornwall. This is just a selection of what can be viewed on this all important festival date.

In West Penwith, Chun Quoit has been deliberately placed to view the winter solstice sunset into a distinctive notch in Carn Kenidjack. This early example shows the longevity of people watching, following, and revering the motions of the Sun.

Tregeseal stone circle and its surrounding monuments have been laid out with the winter solstice in mind. The chambered tomb in the valley is aligned to the winter solstice sunrise. The holed stones are a possible countdown calendar to the winter solstice and the stone circles were placed in the landscape so the winter solstice set over the sea gap which frames the Isles of Scilly. There are possible processional routes which would lead people to this landscape on this important festival.
From the Lamorna Gap people could have processed via the Trelew line of standing stones to Boscawen-ûn stone circle, here at Boscawen-ûn they could have witnessed the sunrise come from out of the Lamorna Gap, before making their way via the framed Chapel Carn Brea to the Tregeseal circles.

At Nine Maidens people would view the rising winter solstice from the direction of St Michael’s Mount (this is an obscured sightline). The Sun sets behind Boslow Menhir, which is also visible from the Tregeseal circles. A processional route could take people in this direction via Lanyon quoit, to the menhir and onwards to the holed stones and a line of barrows, all placed on the solstice line. This will lead people to a final destination of the circles at Tregeseal and the setting Sun over the Isles of Scilly.

A number of entrance graves in West Penwith have been aligned to the winter solstice, perhaps the most impressive can be seen at Bosiliack barrow where the chamber is aligned with the rising winter Sun, as with Tregeseal (see above).

Bosiliack Barrow at the winter solstice sunrise (Image credit: Ian Cooke)

On Bodmin Moor, people could have stood in the amazing solar aligned circle at Craddock Moor and seen the winter solstice sunset over Tregarrick Tor. Sunrise from the same circle is above a barrow on Caradon Hill.

We hope this acts a short guide to what amazing astronomical solar alignments can be found at ancient Cornish sites. Many of these can still be experienced today, and it is always a wonderful experience to visit a site when the heavens and earth align.

Calum MacIntosh was a researcher into archaeo-astronomy, author of the booklet ‘Weird and Wonderful West Penwith’ and contributor to Meyn Mamvro magazine.

Cheryl Straffon is a writer and author of a number of books on Cornish ancient sites and prehistoric spirituality, including ‘Pagan Cornwall: Land of the Goddess’ and ‘Between the Realms: Cornish myth and magic’.
Eclipse of the Sun
By Cheryl Straffon From Meyn Mamvro no.39 (1999)

Partial Solar Eclipse of the Sun in Cornwall, 2015 (Credit Carolyn Kennett)

It is now generally accepted that many megalithic monuments were constructed for the purposes of viewing the sunrises and sunsets at key points in the solar year, such as midsummer and midwinter and the equinoxes. Knowing of the megalithic people’s keen interest in such phenomena, which for them may have been a spiritual/religious experience as well as a practical one, we may assume that the comparatively rare event of a visible solar eclipse would have been a major event in their lives. There is every reason to think that the level of excitement and interest generated by the solar eclipse in Cornwall, August 1999 would have been experienced in prehistoric times.

But being awed and moved by a solar eclipse when it happens and knowing that it is going to happen are two different things. We know that megalithic peoples were able to predict solar events such as the particular sunrises and sunsets, and that they could even calculate the fine differences involved in a solar leap year (Loughcrew megalithic tomb Cairn T in Ireland is evidence for this). Do we know whether they were able to predict eclipses? Eclipse prediction requires advanced mathematics and lengthy record keeping. The basic knowledge needed is of the cycles of Sun and Moon, especially the lunar cycle of 18.61 years (which we know they predicted and celebrated at Callanish on the Isle of Lewis and at the Aberdeenshire stone circles) and its triple period of 55.83 years, when the pattern of the nodes are repeated. Such standards of mathematical skill and record-keeping may have been kept by marking on wood, now long decayed, or even on stone: some of the megalithic art and so-called cup and ring markings may have such information encoded in them. Even the positions of the standing stones may be part of this pattern, especially if ropes were used to make connections between them.

Observations of the rising and setting positions of the Moon, necessary for such eclipse calculations to be made, were probably taken over a long period of time using foresights (standing stones) and backsights (notches on the horizon, stone circles, etc). An eclipse is the coincidence of the Sun, Moon and Earth being in a straight line or alignment, and a solar eclipse occurs when the Moon passes between the Earth and the Sun, casting its shadow on the Earth’s Surface. It can only occur at a New Moon: i.e., when the Moon is in conjunction with the Sun and when the Moon is near one of its nodes (that is, when it passes through the plane of the ecliptic). All this can be foreseen by watching the pattern of the Moon’s nodes, by observing when the Moon rises opposite the Sun’s position, and by noting the ‘minor perturbations’ of the Moon, caused by the gravitational pull of the Sun which distorts the pattern of the Moon’s path. When minor perturbations are at their most extreme, eclipses of the Sun are most likely.

Total Solar Eclipse of the Sun, in USA, 2017 (Credit Carolyn Kennett)
To precisely predict an eclipse, they would have had to work out when the Moon was at its maximum declination a difficult calculation that involves making a succession of nightly observations and then extrapolating a curve to indicate the maximum point that might fall between the markers. Alexander Thom believed that the great fan settings of stones in NE Scotland and the Highlands were evidence of this, and that some of the stones in the Carnac rows in Brittany could have been used in this way. In Cornwall, Christian O’Brien has also suggested that solar and lunar declinations were calculated on Bodmin Moor by the position of the Caradon Hill cairns and some of the stone circles. And both Alexander Thom and Gerard Hawkins suggested that the 56 Aubrey holes at Stonehenge could be used to predict which new or full Moon would give rise to an eclipse of the moon or Sun, something Robin Heath has examined in more detail.

That eclipses have been significant and important events to societies all over the world may be evidenced from written records in historical times. The Bible makes reference to a solar eclipse in 763 AD/CE, recorded in Amos ch8 v.9 “on that day, says the Lord God, I will make the sun go down at noon and darken the earth in broad daylight”. It has also been suggested that the passage describing the crucifixion of Christ is a record of a solar eclipse. “At midday a darkness fell over the whole land, which lasted until three in the afternoon”. The event was reenacted on August 11th 1999 at a performance of a Cornish miracle play at Gwennap Pit, when the actor playing Christ was supposed to be crucified at precisely the moment of the solar eclipse!

Other civilisations that have been obsessed with time calculations and astronomy have also been able to predict eclipses. The Maya civilisations in the 11th century produced the Dresden Codes, which contained very detailed observations of the movements of the planet Venus and of solar and lunar eclipses. It has approved so accurate that it correctly predicted a solar eclipse over Mexico City in 1991, nearly 1000 years later. Incidentally, it also predicted that the world would end on 23rd December 2012. As we have survived, the next solar eclipse seen from Britain will take place on 23rd December 2090, and again Cornwall will be the place to be. Book your place now!

The Mayan Chronicles describe an eclipse. “The face of the sun was eaten and a monster plunged head down towards earth during darkness”, and this motif of a monster eating the Sun is found in other civilisations. The Chinese thought of it as a dragon, and the Aztecs said “If the Sun becomes completely eclipsed eternal darkness will fall and demons will come down and eat us”. The Yuchi people of North America believe that the sun-goddess was menaced by a monstrous demon toad who tried to swallow her. When it succeeded there would be an eclipse. As soon as the solar disc began to be obscured the people would start special rituals to save the Sun, decorating their bodies with red designs and firing arrows at the Sun to drive off the toad. During the eclipse they wept and wailed that their mother was dying, but once the rites were seen to be having their effect, great rejoicing broke out.

Across the other side of the world in Morocco, the Haamacha people also have a Sun goddess, who has come through into Islamic religion. During a total eclipse they believe that she has been swallowed by an evil demon, an event permitted by Allah so that mortals will have fair warning of his wrath. After a while the demon cannot stomach the fiery Sun and so is obliged to vomit her up again. Another violent image of the fearful nature of solar eclipses can be found in Greenland, where the sun-goddess Malina is raped by the moon-god Anningan, causing a solar eclipse. Both of them are baleful spirits who send diseases upon those who offend them. This is particularly liable to happen during eclipses, so that men are careful not to go out of doors during a solar eclipse, or women during a lunar eclipse. In Japan, the tradition is to cover wells during an eclipse to prevent poison from dropping onto them from the darkened sky.

Many societies have feared eclipses and devised rites to ameliorate their effect. Few were as bloody as the Aztecs. Bernardino de Sahagun chronicled what happened in Mexico during an eclipse. “When the sun is eclipsed they then raise a tumult and the women weep aloud. The men cry out, striking their mouths with the palms of their hands. And everywhere great shouts and cries and howls were raised. And then they hunted out men of fair hair and white faces, and they sacrificed them to the Sun. And also they sacrificed captives, and they anointed themselves with the blood of their ears”.

In Medieval England eclipses were thought to be presages of great chaos and perturbations on the Earth. In the 15thC Arthurian story The Adventure of Tarn Wathelyn Arthur, Guinevere, Gawain, Kay and Cador of Cornwall go hunting in a forest where they see a terrible human shape arise from the lake. Gawain reassures Guinevere that “This must be caused by an eclipse of the sun, for I have read that strange things happen at such times”, and in King Lear, Shakespeare says: “These late eclipses in the sun and moon portend no good to us: through the wisdom of nature can reason it thus, yet nature finds itself scourged by the sequent effects: love cools, friendship falls off, brothers divide: in cities mutinies, in countries discord, in palaces treason”.

One of the rare instances where the solar eclipse is not seen as a negative event can be found among Rwala (Ruwałah) Bedouin of North Africa, but this is only because, unlike the peoples of more northern climes, they see the Sun as evil and hateful because it attacks them with its rays, attempting to shrivel their skin and give them thirst and fever. Therefore a solar eclipse is an occasion of joy and hope, when the demon Al-hawt eats the Sun, though eventually of course she cannot fully digest it so has to vomit it up again. The rituals of the Rwala at the solar eclipses therefore encourage the demon to eat the Sun, instead of attempting to drive it off.

Nowadays of course solar eclipses have become a great attraction, and the only monsters likely to be seen during them are the cars and crowds which they attract. There have been eclipses throughout Cornwall’s prehistoric and historic times.
In fact an eclipse very similar to the 1999 one in terms of the track of the Sun and the time of the day was seen on the summer solstice (June 21st) in the year 19CE/AD, right in the middle of the Iron Age/Celtic period in Cornwall. One may imagine the inhabitants of Carn Euny or Chysauster settlement watching in awe as their Sun god/dess was totally obscured for 4 minutes on the solstice itself. Other total eclipses were visible from Cornwall on 10th July 38, 3rd Sept 118, and a spectacular dawn eclipse of 22nd December 968 CE. For our early ancestors who used to look skyward to celebrate and placate the Sun on its yearly round, such a sight must have been dramatic and powerful as it is today.

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The Mysterious number 19 and the 1999 Cornish Eclipse

By Robin Heath *From Meyn Mamvro no.39 (1999)*

This article concerns itself with the interactions of the Sun, Moon, Earth system, that huge evolutionary engine which produces life and, in the process the odd eclipse. Father Sun and Mother Moon have, through an eternity of gyrations, generated a ‘child’, a planet teeming with life, with us currently manning, somewhat shakily, the fort at the top of the evolutionary summit. This article is about sun-moon integration, as are eclipses, and the reader will need both right and left brains to see the beauty herein. If we either hate numbers and ‘science’ or loathe the poetic and symbolic then we are not integrated, so let’s try and balance out the numbers with the poetry.

There exists a strange space between reality and a relatively unknown ‘science’ of revealed cosmology which appears to have been understood at some level by the megalithic circle builders. Many stone circles in Cornwall contain 19 stones. This article will address why the number 19 may have been significant at megalithic sites. The frequency of this number suggests that the perimeter stone number was no accident, but part of the intrinsic design, not as we are so often lead to believe the fumbling’s of early humans.
The most important starting point in understanding the megalithic mind set is to observe, from the earth, the motions of the two luminaries. That is what our Neolithic ancestors were really into. Observations of the changing sunrise and sunset positions can quickly reveal an immutable fact – the seasons (the year) take 365 and about a quarter days to complete. In a single year’s observations, that is what one would observe and no committee on Earth can change this numerical fact. The seasonal year averages out at 365.242 days – we now know this to be the time it takes the Earth to complete an orbit of the Sun. Similarly, the Moon takes 29.531 days to complete is phase cycle, waxing and waning from one New Moon to the next. This cycle is synchronous with the tides and the menstrual cycle. There are 12.368 lunations in the year, which because we now insist on using decimal fractions, obscures the fact that 0.368 is seven-nineteenths as a fraction. Here’s our first 19, relating to the most important number in a calendar’s maker’s toolkit – Enoch’s ‘overplus’ of the solar over the lunar year. If the lunar year is 12 lunations it is 354.37 days long.

This means that there are 12 and seven-nineteenths lunations in a single solar year, which is also 235/19. So we can deduce that over 19 solar years there are 235 lunations. So accurate is the synchronicity between the two that there are less than two hours difference between 235 lunations and 19 solar years. This meeting of the two cycles is currently known as the Metonic Cycle, after Meton, a Greek astronomer of the fourth century BCE. It was probably understood much earlier than this. There is a delightful description of ancient Britain given by Diodorus, the ancient Greek historian, where he describes a “spherical temple of the land of the Hyperboreans…. Where the god visits the island every nineteen years, the period in which the return of the stars to the same place in the heavens is accomplished”. For stars, read luminaries, and you have a description of the megalithic astronomy in Britain, which predates Meton by millenia!

Observers of the Sun and Moon culture would quite quickly recognise that times of synchronicity between the luminaries were special occasions. A tally of days, lunations and years would rapidly reveal such times and was indeed the basis for my own early fumbling’s in this arena. For instance, after three years one may observe 37 lunations, the last falling three days before the three years is complete. Not a very impressive hit you might think. However, after eight years one observes 99 lunations the last falling just a day and a half after the eight years. Much better! Now, you don’t need a Ph.D. in advanced sums to work out that 8+8+3=19, nor that 3 days before plus two times 1.5 days after cancels out the errors, and we have our 19 year supremely accurate Metonic cycle. Exactly 19 years after you read this article the Sun and Moon will be in precisely the same positions in the sky as they are now, and roughly at the same time of day. And the question we all want to know the answer to is whether our stone circle builders were aware of this astronomical bulls-eye. Well... the ‘horseshoe’ at Stonehenge comprises 19 slender polished bluestones and many other circles, (particularly in Cornwall), contain 19 stones.

There are other long-term cycles of the Sun and Moon. 223 lunations after any eclipse, a period of 18 years and seven-nineteenths of a lunar month there will be another eclipse of the same type. This cycle is called the Saros and can produce families of eclipses lasting over 1,200 years. An unnamed cycle of 358 lunations or 29 years, does the same but extends over 12,000 years (It’s worth pointing out here that the 19-year Metonic cycle is not an eclipse cycle). So what is the eclipse mechanism all about?

A solar eclipse can only happen if there is a New Moon and the Moon’s path is crossing the disc of the Sun, when Earth, Moon, and Sun align. Imagine a dinner plate, the Earth orbiting the rim and the Sun at the centre. Because the Moon’s orbit is tilted to the plate – perhaps you could use a grape or an olive to simulate the Moon – it only crosses the plate twice in a month, once to rise above the plane of the plate, and once back and beneath the plate. These two crossing places are called lunar nodes, and if they fulfil the conditions that the Sun, Earth and New Moon all fall in a straight line near the nodal axis point there will be a solar eclipse (when the Moon is Full, the alignment is Sun-Earth-Moon, then this will produce a lunar eclipse). There are two eclipse seasons during a year spaced about 173 days apart making up an eclipse year of 346.62 days. The nodes move backwards through the zodiac, taking 18.618 years to complete one revolution.
Eclipses are great cosmic attention seekers! The disc size of the two luminaries is roughly equal, so if the Moon were only 4% more distant from the Earth, total solar eclipses could not take place. We are forced to ask why the same conditions which maintain life on Earth also form cosmological numerical and geological conditions which appear to be not random. If I were a Neolithic astronomer, I'd want to erect 19 markers to tally or record the 19 years of the Metonic cycle. I'd also want to record the 19 eclipse years that make up the Saros eclipse cycle. I might even toy with a calendar which had 19 months each of 19 days, making up a 361 day year. (The Egyptians and Greeks had a 360 day year where the moon did not fit and our present 365 day year lengths has little to do with the Moon either, so why not?) The same markers, which if evenly spaced are 19 degrees apart, can be used for recording days, months, years, eclipse years, Metonic cycle and Saros cycle. No other number structure can perform this multiplicity of function. The 19 stones of the Merry Maidens photographed at Summer Solstice sunset (Image Credit: Carolyn Kennett)

You can now appreciate why I think a 19 stone circle like the Merry Maidens or Boscawen-un reflect cosmic processes rather better than our archaeological books tell us. In visiting sites such as these I hope you can reconnect back to our ancestors, who began this process of understanding the Sun, Moon and Earth system over 5,000 years ago in western Britain. From the darkness comes illumination.

Robin Heath is a writer, lecturer and megalithic researcher, a former editor of the Astrological Journal.

Ceremonies of the Sun

By Caeia March From Meyn Mamvro no.39 (1999)

August in West Penwith. Summer sunshine and dazzling light on white surf. Holiday time and flaming wild montbretia colouring the cliffs and waysides with vermillion joyfulness. Stocks and round dolled bales are in the corn fields, and everywhere is the abundance of harvest. In ancient times here in this land the harvest goddess was celebrated as the golden Sun mother ripened all her crops, and the Lammas moon mother hung full and yellow over the harvest land.

Over the Irish sea in a small town in Ireland the summer goddess Tailtu opened her skirts and shed bounty upon all her people. Her sons and daughters loved and revered her, dancing for her in the sunshine, without which she could not ripen the cornfields, and her foster son Lugh held a great feast for her on the 1st of the month, with games and celebrations. The place was Telltown, Tailtu's town. There is still a feast there annually, with games and dancing, but nowadays Tailtu is forgotten. The people call the month and the festival Lughnasad, thinking it was Lugh's time, and their failure and ours to remember that he only held his party in honour of his foster mother has given rise to a serious legacy for modern pagans. As the harvest comes and goes we fail to recognise that this had once been a glad time. Mourning for a supposedly dying Sun king, modern pagans have cast him as an omnipotent shadow over the party, as if he were some sort of Christ figure on Good Friday, and the gladness is in danger of being subsumed into the shadow, and the shadow looms much too large. The name, and the man, take over.

So where is Tailtu now? Janet McCrickard in The Eclipse of the Sun argues that in ancient times the Sun was female, loved and celebrated throughout the year. Indeed 'Teine', the Gaelic word for 'fire' (the largest fire we know being the Sun herself) is a female word. In Cornwall, when the Sun reached her zenith in midsummer, fires were lit on holy hill tops, such as Chapel Carn Brea, for the summer solstice. Harvest festivals were held for Lammas time in August at places such as Morvah where there were great feasting, dancing and games.

As the Sun moved to her time of equal day and night at the Autumn Equinox, she moved very fast as observed from the earth, and at Caradon Hill on Bodmin Moor, as seen from The Hurlers stone circle she bounced along the horizon from cairn to cairn until Samhain (end of October). The earth would be quiet then as the days shortened and the Sun returned into herself: light into darkness, to be reborn from her own body in a celebration of light again at the winter solstice.
The Grain Goddess (Corn Mother) at Lammas time (Image credit: Cheryl Straffon)

All over Europe she was known as the winter goddess/maiden of the light. Lucina to the Romans, derived from Lusna of the Etruscans. On winter solstice morning, she was reborn again and ventured forth, and the young girls in Sweden wore candles in their hair to symbolise her return. Christianised, she became St. Lucy. In the fires of the great triple goddess Bride, she was the young woman, the maiden of Candlemass, the festival of Bridget, the Irish time of Imbolc (Feb 1st/2nd). Rising and moving fast, she grew and grew to Spring Equinox, warming the newly planted fields, and brought her promise of summer bounties to come.

This annual cycle was sometimes represented by the retaining of the last sheaf of corn from the harvest fields, which as a sheaf or ‘neck’, or woven into a corn dolly, was carried into the houses and placed over the mantle shelf. Here, embodying the spirit of the corn and the bounty of sunshine and summer, she presided over the hearth and home; and brought sunlight into wintertime, reflected in the leaping fire flames of the hearth, and warming the hearts and homes for the winter story-tellings. In the spring time, she was carried back into the fields, often with processions and singing, prayers and gladness, where she could bless the fields, symbol of sunlight and summer fruitfulness and plenty.

The eclipse of the sun-mother is always an awesome sight. The forgetting of her original meanings is an awesome neglect. Harvest was not as sad when Lugh the sun-god danced for his foster mother. Let it be once more a glad and happy time for us, without concern for shadow, loss or sadness in the midst of a party or feasting. Time enough for that when the sunshine has returned into her mother, the dark earth of winter. Dance, dance and be glad. Taititu is alive and blesses us all.

Caeia March is an author, who formerly lived in Cornwall, where she wrote two novels ‘Reflections’ and ‘Between the Worlds’ set in the landscape of West Penwith and Cornwall.

Green Flashes, Moonbows and Stellar Conjunctions

By Cheryl Straffon From Meyn Mamvro no.59 (2006)

This year’s standstill of the Moon was a phenomenon that we know was observed by our megalithic ancestors and ‘encoded’ in their ancient sites. However, this was not the only rare phenomenon that was of interest to them, and many sites were constructed for viewing significant times on the solar cycle (such as solstices and equinoxes). It is also probable that eclipses, both solar and lunar, were of great interest to them. There are also other effects that sometimes are manifested, which are observable today and must have been equally observable thousands of years ago, and possibly incorporated into rituals and ceremonies at ancient sites.

A setting Sun sometimes is accompanied by a green flash (Image Credit: Wiki Comms, Brocken Inaglory)

Firstly, we can take a look at the solar effects, and specifically the ‘green flash’. The green flash occurs occasionally at the moment of sunset when the Sun dips into the sea. The conditions need to be right – a clear day and a clear horizon – and the observer needs to be in a relatively elevated position for optimum viewing. At the precise moment when the top edge of the solar disc disappears behind the horizon, the spectrum of light refracts or breaks up and a green flash is observed, lasting only a second or two. Blink at the wrong moment and you will miss it! When viewed, it is an unforgettable experience, and I suppose that I see it less than a dozen times a year, and I live in a house with panoramic views of the western horizon.
Our ancestors would probably have had a more frequent and reliable view of it, as the climate in the Neolithic and early Bronze Age was much better, more akin to the south of France today.

Even rarer than the green flash is the turquoise and blue flash. I have seen a few greeny-turquoise ones, but have only seen a blue flash twice in my life, once at Port Issac and once at Pendeen Watch. Because the Sun breaks up into its spectrum of seven colours – red, orange, yellow, green, blue, indigo and violet – at the moment of setting, the red, orange and yellow appear to be in the Sun’s rays themselves and only the green appears before the Sun has set. However on rare occasions, the green flash lingers longer, for about 4-5 seconds, long enough for the next colour on the spectrum (turquoise and blue) to appear for a second before the Sun finally disappears. It is a stunning sight, and if this too was a once in a lifetime experience for our ancestors, they must have been similarly impressed. If the Sun was conceived of as a living being to them, such a manifestation must have been a very magical experience.

It is interesting to note that there are a line of barrows all the way along the northwestern coast of Cornwall, from which the sunset and the green/blue flashes would have been especially visible. Although some of them were more inland than they are today (the sea level having receded before its present rise) nevertheless they are all on high ground relative to the level of the sea beneath, and all NW, W or SW facing.

The barrows include the following (from north to south):

- Tumuli at Higher Longbeak [SX199 039], Lower Longbeak [SX198 032] & Millook [SX179 995] at Widemouth Bay south of Bude.
- Tumuli at Newton Farm [SW131 935] between Crackington Haven & Boscastle.
- Tumuli at Lower Beeny [SW111 923] just north of Boscastle.
- Tumulus at Port Issac [SW988 808].
- Tumulus at Polzeath [SW938 791].
- Tumulus on Brea Hill [SW928 772] near Padstow. ‘Brea is the Cornish for breast, and this breast-shaped hill with its distinctive nipple-like cairns would have been seen as a sacred feature in the landscape.
- Tumuli [SW871 761] on the cliff edge at Harlyn Bay south of Padstow.
- Tumulus on Trevose Head [SW849 762] nr Constantine Bay. It has been suggested (by Howard Balmer) that Trevose Head itself was a sacred headland in the shape of a Goddess feature in the landscape.
- A line of 6 Tumuli [SW856 733, SW865 725, SW847 715, SW846 713, SW845 710, & SW847 684] from Treyarnon Bay to the south of Porthcothan, all at the cliff’s edge.
- Tumuli at Trevelgue Head [SW828 631] and Tolcarne Beach [SW820 623] in Newquay.
- Tumuli [SW766 606, SW765 603 & SW768 600] north of Holywell Bay near Newquay.
- Tumuli [SW748 538 & SW734 523] between Perranporth and St. Agnes.
- Six Tumuli (now destroyed) above Reskajeage Downs, a tumulus above Hodder Cove [SW606 430] and one at Godrevy Headland [SW581 434] on the coastal stretch between St. Agnes & Hayle.
- Seventeen Tumuli stretching from Kenidjack Castle [SW357 325] and Ballowall Barrow, near St. Just [SW357 311] south along the coast to Carn Leskys [SW357 305], Carn Gribba [SW356 304], Boscregan [SW358 297], Escalls [SW363 272] and to Mayon Cliff [SW349 261] near Sennon and Land’s End.

All these sites were positioned deliberately overlooking the sea, where the users of the sites (or perhaps the spirits of the dead within the barrows) could have seen the sunsets and green flashes mentioned. These may have been sacred places for the shamans to go on spirit journeys, perhaps at sunset, where the green flashes may have been the signal for the start or finish of the spirit journey itself.
Turning from the Sun to the Moon, there is the usual phenomena of the moonbow. This occurs when the Full Moon (whose light of course is reflected from the Sun) is covered with light cumulus cloud. The light from the Moon catches the droplets of water in the cloud and breaks the white light up into its spectrum of colours. These colours appear as coloured rings around the Moon, and though the appearance usually lasts an even shorter time than rainbows, and the bands of colour are not so well differentiated (at most I have only seen red, orange, yellow, green and blue), nevertheless it is a visually stunning sight. The first time I saw it when two of us were doing a Moon ritual at Alsia Well, near St. Buryan. We stopped mid-track in the ritual and just gazed in open-mouthed astonishment! Since then I have seen it a few times and always at Full Moon. Perhaps the light from the Moon is stronger than, or perhaps that’s the main time I’m out gazing at the Moon, so am most likely to see it! In any case, for a people who observed the Moon so regularly and with such detailed attention, the appearance of moonbows must have seemed most magical.

As well as the Sun and Moon, the planets and stars have often been significant in ancient people’s cultures. Their position changes along the plane of the ecliptic, so that different combinations of planets and stars are visible at different times. Certain stars were very important to ancient civilizations, particularly the morning and evening ‘star’ (planet) of Venus, known as the Goddess Ishtar in Babylonian mythology. The Egyptians seemed to have aligned their pyramids to the stars in Orion and to Thuban (the pole star) so that the mummified bodies of their pharaohs could travel straight to the gods after death. The Pleiades star system (often known as the Seven Sisters) was also observed by many cultures, particularly in Hindu and Australian Aborigine mythology. The Dogon people of Africa believed that their ancestors came from that system, and recently a Bronze Age disc was discovered in East Germany depicting the Sun, Moon and Pleiades star system. Sirius the ‘dog star’ was also known by the Dogon people and by the Egyptians, who identified it with the Goddess Isis.

At the Merry Maidens stone circle [SW 4327 2451] near Lamorna in West Penwith, Sir Norman Lockyer suggested that an observer standing at Gûn Rith standing stone [SW4294 2446] near to the circle at the end of April 1960BCE would have seen the Pleiades star system rising above the circle. This would have given them an advance warning of the imminence of Beltane (May day) festival, one of the great festivals in the Wheel of the Year. Adding to this, Alan Bleakley discovered that if you extend the line from Gûn Rith to the Merry Maidens circle it continues out through the entrance/exit of the circle and on to a standing stone in the corner of the hedge [SW4343 2452], through the lost Tregurnow stone circle [SW4375 2455] and finishes at a tiny place called Borah whose name means ‘the place of the witch’. Bleakley points out that Gûn Rith is Cornish for ‘Red Downs’, perhaps a reference to the setting Sun in the west, and the line splits the circle into two crescents, one to the north and one to the south like two Moons.

The apparent movement of the stars and planets would thus have been of great interest to the priest/esses who were probably responsible for mediating the goddesses and gods and facilitating the rituals. In particular the conjunction of stars and planets such as Jupiter, Mars, Venus etc., with the Moon would be seen as especially auspicious or presaging difficult times ahead. The people, who lived much closer to nature than we do, would have been able to work out much of the movement of the planetary and stellar bodies over periods of centuries. Even so, unusual happenings like the appearance of comets must have been of profound significance. Who can forget the appearance of the highly visible Hale-Bopp comet next to the Moon for about a month in 1997? It was a very magical sight, and similar appearances must have had a similar effect on the megalithic builders, who perhaps incorporated them into their ceremonies and rituals at the sites. Perhaps the comets may have been seen as the spirits of the dead returning to Earth for a while? Or perhaps they may have been seen as a visit by the Ancestors. If so, they may not have been far wrong, for comets are believed to have brought the building blocks which led to the first life to Earth. We need to perhaps widen our understanding of ancient sites to postulate that the people were not only using them to observe and celebrate the Sun and the Moon, but other celestial events as well. That we can continue to view them today helps us connect with the magic of the universe and to still celebrate their appearance at some of our ancient sites.

Cheryl Straffon is a writer and author of a number of books on Cornish ancient sites and prehistoric spirituality, including ‘Pagan Cornwall: Land of the Goddess’ and ‘Between the Realms: Cornish myth and magic’.

Comet Hale-Bopp making a spectacular pass in 1997 (Credit Wiki commons, Philipp Salzgeber)
Winter Solstice at Chûn Quoit

by Cheryl Straffon & Lana Jarvis From Meyn Mamvro no.76 (2011)

Winter Solstice 2010 on December 21st was a very magical occasion, with a total eclipse of the full moon coinciding with the solstice. It was the coming together of solar and lunar energy at a very powerful time of the year, and a rare event. Although lunar eclipses are relatively common, with often at least a couple in any one year, the coinciding of one with the winter solstice had last been seen in Britain over 450 years ago. In addition, the timing of this one meant that it happened at the very dawn of the Solstice, the longest night and shortest day of the year, a perfect blending of eclipsed full moon and sunrise energies. However, the timing did mean that it was only going to be visible for a short period of time at the setting of the moon from 7.40am, until the rising of the Sun around 8.30am (where we live in West Penwith) would obscure the view.

Lana sometimes has to work night shifts and it so happened that on the night of the 20th/21st, she was working away from home in Helston. Neither of us got to see the whole eclipse from beginning to end, but between us we did see all the salient features! Cheryl got up at 6.30am to see the beginning of the eclipse, as the bright full moon began to be eaten into by the shadow of the earth, as it started sinking towards the south-western horizon. After about 20 minutes, it disappeared into a bank of cloud from which it never emerged. Meanwhile however at Helston, Lana witnessed the full moon eclipse itself from about 7.40am as the moon turned a deep red, with just a silver sliver visible on the right.

This was the prelude to the solstice day that rewarded us with not only the eclipsed full moon at the beginning, but with a perfect sunset at the end. The day was bright and sunny, with just a few clouds, and at about 3.30pm we saw the Sun moving towards the south-western horizon, looking as if we might have a clear sunset. We jumped into the car and drove just up the road to the parking place at the base of hill that leads up to Chûn Quoit. It was at this site that Cheryl had first witnessed in 1988 the setting of the winter solstice Sun into the distinctive notch on the natural rocky outcrop of Carn Kenidjack, and realised that the Quoit had probably been deliberately placed there by the megalithic builders to observe the phenomenon. The alignment was confirmed the following year in 1989, when once again it was observed and recorded, but although the Cornish Earth Mysteries Group made an annual pilgrimage to observe it for the next 19 years, never once was it seen, as conditions were always too overcast! On occasions it was seen by individuals a few days either side of the solstice, where it still ‘worked’, as the Sun appears to be stationary at this time of the year for about a week (‘solstice’ means “sun stand still”). Sometimes we have been asked if this could just be a ‘coincidence’, but if you move 100 yards or so in any direction from the Quoit it does not work. We know that the megalithic builders were interested in sunrise and sunset alignments at their tombs (Newgrange in Ireland at the winter solstice being the most famous example) so this is no doubt deliberate.
Also, we have sometimes been asked if the movement of the Earth in relationship to the Sun has shifted since Neolithic times when Chûn Quoit was built. The answer is that it has, but only by about one Sun’s width. This might make a difference to this alignment, were it not for the fact that there are two notches in Carn Kenidjack next to each other. In Neolithic times the Sun would have set into the left hand one, now it fortuitously sets into the right. A similar thing is apparent at Newgrange. When the site was built, light entered the light box of the tomb at sunrise. Now it still does so, but it happens 20 minutes after sunrise itself. Five thousand years may have elapsed since these sites, both Newgrange and Chûn Quoit, were built, but amazingly we can still see the megalithic magic at work. The only difference is that there is an annual lottery to see the Newgrange alignment, for which any individual stands a 1 in 25,000 chance of being successful, whereas at Chûn anyone can see it for free!

That was apparent when we got to the Quoit, for there were about a dozen people waiting there to view the sunset! We all stood quietly, watching the Sun descend towards the notch, and when it got there, it seemed to hover for a long while over the notch, as if held in the sky by an invisible hand, before it slowly sank into the notch. It was an amazing sight, and all present were both thrilled and in awe. The experience touched our souls, and as we walked back down the hill, we felt elated and full of the spirit of the winter solstice. The ground was full of ice-clad puddles, bathed in the winter sunshine, illustrating both the Crone and the Sun Goddess’ power at this time.
Sun and Moon at Boscawen-ûn

By Carolyn Kennett From Meyn Mamvro 95 (Spring/Summer 2018)

During the last few years, in many ways Boscawen-ûn became a second home to me. While waiting for sunrises and sunsets I observed the change in the seasons at the circle, all accompanied by the changing looks, sounds and smells. But one thing remained the same and that was the tranquillity of the site. I kept some strange hours, as I was mainly there for sunrises or sunsets and quite often at night. More often than not I was alone in the circle, sometimes for hours on end.

One of these visits, in particular, comes to the forefront of my mind. Having risen when it was still dark, I drove to the circle with the beginnings of dawn, hoping the low developing horizontal cloud would clear. I arrived in time for the sunrise of the 25th June 2016. The week had been wet and the solstice had passed behind a thick blanket of cloud. I stood atop Creeg Tol willing the low bank of cloud to blow out of the way, even though I knew I was nearly a week late to see the summer solstice sunrise. The vantage point of Creeg Tol meant that I would see the Sun peer above the horizon, something that I could not replicate in person in the circle below due to the large hedge obscuring this direction. The dawn had a stillness about it which makes it one of my favourite times of the day. The clouds were starting to disperse and right on schedule, the Sun started to peer above the horizon, accompanied by the mixed dawn chorus of birds, roosters and cattle.

I photographed the sunrise from my vantage point at Creeg Tol and set off down the hill towards the circle. About half way down into the hill I started to lose the sunrise; the Sun was setting behind the hill it had just rose from. By the time I reached the circle the Sun was once again well below the horizon. I realised that without the hedgerow I could witness the Sun rising twice, in effect a double sunrise. Once from atop Creeg Tol and then again from inside the circle. I hoped this would work in reverse: with the Sun setting visually from the circle and once again from Creeg Tol. It was an idea I would test out repeatedly over the summer months with great success. I think this double sunset and sunrise during the summer months is one of the most visually beautiful aspects about the circle. A local settlement Goldherring, which has some Bronze Age round huts is north of the site and people could have accessed the circle from the direction of Creeg Tol. Double sunsets and double sunrises are something that we can all witness from the site and this is only the beginning of what makes Boscawen-ûn astronomically special.

It is important to consider Boscawen-ûn in the landscape as holistically as possible. During this project I wanted to consider the way the circle sat at the base of the northern hill, in what would have been a marshy area and quite possibly difficult to get access to, particularly at wet times. Why had it been positioned here? What would have been seen in the sky? It was equally important to view the site as a part of a changing landscape, where people have shaped and changed the site itself over a large period of time as well as the surrounding landscape. I am a great believer in looking what archaeoastronomy ideas have been historically suggested about a site. These historic ideas brought another list of questions such as: Is there any truth in a Lunar link at Boscawen-ûn? Does the carving on the back of the central stone light up at summer solstice? These were just the start of a list of burning questions which would keep me returning to the site, making measurements, and calculating positions of celestial objects over the coming year. Hopefully enabling me to answer if the site was built with astronomy in mind.

I started by considering if there were any alignments between the circle and features on the horizon. This meant that I needed to map out all the natural and man-made features which would have been found from the period of the stone circle. This was in itself quite a task. The internet was a wealth of information, but local knowledge from people such as Cheryl was a great help to me. Many local sites such as barrows and menhirs had disappeared and I needed to try to reconstruct where they were as accurately as possible in relation to the circle. My final list identified 48 local features or as I would name them, targets. These targets would then be considered against a number of pre-selected celestial events. If all 48 targets were considered against the chosen celestial events, statistically a match would be highly likely. For instance, if we were to consider the targets located around the site in a circle of 360 degrees. If each target considered covered 1 degree with an error of +/- 0.5 degrees a total of 96 degrees or just over a quarter of our circle would be covered in targets.
(The error from this project was set as 1.04 degrees - this came from a small amount of measurement error as well as error for refraction, extinction, and parallax). Statistically, this would mean that it would be far more likely for a target to make a match with a considered event. Therefore, to make the project more robust I needed to reduce the number of targets. I decided first of all to consider targets that were visible from the site and only targets that sat proud against the horizon. The reduction in targets could have been undertaken in a number of ways but I felt that this made the most robust format for retesting any results. This left me with just 7 remaining targets out of the original 48 to match with my events. These were as follows:

The Lamorna Gap – yes, it is just visible from the site through the hedgerows. A smaller sea gap further south to the Lamorna gap, Creeg Tol. A barrow just west of Creeg Tol, Chapel Carn Brea, Boscawen-ûn Field Menhir and finally Bunkers Hill Menhir (East). Once the targets were identified, I made on-site measurements of their azimuth and altitude and this was converted into an astronomical declination. Alongside the on-site measurements I ran a computer program called HORIZON. This also gave me declinations for my 7 targets and it acted as a test of accuracy for the on-site measurement, as well as allowing for reconstruction of the horizon behind the hidden, hedgerow covered NE direction.

Next I considered which astronomical events I would examine alongside the targets. I decided to look initially at five events in total. These five events would give 14 positions along the horizon: 7 rising positions and 7 setting positions. These were the extremes of the solar calendar or the solstices, as well as the solar equinox positions. I also considered the lunar standstill positions both for lunar major and lunar minor. I then calculated the declinations of these 14 events for a date of 2500BCE. The horizon position of a solstice Sun and the lunar positions in 2500BCE has moved slightly compared to its the current position, whereas the equinox would be in virtually the same place. So a rising solstice Sun would have a declination of 23.9 degrees in 2500BCE whereas it would have a declination of 23.4 degrees currently which on a flat horizon at the latitude of Boscawen-ûn equates to an azimuth difference of 1.02 degrees.

When all this was considered I could look for matches between my 14 events and 7 targets. I could see immediately that 4 of my 7 targets declinations matched with one of the fourteen identified events, within the limits of the error I had set. The first and probably most primary of these is that an observer in the circle at 2500BCE would see the winter solstice sunrise rising from the Lamorna Gap. The Lamorna Gap at present is obscured by hedgerows, but without this vegetation would have been a subtle sea view at best. The Lamorna Gap declination was measured as -23.6 +/-1.04 degrees, matching a winter solstice sunrise of 23.9 degrees. Also, you must consider that the sea view extends for more than 1 degrees along the horizon and that this event could be observable over the coming millennia.

This first alignment extends through the circle to my second alignment. This is to a barrow which is no longer visible; it was located to the west of Creeg Tol. It would be in the position of the summer solstice sunset when observed from the circle. It had a measured declination of 24.3 +/- 1.04 degrees coinciding with the declination of 24.9 degrees. Equally an observer at the barrow would have been in a position to observe the winter solstice sunrise out of the Lamorna Gap. Its position just above the circle would give an observer a more advantageous height and a more pronounced view of the winter solstice sunrise from the Lamorna Gap. It is interesting to note that the winter solstice sunset at this time would just fall into the large sea gap at the Tregeseal stone circles. Although at Tregeseal the sea gap is far more pronounced, there is possible that there is a connection between the two sites on this date.

The other two matched alignments came between the circle and lunar major standstill positions. I found that the position of Creeg Tol matched the lunar major sunset northernmost position, it had a measured declination of 28.3 +/- 1.04 degrees coinciding with an event declination of 28.9 degrees. The nearby Boscawen-ûn Field menhir was the final alignment and it was in the lunar major sunrise position. This had a measured declination of 28.9+/-1.04-degrees which coincided with the event declination of 28.15 degrees in 2500BCE.
The position of the Field menhir was slightly to the west of calculated declination for the lunar alignment, but it is conceivable that another stone now recumbent in the hedge made a pair and this pair once framed the rising Moon at the extreme of the lunar major cycle. Although we should note here that it may not have necessarily been a full Moon at that time, as the Moon at its standstill declination can be at a number of positions within its phase cycle.

Lunar standstill links are not well documented in Cornwall. They are considered a feature of recumbent stone circles in east Scotland but have also been found in western Ireland and more recently in western Scotland. The discovery of two lunar standstill points at Boscawen-ûn is both interesting and intriguing; raising more questions than it answers. Boscawen-ûn does have myths surrounding it which are linked to the lunar cycle, so this could be a feature of this site. Future work in west Penwith will consider evidence for lunar links. For instance, the Merry Maidens which I had discounted through my reduction of data, as it did not stand proud against the horizon is in the Lunar Major Standstill Southern rising position from Boscawen-ûn with a declination of 29.9 degrees. This concludes the main horizon findings, but as I said I also looked at other features within the circle.

The positioning of the quartz stone to the SW of the circle could signify the start or end of the winter season, but due to its localised vicinity to an observer, it could never pinpoint an actual date, without another position to line it up. The stone on the opposite site could have well been used to align the position, but this does not line up with anything calendrically significant. The quartz stone does though align with the cist (located in the NE of the circle) and the out of sight Boscawen-ûn Hedge menhir. The summer solstice sunrise would have occurred in along this alignment around 2500BCE. This alignment was first suggested by Norman Lockyer in his consideration of the circle. There is another stone between the Hedge menhir and the stone circle, this would possibly bring inter-visibility between the circle and the Boscawen-ûn Hedge menhir. Even so, there are numerous examples of standing stones being just over brows of ridges which form alignments so this could be a viable consideration when looking at this alignment.
Rock art carving's (either feet or axes) have been identified on the central stone. I was able to calculate the amount of time the art would be illuminated for in the year 2500BCE. The art on the back of the central stone is only fully illuminated in and around summer solstice sunrise. Without any vegetation, a full illumination would occur 30 days either side of the solstice. The maximum time in minutes that the art would be illuminated would occur on the summer solstice. This amount of time would reduce each day until a full illumination could not happen 31 days later. It must be noted that this measurement takes into account a completely flat landscape. Any vegetation would significantly reduce the length of time and amount of days the art would be fully illuminated. Partial illumination of the art also occurs and this time it happens both in the morning and the evening in and around the summer solstice; this partial illumination would occur for over a much longer period.

There are many more suggestions that could be made, particularly linking stellar events to the site. Without more accurate dating these suggestions must be taken under advisement. For instance, the Pleiades would set over Chapel Carn Brea in 1500BCE, but at an earlier date of 1800BCE, it would have set to the south of the framed hill. I did consider if the central stone could have pointed at a star. The only bright star that it could have pointed at was Arcturus and this would have been at a remarkably early date of 3820BCE. This must be taken under advisement, as the stone could have moved over time. Overall, the suggestions of stellar alignments without accurate dating are always difficult to suggest.

It does seem that a number of astronomical features were considered by the builders of Boscawen-ûn. They certainly had an eye for the solar calendar within the design but perhaps more unusually a knowledge of lunar cycle. This project, for me, has raised more questions than it answered and I will be continuing it by looking for further examples of lunar alignments within Cornwall and try to draw more conclusions about the astronomical features at some of the other Cornish circle sites.

Carolyn Kennett (FRAS) is a writer, researcher, and astronomer. Particularly interested in the history of astronomy, she edits the Society for the History of Astronomy's Bulletin Magazine. www.archaeoastronomy.com
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