Figure 1 Jack at Stonehenge with his son-in law, David

JACK MORRIS-EYTON'S RESEARCH INTO SHADOWS AND LIGHT CAST BY MEGALITHIS IN THE UK

ABSTRACT

Jack Morris-Eyton spent 18 years researching into the meaning of shadows and light cast by megalithic monuments, with especial reference to Castlerigg, Swinside, and Stonehenge. He developed a major system to explain how these monuments were designed and used, as 'prediction calendars' with detailed explanations and many illustrations. He categorises the various shapes of megalithic stones making it easy for others to identify their intended use. He has also discovered a common distance between sites, and reports on a system for 'signpost' marking to reach them. Sadly, he has since died, though his work lives on, edited and clarified with additions from his previous unpublished articles plus input from other members of The Megalithic Portal and Jack's family making this the most complete collection of Jack's work available today.

David Smyth, Editor 9th Nov, 2017.

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Editor's note

Jack Morris-Eyton died peacefully in his sleep on the 29th November, 2011.

He had a great passion for studying ancient megaliths, in particular Swinside, Castlerigg and Stonehenge, and over the years developed an innovative theory for their original intended use. Some of this he made public on the website 'Megalithic Portal,' the first being aired in December, 2005. This comprised a series of articles, entitled 'The Great Stone Circles, how they worked', which was a forerunner for his book. It can be seen here: http://www.megalithic.co.uk/article.php?sid=2146412568.

At the time of his death, he was working on the book to explain his findings, sadly, never finished. His widow, Jane, passed his records on to Simon Charlesworth who graciously passed them on to myself. They consisted of 151 megabytes in 23 files, some finalised, some in process of being written, some duplicated. Chapter 11 was missing (now discovered by his son, Robert and included here). The complete, unedited version may be made available, though an edited version (for clarity) is reproduced below, without any of Jack's pictures that do not have permission to be reproduced (none of them had before the editor had access to his work). Also included are all the pertinent notes Jack posted over the years on the Megalithic Portal site. Apologies if some of this work has therefore been duplicated. New material has been inserted where it helps to clarify Jack's articles.

Where needed, square brackets [] show insertions from the editor to make the text clearer. Standard brackets () contain Jack's own notes, which have been left in, showing changes he wished to make, but never had the chance to make. Inserts from the Portal are in italics. In the spirit of preparing this document for researchers in perpetuity, other miscellaneous notes have also been preserved, even though the meaning of them might not be immediately obvious. Some of them are presumed to be references to photographs Jack took, and hopefully one day we might be able to see them.

It is to be hoped the correct labels Jack made for his pictures have been kept intact. Due to the vagaries of the text editor he used, some text boxes were discovered hidden under photos. If so, these were brought to the front in order to be seen.

Jack was at the forefront of research into shadows cast by megaliths, but went even further. He recognised that many stones have similar shapes, each with similar functions related to various astronomical alignments. This is a major advance in our understanding of how these megaliths were designed to be used. He developed a system of observing the sun's orb at various stages of touching the horizon, and of working out focal points of stone circles with their multiple alignments to the horizon.

In September 2017 the Editor visited Cumbria in an effort to reproduce as many findings of Jack's as possible, though that could hardly encompass the 18 years of continual research. However, many measurements were confirmed, with some queried. These have been detailed below. Robert has recently (25th Oct 2017) had Swinside (Jack's local site) surveyed professionally, which will be the first for this circle since Alexander Thom's survey. Once this is finalised it is hoped to be included as an update to this work.

Figure 2 Jack at the Heel Stone, Stonehenge. Photo by Angie Lake 5/12/2006. © Angie Lake

Copyright and thanks:

This work includes additions and comments from many others, notably Andrew Davis for his diagrams, Dimitrios Dendrinos[1] for pointing out improvements that could be made, Angie Lake and Simon Charlesworth who knew Jack well. Also inserted by the editor are contributions from various people to the Megalithic Portal (in addition to those mentioned in Jack's text)[2]. I am exceedingly grateful to Jack's family – Jane, his widow, and his children Robert Morris-Eyton and Helen Denton. They made available Jack's field notes, files, photographs and books which were invaluable. Jane and Angie had accompanied Jack on many of his visits and provided much extra information.

[1] Emeritus Professor of Urban, Regional and Transportation Planning, School of Architecture and Urban Design, University of Kansas, Lawrence, Kansas, USA

[2] http://www.megalithic.co.uk Editor Andy Burnham

Wherever possible, references Jack has made have been contacted for permission to use the material. However some were incompletely referenced and so could not be reached despite strenuous efforts to do so. If any person recognises their work and would like to contact the editor, their inclusions will be referenced in another edition.

It is intended that the editor of this work will write a book of his own, using this extra material, and citing Jack as a major contributor. Accordingly all material here is copyright and can only be used with the editor's or individual's written permission.

The remainder of this article is taken from Jack's original records, and reproduced here in his own words as faithfully as possible:

Foreword

03/12/2010 By Jack Morris-Eyton [JME]

Inspired by evening 'Curious Archaeology' classes, Jack Morris-Eyton, a retired farmer, has sought to find out more about the great stone circles, not by reading other people's works, but simply through observations. These observations have taken place over 18 years, primarily at Swinside, Castlerigg and Stonehenge but with many visits to other stone circles and stone arrangements throughout the British Isles at varying times of the day and night! Many new exciting discoveries have been made which appear to contradict much of the existing material in circulation – but this does not mean that the observations are wrong.

The key findings of the research are:

- Similar shaped stones were used throughout all the great stone circles in the British Isles, to mark the sun and moon alignments. Whenever a certain shape is seen it will always have the same meaning e.g. a standing, diamond shaped stone always marks either the first or last gleam at the solstices, in addition to several other uses in the great circle. The spacing between the stones in different circles varies with the elevation of the skyline.
- How the ancients devised a system to predict the approach of key festival dates, initially at simple sites and later at the more complex great circles.
- How stone circles were used as a solar calendar by tracking the sun's movements throughout the year.
- How the movements north and south of the moon over its 18.6 year cycle are recorded.
- How [ancient man] used natural and manmade skyline markers in line with the main sun and moon rises and sets.

I recognise that there is still work to be done and accept that there may be some obscure great stone circle somewhere that I have not visited which may not fit into these findings. However the number of conclusive observations from other sites is significant. Hopefully this book will inspire both the doubting and the appreciating reader to go and look for [him or herself].

There are still many unanswered questions such as: who built the circles; why they were built at specific locations; who planned the construction process and organised the labour and so on. Observations of the stone circles cannot answer all of these questions, but hopefully this research work will help others [in their search] to reveal more about the past.

Chapter 1 Introduction

16/03/2011

Objective

To produce a book that is readable by all and with sufficient data in it to convince the sceptics.

This book is based entirely on my own observations and photographs over 18 years, with a conscious effort being made, initially, not to read other people's ideas. This has led to the discovery of the working systems of these stone arrangements and the great circles in particular, showing how they were designed to indicate the movements of the sun and moon throughout the year. The early readers of this book have said that details of all sources must be given, both own discoveries and that gleaned from outside sources. This has led to more research into other publications than was undertaken than in the first 18 years, and the resulting few outside sources being credited. ...Nobody else appears to have done all these observations of the systems, mainly because of the vast number of hours needed to be spent, due to weather, when even those local visits planned in good weather half fail due to poor visibility. The long distance ones are even more difficult as they have to be planned in advance. Anybody doubting these observations will have to go to the sites to check their validity.

Many photographs have been taken, including 49 of the moon in various positions, before the moon system was worked out. This could never have been done without the knowledge from Professor A. Thom's book 'Megalithic Lunar Observatories'. [(Thom, 1971)]

Other stone circles and arrangements INSERT REF [Never inserted, unfortunately].

The books 'The Stone Circles of Cumbria' by John Waterhouse [(Waterhouse, 1985)] and "The Stone Circles of the British Isles' (1976) by Aubrey Burl [(Burl, 1977)] were used to locate the more interesting arrangements both within Cumbria and over the rest of the British Isles. Unfortunately many of the other circles are so incomplete, or have suffered from such poor restoration, that it would seem to be impossible to calculate how they were originally meant to function.

Abbreviations

Insert from Megalithic Portal[3]

V. - The First Gleam and Last Gleam of both the sun and moon. This is when the top of either just appears over the skyline

O. - When the sun or moon's Full Orb appears to break contact with the earth.

O.+. - This is used in places where it seems as if the sun and moon are indicating just a little

[3] *Italics denote notes taken from Part 2 - Methods Old and New http://www.megalithic.co.uk/article.php?sid=2146412176&mode=thread&order=0)*

later.
(C). - At the time of construction of the circle

F. - After the sun has moved 5° 37' azimuth (the significance of this amount will be explained later) along the skyline, it reaches a place where the edge of the shadows from certain stones strike altar type stones. Often the sun has risen above the morning cloud by this time. The same applies in the evenings so this could be of religious significance and is therefore called 'Festival'.

(f). - A fallen stone

MSSR - Mid Summer Sunrise

MSSS - Mid Summer Sunset

MWSR - Mid Winter Sunrise

MWSS - Mid Winter Sunset

MMaS - Moon Major Standstill with either MNR (Most Northerly Rise) or MSR (Most Southerly Rise)

MMiS - Moon Minor Standstill with either MNR (Most Northerly Rise) or MSR (Most Southerly Rise)

For example, Midsummer Sunrise First Gleam, as seen today is represented as MSSR.V. While Midsummer Sunrise First Gleam at the time of construction is MSSR.V. (C)

Midsummer Sunrise Full Orb as seen today would be MSSR.O. and Midsummer Sunset Last Gleam as seen today MSSS.V.

Midwinter Sunrise First Gleam as seen today is MWSR.V. and Midwinter Sunset Last Gleam at the time of construction MWSS.V. (C)

Moon Major Standstill Most Northerly Rise, First Gleam today is represented MMaSMNR. V. and Moon Minor Standstill Most Southerly Set Full Orb at construction by MMiSMSS. O.(C)

Sunrises and Sunsets
To start with the basics, it is accepted that the Earth orbits the sun every 365.2422 days. We take this as 365 days plus 1 extra every leap (4th) year. The discrepancy is further resolved by a 1 day correction every hundred years. The Earth rotates once every 24 hours at an angle 23 ? ° from the vertical, and because of this a different part of the earth is nearest to the sun in the summer and winter, giving us the seasons of the year with the sun rising and setting at different points along the skyline throughout each half of the year. As the earth moves around the sun and the seasons progress, the elevation of the sun changes. This is called the 'obliquity of the ecliptic', or simply the 'obliquity' for short. [Earth's obliquity oscillates between 22.1 and 24.5 degrees on a 41,000-year cycle; the earth's mean obliquity is currently 23°26′13.2″ (or 23.43701°) and decreasing. (Axial Tilt, 2017)]

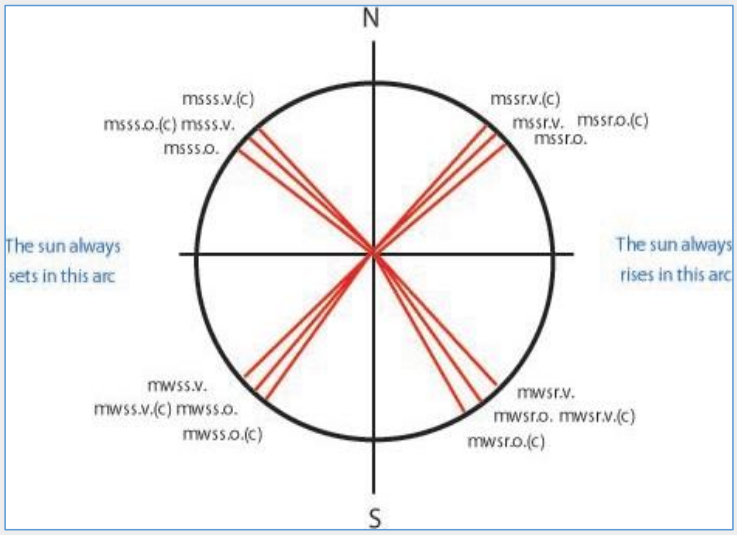


Figure 3 Schematic calendar. By JME

Legend	*MSSR - Mid Summer Sunrise* *MSSS - Mid Summer Sunset* *MWSR - Mid Winter Sunrise* *MWSS - Mid Winter Sunset* *V - The First Gleam and Last Gleam of both the sun and moon. This is when the top of either just appears over the skyline* *O - When the sun or moon's Full Orb appears to break contact with the earth.* *O+ - This is used in places where it seems as if the sun and moon are indicating just a little later.* *(C) - At the time of construction of the circle*

[This shows] the relative positions of the sunrises and sunsets with a very much bigger angle between each V and O. Note also that MSSR is not opposite MWSS, and the difference varies according to the elevation of the skyline. The sun does not rise vertically but at an angle, so that very roughly for each rise of 1° of the skyline the First Gleam moves along by nearly 2°.

It must also be noted that there is a small difference of about 1° between today's summer solstice sunrise and sunset, and that of the Bronze Age about 2000BC (the approximate time when many of the stone circles were constructed). The midwinter sunrise and sets were similarly approximately 1° further south than they are today.[4]
This is due to the fact that the sun is not as far north today as it once was, because the earth is like a giant top, wobbling slowly about the vertical and rotating once approximately every 24,800 years. This moves the position of the solstice sunrises only about [0.25?]° per thousand years, so unfortunately gives us no chance of accurate dating by this means. The

[4] Note from Dimitrios Dendrinos: Jack refers to the one degree difference in azimuth but does not document how he arrived at that figure. In fact, no-one knows, especially as there may be millennia of difference between these monuments.

accompanying diagram shows a far bigger angle than 1° [Figure 3], due to the fact that such a small angle could not be recreated on my computer.

In a circle with a diameter of 30m the difference of 1° across the circle is about 52 centimetres (or in Imperial measure in a 100ft diameter circle it would be about 21inches). These minor discrepancies from the time of construction are partially masked by the daily and hourly variations in the refraction of light due to changes in temperature, pressure and also humidity, which is often left out of the calculations. The full formula also includes the height above sea level, but as this remains the same as it was at the time of construction, it can be ignored. Again this variation in the refraction of light makes it impossible to date the circles using these observations.

It is very dangerous to look directly at the bright sun, so the Ancients devised a system whereby they erected tall stones to cast shadows to targets at about 5 minutes after First Gleam. The only exception being at the Summer Solstice when the times are shorter as the sun has 1° less to travel, then again after approximately 11 minutes, 22 minutes (which seems to be the most important timing) and finally after about 45 minutes. This system is also highly advantageous as on many days the sun has risen above the morning cloud and mist by the 22 minute mark. The same arrangement applies in the evenings as well, i.e. sometime before Last Gleam.
Methods
At Swinside there is a fallen stone at SD 17178 89329 [Figure 13, p39]*, at the start of a line of stones, running virtually due north, on Thwaites Fell which was used to fix north from the circle and get a bearing to Knot Hill, where today there is a trig point. No other trig points are visible. Offsets were measured to each stone, from which bearings were planned to be taken, and bearing corrections calculated. It was impractical to use the fallen north stone each time because of the distance, as it had to be marked with a white flag to be seen from the circle. At other sites a reference point was selected, anything from a few hundred yards away to 3 or 4 kilometres. The GPS map reference of this point … recorded the position, and then a bearing was taken from site to the reference point with the handheld GPS. This system gives a bearing to within 1 ° accuracy unless measurements are taken to the sides to find where the degrees alter. Generally speaking readings to within 1 ° are sufficiently close to be able to find out how the site works. This takes a little longer than just using a compass, which is very unreliable when used in a circle, as the magnetism in the stones can badly affect the needle. End of Jack's insert*

The dates of visits to stone circles were dictated by weather, other commitments and the need to fit in as many visits as possible, when away from home. In the case of Stonehenge, private access to the centre was and is restricted, so many visits were not on the desired day. During the solstice periods a little mental adjustment is needed to deduce how things were at the time of construction when the sun moved about 1° further north at the summer solstice and a similar amount further south at the winter solstice, than it does now. This distance at the circumference is 21 inches across a 100 foot diameter circle, or 52.5cms across a circle of 30 meters, assuming the circle was built about 2000BC. The movement of the solstice sunrises and sets moves one quarter of a degree per thousand years, so any other construction date than 2000 BC of only a few hundred years would not be apparent, as the variation caused by the hourly change in the weather affects the refraction of light where it passes near the surface of the earth by up to this amount.

Altogether, over a thousand visits have been made to various stone arrangements throughout the British Isles and abroad to discover these findings, with the majority of the research work being undertaken at Swinside, Castlerigg and Stonehenge. A brief review of these circles is in order before proceeding further.

Swinside, Castlerigg and Stonehenge

Swinside

[Grid reference SD 172882]

Located on the west coast of Cumbria, Swinside stone circle is one of the Great Stone Circles of the British Isles and was probably built about 2000BC. Prior to the building of the current stone circle (and its subsidiary), archaeological evidence shows that the whole area around Swinside was inhabited for hundreds of years. In addition to this remaining stone circle, there is evidence, documentary and on the ground, indicating that there was at least one other circle in the adjacent field.

INSERT EVIDENCE? [None inserted, unfortunately, but the editor found this though it isn't in the adjacent field, but 2.5km to the SE :

> *Ash House Stone Circle*
>
> ***Description: Site of a stone circle of Bronze Age date.***
>
> *Two large stones and a possible stone-hole. One of the stones has fallen. It has been suggested that these are the remains of the so-called "lost circle" near Swinside (HER 3977) referred to by Hutchinson in 1794. It was said to have consisted of 22 stones in a circle of approx 30.7 m diam with an opening to the SW through which the Duddon Sands were visible. The nature of the remains leaves this interpretation open to doubt. See article 'Explorations on Thwaites Fell' in the 1929 volume of C&WAAS (S2223 p. 257-258) and 'The History of the County of Cumberland' by Hutchinson (S1227 p. 529, 555). Also see the articles on the 'Stone Circle at Sunken Kirk' in the 1904 volume of C&WAAS (S1951 p. 354) and 'Prehistory of Cumberland and Westmorland' in the 1933 volume of C&WAAS (S2219 p. 175). The site is included in an MA thesis by T. Clare as site no. 443 (S1939) and Crawford & George's archaeological survey of Copeland (S1116 p. 57). The site is also included in the publication 'The Stone Circles of the British Isles' by A. Burl (S1028 p. 60, 342). In May 1987 stone positions have supposedly been located by dowsing. See sketch in CCC SMR (S1048). According to OS, "Marjorie Cross sites it on the Mount, near Ash House, where there is a level platform with 2 stones 3 ft high, the remainder having fallen into the gill below and one still visible. The circle diam is 100ft and it is possible to see the Duddon Sands. At SD19298730, 2 large upright stones, both over 1.0 m high, and possibly the remains of a stone circle. Their situation, as given by Marjorie Cross, fits Houseman's description except that the Swinside Circle is approx 1 1/2 miles to the W.N.W. Surveyed at 1:2500 ft" (S1361) The smaller of the two stones remaining has a set of 4 parallel grooves, each about 1cm deep and 15cm long. See article on cup and ring markings in Cumbria in the 1989 volume of C&WAAS (S1863 p. 1- 19). The site is also included in a recent publication on 'The Prehistoric Rock Art of Cumbria' by S. Beckensall (S1620 p. 115-116).* (Archaeology data service, 2017)

However, Angie Lake was a fountain of knowledge as Jack and she dowsed the adjacent fields together looking for lost circles. Her photos and comments appear below, see Figure 15, p41]

The location of Swinside
[Insert from Megalithic Portal [5]]

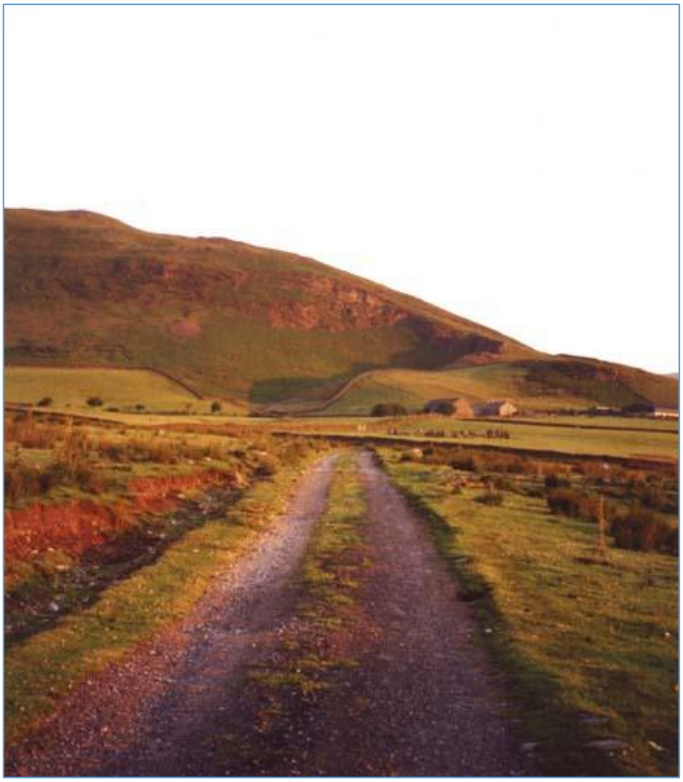


Figure 4 Trackway to Swinside. Photo by JME

Last week I said I have only reported what I have seen. This week I am going to have to make deductions from those observations, which doubtless some of you will say are 'nonsense', or are things you know already. Good. That means you are thinking about things and not just accepting someone else's theory. I am sure that a lot of what I am going to say will apply to most of the Great Circles, so why not go and have a look for yourselves. This week we return to Swinside for which I will not be providing a map as everything is centred upon the grid reference SD172882. [Actually, Jack did draw a map, see Figure 6 p26 and Figure 12 p35 for an inserted map by the editor]

[5] *(Italics denote insert from Megalithic Portal http://www.megalithic.co.uk/article.php?sid=2146412287 Part 8 - The location of Swinside)*

For thousands of years the area around Swinside has held a magical attraction to man, with a series of circles near … the present stone circle, and over 30 pre-Roman manmade sites within a two mile radius, as well as many more at greater distances. These sites vary from a single standing stone, to other more complex groups laid out with great care. In addition to these there are countless burial sites, perhaps over 900 for the South Cumbria area as a whole, as was quoted to me some years ago. I am certainly not going to count them! They vary from large round cairns of varying types, down to what look like single grave mounds of stones, which I am told are of a similar date to the Swinside circle. These single grave mounds resemble those I saw in Korea, where ancestor worship was still very strong and they appeared to be placed so that the occupant could watch over the family home.

Why did the ancient people originally choose this area? No one really knows and we can only speculate and make deductions to help our guesses.

It is possible that there was originally a small henge built first. This was not placed on the top of Knott Hill (off the picture to the left) [Figure 4] *as one might expect, but some 900 metres to the south where the view was very much better and because, it seems, the ancients liked to hide their sites from the unwanted visitor. This early henge did not use a line through Knott Hill, but another line, which is now the track across the moor to Swinside, as seen in the top picture* [Figure 4]. *This has at least two marker stones beside the track and points to the large carved rock on Wrayslack* [Figure 5], *which has a cut of over a metre deep made along its side for about 4 metres, and can only be seen when in line. It is best viewed when coming back from the circle along the track, or off the Main A595 opposite Hazel Mount drive at SD190869. Please note the rock is not on open access land.*

Figure 5 Wrayslack marker stone. Photo by JME

How to get to Swinside Stone Circle [see Figure 6]

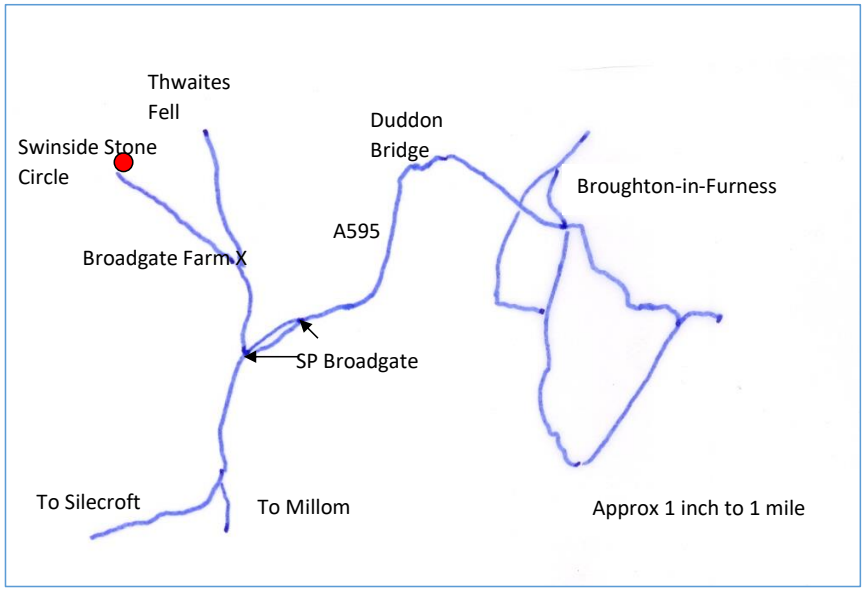


Figure 6 Map of surrounding area by JME

The stone circle is definitely worth visiting. Cars should be parked at the bottom of the farm track and the circle approached on foot, a walk of approximately one kilometre (¾ mile). Disabled visitors may take their cars up the track, but it is very rough.

Approach through the field gate, which is located on the western side of the circle. Note the tallest Stone no. 1, next to a small Stone no. 57, which is the North Stone. Numbering of the stones is clockwise from no.1 with Stone 29 being the Southern Stone [see Figure 8].

Within a two-mile radius of the present circle there are over 30 pre-Roman manmade sites. These vary from single standing stones to more complex groups.

The activities of the prehistoric people extended outside the two-mile radius zone with hundreds of burial sites in the parishes of *Thwaites*, *Ulpha*, *Bootle*, *Corney* and *Waberthwaite* in South Cumbria. They vary from large cairns of several types, down to what look like single grave mounds of stones. These single grave mounds resemble those seen in Korea, where ancestor worship was still very strong in 1951, and appeared to be placed so that the (deceased) occupant could watch over the family home. However, there is no firm evidence that this happened at Swinside. There are also many heaps of stones from clearing the grassland for grazing, which are often mistaken for graves. These generally are of a rougher nature, and only soil analysis will prove either way.

A copy of a family letter states that some of the Swinside stones were pushed over ready for blasting by contractors building a new barn at *Swinside Farm* in April 1808. Family folklore

says the destruction was halted by the estate owner making the journey from London within 4 days of receiving the letter, and insisted the stones were to be pulled back into line. The surveys in this paper have used only those stones that are still in the positions they were when first erected, with allowances for leaning, plus fallen stones 39, 53, 54 where the assumed sockets have been used.

The numbering system employed here is that which is used in the Cumberland and Westmoreland Antiquarian and Archaeological Society Transactions (C&WAA) diagrams [(archaeology data service, 2015)]. However, stone no. 25 does not nowadays exist, although it is shown on some other plans. Two stones are indicated (nos. 32 and 33), but from observation on site, the socket looks as if it only held one stone, although this can only be confirmed by excavation. There is no evidence of any stones having been removed since 1808.

My researches at Swinside stone circle began on 11th June 1992 with an early morning visit with my wife, Jane, to the site to watch the sun rise. While waiting for this, it became apparent that the centre of the circle was not in line with the skyline. It was also realised that in order to fix a position on the skyline it was necessary to look over 2 stones, a back sight and a fore sight, and this meant making all observations from the outside of the circle, across the circle, but not necessarily through a central point.

Figure 7 Swinside stone circle, shortly before sunrise 11/6/92 Photo by JME

The arrow [in Figure 7] shows the position of the gateway or entrance between Stones 18 and 20, with Jack in the circle.

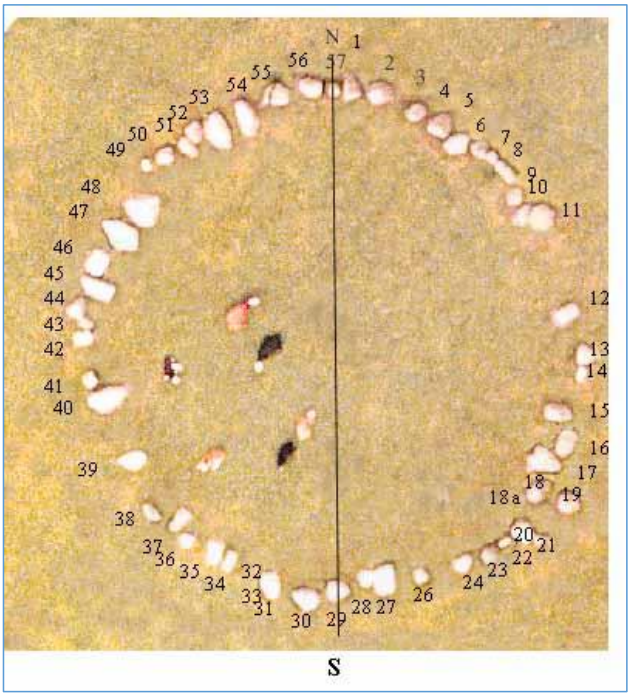


Figure 8 An aerial photograph of Swinside taken by Ed Cleasby in a microlite 10/5/2005.

I have left the cows in the photograph to remind people that this is a photograph. The numbering is that commonly used except that Stone 25, which is shown on some plans, does not exist and the two stones often indicated at 32 & 33 may perhaps only have been one, but it is difficult to say without excavation.

Excerpt from Megalithic Portal[6]

On the 28th November 2004 (near to the MMaSMNS) –[Moon Major Standstill Most Northerly Set] *I watched the moon setting over Raven Crag above Stone 49 from Stone 15 at Swinside, and then kept moving, so that the moon was just touching the slope. As frequently happens, the cloud blocked the view before it reached the bottom of the slope, but I know now that at this point I was actually close to another small circle, since seen as a cropmark on an aerial photo. On the ground the circle remains as a number of stones, which have been disturbed by field drainage operations.*
There is also an observation place in the next field for watching the sun do the same thing, as was seen on 21st June 2004.

I suggest they may have given up this small circle because the ground would have been very wet before the modern drainage system was put in and with the increasing population a

[6] Italics denote insert from Megalithic Portal notes
http://www.megalithic.co.uk/article.php?sid=2146412287 Part 8 - The location of Swinside

muddy mess would have been inevitable. Another consequence of the population growing was that they began to [build] much more impressive structures. The same thing appears to have happened at Burnmoor and Buttermere.

Stonehenge

(Grid Reference SU 122 422)

Although the stones at Stonehenge look very different [from] Swinside and Castlerigg, it is, like them, a marvellous scientific instrument. The key objective [was] to provide sun and moon calendars for general use, with added stones for religious purposes; otherwise the extra stones would not have been added. The later additions of the big trilithon sarsen stones have been so shaped that they do not interfere with moon alignments of the earlier blue stones, and add to the calendar sensitivity creating shafts of light striking targets incised on other stones at set times on certain days.

Stonehenge has some stones missing, making it very difficult to understand without the [unlocking] of Swinside and Castlerigg.

Locations [relationships between sites]

> [Jack has identified various chains of sites, all of which are very close to 14.1km apart. In addition each may have 'outstations', at the same distance (14.1km) from the central site. The editor has checked most of Jack's distances and bearings on the GIS maps and tables reproduced below agreeing with some and disagreeing slightly with others. The updated or originally correct measurement is in green font.]

Stonehenge

Stonehenge does not appear to be part of a chain, but was selected because of its amazingly level skyline, which varies by only about one half of a degree, except in the area where neither the sun nor the moon rise or set in the north in the area of *Lark Hill Barracks*. This is difficult to confirm because of the trees, which could not have been there when the monument was built, as they block the lines of sight in many places.

All of these circles have skyline markers, and like Swinside, Stonehenge does have a ring of outstations at about the 14.1 km distance. There are at least 7 outstations with several other possible ones on the circumference plus any in the military training areas. Starting in the north are: [Distances in square brackets are from Stonehenge, inserted by the editor]

1. *Everleigh Church* SU198542 [14.3km]. History tells us that St. Augustine suggested that his new churches should be built on pagan sites. Notes say [the] church has been rebuilt on [a] slightly different site. But why was it so positioned, when it is further north than either the sun or moon goes?
2. *Barrow plantation cemetery* is on the line of MSSR [Midsummer sunrise] at SU 229515 [19.7km]
3. *Sidbury Hill*, North Tidworth, SU 217507 [12.64km], which is at less than the 14.1km. This hill top would be visible from Stonehenge if there were no trees in the way (checked by GIS). There is a very old yew tree on the top protected by barbed wire, and vast earth works of an Iron Age fort.
4. *Road and path junction* SU233510 [14.3km].

5. *Grateley hill fort* SU264423 due east of Stonehenge [14. 2km]. The later hill fort will have destroyed the original monument.
6. *Pitton Lodge tumulus* SU 208308 [14.3km] at the bottom of the hill, which is a strange place to put a burial barrow, and marks the Moon Major Standstill Most Southerly Rise Full Orb position. See explanation in Chapter 13 The Moon.
7. *Baverstock Church* SU 028315 [14. 2km]. A very old church on a levelled mound overlooking the valley. Very near to Moon Major Standstill Most Southerly Set.
8. *Gore Cross* SU 009509 [14.3km]. Junction of main road A360 and track ways.

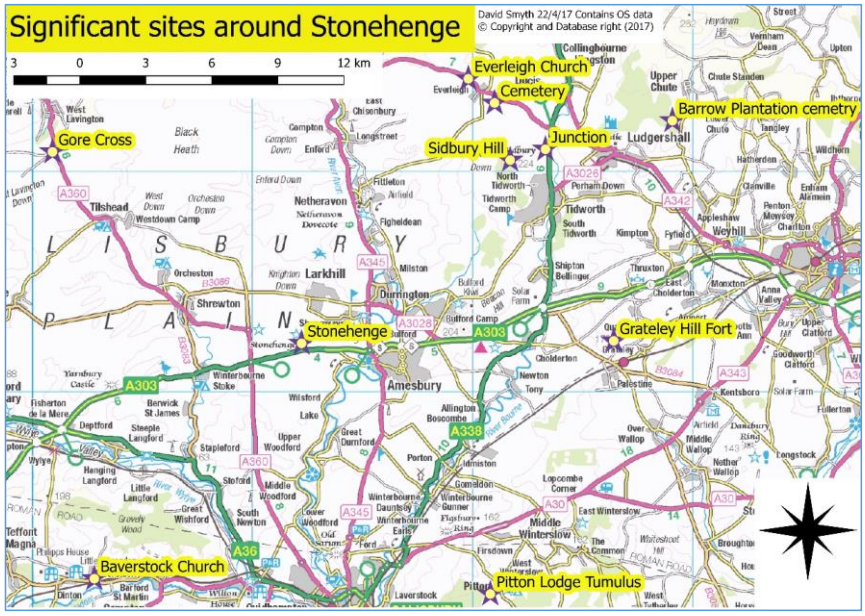


Figure 9 Sites around the 14.1k distance from Stonehenge. Map by David Smyth ©OS Data

Insert by Ed.	Distance from Stonehenge (km)
Everleigh Church	14.315
Barrow plantation cemetery	19.65
Sidbury Hill	12.64
Cemetery	14.1
Road and path junction	14.272
Grateley hill fort	14.182
Pitton Lodge tumulus	14.267
Baverstock Church	14.172
Gore Cross	14.299

Swinside

Swinside [SD17168817] is one of a chain of circles and other monuments running very nearly true north/south [89.3 grid] at a mean spacing of about 14.1km with some marker stones in between. [Figure 11].

The circles *Swinside*, *Brattshill*, *Buttermere*, *Elva Plain*, and *Walney* on this main chain have possible out-stations ie circles, burial cairns, road junctions and so on suggesting that there used to be something there – possibly just a standing stone, long gone now.

Castlerigg

Near Keswick, Cumbria
(Grid Reference NY 291 236*). [Distances in green, below, have been double-checked by the editor, and may confirm or be slightly different to Jack's measurements, in black]*

Figure 10 Castlerigg from the air. Photo taken 10/10/16 at 3:45pm with kind permission © Shaun Bunting

This circle is easily approached by car with a short walk up the field, which in wet weather can be a little muddy. [It] is clearly visible from the road and there are superb views all around from the circle itself.

The numbering system used is the one published in C&WAA Transactions [(archaeology data service, 2015)] with additional numbers used for the stones in the Sanctuary, which other people have chosen to ignore in most plans seen by myself.

Castlerigg appears to have one important stone missing, probably a small round one, number 37A, but the original packing stones are still in place. The rest of the stones appear in their original places with some leaning.

The Castlerigg site was adjusted so that it makes use of the main skyline features to mark the various sun and moon rises and sets, while being on one of the few reasonably flat areas in the district.

……. The Castlerigg site stands 13.8km from *Buttermere Lake* and 14.0km [14.1km] from *Elva Plain*, and almost symmetrically opposite the stone circle at *Above Branthwaite*. It appears that Castlerigg at the time of construction was considered a position of lesser importance, as

it does not appear to have any outstations, but it is included in this book, because it is here that the system of side stepping the moon markers was discovered and can be tested by anybody. [See Side stepping, Chapter 13].

To the east side of this main chain stands Castlerigg at 13.8km from *Buttermere Lake* and 14.0km [14.1km] from *Elva Plain*. On the west side of the north /south line, Stephen Hood in an article 'New evidence for Prehistoric activity in and around Dean Parish' in the Transactions of C&WAAS 2005 [(archaeology data service, 2015)] referred to a quote in an earlier article about an old, rough, stone circle near a cutting in the railway line. A search of the area about 14km from both *Buttermere* and *Elva Plain* was undertaken and in the corner of a field a pile of rough boulders was found, with 1 or 2 standing, now used as a gateway, at NY05917 24468 [marked "Boulders" on the map below]. Glacial erratics are not obvious in the area, either in the fields or in the hedgerows, where they are often moved when field clearing. The distance by GPS from this location to *Buttermere Lake* is 14.1km [14.2], and 13.8km [13.85] to *Elva Plain*. The intriguing thing is why and how?

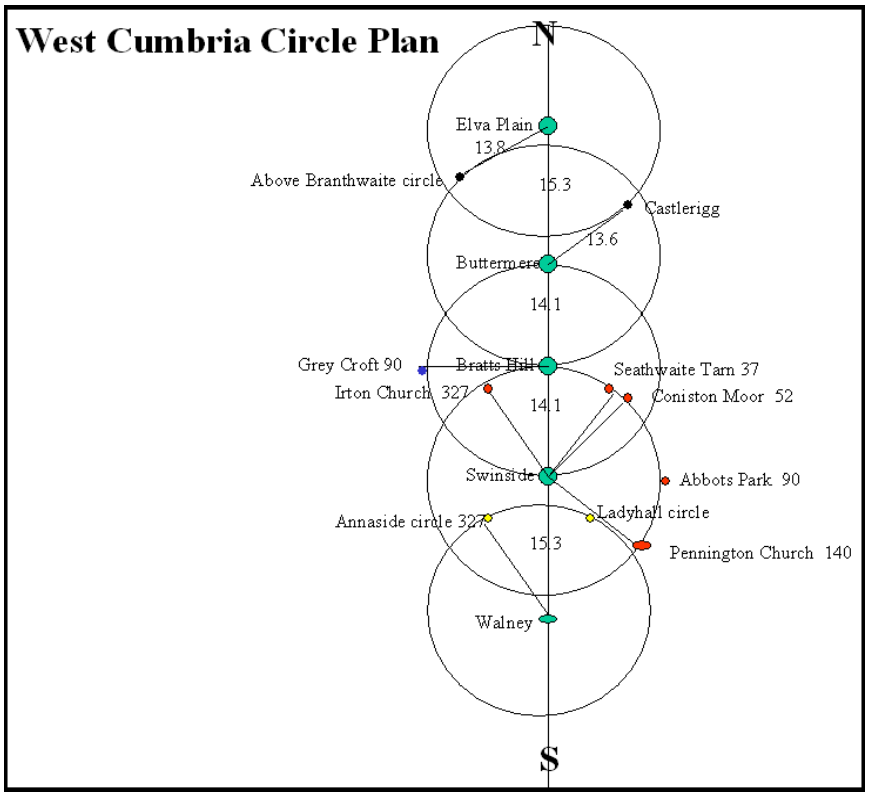


Figure 11 West Cumbria Circle Plan Drawn By JME

(This needs the coast drawing in) [See Figure 12]

New thought. It is possible that the original *Walney Island circle* was on dry land at the 14.1km mark from Swinside with Walney Island stretching rather further north than it does today or the Duddon flowed out down the Walney Channel, and then there may have been a big flash flood and storm, altering the estuary. Today Walney suffers from severe erosion threatening to cut the island in half. This idea comes from the fact that *Hall Foss circle* SD 112857 is on the 14km mark [13.9km from Walney Island Circle] and the *Druid's Circle* on Birkrigg SD 292739 is due east [of Walney Island circle?] at slightly under the 14km at 12.4km [12.3km].

The present *Duddon Channel* swings about from side to side. Ronnie Davis, the last mine manager at Hodbarrow Mine, Millom, said that before Seathwaite Tarn was built to supply water to Barrow, 2000 ton boats could use Millom pier [but] afterwards boats had to be restricted to 1200 tons. About 7or 8 years ago the dam was shut in order to reline the pipe and the Duddon switched back to the pier for that year.

> The spacing distance of the circles varies, according to topography, by up to a kilometre or more. From Swinside going northwards there is *Brattshill* at a spacing of

14.2km [14.3km], and on again *Buttermere Lake Edge* is at 14.1kms [14.09]with the remains of a circle to the north on the dry ground above the village with only a few stones left, in an area that has been well graded, at NY176172. The builders appeared to measure from the site at the edge of the lake, not the circle, judging by the distances to the other local circles, *Castlerigg*, *Elva Plain*, *Bratts Hill*, and *Above Branthwaite*. North again there is *Elva Plain* NY176317, at 15.3km [15.4km] from *Buttermere Lake*, because the 14.1km mark lands on very steep ground, and the circle was erected on good ground with a good sky line. This happens to be the same distance to a possible site on *Walney Island* south of Swinside [14.8km] as mentioned above. There is a change in vegetation in the circle area and it is near where the first flints were found on the island. This idea is supported by there being the remains of a circle near *Ladyhall* SD187863, which is 14km [13.3km] from the site on Walney Island. At the 14.1km distance there is a similar cemetery to that found above Seathwaite Tarn at SD2578699278, at the same distance and bearing from Swinside. [This, unnamed and unfound cemetery the Editor has inserted as projected at approx. 38° Grid and 14.1k distance, here labelled as '*Cemetery*'].

All these major circles on this N/S line have out stations at about the 14km distance as per diagram.

There is a broken line of stones stretching about 8 km southwards from Swinside to the base of the old cross in *Millom Holy Trinity church yard* (SD 171814) by the castle. The line is then destroyed, if it ever existed, by the town of Millom.

Insert on West Cumbrian Circles by the editor

This whole idea of regular spacings between sites seems to be innovative and significant. Dimitrios Dendrinos, on reading a draft of this paper, commented:

> *The 14.1km distance relationship Jack identified with his work is very important; it must be editorially emphasized. This spatial connection is a basic component of a Central Place Theory framework, which I have suggested in a number of my papers exists in the analysis of Neolithic sites in both the British Isles and the Fertile Crescent (and other regions as well, in fact it is a basic tenet of Economic Geography). Jack's empirical verification is a very important finding.*

Accordingly, the Editor drew a map incorporating the places mentioned in Jack's diagram of West Cumbrian Circles, including the coast, which he had meant to do (Figure 12). In order to do this, each place name and its exact grid reference needed finding; this was not possible in every case, as some of them do not appear on the OS map or elsewhere, and some may be confused with nearby sites.

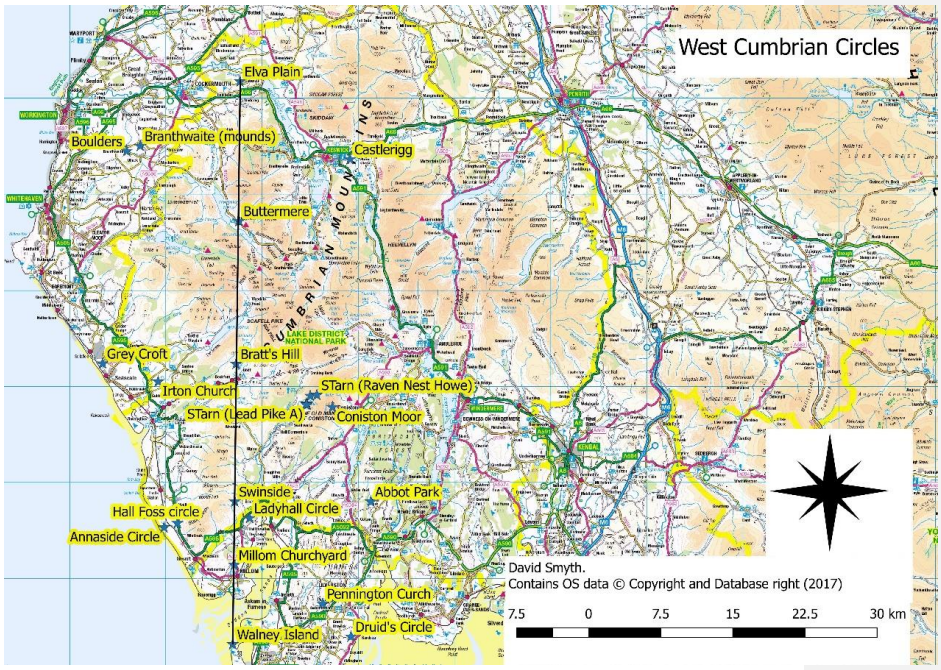


Figure 12 West Cumbrian circles. David Smyth © Copyright and Database right OS maps (2017)

Distances

From	*To*	*Km*
Elva Plain	Castlerigg	*14.1*
	Branthwaite	*12.3*
	Buttermere	*15.4*
Buttermere	Branthwaite	*13.4*
	Castlerigg	*13.8*
	Coniston Moor	
	Bratt's Hill	*14.1*
Bratt's Hill	Grey Croft	*13.8*
	Coniston Moor	
	Swinside	*14.3*
Castlerigg	Elva Plain	*14.1*
	Coniston Moor	
	Buttermere	*13.8*
Swinside	Bratts Hill	*14.3*
	Irton Church	*14.8*
	Pennington Church	*14.0*
	Walney Island	*14.8*
	Coniston Moor (Cairn on summit?)	*14.6*
	Seathwaite Tarn (Raven Nest Howe)	*14.0*
	Abotts Park [Abbot Park]	*14.2*
Walney Island	Ladyhall	*13.3*
	Hall Foss	*13.9*
	Annaside	*14.2*

Below is the Editor's attempt at identifying each site mentioned by Jack in the above diagram (Figure 11 p33).

Walney Island circle

Jack doesn't give a position for this site. The grid reference for the centre of the Island is SD1833268407, though Jack thought there might have been a circle, now submerged, just north of the island at about SD1688273804, which is on the foreshore just off Lowsy Point, at 14.1km south of Swinside. Accordingly, this, submerged position is used for the reference.

Hall Foss circle

SD 112857 Is now destroyed (http://www.megalithic.co.uk/article.php?sid=971)

The Druid's Circle

SD29247396 Latitude: 54.156557N Longitude: 3.085043W (http://www.megalithic.co.uk/article.php?sid=874)

Brattshill

Site Name: Brat's Hill Alternative Name: Burn Moor
Type: Stone Circle

Map Ref: NY173023 Landranger Map Number: 89
Latitude: 54.409406N Longitude: 3.275679W

Annaside Circle

SD098853

Pennington Church

SD263774

Abbot Park

Estimated at SD313880

Coniston Moor

There are no more details of where Jack positioned this; the moor covers a large area. For the purpose of arbitrarily deciding on a location, the Ed. has taken the cairn on the top of Coniston Old Man SD27895 97834 which is 14.13km from Swinside

Buttermere Lake edge

No sites are evident here, on the OS map, Megalithic Portal, nor the Archaeological Data Service (ADS). It is obvious Jack considered it an important location, on the N/S line, 15.4km from Elva Plain and 14.1km from Bratt's Hill. This puts it at NY1753915461 – at the north end of Buttermere Lake on the water's edge. The question remains: did Jack find evidence of a site here, or is he extrapolating to fit his theory? [Jane says he never found it]

Round Cairn at Raven Nest Howe Seathwaite Tarn

There are many cairns and possible sites in this area, and Jack has not specified a location for what he calls 'Seathwaite Tarn'. Accordingly the Editor chose the most likely site marked on the map – Raven Nest Howe, but Jack may well have meant somewhere else. The details for this estimated site are as follows, taken from the Archeological Data Service:

Lake District National Park HER
Site of a possible round cairn (a roughly hemispherical mound constructed primarily of stones, normally containing or covering one or more human burials. The mound may be surrounded and partly retained by a low stone kerb) or a ring bank (circular enclosure featuring an enclosing bank with no accompanying ditch) of Prehistoric date.

Possible burial cairn or ring banked structure 7-8 meters in diameter identified by Peter Rogers in November (S2853) and December 2001 (S1819).

Monument Type: Monument
Cumbria
Grid reference: *SD257991*
Map reference: *[EPSG:27700] 325791, 499103*
54.381859, -3.142723

Cite record using this URL:
http://archaeologydataservice.ac.uk/archsearch/record.jsf?titleId=2891298]

Comment on The Megalithic Portal:

The Brat's Hill and White Moss area is boggy moorland. The cairns are in close proximity to each other and it is estimated that there are over 400 of them in this one site. Some of the cairns seemed to be oval rather than round and ranging in size from what looked like 2m in diameter to 10m in length and about 1m high. The ones round in shape were probably 2m to 7m in diameter and about 1m high. There are five stone circles although we only visited three.

Brat's Hill circle is large and we counted about 40 stones forming an irregular circle. The diameter of the circle is about 25m perhaps more. There are 5 funerary cairns within this circle with 4 of them arranged around a prominent stone in the circle. (http://www.megalithic.co.uk/article.php?sid=23) by Alphasmam.

End of Editor's insert.

Swinside and route markers.

At Swinside there are at least three old routes passing close to the circle, but none of them go through [it], perhaps on the basis that you don't build a pub or a church in the middle of a cross roads. However, the true north/south line does go through Stones 57 and 29 as well as a standing stone, now fallen to the north at SD 17178 89327.

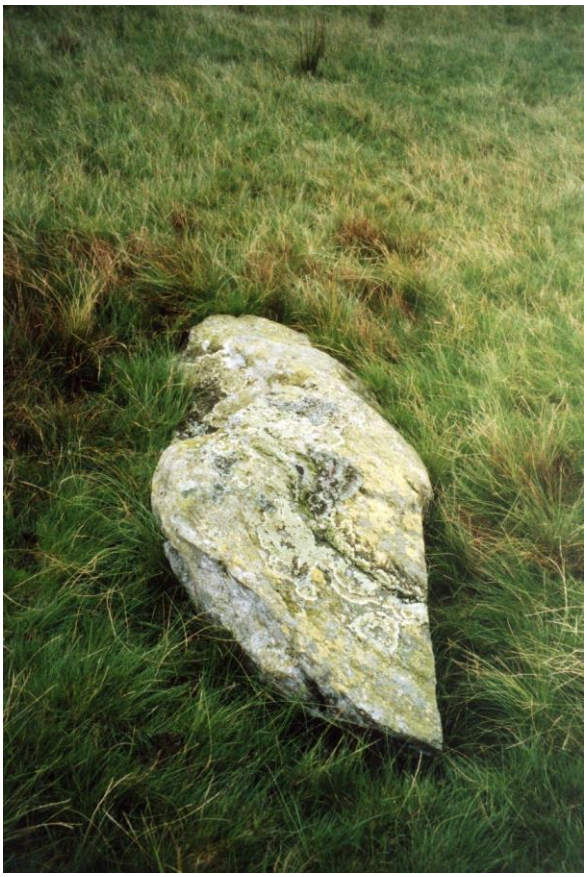


Figure 13 Fallen Standing Stone marking north from Swinside. Photo by JME

[The fallen standing stone in Figure 13] can only be seen from the circle when a marker is in place.

This line is fractionally out of true north, with stones marking a line to *Brats Hill* NY173023 and then on to the northern edge of *Buttermere Lake*, where the remains of a circle are, on the higher ground above the village with only a few stones left in an area that has been well graded, at NY176172. It appears that all the design measurements were taken from the lake edge site. The line goes on to *Elva Plain* NY176317, where the circle has been moved … to better ground. [This] equals the distance from Swinside to a possible site on *Walney Island*, where there is a change in vegetation in the area where the first flints were found on the island. The standard spacing of 14.1km would have landed the circle in the *Duddon Estuary*. This theory is supported by there being the remains of a circle near *Ladyhall* SD187863, which is 14km [13.3km] from the site on Walney Island. All these major circles on this N/S line have out stations at about the 14 km distance as per diagram [Figure 11 p33].

It is just possible that *Walney Island* stretched a bit further north and an earlier circle was on this land with outstations at *Hall Foss*, SD 112857, due east, but under the 14km, there is the

Druids circle on Birkrigg SD 292739, which would have marked the equinox. No geological evidence has been found for this theory.

The photo below [Figure 14] is taken from Raven Crag [SD17148 88242, to the WNW of the circle], looking down onto Swinside and the surrounding area. Prior to the present stone circle being erected at Swinside, it is probable that there was originally a small henge built first in line with Track 2, and another bigger circle in the same field.

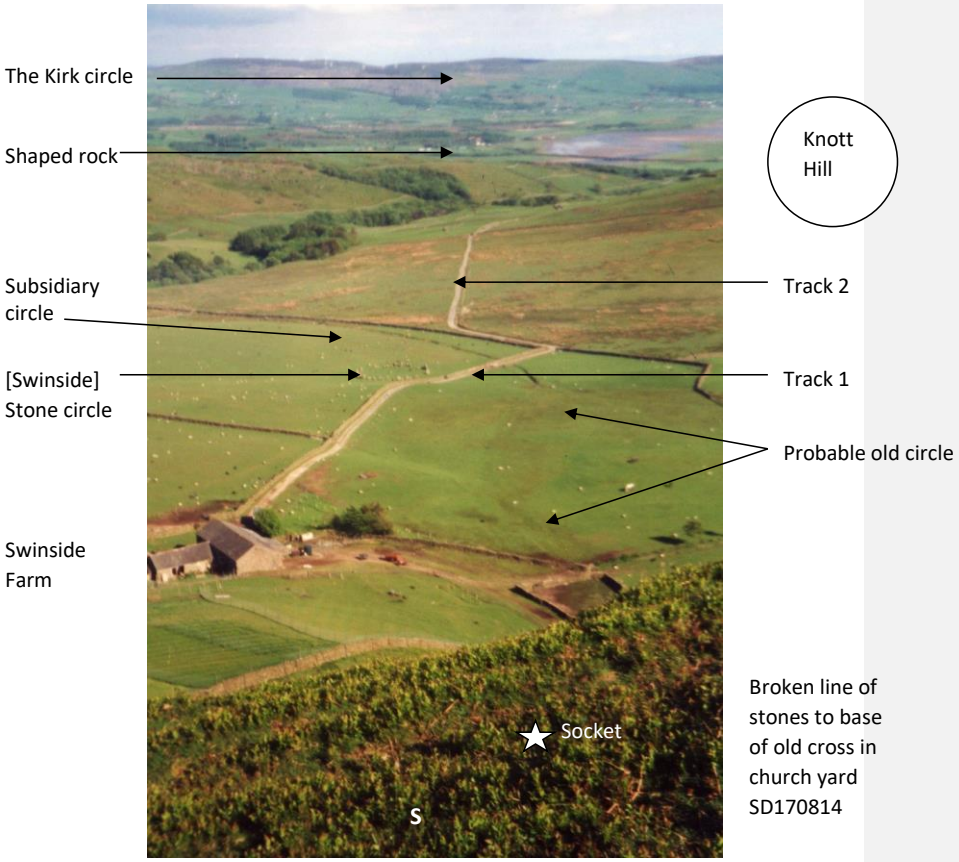


Figure 14 Swinside Farm and Circle

[Editor's note: The white star, 'S', 'socket' and reference to broken line of stones text boxes were discovered underneath this picture, not locked to the photograph so their positions are uncertain. The 'broken line of stones' refers to the old cross at SD170814 and is part of the remains of Millom Castle and old church 6km due South. This is marked on one of Jack's maps shown to the Editor. Jack mentions an old cross at Irton Church NY092 005 in the chapter on the Moon, see Figure 202 p211. The Kirk Circle is SD2507082693 to the South East beyond the Duddon Estuary. The shaped rock probably means the Wrayslake marker stone, Figure 5, p25 SD190869 . There is another megalithic site 500m to the north-east of this at Ash House standing stones SD19288729].

Insert by the Editor

Jack has mentioned dowsing for extra circles, tracks and alignments in several places in this narrative. For this purpose Angie Lake was closely associated with him and has kindly made available photos and comments that illustrate his research. Figure 15 shows Jack in the centre of one of these possible circles, marked by ranging poles. Another, larger one is to the right of the horse. A third is extreme lower left, marked by the leaning post, beneath the flock of sheep. Swinside main circle is out of sight to the left.

Figure 15 Swinside with possible associated circles ©Angie Lake

Figure 16 Dowsing day at Swinside. Jack standing in the centre of the (possibly) destroyed circle. Photo by Angie Lake 1st October 2005

Figure 17 Swinside possible circle close up ©Angie Lake 1st Oct 2005

Figure 17 is another view, with Knott Hill in the background, so looking South. Angie says: "One site was even overlooking Swinside circle from a small raised platform that had direct focus to the conical hill that dominates the area. Consequently it was quite a small circle, too."

End of Editor's insert

Track 1

The track which goes past the gateway into the circle field, points a few yards to the left *[presumably East]* of the trig point on Knott *Hill [the trig point is at SD 17444 87291 see Figure 18],* where there is a possible stone socket at SD 227718 *[This map reference must be a mistake on Jack's part as SD 227718 is right down by Furness Abbey].* The line continues across the *Duddon estuary*, along a footpath above *Furness Abbey*, where there is a marker stone at SD226718 *[The Editor tried to find this stone in 2017, but there was no sign of it at the stated map reference*]. This raises the interesting thought that perhaps there was something there before the Abbey was built. There is no other physical evidence for this. The line appears to continue to the hill above *Stank Farm*, *[Stank Farm is not marked on the OS map, but North Stank Farm is. Accordingly, 'the hill above' might be SD2326972206]* where the name implies a standing stone. Peter Acott dowsed around the socket while I looked over it, and noted every time the rods crossed to where the lines pointed, some natural, others manmade or at least man enhanced, radiating from Knott Hill. Unfortunately the field notes, naming the sites, are not complete. I am aware that dowsing is not accepted by some people, but they ought to accept that there are mysteries that we do not understand, and not deny anything to which a chemical [formula] cannot be attached. The trig point there is concreted onto a rock outcrop. Obviously the Ordnance Survey would not have known about the socket, which is quite lucky because if they had used it, it would have been concreted over. (List of targets?)

Insert by the Editor

Figure 18 Possible track from the small circle above Swinside towards the East of Knott Hill. Dowsed by Jack and Angie, picture by Angie Lake 1st Oct 2005

It is not clear which targets Jack was referring to here. However, assuming they were the places he mentioned above, the Editor drew a GIS map following the footpaths and place names Jack detailed. This was relatively easy to follow from Swinside to the Duddon Estuary, but then much less obvious from Furness Abbey, which is 12.2km away and on the other side of the estuary. One wonders how Jack knew the track re-started at the Abbey. It makes slightly more sense if the track re-started at the hill above Stank Farm (Actually called North Stank Farm on the OS map), then carried on to Furness Abbey but is still so far away as to lose its identity. See Figure 19 below.

Figure 19 Track 1 Drawn by David Smyth.

Both Jack and Angie mentioned possible route markers along these tracks without detailing where the closest ones to Swinside were. See Chapter 4 Wayside markers and tracks*. The Editor searched for these possible markers and has detailed four possibles below.*

Markers 1-4

Found alongside the main track to Swinside (as are all three). At 54.281422N 3.271634W + or – 7m. Top left shows the rough base. All other sides appear to have been shaped and smoothed. The triangular top in particular the Editor has noted as a common marker stone between sites.

Figure 20 Possible marker stone 01 Pictures by David Smyth 12:37 19/9/17

Rough base

Triangular top

Interesting markings

Triangular top

Figure 21 Swinside Marker 2. Pictures by David Smyth 19/9/17 12:44pm

Possible marker at 54.279762N, 3.267611W, + or – 7m, with pointed top, now lying flat along the present-day track, Swinside circle and farm in the mid distance.

Figure 22 Possible marker stone 03. Picture by David Smyth 12:50pm 19/9/17

Figure 23 Possible marker 04. Picture by David Smyth 12:51pm 19/9/17

Figure 23 shows the 4th possible marker alongside the same track. It is at 54.278217N, 3.264864w, + or – 7m

End of Editor's insert.

Track 2.

The straight road across the moor is on an ancient track with 2 marker stones to the side of it. Nearly always the prehistoric people walked just off the laid down line, as sensitive people find it uncomfortable to be on a line for long. It is noticeable that the track does not point directly at the circle, but to a cairn on the top of *Raven Crag* [NY 30345 18757, 33km to the NNW]. In the other direction [SE] can be seen a shaped rock on *Wrayslack* SD 185873 [Figure 5, p25]. This rock has been cut away about 1 metre deep, for nearly 4 metres and is best seen from off the main road outside *Hazel Mount gate* SD 188869. The line ends at the henge circle called *the Kirk* on Kirkby Moor *SD251827 [The Kirk stone circle is SD2507282699]*. The siting of this henge is the reason to suppose that there may originally have been another at the Swinside end of the line *[presumably Jack means the lost circle near Swinside]*. [Figure 5, p25, Wrayslack] is looking towards Swinside in the distance. The white mark on the walking stick is at 1 metre. This rock has at least two other uses when viewed from Swinside:-

1. As a marker for the Moon Minor Standstill Most Southerly Rise (see under Moon).
2. It is the last place on which the Mid-Summer Sunset (MSSS) lights up on the north side of the Duddon.

This is a long distance route [Track 2] between the ford at *Ravenglass* [SD 08288 96675], crossing the Crake at *Penny Bridge* [SD 30988 83291] before following the old lane across the fields to the ford over the *River Leven [No apparent ford marked on the newer OS maps, but two footpaths converge on a narrow part of the Leven at SD 34944 84027]*. Because of the rough terrain, prehistoric people followed the better 'going' across *Thwaites Fell* [SD 17672 89339] where today's road runs, while keeping to the general direction. [See map

below drawn by the Editor, Figure 24].

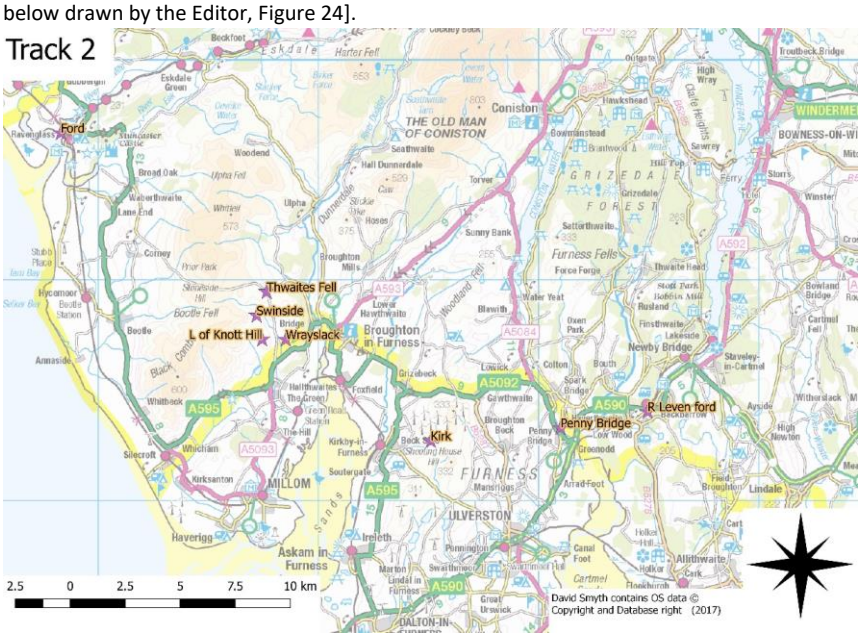


Figure 24 Track 2 drawn by David Smyth ©OS maps

Insert from Megalithic Portal [7]

We look down on the Swinside circle and see how the main track leading across the moor does not lead to the circle. The track past the gateway into the circle field points to the left of the trig point on Knott Hill, where there is a possible stone socket. The same position is suggested by several of the other lines that centre upon Knott Hill. The trig point there is concreted onto a rock outcrop away from the old point where this socket is. Obviously the Ordnance Survey would not have known about it, which is quite lucky because if they had used it, the socket would have [been] *destroyed.*

We continue on across the Duddon estuary, to the henge called 'The Kirk' on Kirkby Fell as seen again in this photograph [Figure 14 p40]. The sighting of this henge is reason to suppose that there may originally have been another at the Swinside end of this line, particularly in light of the amount of work required to carve the rock on Wrayslack.

The idea that the ancients did not want everybody to find the site at an early time is further borne out by the North Stone (f) on Thwaites Fell which is positioned below the crest when viewed from the old track/road across the Fell. This route would have superseded the original coastal track marked past Swinside circle, between the places where it is possible to cross the three estuaries.

In the earliest time, a network of routes [was] laid out across the country. These seemed to

[7] *Article 8 http://www.megalithic.co.uk/article.php?sid=2146412287 Part 8 - The location of Swinside:*

go from natural marker to natural marker with manmade ones in between. Unfortunately these lines often passed through places which were difficult to walk with comfort, so man being man, they did not follow the lines exactly, but bypassed things like cliffs and very wet or very steep ground. Today it is fun to see why they moved off line. At Swinside several of these old tracks cross close to the circle, but none go through the present circle with the exception of the N/S line, which was not followed as a track in this area. They were following the age-old principle that you don't build in the middle of the crossroads, but on the corner site, and they did exactly that.

Another point of interest in this photo [Figure 14 p40] *is the faint outline of a large circle in the right hand field (the one with the white cow in it). In Hutchinson Cumberland, published 1794* [(Hutchinson, 1794)]*, there is a description of another circle 'being much dilapidated and to the south'. This is to the south of the farm steadings, not as many have assumed from the present circle. The stones from this large circle were used to build the farm barn in 1808.*

Dowsers often claim tracks coming out of the circle, but these are force lines indicating the major sun and moon rising and setting positions. This is one of the mysteries, which is beyond many people.

Single standing stones were often used as way markers as best seen in Caithness where large standing stones are seen above most of the road junctions. Today they are often used as boundary markers, but it is very debatable if they were erected as such or if the boundaries were laid out later using the existing standing stones. Who was able to organise this network of marked routes remains unanswered, but those readers interested in way-lines should refer to the work by Alfred Watkins. [Presumably (Watkins, Early British Trackways, Moats, Mounds, Camps and Sites, 1922)]

Most of the great circles of the Swinside series were built near a junction of the old straight tracks – including Castlerigg (NY291236), and the Rollright [Stones] *(SP296310) on the Warwickshire/Oxfordshire county border. Also, Stonehenge has 2 major roads meeting nearby. There are two exceptions where this does not apply: at Avebury (SU102699) where the road goes through the middle of the big circle with its vast ditch and bank, but avoids the smaller circles* [Figure 25], *and Brats Hill on Burnmoor in Cumbria, where the peat has buried any sign of a track system, and no one would want a road there today!*

Figure 25 Avebury. Showing the Swindon road going through the circle. Photo by JME

[End of Jack's insert]

Insert by the Editor

Jack's idea of ancient trackways makes sense: people walked between the sites, coast, rivers and so on, though his listing of the waypoints is rather hard to follow as they do not seem to be linearly defined, but included in what sometimes seems to be a random order. Track 1 (Figure 19 p45] 'jumps' SSE 12km across the Duddon estuary down to Furness Abbey, then back NW to North Stank Farm, which is closer to the starting point. Track 2 (Figure 24 p50) also 'jumps' wildly. Perhaps Jack sometimes noted the various points along the tracks individually in an ad hoc manner, without ensuring they followed each other consecutively.

One wonders how Jack calculated where these tracks went in the past, with little physical evidence available. He may well have used dowsers, which he mentions several times, though then he rather dismisses this idea himself when he says "Dowsers often claim tracks coming out of the circle, but these are force lines indicating the major sun and moon rising and setting positions. This is one of the mysteries, which is beyond many people".

End of Editor's insert

[Scotland to Carnac]

This N/S line appears to stretch north through Scotland with *Guide Best Circle* [Guidebest] in Caithness ND 181351 being about 2kms out by my calculations. To the south there are several sites through Wales and on down through Somerset. GPS shows the line misses *Carnac* in Brittany by about 11kms.

Chapter 2 The Ice Age and Stones

27/12/2010

The story has to start with the last Ice Age, 12-14000 years ago, as no above ground man-made construction in central and northern Britain [would have] survived the grinding ice. As it melted it left behind the boulder debris called erratics, which are rocks ripped out, rubbed smooth, and often transported long distances, before being deposited. These later became the building materials for many of the stone arrangements in northern Britain.

Whilst the ice age ended long ago in Britain, glacial activity can still be witnessed in countries such as Greenland.

Pictured below is the "*Twin Glaciers*" in *Dyneas Fjord*, Greenland, visited by the author in 2005. One arm of the glacier empties into the fjord and the other limb melts on dry land - a truly magnificent sight with the ice invisibly moving down the slope. The ice falling into the water was predominately a white ice cliff face, whilst that melting on the land was distinctly dirty, polluted by thousands of years of debris from the air concentrated on the top of the ice, eventually running away as cloudy melt water.

Figure 26 The Dyneas Fjord, site of the Twin Glaciers in Greenland 29/08/2005 Photo by JME

Here [Figure 26] the ice is melting on land. Note the overhang of the ice.

Figure 27 This glacier is melting into the fjord. After a few years seeds blow in and vegetation starts, and the visitors arrive. Photo by JME posted Nov 2002

Ice melts from the top, the front face and underneath by the heat from the ground below. As it melts it is possible to look up underneath the ice and see rocks of varying sizes hanging in the ice. The smaller bits fall out of the ice first while the bigger ones are held a while longer before falling out. Sometimes the larger boulders (1-2 metre size plus) fall onto the other smaller pieces, which then act like packing stones and prevent the larger rocks from rolling down the slope.

Skyline Boulders

The photo below [Figure 28] shows several stones clearly on the downstream side of the ridge at the *Twin Glaciers* in Greenland where no man has probably ever set foot, and if he had, has certainly not erected them all.

Figure 28 Boulders left by the glacier at site of the Twin Glaciers in Greenland 29/08/2005 the ice is on the left. Photo by JME

These boulders can be seen throughout the Lake District as remnants of the Ice Age. The biggest collection of perched boulders is seen in the *Seathwaite Tarn* area at the top of the *Duddon Valley*, Cumbria.

Figure 29 One of many boulders to be seen from Swinside Circle on Barrow Hill. SD185887 Photo by JME

Figure 30 An Ice Age Erratic near Swinside, which may have been erected as a standing stone, in line with the stones in the circle. 244 Photo by JME

At Castlerigg only locally found glacial erratics have been used with only one stone (Stone 11) having a very obvious slot cut into it, which looks as if it is fairly modern judging by its sharp outline, but it is impossible to age the cut.

At Swinside several of the stones have been split from an erratic as shown by their having at least one side where the corners have been rubbed smooth. As at Castlerigg all the stones at Swinside have been carefully selected for their basic shapes.

Stonehenge is primarily made up of worked sarsen and blue stones which are not glacial erratics, but come from naturally occurring exposed rocks. Most of the blue stones could well be in their original shapes as found in the Preseli mountains in south Wales. There are some stones of traditional shapes as found at Swinside and most other circles, with their shapes described in more detail in Chapter 14, Stone Shapes. This must be because of their important position[8]. There are the five stones 46,47,48,49 and 31 (see plan below) [Figure 31]. They cannot be anything to do with the midsummer rising sun as they [are] hidden behind the stones of the outer ring. Another group in their traditional shape [is] 160a, 160b and 160c as round Bun Altars in the middle, [plus] another group is between the outer ring and the big sarsens. [This plan is reproduced under the terms of the Archaeology Data Service copyright ©English Heritage (RMJ Cleal, 1995)]

[8] Note from Angie Lake: This sentence needs altering or re-writing, I think. It's like thinking aloud, and needs something else regarding the placing of certain-shaped stones.

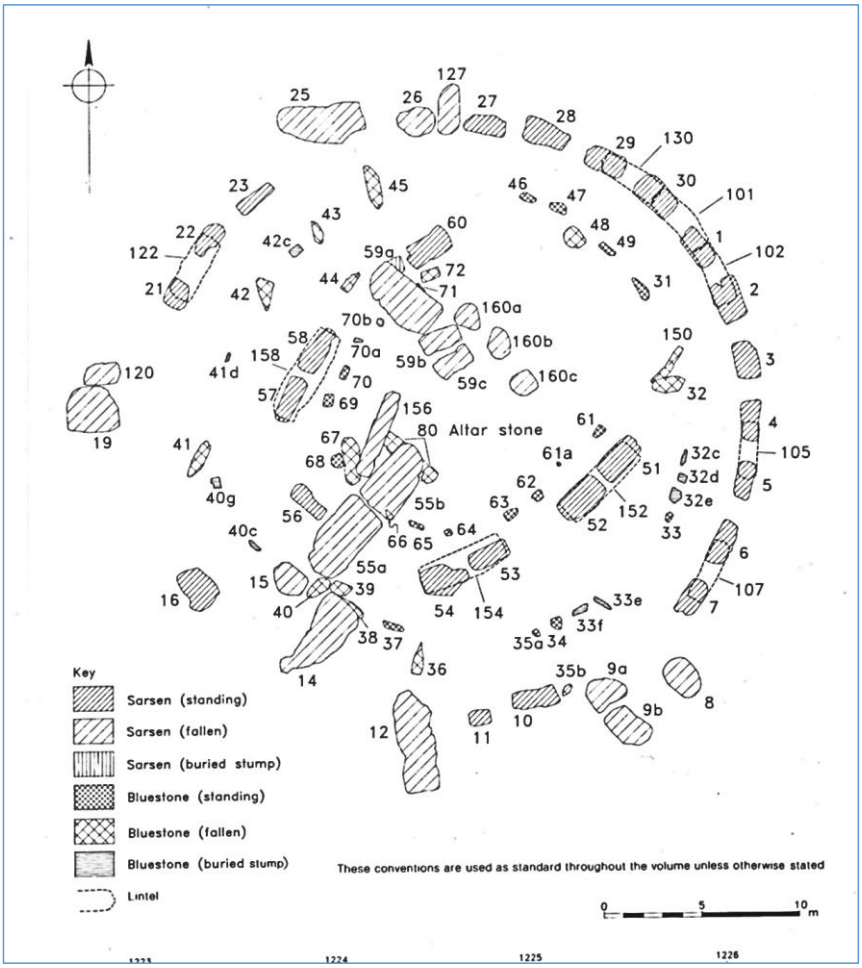


Figure 31 Plan of stone settings fig 14 from 'Stonehenge in its landscape' page 27 Published by English Heritage. (PNA) Reproduced under the terms of the Archaeology Data Service copyright ©English Heritage

We are told that the big sarsen stones came from the Marlborough Downs and were worked there to reduce the weight before moving. The author suggests, with no other evidence than observation of the river systems, that they would have been fitted with a floatation collar, probably of dried reeds, so that the stones floated with their tops level with the water, making use of the displacement of the stone to reduce the amount of extra buoyancy required. They would then have been floated down the Kennet to Hungerford in winter when there would have been plenty of water in the river systems, and then back up the river Dane to the area of Crofton Pumping Station, near Burbage. A short overland portage would then have taken place with a rise of only some 50 to 60 feet (around 20 metres) judging by the canal where the lift is 40 feet plus a cut and cover tunnel, with the main railway line crossing over the canal at this point showing it to be the easiest route through the higher ground.

This area has not been walked [by Jack], as the engineering works for both the canal and the railway line will have destroyed any evidence there might have been.

The stones would then have been floated down the Avon to the end of *The Avenue* at West Amesbury where the ground is reasonably hard for a landing place. Anybody who has seen these valleys in flood can well imagine these stones being floated this way.

They would then have been moved up the Avenue over the *King's Barrow Ridge*. The excavations in 2008, under Professor M. Parker-Pearson [(Pearson, n.d.)] near the top of the Avenue, appear to show where timbers had been laid as rails over which the stones were pulled on rollers. [See Figure 32 and Figure 33].

Figure 32 2008 excavations photo A [Reproduced with the kind permission of Professor Mike Parker-Pearson see editor's note, below].

Figure 33 2008 excavations photo B [Reproduced with the kind permission of Professor Mike Parker-Pearson].

These 2 photos [Figure 32 and Figure 33] show rounded depressions, made by logs of wood laid as rails*. [Editor's note: I contacted the professor, and he said "Unfortunately the caption is wrong - there were no traces of wooden rails (I think he must have been referring to the periglacial fissures, natural features coincidentally on the line of the Avenue - see the attached publication).* (Mike Parker Pearson, 2016) *The publication is reproduced in Appendix A]*

The depth of these depressions suggests that the stones were moved when the ground was very wet, consistent with the suggestion that the stones were floated along the Avon when in flood.

The peasant farmers would have little to do during the wet winter months, so their labour was available without upsetting the growing of food crops, with the livestock being looked after by the womenfolk. Historically these peasants/tenants would have been bound to supply service in the form of rent, labour and fighting men to the tribal chief/landlord in return for the leave to occupy their land. This system was universal throughout the world, and went on until fairly recently.

My [own] farm bought its freehold in 1746 (being freedom from servitude, liability for so many days work for the landlord and liability to be called up for military service), but was still liable for a rent charge of one tenth of the estimated (by the landlord) of the crop [payable] to the landlord, which later went to the Church, until taken over by the Crown in 1841. (Tithe Redemption Maps).

Traditionally, European wars were not started until the harvest was in, and the saying was the boys would be home for Christmas. This system supplied all the labour needed to shape the stones, transport them to site and erect them, and over the years build many of the barrows connected to Stonehenge.

This suggests that *Durrington Walls* was the construction camp with all the usual facilities. The press reports on the 'Riverside Project' excavated under Professor M. Parker - Pearson

show many hut sites and evidence of killing pigs for sport by the higher society members, well beyond the number required for food, as we see today with pheasant shooting.

As they were moving these big stones in the wet of winter, mud must have been a problem, which needed scraping off the surface so that the pullers could keep on their feet. This mud then made a bank either side of the Avenue, which has now been ploughed out leaving only the filled in drainage ditch. Probably, originally they went up the gentler slope to the west of the present line from the dip, and then moved the Avenue to its present line so that it gave a ceremonial route for both the rising midsummer sun, when at Full Orb plus, and the Full Orb setting midwinter sun.

The blue stones were probably again transported by water, coming up the Avon to *Lake Village* SU135391. The valley has been extensively engineered with weirs and sluices every half-mile or so, to make water meadows and it is now virtually impossible to guess where the river went in prehistoric times. As farming techniques developed, the water meadows were flooded in winter to fertilise the grass, producing at least 2 crops of hay each summer when the water level was very carefully controlled. Today modern farming methods and equipment have reduced the necessity to use these methods, and the water meadows have lost their original use.

These blue stones would then have been dragged up the valley past *Spring Bottom Farm* and on up the moderate slope to cross the *Normanton Down ridge* on the track that leads directly to the site.

Area map required. [Never completed, unfortunately].

Chapter 3 Timelines and Tools

Before the last Ice Age, the British Isles, as we know them today, were inhabited by hunter-gatherers using caves for shelter as they moved around. It is in these caves that evidence of their existence is found. Chris Salisbury reports in C&WAA 1997 [reference not verified] on his and others' findings, of evidence of habitation below the stalagmite floors of the caves in *Blenkett Wood,* Allithwaite in Cumbria SD391756. For many hundreds of years of deep ice, there were no resident humans in the area, then as the ice retreated the hunter-gatherers returned following the animals, and at an early date set up a camp on *Heysham Head*[9]. There are reports of lithic scatter in the area and I was shown a pecked mosaic in the rock below the cliff. This camp appears to have been sited where the migrating herds crossed Morecambe Bay, on a suspected hard ridge, when the sea was much lower, before all the ice melted [and] the British Isles became separated from the continent of Europe. There is much evidence that prehistoric people continued to trade with Europe, because Baltic and other European amber was found during field walking under direction of Chris Salisbury at the *Gleaston [water] Mill* site on the Furness Peninsular, Cumbria SD260711.

Investigators into the development of the stone circles have failed to provide conclusive evidence as to exactly when after the Ice Age the great stone circles were built, despite the availability of various scientific dating techniques and work by archaeologists. The generally accepted idea is that most of the developments took place over a long time between 3500BC, possibly earlier, and 1500 BC, being considered the end of the Stonehenge period. Before these dates it appears that human development in the British Isles was slow, probably over several thousand years.

Civilisation progressed with the Stone Age hunter-gatherers using stone axes, arrows and other stone tools. As nomadic people, it is unlikely that the hunter-gatherers erected any stones. Then gradually they become more settled and started to grow food crops. An early settlement relating to this period is known to have existed in the area of *Eskmeals* on the west Cumbrian coast in grid square SD 0891.

The original clues to these sites were found by P.J.Cherry and his wife, finding many lithic scatters of stone tools and chipping flakes. In all, they collected 60,714 from the Cumbrian coastal area, mainly between *Haverigg* and *St Bees*[10]. This area has sharp sand suitable for grinding and polishing stone axes. The conclusion report is in C&WAAS 2002 [Cumberland and Westmorland Antiquarian and Archaeological Society] with references to 24 of their

[9] Note by the Editor: Neolithic or New Stone Age Man were about five and a half feet in height. They made weapons from Bluestone, teeth and horns, binding them to wooden shafts with green hide. There are stone axe and hammer heads from the district in Lancaster Museum of great size and weight, one of these weighing eight and three-quarter pounds. This New Stone Age lasted thousands of years, and relics show that 2 distinct races of men must have been in this district, first the long headed men, these being followed by men with a much rounder type of skull. Some of the burial places for their chief men called Barrows are intact at Heysham. (The History of Heysham, 2017)

[10] The Editor found this: Field surveys have revealed a substantial number of lithic scatters on the south-west Cumbrian coastal plain and the eastern limestone uplands of Cumbria. The raw materials used for toolmaking in the two areas show interesting contrasts, including predominant use of Irish Sea beach pebble flint in south-west Cumbria during the Late Mesolithic and Neolithic, with minimal importation of chalk flints from Yorkshire and (possibly) Antrim during the Neolithic. (Cherry, 2017)

previous articles. The article mentions many others who did pollen research and others who found the remains [of] hearths and huts etc.

It looks as if summer camps were set up above the tree line in the hills behind *Eskmeals* where I have found a possible line of stone hut walls on the north-east side of the Seat above *Devoke Water* SD165 972. These are unlikely to be shepherd's sheilings as they are close together, whereas shepherds guarded their sheep separately in their own grazing areas.

The Stone Age evolved into the New Stone Age or Neolithic civilisation, with people living in settled habitations. It is likely that these people were responsible for the development of route markers, prediction sites and long barrows, utilising stone axes to cut wood and deer antlers as picks. I am not qualified to give a numerical date when these changes took place; all I can do is make an informed guess at the order in which I think things happened. I am well aware that others think differently, so I hope this book can add to the debate.

Gradually the Neolithic era progressed into the Megalithic period, marked by the erection of large stones in stone circles. Around this time copper was found (the biggest mine was on the *Great Orme*, Llandudno) and made into tools but these were very soft. A copper/arsenic axe was found at *Gleaston Mill*, Furness (SD 260711) by Chris Salisbury. It is believed to be dated between the pure copper axe and bronze axe periods, when tin was added to the mix, but I think it is more likely these copper/arsenic axes were the result of using the local copper ore with its high arsenic level.

The Bronze Age was so-called after the use of bronze in tools and weapons. This made Cornwall's tin very important. Throughout this period there was still a big trade in stone axes from *Langdale*, located in the centre of the Lake District, Cumbria, which were brought down to the [coarse] sandy beaches to be polished to make ceremonial axes. These axes were never, or rarely, used to cut wood, because working stone axes needed to be re-sharpened by chipping/knapping and there is little or no evidence of these polished axes ever being re-sharpened. More often these polished axes are found broken in half as 'offerings' in water and sometimes in burials.

The development of the stone circles and other stone arrangements did not just appear but evolved as civilisation developed and tools improved, over thousands of years.

Chapter 4 Wayside markers and tracks

02/01/2011

Landscape typography was very important to prehistoric people. During the Neolithic period, they often selected and utilised the ice age erratics as wayside markers on the old tracks between natural skyline markers such as hill tops, and natural clefts in the skyline etc.

The combination of old tracks and wayside markers was first spotted by Alfred Watkins and first published in “Early British Trackways” (1922) [(Watkins, Early British Trackways, Moats, Mounds, Camps and Sites, 1922) and a modern version at (Watkins, Early British Trackways, Moats, Mounds, Camps and Sites, 2008)] and then later in his book “The Old Straight Track” (1925). The work caused a great deal of debate at the time and 80 years later, there are still many readers who refuse to accept his findings.

This way-marking is universal across the whole country. A tremendous amount of energy was spent on the placement/enhancement of these markers, but who could have organised this system remains a mystery. However, they did not slavishly follow straight lines, but diverted to miss bogs, cliffs or climbed to the top of steep hills by taking the easier route on flatter ground around the bottom of the hill before returning to the line.

Chapter 5 Prediction sites.

22/03/2011

There are very few days in the year when the sun rises or sets in a clear sky, down to the level horizon, in the British Isles, so prehistoric people devised a system using shadows to measure the height of the sun when above the low cloud. This normally occurs sometime after sunrise and again before sunset. The system works because the sun always passes through the same azimuth, being the bearing along the horizontal at the same time each day, as with a sundial. Only the elevation, being the vertical bearing, of the sun alters with the date. Now[adays] the sun does not go as far north or south at the solstices as it did at the time of construction (by about 1° less), which causes minor inaccuracies at the solstices.

Prediction sites are the most common stone arrangement in the British Isles, after field clearance piles and burials, and are the basic principle of all sun observations.

At these prediction sites a pointer stone casts a shadow down a row of target stones over a period of several days. There are stone rows, which are not prediction sites, and must have other uses as they go much further than any shadow could ever reach, and often go over the crests of a hill. The shadow from the pointer stone swings over the row at the same time every day, providing the vertical or time element [Figure 36 p67]. The shadow gets shorter as the sun rises higher in the sky, according to the date leading up to the summer solstice, and longer as it moves towards the winter solstice. Travelling in an arc, the height of which rises from … low in midwinter to its highest at midsummer, with north/south rows working on mid-day sun time. At a given date the sun will always be at the same elevation each year at the same time. The length of the shadow gives the horizontal or date element. The shadow length will alter every day until the festival day (or other annual event) arrives, when it will reach the target stone either at its base or in some cases just leaves the very top in light. By experience of years of watching, people knew how many days each stone was

away from the festival, so that the ceremonies took place on the right day even when the sun was not visible due to cloud, or rain.

Insert from Jack's 12th article in Megalithic Portal[11]

At these ancient prediction sites, the system is arranged to cast two shadows down a row of target stones, working over several days. One of the shadows is normally created by the ground or crest and this gets longer at sunset. Daily as the sun gets lower in the sky and vice versa at the sunrise, this shadow gives the 'Horizontal Cursor'. On a given date it will always be the same length. When this ground shadow reaches the bottom of one of the target stones in the row, at the same time a shadow from the pointer stone swings over the row, providing the 'Vertical Cursor'. This covers the target stone of the day, in many cases leaving the top in sunlight, thus measuring the height of the sun on that day. Using this method the ancients would have been able to count the days to the Solstice or other Festival in order to ensure their activities were carried out on the correct day, despite the cloud cover. The sensitivity of the prediction was often enhanced by utilising a slope [Figure 36]. *The same system appears to work for the moon by focusing on the Minor Standstills, but none of these have yet been observed to their conclusion.*

There are several variations of the principles of the vertical and horizontal Cursors. The Neolithic people must have been in possession of this knowledge to build their tombs which were designed for the Sun or Moon to reach the back wall, as at Clava as per Dougie Scott's CD-Rom 'Watchers of the Dawn. (Scott, 2009)[12] [The Editor contacted Dougie, who replied: "The trouble is with the shot that Jack mentioned is that it is badly blurred and it does not actually do what I thought it did at the time I spoke to him. I do not to share my pictures, as I intend to use them in my own publications."]

At an early period, natural rocks were used. Later, they set up single stones with small ones on the crest, up to very large ones erected some distance away. The system is a little inaccurate at the solstices, but is very precise at the equinox. I hardly dare suggest that if the Loughcrew pictures had been taken on the day of the actual sun's equinox and not the modern calendar date, and if the cloud had behaved itself, the sunlight would have lit up the whole of the back wall plate. At Loughcrew [the Editor found this picture on the Portal, ***Figure 34****, by Nick* Lievense *which illustrates Jack's words] the top lintel measures the height of the sun with the walls of the cairn to the left and right acting as side vectors or cursors. The sill is there to prevent the same effect occurring on another date when the sun is lower in the sky, as it cuts out the*

[11] ***http://www.megalithic.co.uk/article.php?sid=2146412336***

[12] [Available from The Megalithic Portal, Ebook and DVD http://www.megalithic.co.uk/shop/douglas_scott_watchers_of_the_dawn.htm]

sunlight from the bottom of the back stone. Only on the exact day will the whole stone be illuminated.

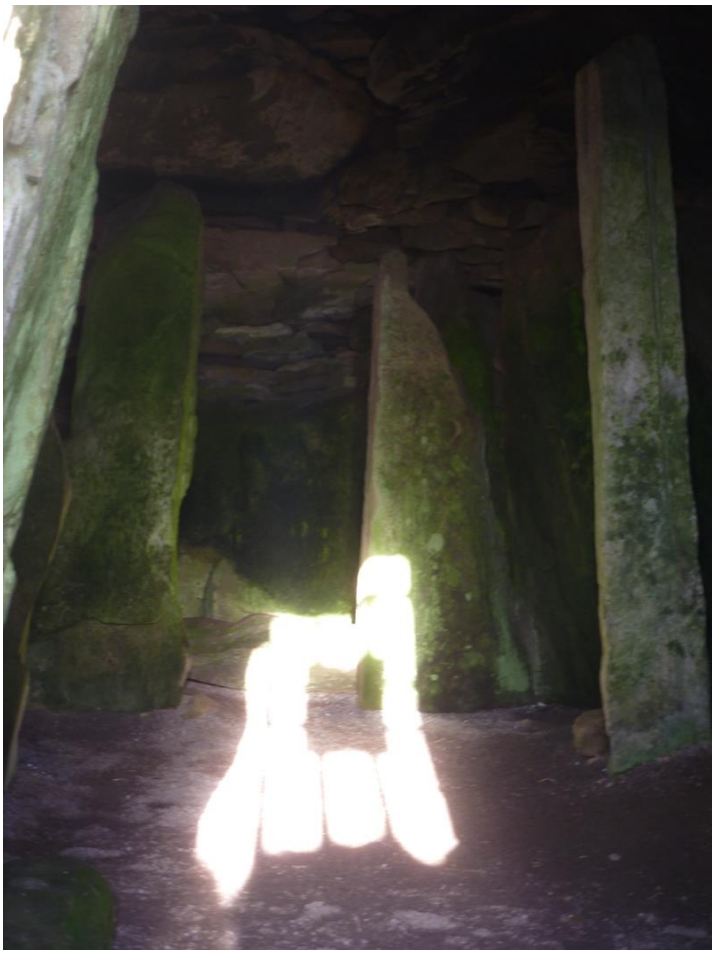


Figure 34 Loughcrew. Light entering chamber, 1 hour after sunrise, [the] morning after Spring Equinox. Picture by kind permission of Nick Lievense

The same principles were employed by the architects of the stone rows. To take a look at the target stones there in closer detail, some of the stone rows, which run due north/south, are laid out so that the shortest shadow occurs at midday on the midsummer solstice, or the longest at midwinter. It is possible that the double rows may comprise one row for days before the Solstice and the other for those after, but many more observations are needed to confirm this theory. Some of these rows continue on way past where the midwinter shadow reaches, and in some cases, as at Shovel Down in Devon, one of the double rows even goes over the next crest. Why?

This must be a further system about which nothing is yet known, but it is a phenomenon that has been noticed at several sites.

Insert by the Editor

Figure 35 Shoveldown double stone row 3. Picture by kind permission of Martyn Copcutt

Martyn Copcutt posted this picture on The Megalithic Portal and said:

> Double Stone Row between SX65908620 and SX65948603 making up part of the Shovel Down complex of sites on eastern Dartmoor.
>
> Shovel Down double stone row 3 is again a typical Dartmoor avenue, and can be seen just to the west of the fourfold circle and double row 2, running off to the north, in a bit more of a westerly direction than row 2. The remains of this avenue are about 160 metres long, but there is not a clearly defined end at

either north or south. It seems probable that the southern end was at a cairn positioned very close to the cairn at the top of row 2 (the fourfold circle) but that this, along with much of the double row at this end, has been destroyed first by a Bronze Age Reave which has been built right through the site at this point, and then by later wall building, which has unfortunately destroyed much of the Shovel Down complex. The row becomes much more complete towards the north, as it wanders off across the hillside. The north and south ends cannot be seen from each other, and the row is clearly not straight, gradually curving to the west as it proceeds over the upper part of the ground it is built on, approximately in the centre. (Shovel Down Row 3, 2017)

End of Editor's insert.

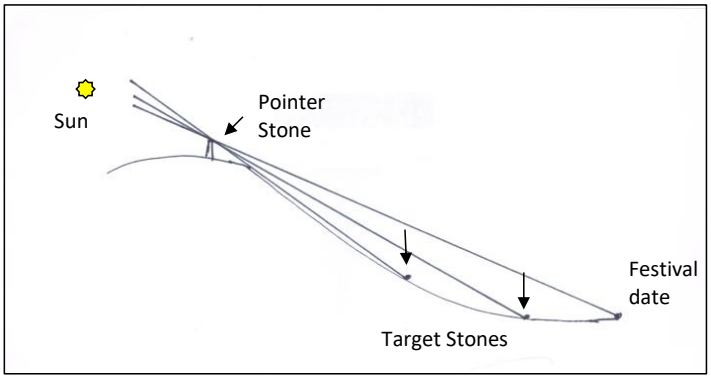


Figure 36 The angles in this diagram [by JME] have been increased to demonstrate the effect.

The search has continued for similar arrangements, with the result that it now appears these prediction sites are probably the most common type of site throughout the country. There are four such sites within two miles of Swinside alone. Some indicate the Moon Major Standstills, by measuring the height of the moon at the Minor Standstill. The best ones visited are on Dartmoor, particularly at **Drizzlecombe** *in Devon* [Figure 39]. *This site was kindly shown to me by Jack Walker on the 15th April 2004. He had written an article about it in the Dartmoor Magazine, (No 69, 2002) and has been working on a book, which is expected out soon.*

The largest fallen prediction stone I have seen is The Grand Menhir Brise at Locmanaquer in Brittany [Figure 37], *which according to the visitor literature was erected during the Neolithic period in about 4500BC. There are still sockets for target stones in place on the site, and these look as if they were used to predict the days of*

the solstices, but unfortunately I had no compass with me to check at the time.

Figure 37 The Grand Menhir Brise Photo by David Smyth

Normally they erected a suitable pointer stone, a tall one in flattish country, as seen at *Drizzlecombe* on Dartmoor, [Figure 39] which is one of the tallest in the British Isles, with the stone row stretching away from it. This one predicts the midwinter solstice sunset. Note also that it has a flat top which suggests that has something to do with the sun. For an explanation of stone shapes go to Chapter 14.

Figure 38 Row 1 at Drizzlecombe, Photo by kind permission of Angie Lake © posted March 24th 2008 on the Megalithic Portal website.

[Figure 38] is looking up towards Menhir 2. Giant's Basin is on the right behind Jack Walker, author of excellent alignment theory book, 'Dartmoor Sun'. (Yet to be published at that time.) Jack gets down to business, checking his alignments.

Figure 39 Drizzlecombe, Dartmoor. Note 1.5m ranging rod. Photo by JME

[Comment by Dimitrios Dendrinos: beyond what Jack says in his caption and explanation of the photo, it also (beyond doubt) shows how the various calendar indicating locations of the gnomon's style (the top of the menhir in the foreground of Figure 39) are marked on the ground. This is another major finding.]

At the other extreme, a small stone is set up on top of a crest as seen at *Moss Cottage Field* in Cumbria SD 186922 [see Figure 40, though there is no mention on the OS map at this grid ref.]

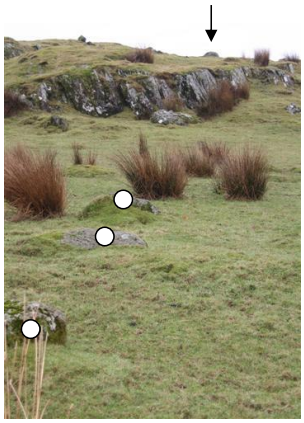


Figure 40 Moss Cottage Field. Photo by JME

[In Figure 40, Moss Cottage Field, the] stone row on left points to the pointer stone on skyline. There are the remains of several other prediction sites in this field.

Figure 41 Moss Cottage Field 20.12.06 Photo by JME

Moss Cottage Field 20.12.06 [Figure 41] at 1.50pm. Main shadow just reaching target stone with small pointer shadow going over the stone. This will have been caused by the fact that

today the sun sets 1°further north than it did when the monument was constructed, making it a little inaccurate today. (07064)

The same idea is used on *the Pen*, also in Cumbria SD18930 90259 [1.5km South of the given reference for Moss Cottage Field]. Here small stones have been rammed into a cleft in the bedrock above the ice shear line, proving that they were placed there by man after the ice age.

Figure 42 The Pen prediction site. Photo by JME

[In Figure 42, the Pen prediction site,] note the handle of the small trowel on the left. The small upright stones cast a shadow down this row.

Figure 43 The stone row prediction site on the Pen. Photo by JME

The passage of midwinter was particularly important to prehistoric people so as to avoid planting crops in those periods of Indian summer in late autumn, and risk losing the crops to winter frosts. The midwinter period was so important that they marked both the solstice and the Festival of the Returning Sun (FORS) on 6th January. This festival was there long

before the Celts appeared, hence the new name.

Figure 44 Logan Beck prediction site SD 185900. Photo by JME

This stone [Figure 44, *Logan Beck,]* has been shaped so that it casts a shadow to the target stones.

Why go to such lengths to create this shape, when no use has yet been found for the very fancy ridge? It took 14 visits to work out this prediction site.

The shadows at the Logan Beck site in Cumbria work at midday sun time on Jan 6th. There are 3 target stones with midwinter, in the side of the roadside ditch, the nearest one being 6th January. The build-up of grass and peat makes the observations slightly blurred, but the system is accurate to within about one minute.

This site is approximately 3°15' west of Greenwich and the sun moves through 180° in 12 hours at the equinox. [This gives] a movement of 15° per hour so the sun moves approximately 3° in 12 minutes of time in 1/5 of an hour. This photo was taken at 12 minutes past midday, … after the solstice. Photos taken before the solstice are about 12 minutes early. This is confirmed by timings at *Lacra*, where the times were [recorded] before it was realised the significance of the difference before and after the solstice, and the camera time had not been checked.

Figure 45 Heathwaite. Photo by JME

There is a similar shaped stone to that at Logan Beck on *Heathwaite* [Figure 45] some 8kms away, but here it is the centre of a calendar SD 254878. It is well hidden in the bracken. [This grid reference puts the rock very close to an ancient field system at Heathwaite].

The same idea as sun pointers appears to work for the moon by measuring from the Minor Standstills, (explained later in chapter 13) in yearly steps to the Major Standstill, but none of these have yet been observed through the whole 18.6 year lunar cycle. Lacra

Inserted article from Megalithic Portal[13]

One particular area of interest is Lacra in Cumbria (SD152811), [The grid ref. for Lacra D is actually SD15098121] *which contains a number of sites of various kinds, ranging from individual stones and stone rows to small stone circles. This seems to be much older than Swinside circle, because the rows and individual stones appear only to indicate the seasons of the year and t hree prediction sites. (Please note that the site is on private ground with no footpath nearby, and the area is used for suckler cows with calves, which do not take kindly to people with dogs. During the winter months the cows are fed daily, and the sound of a vehicle brings a cavalcade of cows throughout*

[13] From http://www.megalithic.co.uk/article.php?sid=2146412336

the year. Nearly every year a person is killed in Cumbria while taking dogs into fields with suckler cows, where visitors have no right to be).

Figure 46 The 'avenue' at Lacra D taken 26.06.02 at 5.19am by JME

Figure 47 The second of the photos (taken 26.06.02 at 5.20am) of the stones in the 'avenue' at Lacra D

This photo [Figure 46] ***and this photo*** [Figure 47] *taken at Lacra D in Cumbria in 2002 demonstrate the sunlight just touching the tops of the stones in sequence, but unfortunately do not show the pointer stone shadow, as they were taken before I was aware of what was happening and I was standing in the wrong place! These stones are in what is called the 'avenue' at Lacra D, where one row predicts the summer solstice and I am fairly sure the other predicts the Moon Major Standstill Most Northerly Rise, but I have yet to observe this. It aligns to a shaped rock on the skyline and the bottom end stone of the row is of the triangular moon shape* [link expired but see Figure 286, p272].

Upon returning to Lacra on the 14th December 2003, I discovered that by sitting on the fallen pointer stone my shadow swung to the row of stones running down the slope. When this picture was taken [Figure 48]

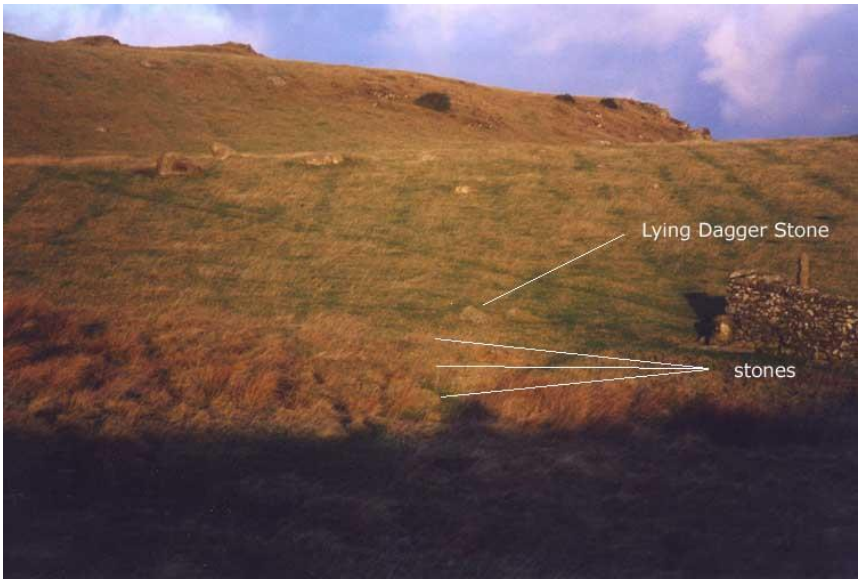


Figure 48 The Midwinter Prediction at Lacra taken 14.12.03 by JME

my pointer shadow had swung onto the row and covered the target stone at the same time as the ground shadow had reached it. This photo was taken at 3.23pm, and it is safe to assume that the pointer shadow will always pass the line of stones at this time, with the shadow growing longer as the sun gets lower towards the solstice.

At the time of construction the midwinter shadow would have been cast as far as the larger stone opposite the wall end, which is of the standard 'lying dagger' shape [Figure 253, p250] *and frequently used to indicate the sun at Full Orb at a solstice. Shadows can only be really seen when the sun is at Full Orb, once the sun appears to touch the skyline or cloud the shadow strength fades very quickly.*

Inserted article from Megalithic Portal[14]:

Stonehenge

The Orientation of Stonehenge

The builders of Stonehenge along with the other great circles of Swinside, Castlerigg, Long Meg and Arbor Low all celebrated 'The Festival of the Returning Sun' (FORS) on the 6th January as their most important festival. I am calling it this because it was there long before the people often referred to as the Celts appeared, so we should not use their name for it. They erected stones aligning to the Full Orb, (that is when the sun appears to break contact with the Earth), both in the morning and in the evening, when the setting sun is exactly opposite the midsummer rising sun at Stonehenge at the time of construction.

In approximately 2000BC the ancients counted forward 19 days from the solstice, to make their year 13 moons. The Moslem Faith on the other hand uses 12 moons to the year and moves Ramadan back 11 days each year. By using the computer program Redshift 3, it tells us that today the sun rises at the same azimuth on the 17th day after the winter solstice as it did on the 19th day after the solstice in 2000BC, giving us the date of January 6/7th.

Or it could just be that on this date, because of the nearly level skyline at Stonehenge, the Full Orb of the FORS setting sun is positioned exactly opposite where the Full Orb of the rising summer solstice sun would have been at the time of construction over the Heel Stone. There is no shaft of light or shadow at the First Gleam because the Sun is too weak at this stage. The layout is designed to throw a shaft of light through the gap between the legs of the Great Trilithon at this time to strike the edge of Stone 15, a bun shaped alter type. This could be the reason why all the 'experts' have failed to note this very accurate occurrence, as they have assumed that the First Gleam was the most important. All the main Great Circles follow the same basic principles. However, at the other circles, because of their varying skylines, this straight through alignment does not occur, which suggests that the number of days from the solstice fixes this festival.

At Stonehenge the evening sunset on FORS was the most important of the year, and is the one major solar event which can be seen by all entering the site as a public visitor. In order to give people two chances to see this sequence I am putting this on now, so that you can go and have a look between December the 3rd and 8th, and again around January 6th. The sun is in the same position on both of these dates. Note that

[14] Italics denotes insert from Jack's article in the Megalithic Portal, Part 13, http://www.megalithic.co.uk/article.php?sid=2146412398

Figure 49 Taken at 3.52pm on 05.01.2003 [by JME] Photo by JME

December 5th is the Festival of Aphrodite and January 6th is Epiphany in the Christian calendar.
Whilst waiting for the sun to go down watch from the western end and see the effect of the shadows of the lintels moving up the Heel Stone as in this photograph. [Figure 49]

Insert by Angie Lake:

This photo [Figure 49] illustrates well the 'spine' feature on Stone 16 (also with a lozenge shape surrounding it). I suggested that a post once stood between it and the South West which cast shadows on the winter solstice. [See her photos below]. I'm sure this 'Goddess/fertility-feature' stone was a major ritual focal point while the circle was at the height of its importance.

Mike Pitts, In 'Hengeworld' also describes the stone as 'a great chrysalis awaiting the midwinter sun.' Not a bad description!

"The main thing about this is what was the 'spine' for, if not just decoration? Does anyone else think it possible that a post stood outside the circle between Stone 16

and SW, purposely to cast a shadow? Alex D tends to agree with the idea, adding that maybe the outer face of the stone represents a 'vulva' and the shadow cast by such a post would effectively 'fertilise' the stone symbolically at Winter Solstice. It was a time of insecurity and the ancient people might look to it to represent renewal of all aspects of their existence. (So what happened when the sun didn't shine and cast a shadow???!) Perhaps the significant time was earlier and later, and not on 21st Dec? I seem to remember a hole in the Aubrey Holes ring slightly offset from the others in or around the SW arc, which might have held such a post?"

End of Angie's insert

At Stonehenge the evening sunset on FORS was the most important of the year, and is the one major solar event which can be seen by all entering the site as a public visitor.

Don't leave it too late before going around to the Heel Stone, because if you are lucky with the evening murk and low cloud, you will see the full sun over the Slaughter Stone, past Stone 56 (the Great Trilithon) just touching mound 15 by Normanton Furze, at the same time as the light shines onto the Heel Stone as pictured here. [Figure 50]

Figure 50 taken on 05.12.2001 [by JME]

The shaft of light strikes the Heel Stone lighting up the incised circle as in the photo above. How many thousands of people have walked past this and not noticed it?

It is possible that had the other leg of the Trilithon been standing, the notch in Stone 56 would have matched the fracture in Stone 55, and would have cast a round circle of light onto the incised circle in the Heel Stone, as it does in at least one other place in

the circle at Stonehenge. Unfortunately this has not been fully observed on the correct date and was just off target both times it was watched.
There are possibly several other incised circles etc. which, it is guessed, will do the same thing, but due to time, distance, and having to book private access research time weeks in advance, three out of my last four private access entries have failed due to the weather. Research has virtually stopped until a local assistant can be found and better arrangements can be made with English Heritage. So far I have driven over 15,000 miles undertaking research on Stonehenge alone, and many more miles with all the other sites visited.

*At the time of construction the First Gleam of the midsummer Solstice was viewed from right hand side of Stone 55 (the fallen leg). The Full Orb shaft of light went through the gap between the legs striking the edge of Stone 15, a bun shaped alter stone and the Full Orb +2 was seen from the left hand side of Stone 56*15. *Another case of side stepping as seen with the Moon at Castle Rigg. Now it rises just to the left of the point of the Heel Stone, when viewed from the same place as seen here.* [Figure 51, which Jack further describes as:] *At the time of construction, the First Gleam on the summer solstice would have appeared to the side of Stone 30, when viewed through the gap between the legs of the Great Trilithon, and would have occurred directly above the Heel Stone at the Full Orb. Now it rises just to the left of the point of the Heel Stone, when here in this photo taken at Sunrise on 26.06.2001*

[15] Note from Dimitrios Dendrinos: Jack's use of the term "orb" and its measures in the various contexts he employs it is so loose that render the arguments related to this notion extremely weak.

Figure 51 Sunrise on 26.06.2001 [Photo by JME]

These two alignments are directly opposite each other providing the centre line for Stonehenge.

In order to witness this, it needs to be a very clear evening, otherwise the sun disappears into the murk at the critical time. Please tell us all at the Portal if you are lucky. It would be fantastic to confirm that this is the orientation of Stonehenge, and not the midwinter sunset as some people hopefully imagine is the centre line.[16]

Stonehenge has several different prediction systems. One uses the line of barrows called *New Kings Barrows [New King Barrows]*, for both the spring and the autumn equinox by viewing the daily sunrises, moving along the line to arrive at the middle barrow, no.28 on the correct morning. The effort put into building these mounds was colossal. It is doubtful if they were all built as burial mounds.

[16] Italics denotes insert from Megalithic Portal, Part 13, http://www.megalithic.co.uk/article.php?sid=2146412398

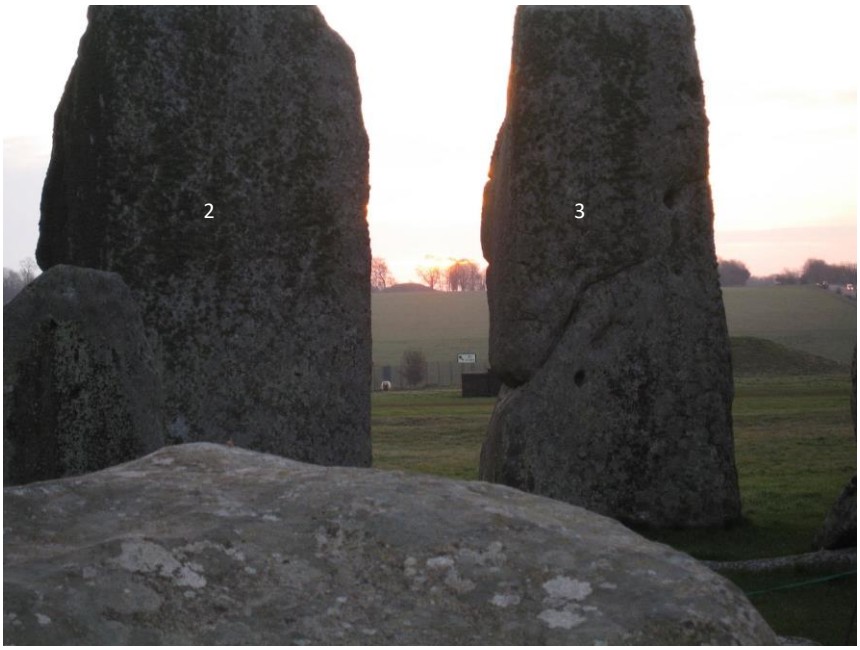


Figure 52 Stonehenge just before sunrise on 17.3.08. Photo by JME

[Later, Jack writes[17]:] *It is two years since I wrote my last article 'Great Stone Circles, How they Work' on the orientation of Stonehenge (no 13). Since then I have made many more visits to the site with the co-operation of English Heritage. This article about the relative positions of the Great Trilithon and Stones 15 and 16, is sparked by the ongoing discussions on the Forum, which arose following Angie Lake's photograph taken on 6th December 2006, showing signs of a feminine fertility symbol on Stone16.* [Figure 53] *Angie noted in The Megalithic Portal:*

> *Another shot of the markings on Stone 16 (hope that is the correct number) illuminated by the rising sun on 6th December 2006. This inner face is close to the remaining upright of the Great central Trilithon. Also: Since Jack's mention of seeing 'tops of legs' above the 'V' mark I've noticed, in this shot, a sort of 'wishbone' shape below it. (My 'V' is the thick inverted 'V' about a third of the way up this face, from the ground.)*[18]

[17] Insert from Article17 http://www.megalithic.co.uk/article.php?sid=2146412398

[18] http://www.megalithic.co.uk/modules.php?op=modload&name=a312&file=index&do=showpic&pid=26302&orderby=

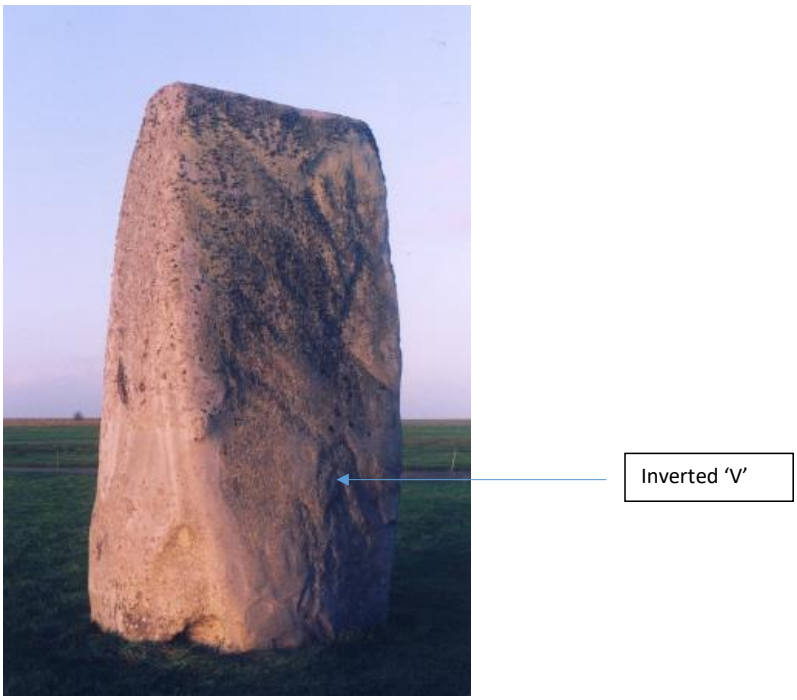


Figure 53 Feminine fertility symbol on Stone16 by kind permission of A. Lake©. Dawn, 6th December 2006

Figure 54 Feminine fertility symbol on Stone16 by kind permission of A. Lake©. Dawn, 6th December 2006

In my original article I got it slightly wrong, because I deduced what I expected would happen rather than waiting and observing. I asked Angie Lake to dowse around the outside of the circle to look for force lines which I suspected went to the important Sun and Moon rising and setting positions along the skyline. These she found.

When we had finished three separate inner and outer circuits for my survey, she dowsed again for the most important part of the circle. Her rods pointed to Stone 16. At the time we thought they could be pointing through that stone to the Great Trilithon, which I had always assumed was the Great Stone of the circle (see my article number 5a). Angie took several photos but it was not until they were developed that she noticed the symbol of an inverted V mark on the stone. Upon closer inspection it appears that there are the tops of legs on either side of it. This symbol can never have received the direct sunlight at the First Gleam, but does do later because Stone 56 (the Great Trilithon leg that remains standing) is positioned directly in front of it. I have always wondered why the great Trilithon did not receive any rising sunlight in the midwinter period. However, this discovery suggests that the Great Stone is this Goddess Stone, which does receive the sunrise light both at Midwinter and at the Festival of the Returning Sun (FORS) on Jan 6th.

On a previous visit Angie had considered through dowsing that the most important place was the area between the Great Trilithon and Stone 16. There has therefore been consistency in her dowsing and it is possible that these two stone arrangements were created as a sacred

area and not just one stone. I am not going into the realms of religion in this article, merely keeping to what I can observe. I will let others work out the religious part.

Figure 55 Stonehenge First Gleam past Stone 16 in the foreground and over fallen Stones 14 and 12 on 18 December 2007.Photo by JME

[Figure 55] *….. shows the First Gleam, past Stone 16 in the foreground, over 14(f) & 12(f) on 18.12.07. There are no signs on the ground showing exactly where Stone 13 stood. It is presumed that its position would have created a sharp beam of light on to 16 at First Gleam at the time of construction. [*Figure 56]

Figure 56 Stonehenge. First Gleam past the bulge in Stone 16 seen on 2nd January 200. Photo by JME

Today we see the Midsummer Solstice sunrise from the southern edge of Stone 56, over the Heel Stone [Figure 57]. *This is roughly where it was at the Full Orb stage at the time of construction, The First Gleam at the time of construction, on the summer solstice, would have appeared to the side of Stone 30, when viewed through the gap between the legs [uprights] of the Great Trilithon Now it rises just to the left of the point of the Heel Stone.*

Figure 57 Stonehenge. Sunrise on 26.06.2001. Photo by JME

The shaft of light is expected to strike the edge of Stone 16 at the next stage of the sunrise, just before the sun disappears behind Stone 1. To be checked next summer, hopefully, weather permitting.

Later still, after about an hour, the sun should shine on to the inverted V symbol, when it has risen above the outer lintel over Stone 2. It would have shone through the gap between the two legs [uprights] *of the Great Trilithon at the point where there is a broken notch in the edge of Stone 56. This has not been observed, only surveyed with a theodolite. Unfortunately it was difficult to guarantee that the theodolite was exactly in line between the V and notch in Stone 56, meaning the survey might not be as accurate as it should be, hence the comment 'about an hour'. Readings were 62°25' from North and an elevation of 8° 20'. An attempt was made to assess the gap width between Stones 55 and 56 by measuring the fallen lintel, but no satisfactory result was obtained because the mortise holes are not evenly spaced (being 28 and 53cms from the ends of the lintel) and sadly the tenon on the top of Stone 55 has been knocked off.*

I expect the sunlight to show as a notch in the shadow cast by Stone 56, and if I am correct, it

will be a little out in height on Midsummer's Day. Those of you there on that day will have to observe and tell me if I am wrong.

While doing this survey I spotted this image on the inside face of Stone 56 [Figure 58] *which would probably have been lit up by the Full Orb of the Midsummer Sunrise.*

Endo f Jack's insert

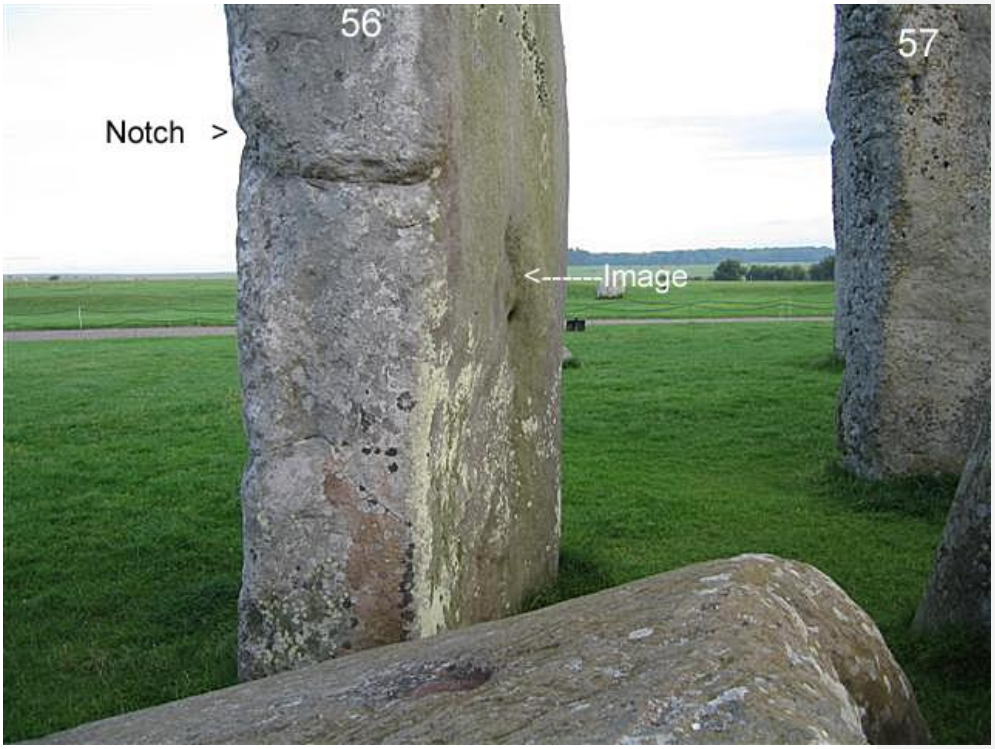


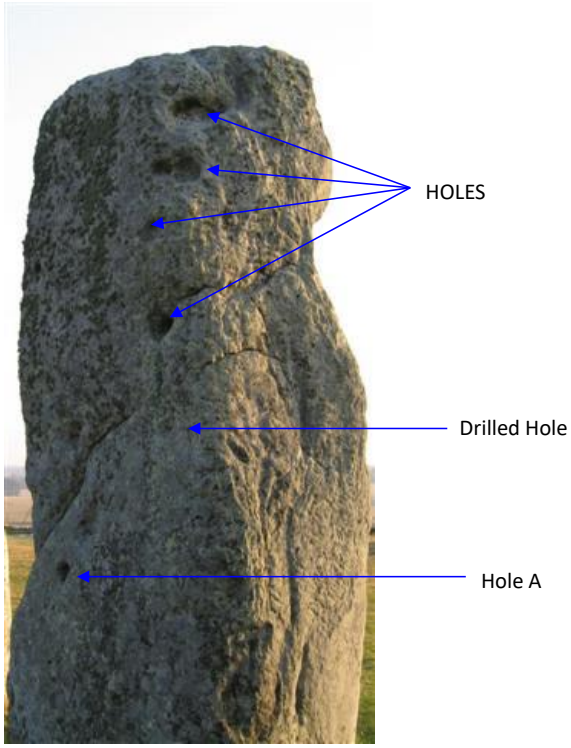
Figure 58 Stonehenge. Stone 56 with the notch for the light to Stone 16 and an image on the front face. Photo by JME

Some minutes after sunrise, the sun lights up this square, [Figure 59] which is one of the published symbols in Stonehenge in its landscape, page 31 on Stone 57 description by Atkinson. Before this photograph nobody realized what it did at the equinox.

Figure 59 18.3.08 (one day later, a better photo). Photo by JME

Note the correct time of day, when the light square hits the edge of the symbol, but does not go as high as the top of the symbol. Why?? The light just touches the top of blue stone 70, showing that this is the correct date. The same thing happens for both equinoxes.

The sunsets at the equinox period in the autumn are predicted by the light shining on to a series of holes in Stone 3. The photographs were taken on the dates shown thinking that there might have been another festival in the spring time, before I registered that I was looking at the prediction for the autumn equinox.



Stone 3 showing row of larger vertical holes. Photo by JME

(new photo required at right light)

Figure 60 Stone 3 4/4/07 746 Photo by JME

Figure 61 Stone 3 5/4/06 Photo by JME

Figure 62 Drilled hole in Stone 3..748 Photo by JME

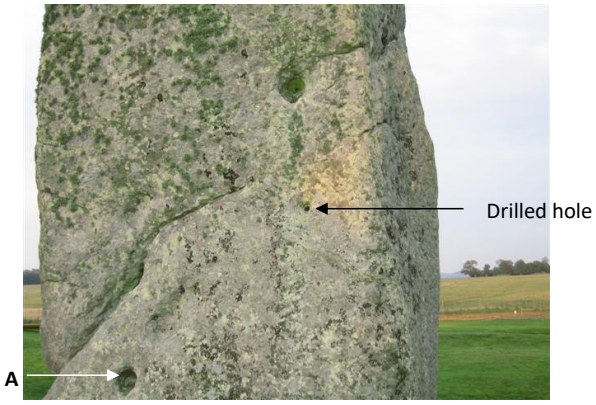


Figure 63 Photo by JME

The drilled hole was seen nearly lit up by a patch of light on 14/9/06 at about 7pm BST. The sun was so weak that it was possible to look directly at it through the aperture made by 3 stones. Seeing how weak the sun was, it was a surprise that the camera flash had not completely obliterated the light patch, which is seen to be slightly off target and is the same shape as that taken on 5/4/06. The stones making the shape have been re-erected and may be fractionally out. The surprising thing is the date. Would it have been on target in another 7 days' time?? The stone arrangement through which the light shone might have looked a complete hole, because my head moved to that position.

There is another line of sight aperture, visible off the public footpath, leading to the lower left hole (**A),** in Stone 3 [Figure 64 Taken at 17.50 pm, 29/9/09. This must be part of the

equinox system, but due to restricted observation times it has not been resolved. …. No sun[19].

Figure 64 Taken at 17.50 pm, 29/9/09 Photo by JME

The [largest] remains of a prediction site are *Le Grand Menir Brise* at Locmariaquer, Brittany, with its row of stone sockets stretching behind it, estimated to have been 20 metres tall and weighing 350 tons. [Figure 65]

[19] Note from Dimitrios Dendrinos: Jack's work on Stonehenge: his observations and comments on Stonehenge seem to be ad-hoc and weak, and in need of far better documentation; in fact, his work on Stonehenge is far less satisfactory than his work on Swinside or Castlerigg. Obviously, the time constraints he faced there were far more constraining than at any other monument, for obvious reasons.

Figure 65 Le Grand Menhir Brise Picture by David Smyth June2006

This knowledge of prediction must been available to prehistoric people when they built the passage graves, which are located generally on a gentle slope, so that the full sun shines down the passage on a certain time of day and date, lighting up the back wall plate, which is often decorated. This is achieved by the vertical portal stones defining the time of day, [with] the top lintel and the bottom sill making a frame through which the sun shines on to the square back wall plate. A day too early or late, and the square shaft of light does not fit the wall plate either up or down, and at the wrong time will miss it sideways. The best example of this is at *Loughcrew*, and was shown on Eirean TV for the autumn equinox morning sunrise, but was out by a day or two. [See Figure 34 p65, which the Editor found on the Megalithic Portal].

The other good photo of this is by Dougie Scott on his disc 'The Watchers of the Dawn' set in the Round Cairn at *Grey Campster* [The Grey Cairns of Camster] Caithness ND 261441, where he shows the round image of the sun on the back wall, like a peep hole camera shot. This cairn has been rebuilt and it says a lot for restoration that it still works. [See Dougie's comment in Chapter 5 Prediction sites.

Insert Comparing four circles

The object of this article[20] is to demonstrate that these four Great Circles all follow the same basic system, and that it is virtually impossible to understand the workings of Stonehenge without the knowledge gained from Swinside and Castlerigg. At all these circles the Sun creates … shafts of light/shadow some minutes after First Gleam. The Great Stone provides one side of the shaft of light, with the other created by Second Stone. Somewhere on this line there will be also an altar shaped stone, normally of the bun shape. In addition to this alignment there are several other pairs of stones in parallel. A similar situation occurs at the sunset with the edge of the shadow from the Great Stone touching a target stone across the circle.

We can never see the First Gleam of the midwinter solstice as it was at the time of construction, because the sun does not now go as far south as it used to by about 1 degree. We therefore have to make optical adjustments. These adjustments are all very obvious once this fact is grasped. The time the Sun casts the operative shadows is still in the original place, but it takes a little longer to get there and is a little higher, which affects the length of the shadows.

Chapter 6 The midsummer solstice sunrises at Swinside, Castlerigg, and Stonehenge.

22/03/2011

Prehistoric people built their great stone circles so that the stones indicated 3 major positions of the rising sun at the summer solstice.

- First in time is the First Gleam over the skyline when the top of the sun appears.
- Some 5 minutes later comes the Full Orb position when the sun appears to break contact with the Earth, when the shadows become hard and sharp.
- Thirdly when the sun is clear of the earth by a sun's width.

The circles are so constructed that they cast shadows/shafts of light at about 5, 11, 22 and again at about 45 minutes after first gleam, as it would have been at the time of construction, but not always using the same stones in every circle, as their layout is adjusted to the skyline. These times are slightly out now because the sun does not rise as far north as it did at the time of construction by about 1° along the skyline, which is 53.7cm in the circumference of a 30m diameter circle, or… 21 inches in a circle of diameter 100 feet.

The sun rises in an arc of about 24°, but this is affected by the refraction of light where it passes over the skyline, bending the line of sight downwards. This means that we see the sun and moon before they actually rise by slightly varying times according to the weather. As the sun rises above the skyline the effect of refraction gets less, which by the time it has reached a clear width of the sun above the horizon it appears to have risen at an angle of

[20] From Jack's 18th article in Megalithic Portal http://www.megalithic.co.uk/article.php?sid=2146412405

about 30°. Or put another way, … 1 sun width of rise equals 2 widths horizontally on a level skyline. After that time the azimuth increases with time, while the elevation varies with the date, as seen with a sundial clock. The sun is always at the same azimuth at the same time of day.

This means that we now see the summer solstice First Gleam today at approximately the position where the Full Orb was seen at the time of construction, but unfortunately due to low cloud and murk we seldom can see the First Gleam, so have to content ourselves with seeing the sun at one of its later stages. Prehistoric people obviously had the same problem, otherwise they would not have built in these stages.

Swinside

When you come in at the field gate at Swinside, straight in front of you is a lying stone, stone 39(f), from where the First Gleam would have been seen over Stone 5, a fallen diamond shaped stone, but never seen today.

Figure 66 Swinside, midsummer First Gleam at 4.56am 25/6/03. Photo by JME

A diamond shape always marks one end of the first or last gleam of the solstice.

At Swinside, the First Gleam is marked by several parallel pairs of stones, all pointing to the summer solstice sunrise over a small hump on the side of *Coniston Old Man*. This pattern of parallel pairs of stones is seen in most circles, with the number of pairs varying with each site according to topography,

These diagrams are produced using an aerial photograph taken by E Cleasby at my request from a microlite.

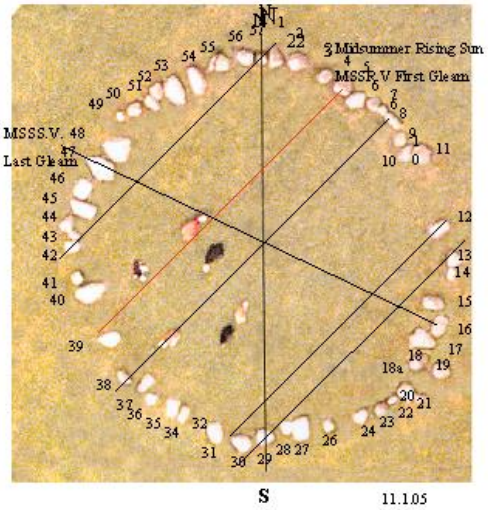


Figure 67 [aerial photograph taken by E Cleasby]

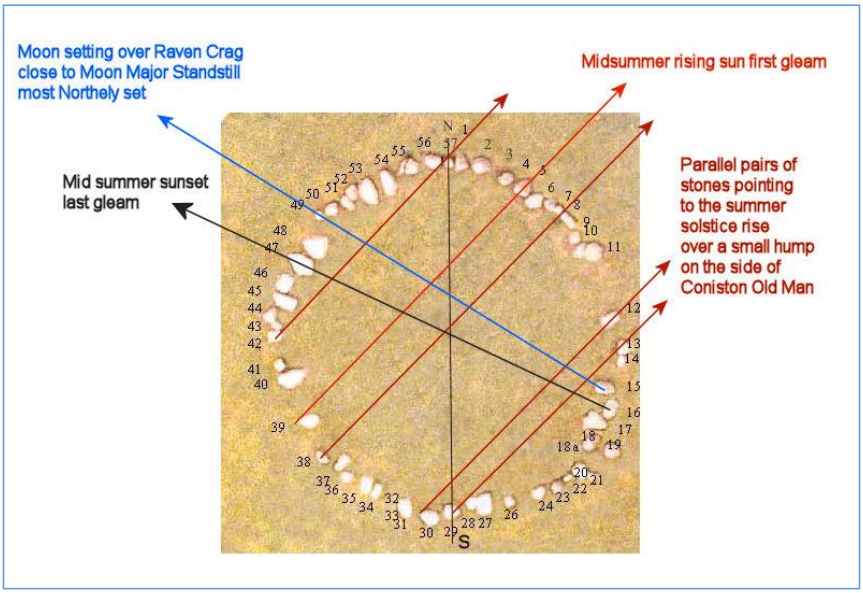


Figure 68 Re-drawn alignments from Figure 67 by Editor

[*Figure 67 is Jack's original diagram, and Figure 68 has been re-drawn with additions by the Editor for clarity. Jack's midsummer sunset line (black in Figure 68) measures 295.5°. Horizon (a modern computer programme by AK Smith illustrating astronomical alignments) returns*

291°, but may not be very accurate as the horizon is so close: 533m away. The midsummer sun first gleam line (orange) measures 45° in Jack's diagram, Horizon returns 48.5 °, which is more accurate as the horizon here is 11km away. Below are more of the Editor's pictures which may clarify some of Jack's alignments].

Swinside stone numbers (Insert by the Editor)

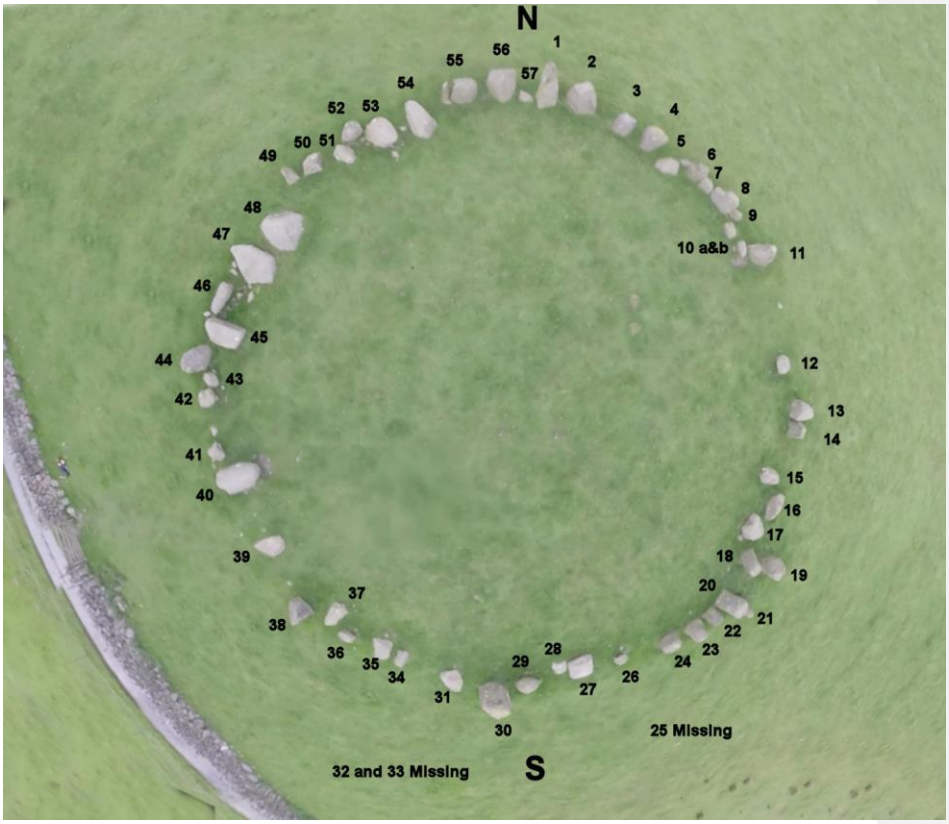


Figure 69 Aerial view of numbered circle. Picture by David Smyth 16/9/17

Figure 70 Stones 1 to 4 Picture by David Smyth 16/9/17

Figure 71 Stones 5 to 10 Picture by David Smyth 16/9/17

Figure 72 Stones 10 and 11 Picture by David Smyth 16/9/17

Figure 73 Stones 12 to 14 Picture by David Smyth 16/9/17

Figure 74 Stones 15 to 19 Picture by David Smyth 16/9/17

Figure 75 Stones 20 to 24 Picture by David Smyth 16/9/17

Figure 76 Stones 26 to 30 (25 is missing.) Picture by David Smyth 16/9/17

Figure 77 Stones 30 to 36(32 and 33 missing). Picture by David Smyth 16/9/17

Figure 78 Stones 36 to 39 Picture by David Smyth 16/9/17

Figure 79 Stones 40 to 45 Picture by David Smyth 16/9/17

Figure 80 Stones 42 to 48 Picture by David Smyth 16/9/17

Figure 81 Stones 48 to 53 Picture by David Smyth 16/9/17

Figure 82 Stones 54 to 1 Picture by David Smyth 16/9/17

Referring to Figure 68, p96, the following pictures are to illustrate Jack's alignments. Stated measurements are by the Editor.

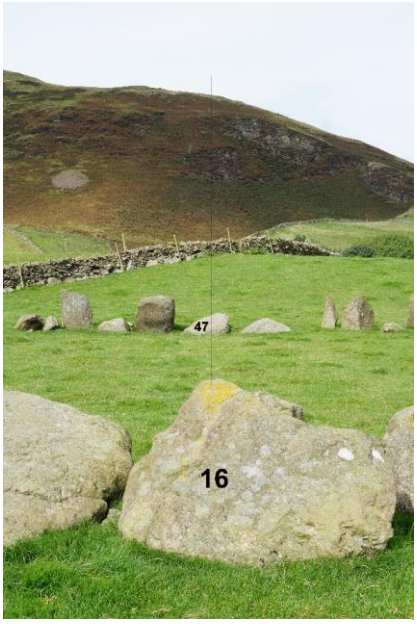


Figure 84 Midsummer sunset last gleam. Picture by David Smyth 11am 16/9/17

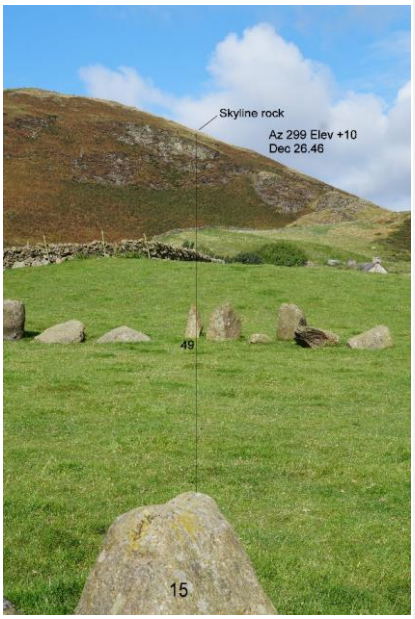


Figure 83 Moon setting over Raven Crag (the blue line) Picture by David Smyth 11am 16/9/17

Figure 86 Midsummer Sun Rise (The orange line) 11:14am 19/9/17. Picture by David Smyth

Figure 85 Parallel MSSR (orange brown lines) 11:52am 19/9/17 Picture by David Smyth

Figure 88 Parallel MSSR (orange brown lines) 12:08pm 19/9/17 Picture by David Smyth

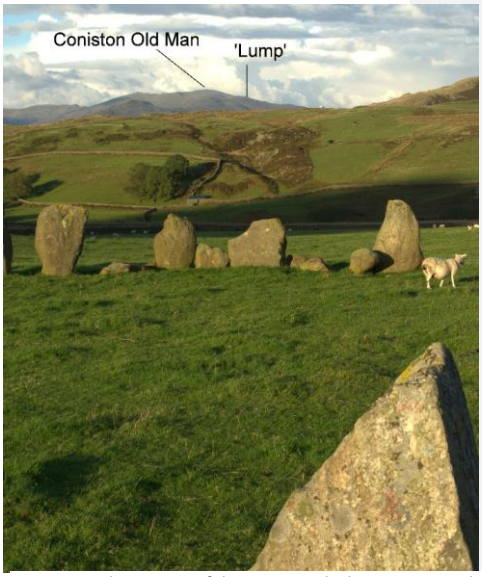


Figure 87 A clearer view of the target on the horizon. Picture by David Smyth 6:12pm 17/9/17

End of Editor's insert

Figure 89 Swinside 21/6/04 Photo by JME

The tallest stone, Stone 1, casts its shadow at First Gleam on to Stone 43 [Fig 106]. At the time of construction it would have struck Stone 42. Later, after 20-22 minutes, the edge of the shadow touches the large Bun Altar, Stone 48. [Figure 90].

Figure 90 Swinside. 21/6/04 Photo by JME

The foresight group of Stones 6, 7, 8, make up a triple with all the stones touching each other. This arrangement is used in both directions:

1. As a foresight marking steps in the movement of the sun as it rises and moves along the skyline, or

2. As a back sight from which observations are made of some of the other sun and moon sets from this position.

After some time the shadows build across the circle at Swinside until we see this [Figure 91]: Shadow from Stone 11 reaches Stone 37, a lying dagger shape, which always marks the solstice at Full Orb.

Figure 91 Swinside at 5:04 am on 25/6/03 Photo by JME

Castlerigg

Exactly the same is seen at Castlerigg, except that the sun comes out of a steep slope and moves very quickly from First Gleam to Full Orb. (As a result the photos very quickly went dark with my old camera, and none are worth showing).

Stonehenge

Figure 92 Summer solstice at Stonehenge. Photo by JME

Figure 93 Stonehenge 25/6/01 photo 861. Photo by JME

This was the view through the gap between the [uprights of the] Great Trilithon before the one leg [Angie Lake thinks this must be Stone 55] fell down [Figure 93]. This would have been the direction of the sun at Full Orb shining down the central axis, over the Bun Altar in the middle, Stone 160b. NB date. The sun would have been a little further to the left on 21st June.

At Stonehenge the Great Trilithon acted as a triple[21] with the First Gleam at the time of construction being deduced from survey to have been viewed from the right hand or the south side of Stone 55, and the Full Orb through the gap between Stones 55 and 56. The line passes over various barrows and on to the top of Sidbury Hill, North Tidworth SU216505 which would have been seen [in the distance]. As confirmed by GIS22, this would have been possible if there were no trees and houses in the way. On top of the hill is a very old yew tree along with an Iron Age fort, and further along the line there is a barrow cemetery (not visited) at 14.1 km, a similar distance to that between Swinside and a barrow cemetery with shrine (?) [which Jack named:] Above Seathwaite reservoir At SD 25786 99278 like the shrine arrangement as seen at Seven Stone East, South Wales SN861 152.

Figure 94 Shrine? At Seven Sisters. Note sloping stone with side rows Photo by JME

Insert by Jack from Megalithic Portal: [23]

The First Gleam at Stonehenge can be seen from several places through the stones, but the most important position is from the right hand side of the remaining leg of the Great Trilithon (Stone 56). Originally when the other leg of this was standing, the observation would have been through the central opening with the sun's rays passing through the gap before striking the big round Bun Altar (Stone 15). Stonehenge was built for this purpose, to throw shafts of light and shadows both internally and externally. The height of the Trilithons was dictated by the requirement for the shadows to reach right down the slope (past the main road) into the surrounding

[21] Note from Angie Lake: It is unclear what Jack means here by the term 'triple'. [Possibly the two uprights and lintel making three parts?]
[22] [A **geographic information system** (**GIS**) is a system designed to capture, store, manipulate, analyse, manage, and present spatial or geographic data.]
[23] Italics denote entries from http://www.megalithic.co.uk/article.php?sid=2146412200&mode=thread&order=0

valleys. Unfortunately when I observed this I was stuck in the Sunday evening traffic and unable to stop and check. This is identical to the Solstice setting sun shadow as seen at Castlerigg. I have seen this shadow pattern at both Solstices, but because of trees at Castlerigg I am unable to confirm that it acts as full sunset calendar but I expect that it does.

I am afraid that the proposed road works will ruin this part of the operation of Stonehenge in the future. We often complain that our forefathers destroyed things though ignorance and now we are about to do the same. It is more important than ever that observations with photographs are made whilst these marvels of ancient skill and technology are still there to be seen.

As the sun rises it moves to the right and after a few minutes it can be seen from the left hand side of Stone 56, past Bluestone 68, over the round Bun Altar (Stone 160b), past the edge of Stone 49, and the edge of Stone 30. At this stage the sun will be seen at the Full Orb - that is when the bottom of the sun appears to be just clear of the earth. At the time of construction it would have been slightly higher. Now the light strikes Stone 160b, if you can see it for people!

Notice also at about this time (or the 22 minute mark), that the length of the shadow cast by the Great Trilithon will probably reach the area of the destroyed barrows or mounds. When I was watching this in 2001 I had not realised the significance of shadows, and unfortunately my photo is indefinite on this point. With so many people about at the Solstice, even if the sun shines, it will be difficult to locate this place, but it is still worth thinking about.

Once this is over, don't waste time, move to the Heel Stone end of the circle where the shadows of the lintels of the outer ring will be cast onto the leg of the Great Trilithon, (Stone 56). It will be observed that the bottom of the shadow would have touched the top of the Bluestone number 68, had it still been standing vertical. Unfortunately this photo was taken a little too late [Figure 95]. *At other sites the vertical line and a*

horizontal line cross on the target.

Figure 95 Solstice sunrise at Stonehenge Photo by JME

There are two factors likely to spoil the accuracy here:

1. Bluestone 68 has leaned from the vertical. Is this the result of deterioration over time or did they make it lean deliberately … to correct a fault in the layout?

2. The sun does not now rise as far North as it once did. It still passes the same azimuth as at the time of construction, but at a slightly lower elevation, meaning the shadow is a little higher than was originally planned.

This shadow striking the top of the bluestone is by no means unique and has been observed at several times throughout the year. Or perhaps it would be fairer to say, seen to strike where their tops are assumed to have been, as some are now broken off.

If you stay around for a little longer, it is likely that another alignment will occur sometime between 40 and 45 minutes after sunrise. I have yet to witness this at Stonehenge at this time of the year, because on my visit in 2001 I was unaware that it was necessary to wait for a further alignment.

I do not claim to comprehend the entire workings of this magnificent site, indeed I feel I am only just beginning to understand it. Living in Cumbria I really need the help of someone living close to Stonehenge to carry on the research with the co-operation of English Heritage. This person must have the time available to undertake more

observations for me throughout the year and be prepared to watch the sun and moonrises and settings at key times of the cycle, as and when we jointly decide and the weather allows. So far I have only managed to observe one sector of the moon movements out of the four.

End of Jack's insert

Later we see this [Figure 96], taken from the left hand side of Stone 56, being the third part of the triple.

Figure 96 Stonehenge, taken from left side of Stone 56 Photo 863 Photo by JME

Note Heel Stone is now out of view, and the sun is well up above the trees.

Figure 97 25/6/01. Stonehenge, same day, just a little later. Photo by JME

This was the first indication of the time/dating system with the vertical shadows indicating the time of day, and the horizontal lintel shadow indicating the date. [Figure 97] Photo 864

Note access to Stonehenge is not available now on this date in order to let the grass recover from the mass entry on the solstice.

Were these Pictish Stones with the bird on them, grave stones?

Help is required to locate other similar images.

At Stonehenge, there is something on Stone 56, which could be a figure [Figure 98].

Figure 98 Stonehenge. Possible figure on Stone 56 Photo by JME

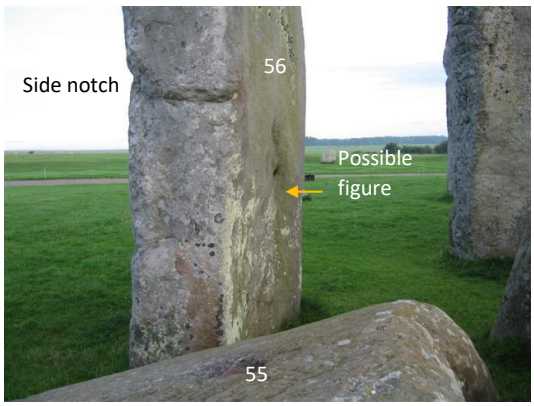


Figure 99 Stonehenge, side view of Stone 56 Photo by JME

It is believed that the Great Trilithon arrangement was erected after the outer ring, so Stone 56 blanked off the sunlight from striking Stone 16 at the Full Orb stage [Figure 99], so the builders may have carved this figure as a Goddess, leaving the figure on Stone 16 which is even weaker with only the inverted V showing, being the fertility symbol, which is lit up about an hour later. The other side of Stone 16 has a swelling like a pregnant woman, which is lit up by the midwinter sunrise [Figure 100].

Figure 100 Stonehenge, Stone 16 Photo by Angie Lake©

[Jack wonders about this and says:]

(For discussion should all references to Goddess figures be left out? Nobody else has noticed the many other symbols on Stonehenge. I accept that it is poor proof in its present state.)

Chapter 7 Midsummer Sunsets at Swinside, Castlerigg and Stonehenge.

04/01/2011

Swinside

Comparing the midsummer sunsets at these 3 circles, the first big difference is in the timing, where Swinside with its very high skyline of some 14° elevation, is the first to disappear soon after 7.30pm BST. Sunset can be watched from a subsidiary stone arrangement in one of the other fields, from where the sun can be seen to run down the slope of *Raven Crag*. This high skyline means that the closing shadows are both poor and displaced some way from where they might be expected.

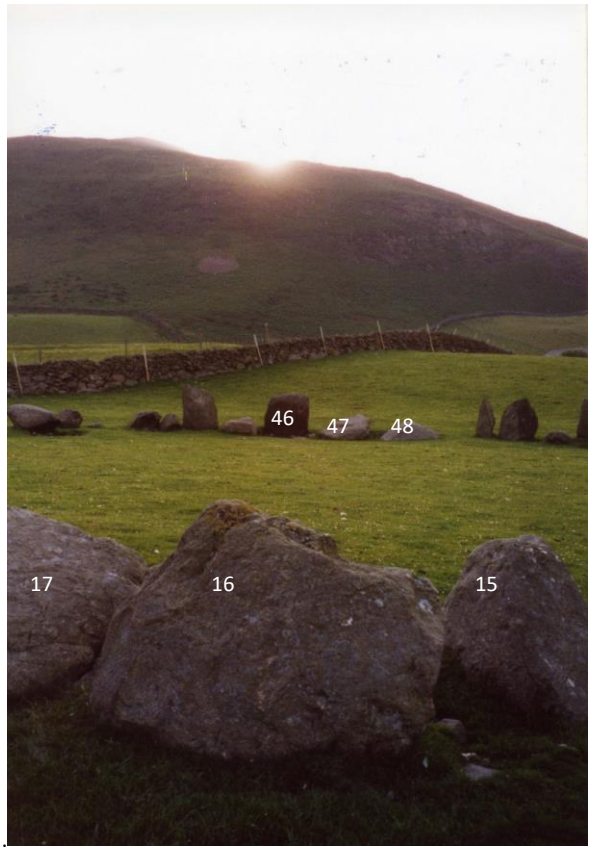


Figure 101 Swinside, 24/6/03 Photo 150 Photo by JME

Looking from Stone 16, over Stone 46 [Figure 101], a flat with off-centre hump indicating sun at Full Orb but today's Last Gleam. Stone 47 [is] a fallen diamond shape indicating Last Gleam at the time of construction.

One of the other sunset lines is from Stone 18a in the middle of the ceremonial triple. The photo from 18a does not show the side stones of the entrance triple. 18, 18a, 20.

Figure 102 Swinside. At 7:49pm on 23/6/08. [From Stone] 18a Photo by JME

Over the double 42/43 [Figure 102]. Taken from ground level on top of 18a.

Castlerigg

Has a much later midsummer sunset at about 9pm, over the mounds/bumps on the top of *Latterigg* NY278247. These mounds or bumps are probably man-made, by digging away on both sides of them. They are very regularly spaced. ….At the right hand end there is a very shallow mound, which is hardly discernible when walking over the area, but shows up when viewed from the circle. If these mounds were all natural, this last one on the right would not be [a] built mound, which confirms the likelihood that they were all manmade. More on these mounds under Moon, Chapter 13.

Figure 103 Castlerigg at 9:07pm on 29/6/94. From Stone 15 over double 30/31 photo 536 Photo by JME

[The 4 black arrows are indicating the mounds].

Figure 104 Here we see virtually the same picture in day light showing the mounds more clearly. Photo by JME

The point of Stone 15 should be in line with Stone 30 [Figure 104]. The midsummer sunset goes to the middle of the mounds with the moon using those mounds to the right, when at its extreme northern set (see Moon chapter)

In the opposite direction Stone 14 casts a very long shadow some ½ mile down the valley, reputed in folklore, to a Holy Well which is now lost in the trees [Figure 105]. The ground shadow and the shadow from Stone 14 meet at this place in a very good demonstration of the principle of the 2 shadows meeting. It appears that this shadow from Stone 14 works throughout the year, but cannot be followed around to the midwinter position because of trees, when it appears that it should end in *Goosewell Wood*, but cannot reach it because of the road wall and bushes.

Figure 105 Photo 523 Castlerigg at 9:02pm on 28/6/03 Photo by JME

The black horizontal line is the ground shadow, and the vertical shadow is from Stone 14.

Stonehenge.

The sunset Last Gleam gets lost in the trees of *Fargo Plantation*, and is seldom seen due to murk, but earlier at about 7:30 BST a shadow is cast from Stone 56 on to Stone 54 and moves across to strike the Dagger symbol.

An experiment was done to discover the reason for the positioning of the dagger symbol [Figure 106].

The measuring staff height was adjusted to what would have been the top of Blue Stone 65, had it not been broken off at ground level, assuming it would be of equal height [to] Blue Stone 68, its twin on the other side, and stood by the base of Stone 65.

In a few minutes the vertical shadow from Stone 56 reached the dagger symbol, at the same time that the shadow of the staff also reached the hilt of the dagger symbol. Further experiments at night near the period of the Moon Major Standstill Most Northern Set does the same thing to the 'axe symbols'. For more details see under the Moon, see Chapter 13.

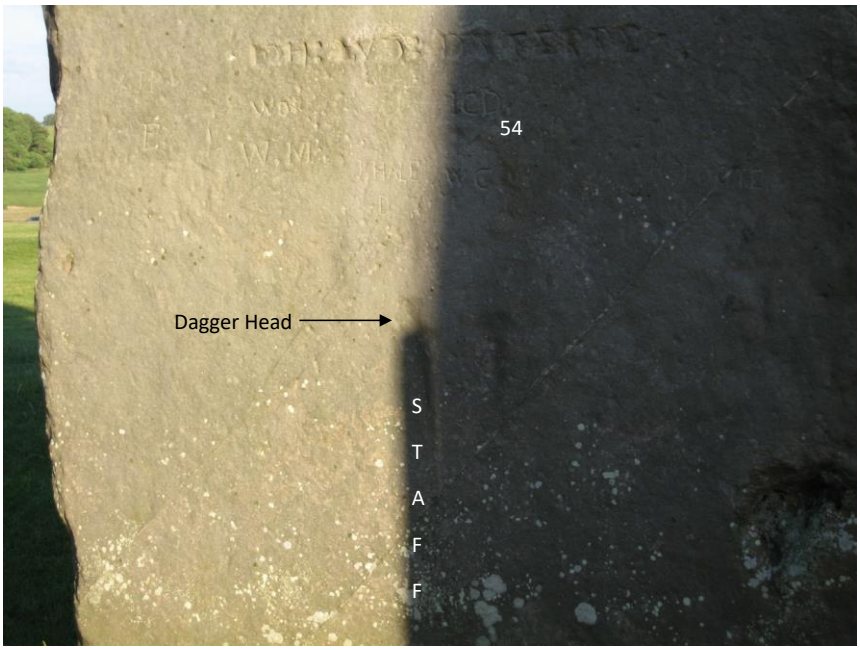


Figure 106 In many circles the solstice is marked with a lying dagger stone, hence the deduction that this is the meaning of this symbol Photo by JME

Similar to Castlerigg, the Stonehenge stones cast long, distant shadows across the A303. Just how far they go was difficult to determine from the road, because of the crops breaking up the fall of the shadow. It was very noticeable on the sides of lorries going along the road, but the final target was impossible to locate during the summer. Later in the year, field walking found that there are a series of round barrows or mounds where the shadow from the top of the Great Trilithon would reach at different periods of the year, just as Stone 14 does at Castlerigg. The most obvious barrow has been cut in half by the road widening, SU 132420. The ground shadow line is from the far skyline and not the nearer horizon. See plan of barrows at the end of Chapter 13. None of these shadows has actually been observed, but has been worked out by ground level sighting through to the skyline.

Chapter 8 Midwinter Sunrise

21/01/2011

Insert from Jack's article *'Comparing Four Circles' in the* ***Megalithic Portal***[24]

Arbor Low

The Circle here is sited on a slope so that the Sun is not seen until it is above the crest [of the surrounding hills, possibly Helvellyn] *and the frequent morning murk. Observation of the Sun is further delayed by a field wall, but I am unable to say exactly how long the delay is (The only figure on my notes is 8.29am, but does not say what it refers to). Stand on the stump of Stone H that is outside of the circle in the southern entrance, and your shadow will hit Stone 27. The Great Stone - the big stone that is half way down to your left. At the time of construction I expect it would have just caught the inside edge of it, when it was standing, and then the shaft of light would have gone on to strike another smaller stone of an altar shape, but as they are all fallen it is difficult to say which one.*

After this go to the fallen Cove Stone A (the large unbroken stone at the northern end of the cove) and stand on it. Your shadow will hit the wall under the trees by the car park. In order to see this you will probably have [to] *move about, unless the Sun is very strong, as at this distance one's shadow gets rather indistinct. This effect is much easier to see at Avebury where the Cove acts in the same way, casting its shadow to the stones in the outer circle, as shown in Article 3b on 7th June 2005* [http://www.megalithic.co.uk/article.php?sid=2146412195].

[Entrances]

[It seems Jack has identified a common denominator for entrances, delineated by triple stones on one side, and a single on the other]

Swinside

At Swinside there are 2 triples over which the midwinter sunrise can be viewed.

Through the four portal stones making the ceremonial entrance or gateway from Stone 49 [Figure 107]. At the time of construction the First Gleam would have been seen at the edge of Stone 21 from the point of Stone 49. This arrangement, to the edge of the foresight stone, appears to be common for the solstice sunrises and sunsets, probably only reaching this position on the actual day of the solstice at the time of construction. This is the easiest sunrise to watch. You need to be there by 8.15am to see the full effect of the sun coming over the skyline. It also has the benefit that there is often a frost at this time of year, which gives a clear view with no mist or cloud.

[24] From Megalithic Portal Comparing Four Circles http://www.megalithic.co.uk/article.php?sid=2146412405

Figure 107 Swinside midwinter sunrise 26/12/95 Photo by JME

23

The best view is from the little pointed Stone (49) through the Gateway or Ceremonial Entrance (Stones 18, 19, 20, 21 with Stone 18a buried in the middle), making it a standard triple. The Sun shines past the Great Stone (30) to cast a shadow past Stone 40 (f) to a small Bun Altar (Stone 41).

The sunrise can also be seen from Stone 54 over Stone 16 today. It would have been over Stone 15 at the time of construction, with Stone 17 making up another Triple. At all of these sites there are several pairs of stones aligning to the sunrise during its various stages.

Figure 108 Swinside Ceremonial gateway or entrance with staff on sunken Stone 18a Photo by JME

It must be assumed that this is the ceremonial entrance through which one or more dignitaries processed on the various festivals, because the centre stone is sunk down to ground level making passage possible [Figure 108].

This is not quite the view at the time of construction when the sun rose in line [with the] ridge back coffin/lying dagger stone. The ground level view of the skyline is this:

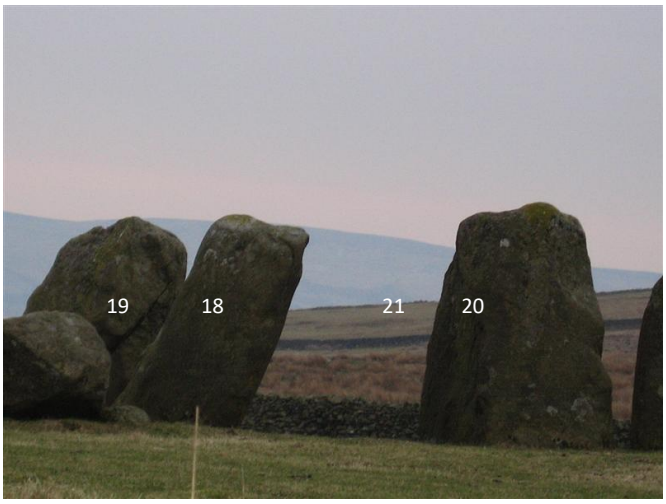


Figure 109 Swinside 30/1/11 from ground level Photo by JME

[From?] Stone 51, showing gateway and far skyline. The white line is a piece of grass stalk [Figure 109].

To the left of the ceremonial entrance there is another triple through which nobody could ever have passed as the stones would have touched each other (when standing up). This triple was used for the observations of the midwinter sunrise from Stone 54, the FORS [Festival Of the Returning Sun] (Chapter 10) sunrise from Stone 53, …. midsummer sunset and the northern sector of the moon settings.

Other entrances

There are several other circles with 4 stones making an entrance or gateway, for example:

- *Rollright* where the same pattern of a ceremonial entrance is next to another triple.
- This same pattern of triples for the winter solstice sunrises is also seen at the Rollright circle on the Oxford/Warwickshire border SP 296309. [The reason for the two entries on Rollright is not clear, so both are included. Ed]
- *Long Meg* appears to have its ceremonial entrance using the midwinter setting sun.
- The wooden circle at *Poulton*, SJ 40232 58597, in Eaton Hall Park, Cheshire has both an entrance working sometime after equinox sunrise and an exit for a similar time after sunset i.e. at dusk? Neither have been observed.
- *Stonehenge* has an entrance for the midwinter rising sun, and causeways over the ditch, which could mirror the entrance at Poulton.
- *Arbor Low* has a pile of fallen stones, in the right place for a winter ceremonial entrance.

Figure 110 Rollright looking in to the circle with the collapsed 2nd triple to the right Photo by JME

Castlerigg

Here the midwinter sunrise is very late: sometime after 9:15am, due to having to rise above *Helvellyn* at an elevation of over 4°. If you are lucky with the traffic, it is possible to watch the First Gleam at *Long Meg* NY 571373 [NY 57112 37207] north of Penrith, (past the Great

Stone 29 to round, flat, Altar Stone 46) and then get to Castlerigg in time. The shadow from Castlerigg Great Stone, Stone 21, touches the Round Bun Altar Stone 27.

Figure 111 Castlerigg midwinter sunrise on 18/12/02. Note stone 27 is partially hidden behind stone 28 Photo by JME

474

[Note by Angie Lake: "Has Jack got the numbering wrong here: should Stone 27 actually be 28 which in turn is leaning over and partially obscuring 27?"

Editor: Refer to numbering of the stones Figure 277 p266. Stone 28 is standing, separate, and off-shot, so it's not clear exactly what Jack meant. In another article[25] Jack said ". As the Sun rises it would have cast a shadow from the Great Stone (Stone 21) onto the Bun Altar (Stone 27)]

[25] Megalithic Portal 'Comparing four circles' see below,http://www.megalithic.co.uk/article.php?sid=2146412405

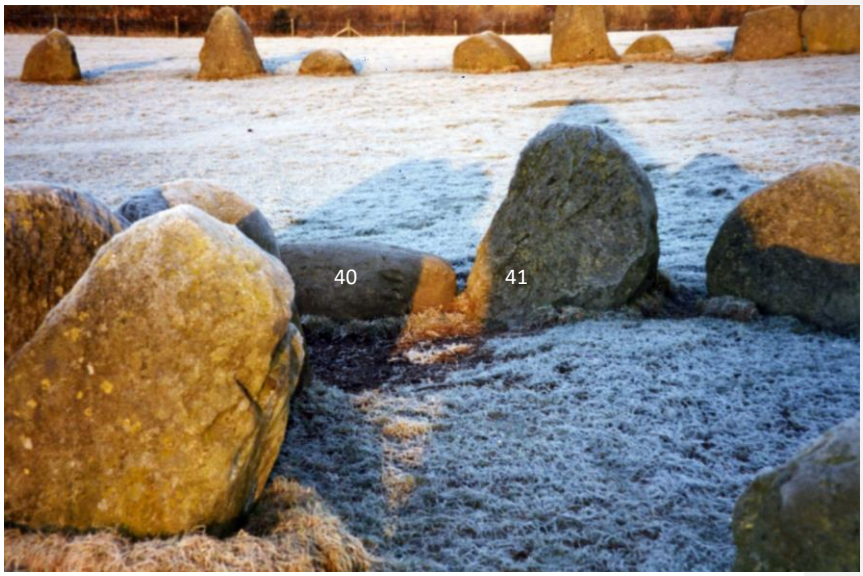


Figure 112 Castlerigg midwinter sunrise on to Stones 40 & 41 in the Sanctuary on 18/12/02 Photo by JME

745

Because of the high skyline here, the shadows do not reach across the circle. [It is assumed that] for this reason… the stones making up the Sanctuary were so placed to make additional marker stones.

Another effect of this high skyline makes the triple very wide, with Stone 14 marking the sunrise, Stone 15 (the central stone) acting as at Swinside for the midsummer sunset, and Stone 16 making the other flank of the triple.

Insert from Megalithic Portal by Jack[26]

The sun rises much later at Castlerigg as it has to climb over Helvelyn and cannot be seen before 9.15am. Here the Gateway Triple is very wide being Stones 14, 15, 16, when viewed from Stone 34 over 15. The width of this triple is probably due to the slope of Helvelyn, so it is not obviously the ceremonial entrance.

[26] Italics denote insert from Megalithic Portal Comparing four circles
http://www.megalithic.co.uk/article.php?sid=2146412405

Figure 113 Midwinter at Castlerigg. [Mid-Winter Sunrise Photo by JME]

This photo [Figure 113] *shows the sunrise over Stone 17 from the Double 30/31 at the mid-winter solstice, demonstrating one of the number of pairs of stones lining to the* MWSR [Mid-winter sunrise]. *End of Jack's insert*

Stonehenge.

Here the winter sunrise lights up Stone 16, the Goddess Stone, which acts as the Great Stone probably with Stones 12 and 14 creating the shaft of light with one side striking Stone 16. This is difficult to prove as Stones 12 and 14 have fallen and Stone 13 is missing. The barrow marking the sunrise has been ploughed out. (Shown in the diagram on page 36 of 'Stonehenge in its landscape', and expanded in Chapter 13 on the moon).

Figure 114 Stonehenge 18/12/07 Photo by JME

Figure 115 Stonehenge 7/01/02. Showing the FORS sunrise past the bulge in Stone 16 Photo by JME

The other major lines of the midwinter sunrise are from 42c (a buried stump), through the gap 51/52 and out through the gap 6/7. At the time of construction the shaft of light entered through 5/6, passed 51, over Altar Stone 160b, to strike Blue Stone 72. [See Figure 116 which is re-drawn by the Editor from 'Stonehenge in its landscape' page 27 Published by

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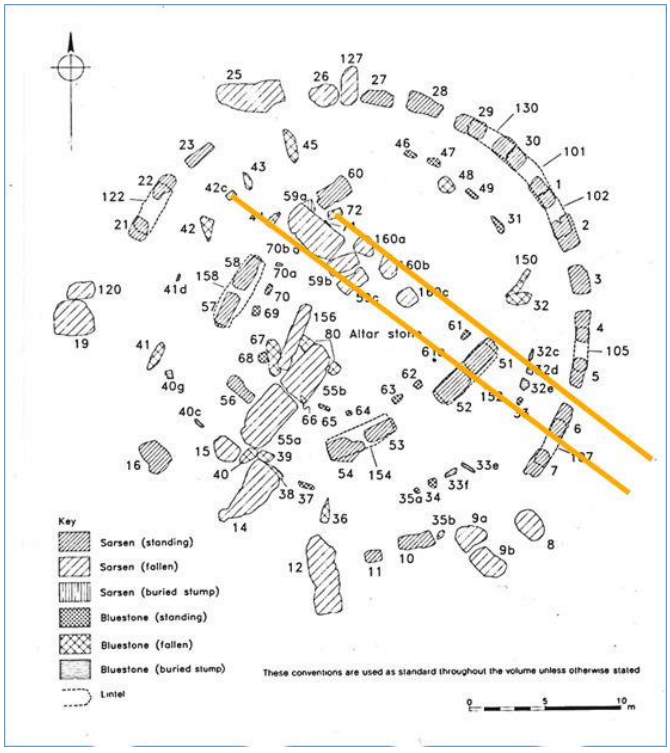

Figure 116 Midwinter sunrise at Stonehenge re-drawn by the Editor

(See Diagram here)[Figure 31 p57] *The sunlight passes the Great Trilithon and casts a shadow a long way. Photographs show it at or near the car park fence. Could it have gone to the postholes under the car park?*

The sun would have risen by the edge of Stone 51, with light touching Stone 160b, a large bun shaped altar, sometime before the lintel shadows become level with the top of Blue Stone 71 (if this was standing) or 72 sometime after sunrise.[27]

Throughout the year the rising sun shines through the various gaps in the outer ring of sarsens and strikes one of the 3 Bun Altars 160a, b, or c. The First Gleam appears to be on one side of them and the Full Orb on the other. More work is required to fix the dates which apply to each altar stone.

[27] Italics denote insert from Megalithic Portal Comparing four circles http://www.megalithic.co.uk/article.php?sid=2146412405

Chapter 9 Midwinter Sunset.

05/12/2010

Arbor Low

At Arbor Low the western bank hides the winter sunsets from the circle stones, and in order to see the distant skyline, it is necessary to stand on the bank, when the sun aligns with the expected stones as seen on FORS.

Figure 117 Arbor Low, taken on the 4th January 2003 by JME

This photo [Figure 117] *taken on the 4th January 2003 shows the Last Gleam past the edge of Stone 27 The Great Stone. On brilliant evenings like this one when standing on the bank, the sun can be seen going down into the dip in the distant skyline past the Great Stone over the stump of Stone 15 (the stone in the east of the circle broken into three pieces), hidden in the snow.*

This suggests to me that the circle was laid out before the bank was erected (the dating of the erection of the stones is problematical) which was done to give observations while the Sun was higher in the sky and above the evening murk. They will have used the existing stone

layout possibly when the Sun was some 11, 22 or 45 minutes before true sunset. Unfortunately I have no observation of timing at this site at the present time.[28]

Swinside.

Like the midsummer sunset, the midwinter sunset is very early due to the high skyline; one should be there for 2.30pm.

Figure 118 The Great Stone's shadow does not quite reach Stone 12. Photo by JME

As can be seen in the top photo [Figure 118]*, the Great Stone's (30's) shadow now does not now reach Stone 12,* [the small, flat stone to the right of the longest shadow] *a leaning table top altar type. It is likewise at Castlerigg, so perhaps it was never meant to.*[29]

It was realised that Stone 40(f) was a tall stone, which must have been so placed to cast a shadow across the circle at the midwinter sunset. In order to find out the target, an experiment was done erecting a board of the same height that Stone 40(f) would have been, and its shadow swung around until it covered Stone 57, the North Stone, at the same time that the ground shadow reached its base [Figure 119]. However, the shadow was very weak because the sun was half down, and the temperature dropped very suddenly as soon as the sun started to drop behind the crest.

[28] Italics denote insert from Megalithic Portal Comparing four circles http://www.megalithic.co.uk/article.php?sid=2146412405
[29] Italics denote insert from Megalithic Portal Comparing four circles http://www.megalithic.co.uk/article.php?sid=2146412405

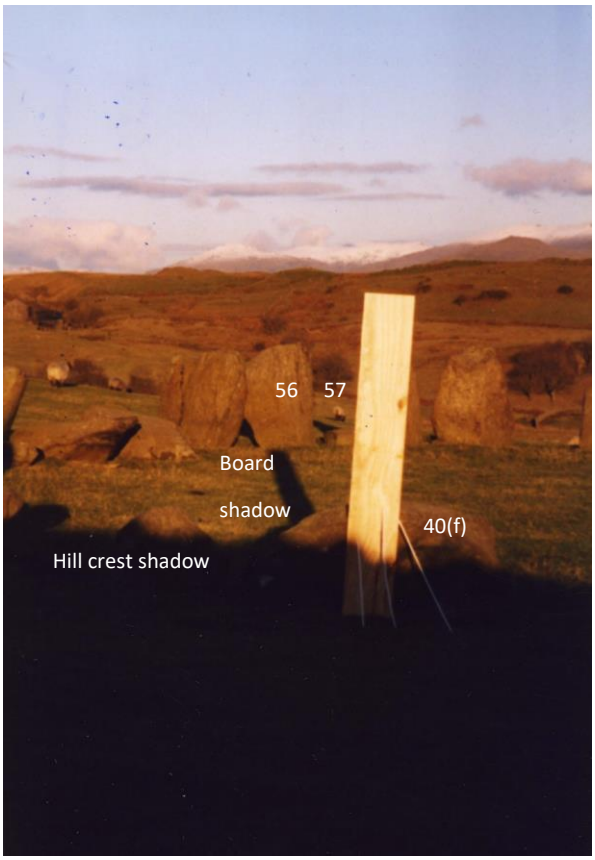

Figure 119 Swinside 17/12/02 2:37pm. Sun still at Full Orb with hard shadows. Horizontal shadow of hill crest. Photo by JME

189

Figure 120 Swinside 17/12/02 2:47pm Photo by JME

Here [Figure 120] the shadow of the board has nearly reached the small North Stone 57 with the ground shadow half across the circle. Notice how far the board's shadow has moved in 10 minutes.

Figure 121 Swinside 17/12/02 2:49pm. Photo by JME

Ground shadow has just passed the stones [Figure 121], but it is still possible to see ….. the board shadow. This is only 2 minutes after the last photo. This alignment would have worked perfectly at the time of construction.

Figure 122 Swinside Photo by JME

Swinside Stone 37. A lying dagger shape marking the Full Orb of the sun at the solstice at the time of construction.

Looking the other way from Stone 4, a spoon shaped stone, over the lying dagger Stone 37, marked the Full Orb position at the time of construction, and from the fallen and broken diamond shaped Stone 5, marked the last gleam. Observation showed that it was out by the expected 18-20 inches. [Allowing for the 1°change in alignments over the centuries]

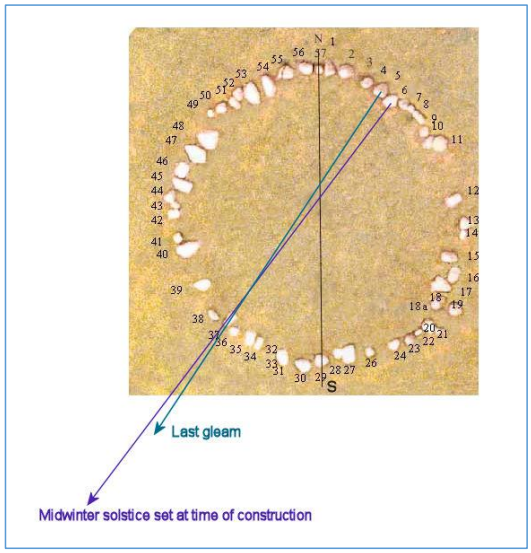

Figure 124 Winter solstice at Swinside. Re-drawn by the Editor

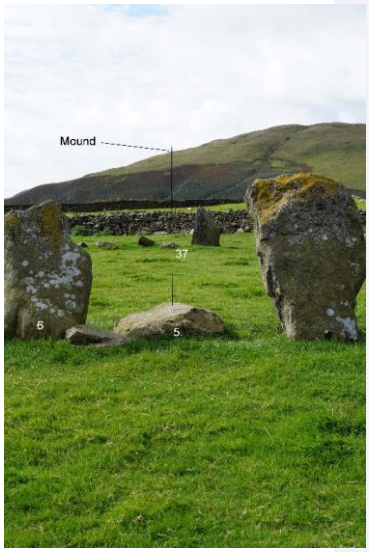

Figure 123 Midwinter solstice alignment 5 to 37.. Picture by David Smyth 11.45am 16/9/17

The Full Orb would also have been seen over the lying Midwinter Stone (Stone 37), a beautifully worked lying dagger shape, from Stone 5, a fallen and damaged diamond shaped stone.[30] [Jack's measurement of this is 218° (from the diagram Figure 124). The Editor measured it as 213° on site, and Horizon returns it as 215°. As this is a Full Orb event, one would need to take 1° off the latter two, making a difference of 6 and 4° respectively]

Figure 125 Stone 37. Picture by David Smyth 7:27am 19/9/17

[30] Italics denote insert from Megalithic Portal Comparing four circles http://www.megalithic.co.uk/article.php?sid=2146412405

Figure 126 Swinside table top altar Photo by JME 187

Swinside [date and time missing, see Figure 126]. The shadow from the Great Stone 30 probably touched the table top altar, Stone 12 at the time of construction, but does not today.

Castlerigg.

Figure 127 Castlerigg 18/12/02 (time missing) Photo by JME

530. The shadow from Stone 21 [at Castlerigg] does not reach the Altar Stone 40 [Figure 127]. This is the same as at Swinside

Figure 128 Castlerigg, the sunset from Stone 1 Photo by JME taken on the 31st December 1994

This photo [Figure 128] *of the sunset from Stone 1 to near Stone 29 taken on the 31st December 1994 well demonstrates the problem of water logging due to mass visitors sealing the surface. I suggested that a narrow drainage trench was dug and used as a chance for archaeological observation. It was turned down for two reasons. Firstly only the stones themselves are under the control of English Heritage, the ground around them is controlled by the National Trust, and secondly, because the advisory archaeologist did not like the idea of a narrow trench, so did not push the idea. Sadly the flood water has now caused a cist to fall in, judging by its size and shape.*[31]

[31] Italics denote insert from Megalithic Portal Comparing four circles http://www.megalithic.co.uk/article.php?sid=2146412405

Figure 129 The midwinter sunrise at Castlerigg 18/12/02. The sunrise is from Stones 30/31 over Stone 17. Photo by JME

Stonehenge

Figure 130 Stonehenge 18/12/07 [time missing]. Photo by JME

Full Orb, from the Heel stone over the Slaughter Stone through the gap between 1 and 2. [Figure 130]

Figure 131 The Stonehenge Slaughter Stone Photo by JME

The Stonehenge Slaughter Stone [Figure 131] is a very large, lying, Dagger Stone, which [type] always marks the Full Orb position of the sun at the solstice. [It] is an unusual shape which was probably originally plastered up with chalk to make a ridge along the centre, now washed out. This is claimed because of its position at the midwinter's solstice sunset.

Figure 132 Stonehenge 18/12/07 near last gleam Photo by JME

From the Heel Stone just touching the Slaughter Stone in this photo [Figure 132] then past Stone 1. At the time of construction it would have been just touching Stone 56.

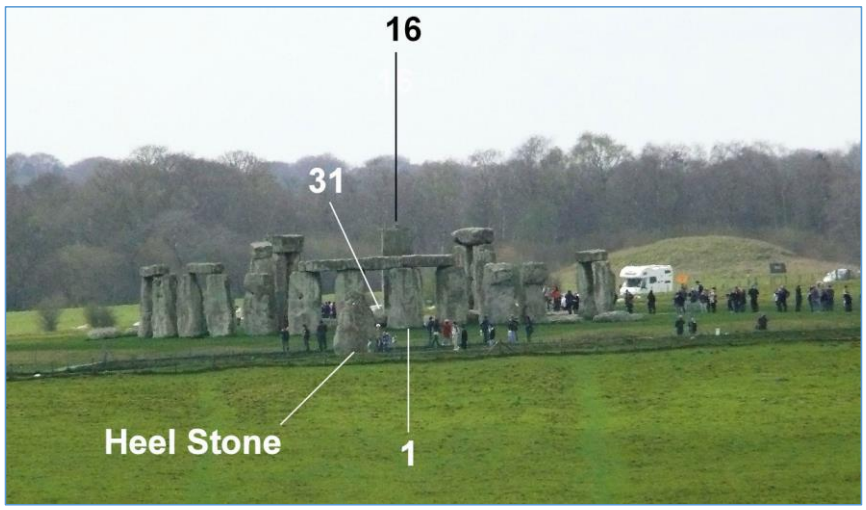

Figure 133 Midwinter sunset line. Photo by Simon Charlesworth 3 April 2011 12:59

[See diagram Figure 222, p227 for this line]

Insert from Megalithic Portal 'Comparing Four Circles' by Jack[32]*:*

Within the circle of Blue Stones at Stonehenge, there are five stones of traditional shapes, Stones 46, 47, 48, 49, & 31, four of which 46 to 49 can be seen in this photograph [Figure 134] *over the Bun Altar (Stone 160b).*

Figure 134 Midwinter at Stonehenge. Photo by JME

These cannot be seen from the area of the Heel Stone, so can have nothing to do with the midsummer sunrise. They do however receive shafts of light/shadows from the midwinter sunset and the sunset at FORS. This occurs during the time when the general public are allowed into the site and so has not been viewed, as it is impossible to allow anyone into the centre while visitors are kept out. It may now be possible to prove this with a mini camera concealed within the circle and to be fair I have not asked English Heritage if this would be permissible.

These five stones also act as a side stepping base for observing the Moon Northern Sector setting as at Castlerigg. I have only seen one setting from Stone 49 on the night of the summer Solstice party, with a thousand heads in the way of the final setting Moon. At midwinter I think that the shaft of light through the Trilithon would have hit Stone 48, and the Last Gleam at FORS would have struck Stone 31.

[32] Italics denote insert from Megalithic Portal Comparing four circles
http://www.megalithic.co.uk/article.php?sid=2146412405

Figure 135 Midwinter at Stonehenge. Photo by JME

This photo [Figure 135] *shows the edge of Stone 49 (half Heel Stone), 31 and 150, 32 not part of the Blue Stone ring with Bun Altar 160c in foreground.*

At midwinter at the time of construction the shaft of light past the southern edge of Stone 55 (f) is expected to have struck the Slaughter Stone. Unfortunately we will never see this now as the sun does not set far enough South. This photograph (link to Photo 902) [no link now available] *shows the Slaughter Stone with the gap between Stones 1 and 2.*

I hope this article demonstrates that all these circles are based on the same principles with variation to suit the sites, and I regret that I have not got photos of exactly the same occurrence happening at each site. This has only taken 13 years so far, and at the beginning I had no idea how things worked so missed many chances, and took many wrong photos.

I will not be publishing any more articles before April, when I hope to continue with more on how the ancients could have worked out the construction, and the interface with the Sun and Moon observations. There will also be a hypothesis that there is a North/South line running through the West Cumbrian Circles, and possibly more on Stonehenge depending on my luck with the weather for observations over the Equinox in the area.

Midwinter Sunset. [A later article in Megalithic Portal] [33]
The last gleam of the midwinter sunset on Dec 18th 2007 was lost in the murk and the trees on the skyline, but appears to align from the Heel Stone, touching the right hand corner of the

[33] Italics denote insert from Article by Jack Morris Eyton with contributions from Helen Denton and Angie Lake http://www.megalithic.co.uk/article.php?sid=2146412398 Article 17

Slaughter Stone, past the left hand edge of Stone 56 out to ***Mound 15 in front of Normanton Furze – see*** [Figure 136].

Figure 136 Stonehenge, nearly last gleam 18th December 2007. Photo by JME

This is the same place that the Full Orb of the Sun was seen on Jan 5th 2003. Unfortunately the cloud has made the photo not worth showing on a small scale, but it did light up the circle on the face of the Heel Stone, as seen [below, Figure 142 p150]. *The light from the Last Gleam of the midwinter setting sun is never strong enough even without cloud to do this.*

This therefore confirms my original article (no 13)[34]*, that the orientation of the axis of Stonehenge at the time of construction, was the Sun's Full Orb position of the sunrise at the summer Solstice over the Heel Stone, when seen from the south edge of Stone 56. In the opposite direction it is from the Heel Stone, at the period of the Festival of the Returning Sun (FORS) on Jan 6th, past the southern/left edge of Stone 56, to Full Orb over Mound 15.*

End of Jack's insert

[34] The Orientation of Stonehenge http://www.megalithic.co.uk/article.php?sid=2146412398

Chapter 10 The Festival of the Returning Sun (FORS) on 6th /7th January

04/02/2011

This festival was in existence long before the Celts gave it a name, so we should give earlier prehistoric people the credit for it. They considered it as important as midwinter and it was so fixed to take up the 19 days to make approximately 13 full moon cycles of 29.54 days a year with 365 days plus 19 = 384 days. Note the Muslims stick with 12 moons, which means Ramadan moves back 11 days a year. Today, because the sun does not go as far south at the winter solstice as it did during …. Neolithic times, the azimuth position is reached in 17 days after the solstice.

As the Earth passes the solstices, the effect of the angle of the axis causes the sunrises to be about 2 days early in the spring compared with the same stone indicators for the autumn.

All of the circles looked at mark this FORS position, it being first spotted at *Long Meg* with the shadow of Long Meg herself shining right across the circle in the evening due to the slope of the ground. The Full Orb of the setting sun was seen central to the portal entrance with the last gleam behind Long Meg herself. This gave the impression that this was a very important day, and could have been designed for midwinter. Research looked at the possibility of a change in the Earth's axis, but there is no proof of this, and more surveying at Swinside showed that there was another fallen diamond shaped stone (53) that used the triple 15, 16, 17 to mark the sunrise on this date.

Figure 137 Swinside 3/1/10 8:45am FORS sunrise from the side of 53(f) over 15(f) Photo by JME

Note the sun is now some distance to the left of the skyline dip, marking midwinter sunrise [Figure 137].

At *Stonehenge* it is difficult to be certain how it worked in the morning because of the fallen stones, and although it had originally been assumed that the Great Trilithon was the Great Stone, research … showed that Stone 16 had many of the attributes of a Great Stone, with Great Trilithon acting as a frame

Figure 138 Stonehenge 7/1/03 sunrise Photo by JME

There is [an] interesting series of photos [culminating with] the Full Orb of the sun over Mound 15, with the evening light passing through the gap in the Great Trilithon, and illuminating the circle on the Heel Stone. [Starting with Figure 139].

Figure 139 Stonehenge 05/01/03. 895 3:50pm Photo by JME

Note the level of the shadow on the Heel stone [Figure 139] [The Heel stone is central, rear].

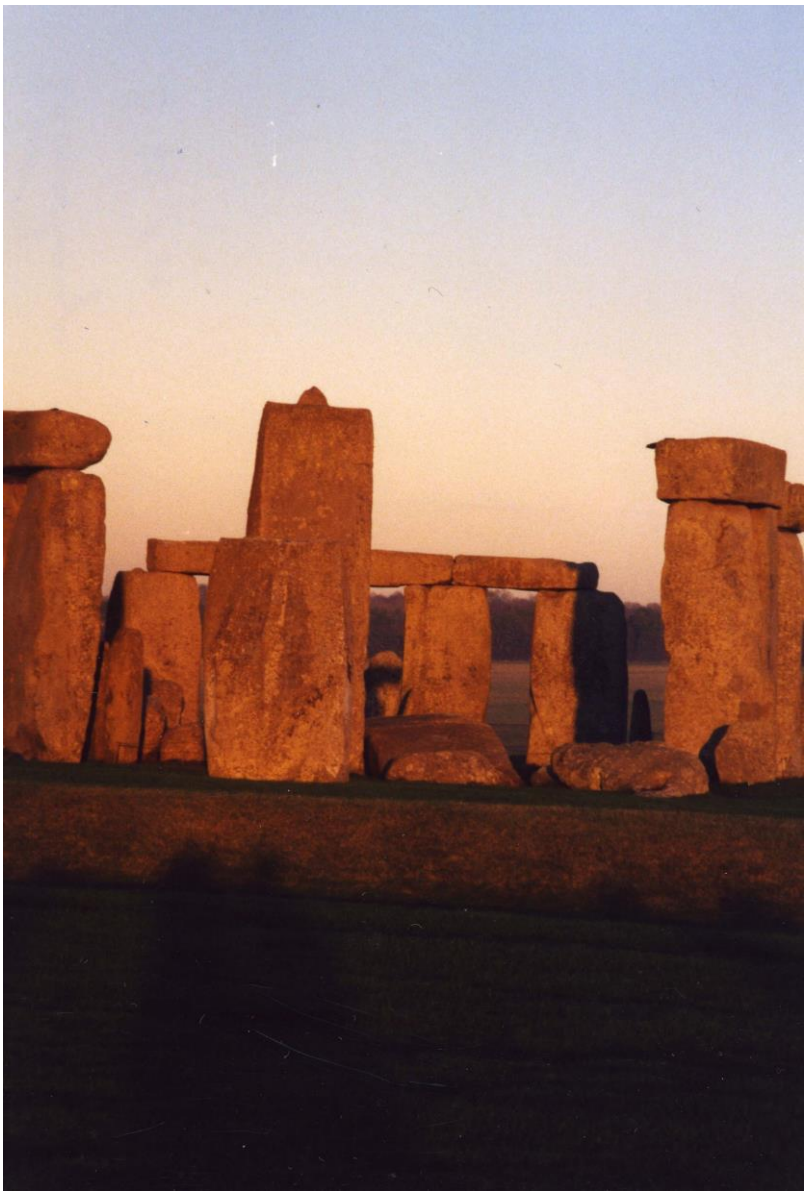

Figure 140 Stonehenge 05/01/03 895 3:52pm. Note the shadow has moved up the Heel Stone. 894 Photo by JME

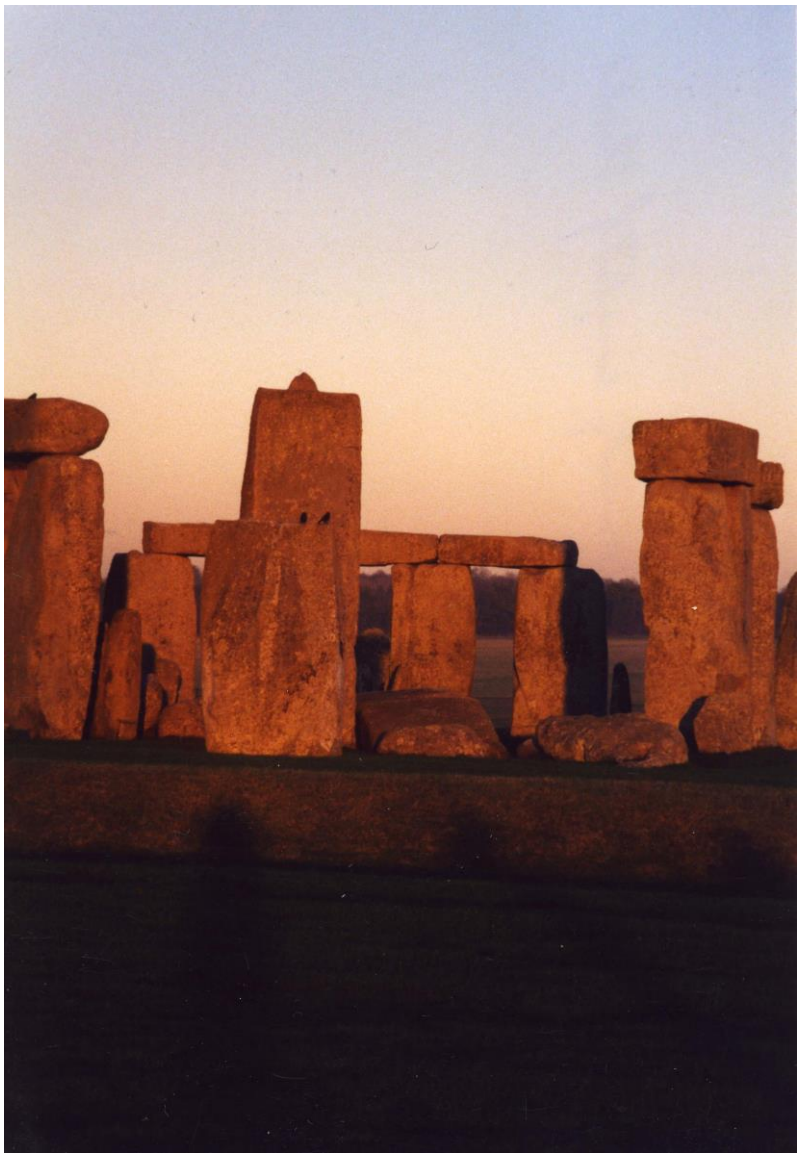

Figure 141 Stonehenge 05/01/03 at 3:5?pm 893 Photo by JME

[In Figure 141 the] time uncertain. Was asked by security staff to move ready for closure of the site.

Figure 142 Stonehenge 05/01/03. Photo by JME

The Heel Stone, time not recorded [Figure 142]. Circle lit up by the Full Orb of the setting sun over Barrow 15. This was the only occasion that this has been seen. The light on the right side is caused by Stone 55 having fallen. The dark at the top is shadow of the lintel 101 in the outer

ring and a bottom dark area would have been the shadow from a blue stone, broken off and hidden under Stone 55. In several places around the circle 3 stones create an aperture casting a shaft of light on to a target.

Alec Nicholson, a friend, who was managing director of Tornado Wire Ltd. and before that a squadron leader in the RAF, was … by chance in *Maeshow* for sunset on January 7th 2009. He saw the light shine straight down the tunnel to the central recess, and … remarked that the builders must have got their construction just out of line for the midwinter solstice. This shows that this monument is built on the line of the Full Orb of the FORS.[35]

This confirms that the axis of Stonehenge was built to align to the Festival of the Returning Sun (FORS) at Full Orb as well as the last gleam of the midwinter solstice. The Full Orb position can be seen more often than the last gleam was because of the evening murk, and the position of the last gleam at the time of construction can only be calculated, whereas position of the FORS Full Orb can be seen in its original place.

[35] Ed: Note Maeshow is generally considered to be aligned on the last rays of the midwinter sun setting. See http://www.orkneyjar.com/history/maeshowe/solstice.htm (Towrie, 2017)which says:

> For a few days each year, as the midwinter sun slips below the horizon, its last rays shine directly through Maeshowe's entrance passage to illuminate the rear wall of the central chamber.

This would have been on Dec 22nd. Although this is observable for a few days each side of the solstice, It is difficult to believe that Alec Nicholson observed the same phenomenon 2 weeks later on Jan 7th.

Chapter 11 Construction and layout of Cumbrian Circles

[1. Find the focal point of a circle]

[Jack] found that there is a focal point to every circle of the Swinside group in Cumbria, and that [this] can be found either by the joining of opposite stones across the circle, or by observing where the lines of the solstice sunrises cross over. The solstice sunsets cross at the same point when they are corrected to the 'as constructed' positions.

From this it is reasonable to assume that the focal point was used in some way in the marking out of the circles. One possible system was to note the focal point from the solstice sunrises over selected features on the skyline, and then to find the north/south line by use of the pole and shadow method:

[2. Find the north-south line]

A pole is erected vertically on a flat, horizontal surface, on which concentric circles have been drawn with the centre as the base point of the pole. As midday approaches the shadow of the top of the post is marked where it crosses one of the drawn circles and is then marked again when it crosses the line of the same circle again sometime after sun midday. Remember that if the site is west of longitude zero, ie the line which goes through Greenwich, the sun does not reach … due south until sometime *after* clock midday. These 2 marked crossing points are joined by a line, which is then bisected and joined to the centre point of the circles. This line is true north/south. It is easier to get an accurate answer when the winter sun is used, as the shadows are that much longer. [However] the system works all year, whenever the sun is shining at midday[36].

[Insert by Andrew Davies

[36] Note from Dimitrios Dendrinos: The process that Jack describes in finding the N-S axis applies only to the case of perfectly flat and horizontal grounds. This is a general comment that must be kept in mind when Jack talks about azimuths. He is obviously aware of the ground's anomalies and their effects on azimuths and the key events (sunrises, sunsets, moonrises and moonsets) - but he doesn't make this always clear when he identifies various rules that seem to be applicable to the various monuments he discusses.

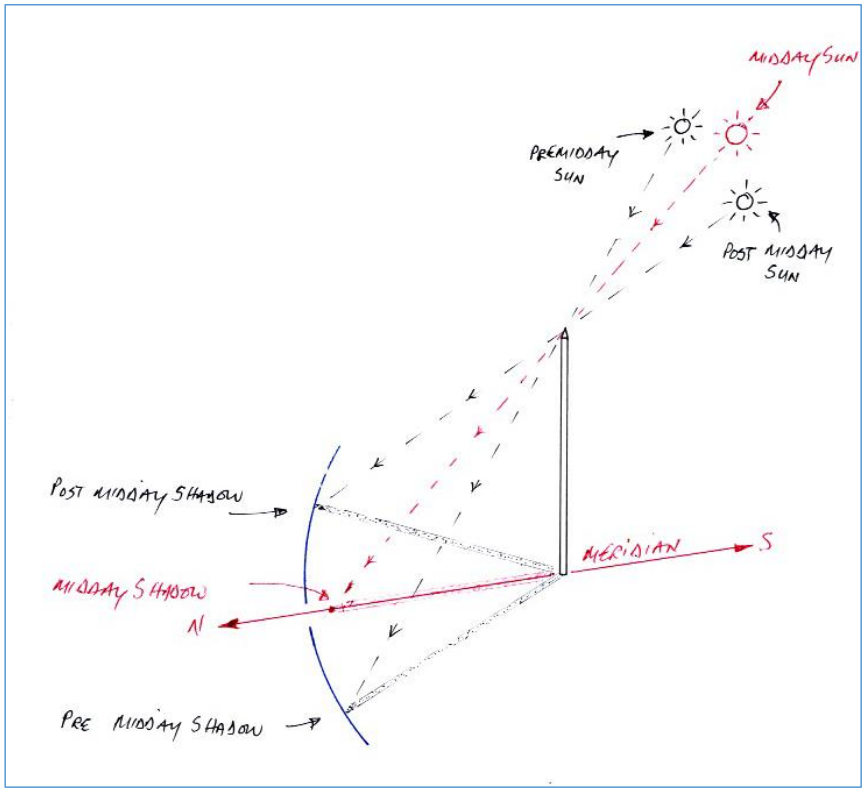

Figure 143 Finding the N-S line. Drawing by Andrew Davies

Erect a thin stick vertically (refer to Figure 143). A little time before local midday (solar noon) mark the shadow tip. Using a string tied to the stick base and a peg as a compass, scribe the blue arc as shown. As the sun climbs to its midday position, the shadow will shorten, until at midday it will be at its shortest. After midday the shadow will lengthen again. When the shadow becomes long enough to touch the arc again, mark the spot. The meridian is midway between the two marked shadow tips. Repeating these steps on other occasions would refine the accuracy due to variations in shadow sharpness because of atmospheric conditions.]

[To mark out a circle:]

Draw the N/S line through the focal point at a length that is longer than the proposed size of the circle, and mark with either posts or stones. Construct, by using a cord and sticks compass, a 90° angle at the focal point. Again, mark with either posts or stones, at either end outside the proposed diameter of the circle.

Using the same compass [method], keep on bisecting the angles and marking until 5 5/8° is reached. This will give a circle of markers at 5 5/8° to which radial lines are drawn from the centre. (There are small stones in these positions at Swinside between the gate into the field and the circle, where it is probable that the ground has never been ploughed. Similar stones

have been seen at the Nine Ladies circle in Derbyshire, before it was realised what they were for).

Insert from Megalithic Portal, Finding the focal point of the circle by Jack:[37]

Finding the focal point of the circle

Now comes some difficult to comprehend research resulting from over 10 years work, compressed into this short article. It may look complicated, but don't be put off. I hope after reading this you will have an entirely new concept of what these ancient people did. The four major concepts I put forward demonstrate the extremely advanced state of their civilisation.

Very early into my researches I borrowed a builder's dumpy level calibrated in degrees for traverse (a survey line plotted between angular points). I set this up at Swinside where the lines for the midwinter and midsummer solstice sunrises crossed to measure the distance from that point to each stone and take its angle.

Measuring to the stones from this point soon presented difficulties because I had to decide which part of the stones to assess. I settled on measuring to the nearest part of the standing stones at ground level. These measurements showed a gradual change with no obvious jumps. I then took the bearing to each stone starting at Stone 1. After a very few readings to the estimated nearest degree, it appeared that an angle of 4 ½° touched every stone as far as I went. On rough plotting onto an enlarged photocopy of the diagram from John Waterhouse's book, it appeared that the stones were erected opposite one another with a few blanks, and that all the connecting lines went through one point. (I now know that the same thing happens at Castlerigg and Long Meg). I then spent months trying to find how they might have constructed an angle of 4 ½° using standard right-angled triangles, as suggested by Professor Thom.

Realisation eventually dawned, that perhaps there had been a fault in the level I had borrowed and that it was out. Perhaps I was looking for the wrong angle, but it must be something close to it, as the ancients appeared to have built at regular angles. What could it be?

I then thought about what instruments they probably had - various poles, and some cord with which to make a simple compass. At school I had learnt how to divide lines and angles with a compass. I then realised that if I drew a circle with the compass, then divided the circle with a line through the centre, and continued to divide the line by compass to give a 90° right angle and so on, I came up with this:

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[37] *http://www.megalithic.co.uk/article.php?sid=2146412397*

1. The dividing of the stone circle into equal angles.

The circle is drawn with a compass of some type.

1. The circle is divided by a straight line through the centre to create an angle of 180°
2.This line is divided into 2 equal parts by use of the compass to create an angle of 90°.
3. The four quarters were divided again by compass to create an angle of 45°.
4. The eight 45° angles are divided by 2 to create 16 angles of 22 1/2° or 22° 30'
5. The 16 x 22 1/2° angles are divided by 2 to create 32 angles of 11¼° or 11° 15'
6. The 32 x 11 ½° angles are divided by 2 to create 64 angles of 5 5/8°or 5° 37.5'
7. The 64 x 5 5/8° angles are divided by 2 to create 128 angles of 2 13/16°or 2° 48.75'
8. The 128 x 2 13/16 angles divided by 2 to create 256 angles of 1 13/32° or 1° 24.38
9. The 256 x 1 29/32 angles divided by 2 to create 512 angles of 45/64° or 0° 42.19'
10.???
This divides the circle into 512 Divisions with the instruments that they had available. They could have gone to the 10th division, but no proof has yet been found. They did not use our 360° circle.

Many readings show the common use of the angle of 5° 37' ignoring the decimal fractions [for] the minute, as it is unreal to read the stones to such a figure.

The most intriguing question is how the ancients laid out the circle. Could they have used a cord compass every time? This would have been very time consuming and likely

to create inaccuracies which are not apparent on site. Or perhaps they had some other instrument?? Has anybody seen such an instrument?

[Insert by Andrew Davies: Method of finding 5 5/8°]

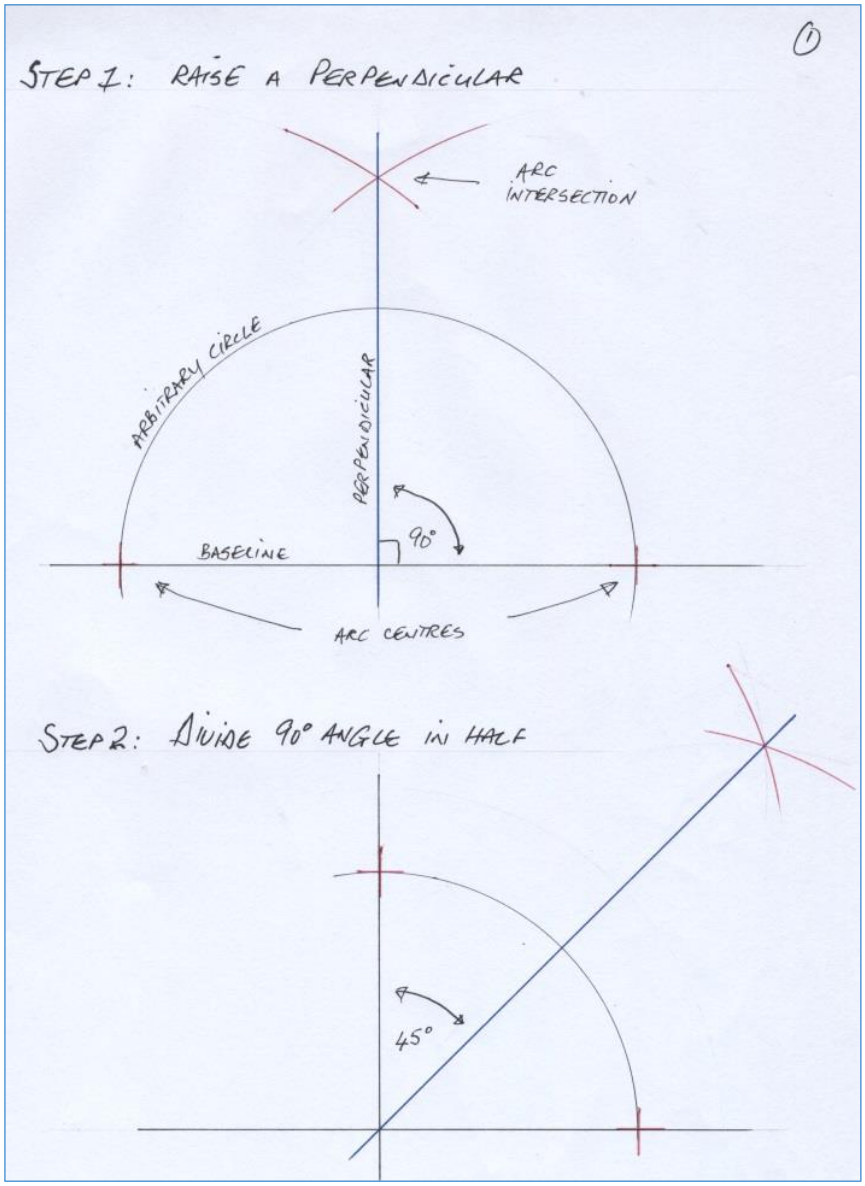
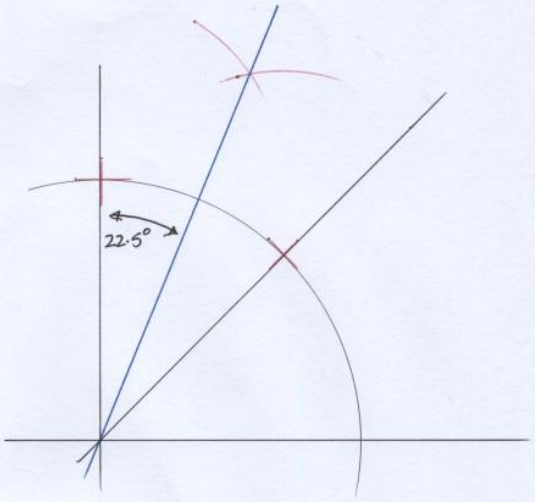


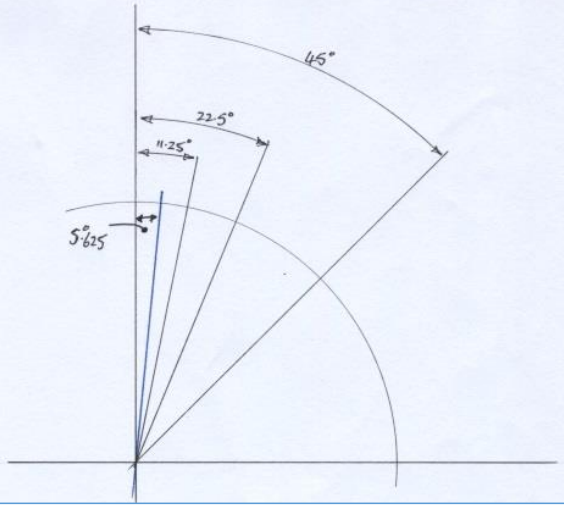
Figure 144 Method of finding 5 5/8° Steps 1 and 2.Drawing by Andrew Davies

(2)

STEP 3: DIVIDE 45° ANGLE



STEPS 4 + 5: FURTHER SUB DIVIDE ANGLES DOWN TO 5 5/8°



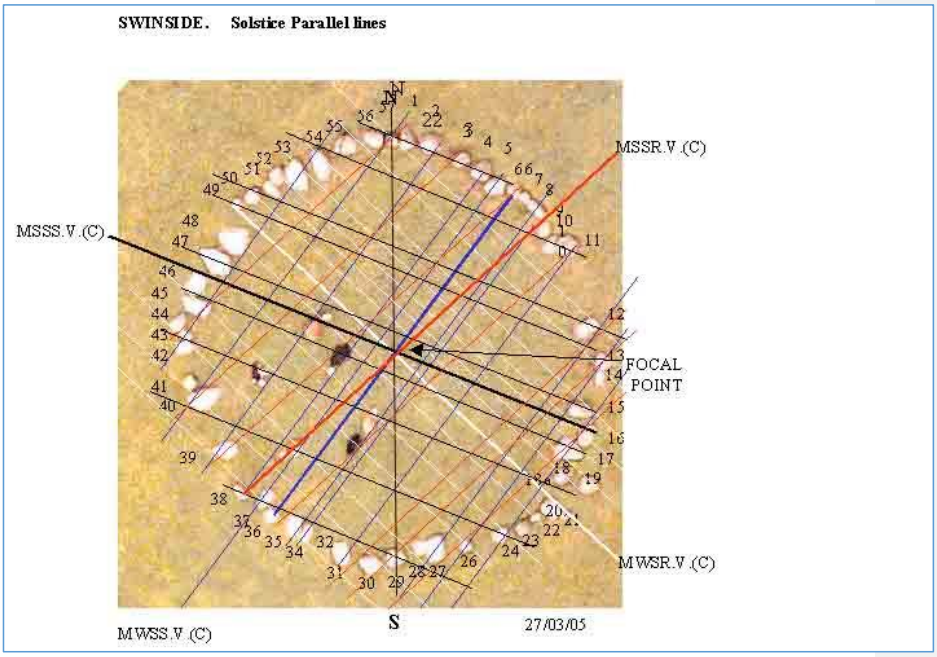


Figure 145 Experiments on finding the focal point at Swinside. Diagram by JME added Nov 30 2005

2. Thom noted that there are several pairs of stones aligning to the solstice sunrises and sunsets. When all these parallel pairs are drawn on to a single diagram as here, [Figure 145] *we see that one pair for each group cross at one place. I call this the Focal Point of the circle. Please note this is not the mathematical centre - the North/South line does not quite go through this point.*

3. Having found the Focal Point of the circle at Swinside, I set up the theodolite at that point. Only reading to those stones that are still in their original positions, I confirmed the 5° 37'unit, or a division of it, as the spacing of the stones, where one was required. It has been noticed that the observation of the First and Last Gleams at the solstices were often past the edge of the fore sight stone, suggesting that it would only have been visible on the actual day. Unfortunately we can never see this to prove it.

4. This exercise confirmed that the North/South line did not go through the Focal Point, but went very near to it. There had to be a reason for this. The idea was formed that they must have stuck in a post as a construction sighting marker. Several sizes of

pipes up to 20cms, were tried to test this theory, but none worked exactly. On deeper thought it was realised that they did not have straight plastic pipes available or indeed wooden poles of a uniform thickness, so they perhaps used a tapered tree instead. Hence the pyramid of plastic pipes in this photo [Figure 146]

Figure 146 Experiments on finding the focal point at Swinside. Photo by JME posted Nov 30 2005

which is the reverse of the midsummer sunrise seen by the edge of Stone 46 at Swinside to the rough chipped notch in Stone 16. The wind has caught the plastic pipe pyramid, the other side of the pipe aligned exactly before the wind blew. This was taken with the old film camera so was not seen until the photos came back.

This suggests that the ancients lined everything up by the edges of the tree, hence the reason for the North/South line being slightly off the Focal Point. It was calculated that in this case the tree had to be about 4 metres high, so that the last gleam of the midsummer setting sun over the very high skyline, with an elevation of 14° 50', could be lined down to the stones accurately. They got the layout calculation slightly wrong

and so they had to hack a rough notch out of Stone 16.

Figure 147 Experiments on finding the focal point at Swinside. This photo shows the line between Double 42/43 and 13/14. Posted by JME Nov 30 2005

This photo [Figure 147] *shows the line between Double 42/43 and 13/14.*

Figure 148 The North/South line through Stone 29 at Swinside [Posted Nov 30 2005 by JME]

This photo [Figure 148] *shows the North/South line through Stone 29 at Swinside, the Southern Stone, with a rubbed notch on the other side, through the left hand side of the base of the plastic pyramid to the little North Stone 57, which has been rolled over, but is still more or less in the right place. The top of the pipe points roughly to where the fallen standing stone marking north lies on the next hillside.*

The same thing appears to have happened at Stonehenge where the lines for some of the moon observations go around a posthole, (No 3362). This is said to have been 18" in diameter, according to the tables in 'Stonehenge in its Landscape' (RMJ Cleal, 1995). *It appears that this happens at several of the other postholes, including those well noted by the Heel Stone.*

The sizes of the trees used depended on the height of the expected observation to be required. Once the circle was constructed the tree(s) were removed. There is excavation evidence that this happen[ed] at Moor Divock [Approximately NY493222] *in Cumbria and there is a strong suspicion that the same system was used at Woodhenge in Wiltshire. There are however, two problems with the Woodhenge site. Firstly, there is the question as to whether the concrete markers were placed absolutely accurately. Secondly the trees around Lark Hill have spoilt the final MSSS* [Midsummer sunset] *observations, but the earlier evening ones indicate that the system was there. Much more work needs doing here.*

If you find all this impossible to believe, go and try it for yourself, and then tell me where I am wrong.

End of Jack's insert

At Swinside, the line marking Beltane through the focal point is of equal distance from the foresight Stone (8) to the focal point, as it is to the backsight stone, which is the Sunrise Altar, Stone 17B. From this it is reasonable to deduce that this distance determined the final size of the circle. From Stone 17B, the observation of the festival at 85°, not through the focal point, was marked with 2 stones (9, 10) on the radial lines. [It was] erected so that the line of sight was over the V made by the tops of the 2 stones, …. imaging the sun being observed at Full Orb, in the various V's or peaks [on the skyline] for the different festivals.

From the Double Stones (9, 10), the solstice sunrise first gleam, observations were marked by Stones 23, and 15E, and erected on the radial lines. From 23 and 15E the 'as constructed' sunset solstice lines were noted and marked with double Stones 17E and 17D to make the western double. NB these circles were built before the earth shift took place.

*[Note from the Editor: I have reproduced the basic plan of Swinside here (*Figure 149*) in an effort to help the reader envisage what Jack meant in these two paragraphs, which are not easy to understand.]*

Commented [DS1]: Prob need to do more than this?

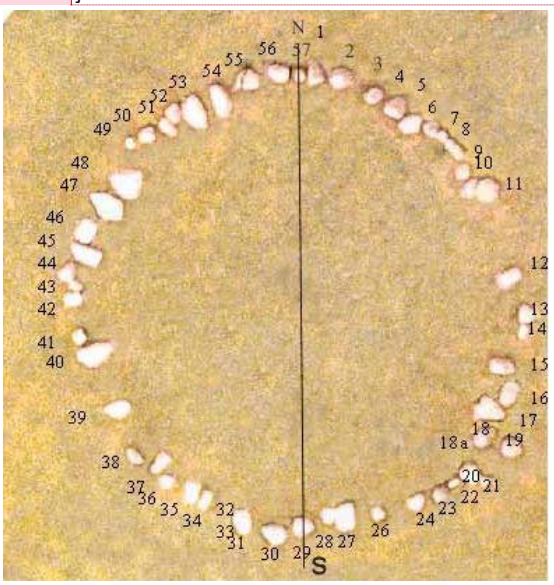


Figure 149 Swinside basic plan by David Smyth after E Cleasby's photo

From the drawings 'as constructed' the positions of the sunrise and sunset altars can be placed.

In order to get the stone alignments to fit with the varying elevation of the skyline, the stones do not make a completely even circle. The same process was used for the sunsets. Where there are wide spaces between stones marking the 85° festival and Beltane there are no known festivals at this period of the year [when] the sun is moving quickly along the skyline. This spacing is similar at Swinside and Castlerigg.

The midwinter sunrise appears to have been the most important annual event marking the end of the daylight getting less and less. …Often, [the] sun is observed at Full Orb over a smaller stone in the middle of a 'gateway' of 2 larger portal stones. At Swinside the gateway is very prominent, whereas at Castlerigg it is very much wider and at first glance does not look like a gateway. At Long Meg, the MWSR V [Mid-winter sunrise First and Last Gleam] gateway is not at all obvious.

From the diagrams of the 'as constructed' circles it is now possible, by waiting a year or two, to fit in all of the other sun marker stones. The moon stones will take very much longer.

From A:\GATEWAY01.DOC page 35 0f 45 07/03/99 [Unknown source, presumably a file on Jack's computer]

Chapter 12 The Solar calendar.

05/02/2011

At the start of observations at Swinside, I had no idea what I was looking at, so marked the sunrises across any 2 stones and continued for some time progressing north to the summer solstice, and then regressing south again along the skyline to midwinter. I then realised that if all these observations were slid parallel [from those original alignments] with 2 set squares [to now line up from- not illustrated here] over the eastern double 13/14, a calendar was produced. Over the years other dates were added as the weather allowed.

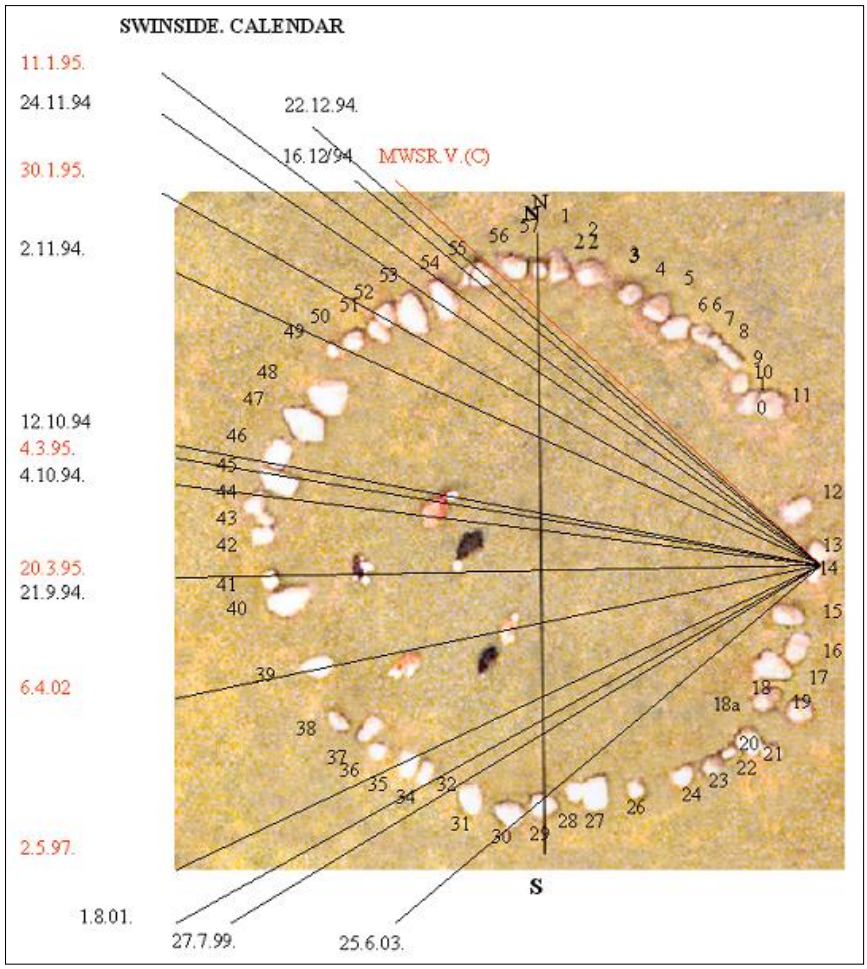


Figure 150 Sun [Rise] calendar at Swinside. Aerial photo by E.Cleasby

[Insert by Editor:

***Legend**: Dates in red: sun rises further N each day until the midwinter (no date given here) from N edge of Stone 50 to Stones 13 and 14).*

***Dates in black**: sun rises further S each day until the summer solstice 25/6/03 (from Stones 13 and 14 to Stone 30).*

Example to read Figure 150: On the early morning of 25th June 2003, the summer solstice, Jack would have stood outside the circle behind Stone 30, looking across the circle and over the top of Stones 30 and 29, to Stones 13 and 14. The sun rise would then have been seen on the horizon on this projected line. Figure 151 *is an attempt by the Editor to clarify and at the same time double check Jack's calendar figures. Although the photo taken by the drone may be clearer, the distortions of the low altitude of the drone have introduced some skew, so Jack's microlite picture is more accurate for plotting. It can be seen that the three key points of midwinter, equinox, and midsummer sunrises match extremely well with 'Horizon'* (Smith, 2017). *End of Editor's insert]*

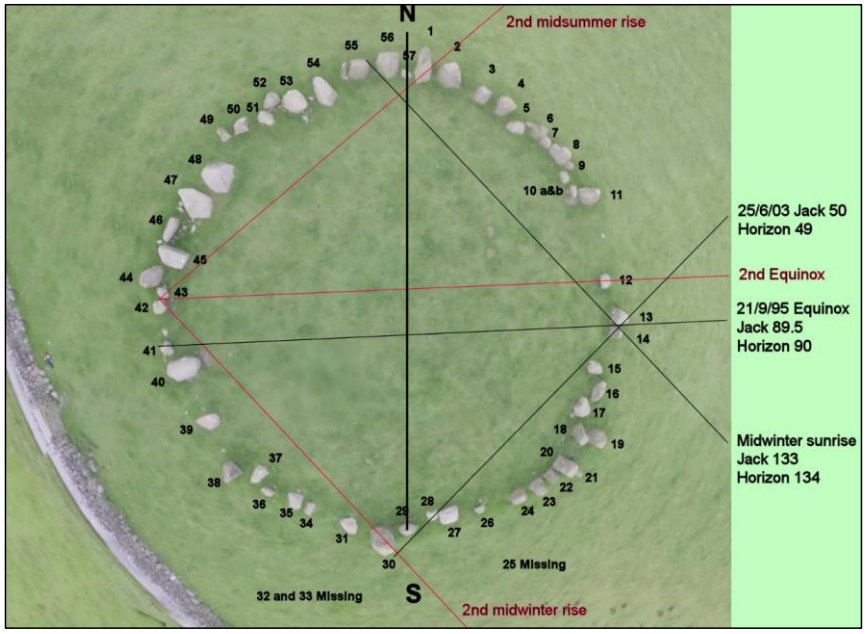


Figure 151 Comparison of Jack's figures with Horizon's. Picture by David Smyth

There are 2 versions of the sun calendar at Swinside [Figure 150]. The First Gleam is observed over the double 13/14, running from Stones 30 for midsummer sunrise to Stone 56 for midwinter sunrise. Very often the stone arrangements were duplicated as here, with a second calendar working from double 42/43 over Stone 1 around to Stone 30.

A similar calendar applies at Castlerigg.

[Note from Dimitrios Dendrinos: the circular nature of all stone enclosures is taken as a given, but never really explained by Jack. This is so since, in so far as the astronomical information they contain is concerned (accepting for the moment that this is exactly what kind of astronomy related information these ancients were obtaining from these monuments), this information could be obtained by much simpler monumental configurations (for example, single menhirs). Even in The Sun Calendar, Figure 150, which engages according to Jack's theory the largest number of stones, not all stones are engaged in the discussion - not to mention that in the vertical N-S line Jack draws in the Figure all that information is projected (and thus contained). Consequently, this fundamental issue isn't really addressed by Jack, and the fact that the circular design of all these monuments isn't explained by the rationale supplied by Jack is a key feature of this manuscript. This is a general comment (going beyond Jack's work). However, it may be the single most central argument when Design of these Neolithic monuments is discussed (far beyond the monuments that Jack includes in his paper).]

Insert from Megalithic Portal[38]

At the time of construction the [midwinter] alignment at Swinside would have come through the gap between Stones 55 & 56, being some 21 inches or 0.53 metres to the left of where it is seen in this picture [Figure 152].

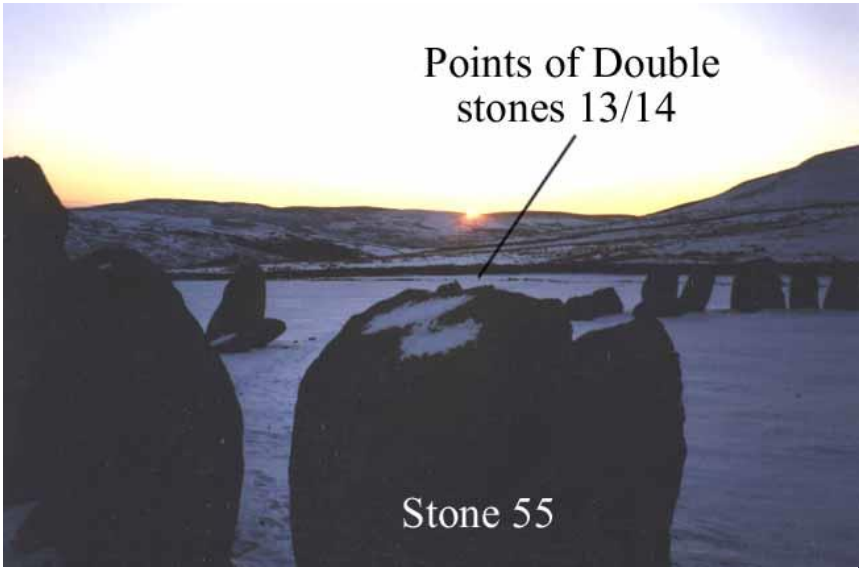


Figure 152 [Midwinter] Sunrise from Stone 55 Photo by JME

[38] Entry in italics is from Part 3a, 3rd in a series, found on Megalithic portal http://www.megalithic.co.uk/article.php?sid=2146412183

The next two photos taken at the end of March [Figure 153] *and beginning of April* [Figure 154] *show how fast the sunrise moves along the skyline at Swinside during the period of the Equinox. Both of these are seen over the Double 13/14.*

Figure 154 Swinside, beginning of April Photo by JME

Figure 153 Swinside, end of March. Photo by JME

End of insert

Lacra

The simplest of all calendars is found [at] *Lacra*, Cumbria, SD 152813 [Figure 155. Lacra A is SD1498381326] where a large pointer stone casts shadows across some 150m to stones set to mark various dates throughout the year.

Unfortunately the photograph [Figure 155] is not clear enough to show the MSSR [mid-summer sunrise] target stone.

Figure 155 Lacra. Pointer stone 23/9/02 848 Photo by JME

Insert from Megalithic Portal[39]

[This…] is particularly advantageous in that the sun has had time to rise above the morning murk. At the majority of these places the ground shadow reaches the base of a target stone at the critical time. [Figure 156]

[39] In this chapter, italics indicate entries from article 3b, 4th in the series, found at http://www.megalithic.co.uk/article.php?sid=2146412195

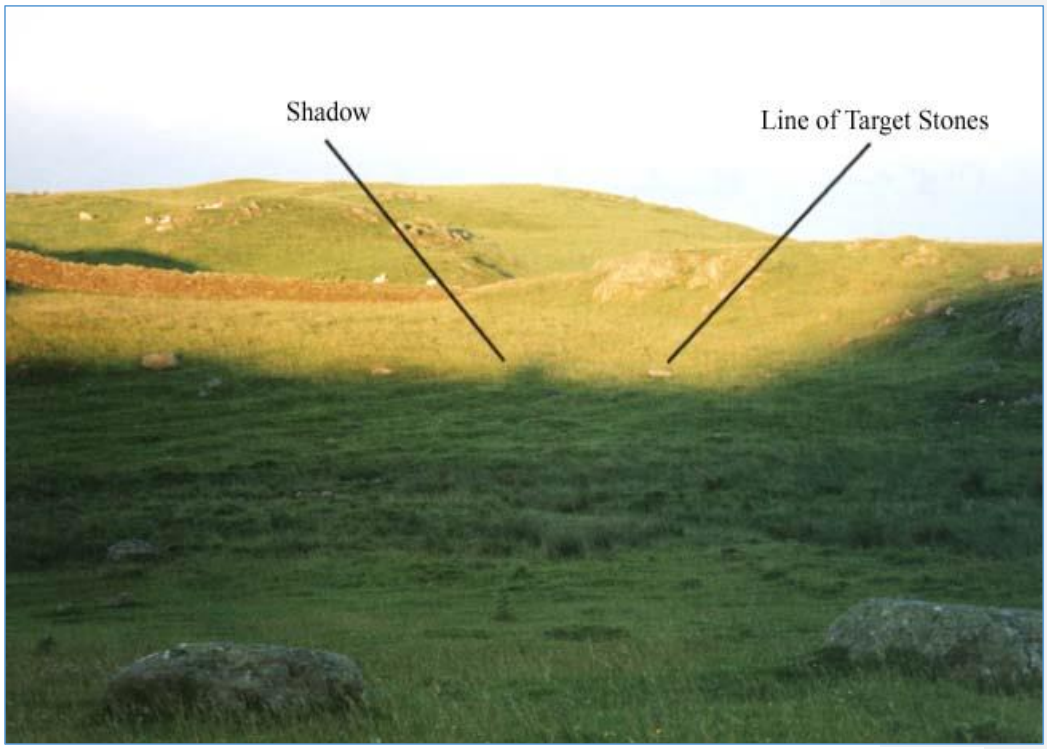
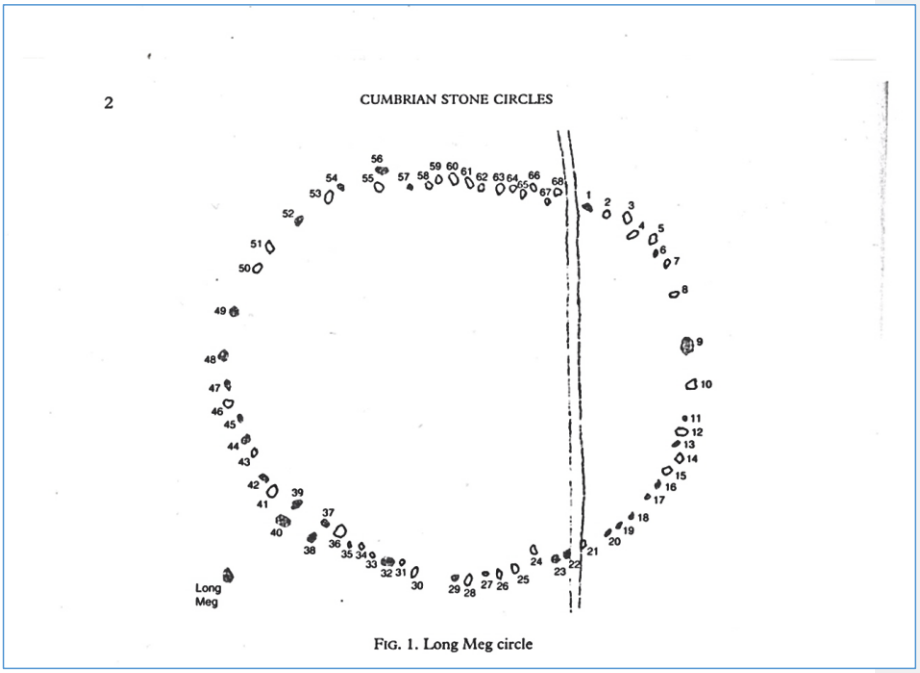


Figure 156 Lacra Photo by JME

(Please note that Lacra is on private land, and the area is used for suckler cows and calves, which should not be disturbed). After about 20 minutes the ground shadow reaches the bottom of the target stone 150m away, at the same time that the shadow from the pointer stone would have covered the target stone at the time of construction, but now misses it as shown in the photograph above. [Figure 156]. *The same thing happens on the quarter days, but unfortunately the midwinter target stone has been moved by ridge and furrow ploughing in the past. This method offers a very simple annual calendar.*

Long Meg and her Daughters



[Figure 157 Long Meg plan reproduced with the kind permission of Marion McClintock, Academic Registrar of Lancaster University]

[Figure 158 Long Meg and her Daughters. Picture by Shaun Bunting ©]

At Long Meg and her Daughters stone circle (NY571372) in Cumbria [Figure 157] *the calendar works on the setting sun with the shadows from Long Meg going right across the circle at midwinter to Stone 1 as reported by Stephen Hood and Douglas Wilson in C&WAA Transactions (2002). Numbers as published in C&W A&A.S. and again in 2004.*

Long Meg Herself has been seen to cast the midwinter sunset shadow to Stone 1. They record the movement of the shadow throughout the winter months. I saw the shadow from Long Meg reaching right across the circle on the 9th January 1997, but had no idea of its significance at that time and in the excitement failed to get a photograph. On 5th February 2003 I met Stephen and Douglas whilst waiting for the sunset shadow from Long Meg to reach Stone 9. [Figure 159]

Figure 159 The shadow from Long Meg just reaching Stone 9 taken 05.02.03 Photo by JME

At the Equinoxes the shadow from Stone 52 goes to Stone 1 at the same time as Long Meg's shadow goes to Stone 19, as seen by me here [Figure 160]

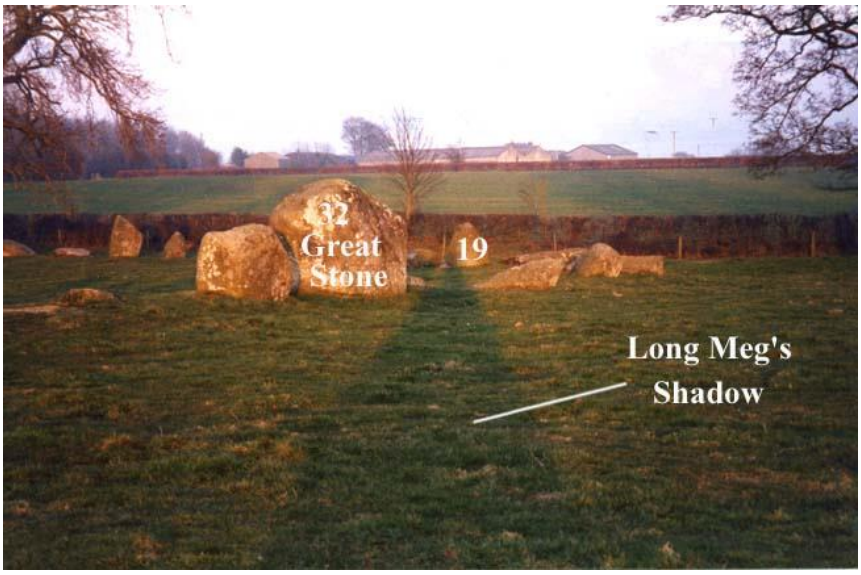


Figure 160 Equinox shadow to Stone 19 March 18th 2003. Photo by JME

and here on March 18th 2003. [Figure 163 p175]

The slope of this circle gives us no sunrise calendar, but Dr Stukeley wrote that there were smaller stones within the circle, so it is possible that these would have been the target stones for the sunrise. Sadly because of their removal no one will ever know.

End of insert from the Portal

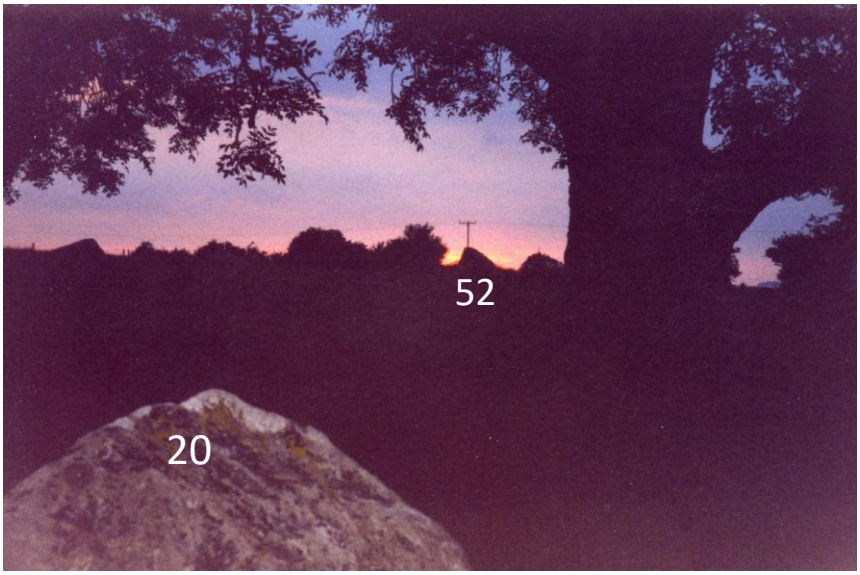


Figure 161 Long Meg 9:43pm on 3/7/03 Photo by JME

Sunset from Stone 20 over Stone 52 [Figure 161] showing a similar shaped stone as seen at *Lacra*. This is over Stone 20, not Stone 22, as expected on the solstice, but this was the first good day after the solstice.

Figure 162 Long Meg 18/3/03. The shadow from Long Meg reaching Stone 20 sometime before 6pm Photo by JME

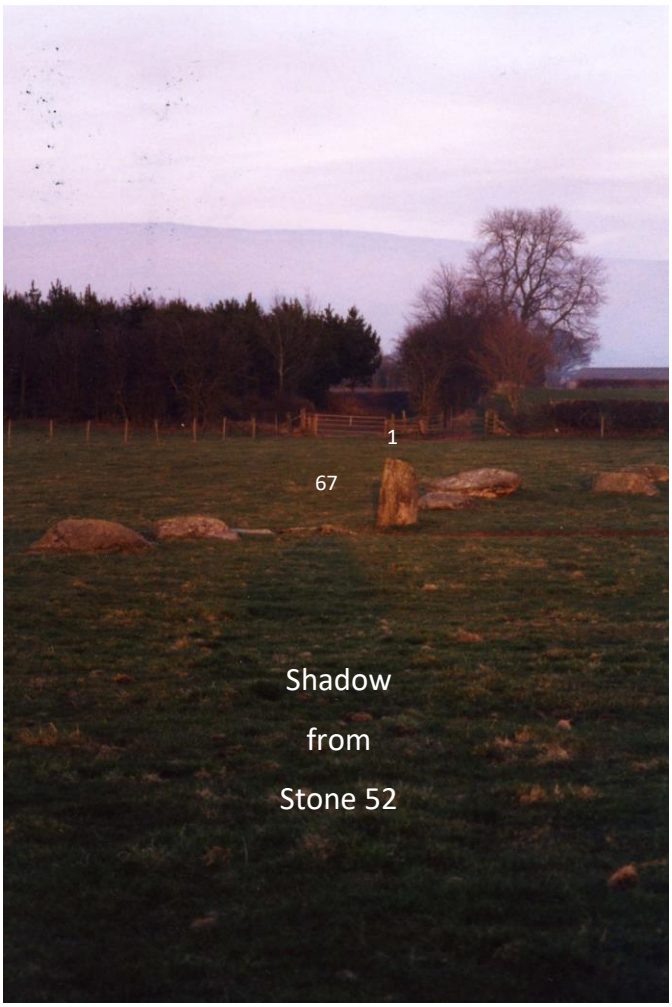


Figure 163 Long Meg 18/3/03. Shadow from Stone 52 to near Stone 1 at 5.52 pm. Photo by JME

The shadow from Stone 52 [Figure 163] ….was expected to strike Stone 1 at 6pm, but time and cloud cover caused the light to fade.

Arbor Low

This arrangement was first seen 4 days before, very poorly at Arbor Low, (SK160636) Derbyshire, by standing on the fallen Cove Stones 20 minutes after the First Gleam on 5th January 2003 and watching where the shadow ended in the trees just above the car park behind the farmhouse. After discussion with the owner I followed the wall up the hill in the probable arc that the shadow would have made throughout the year, had the Cove Stones still been standing, but was most disappointed to find no obvious marker stones in the vicinity.

Dr William Stukeley, 1687-1765 wrote 'Itinerarium Curiosum' in 1724 following his travels around the ancient monuments of the country. A letter of his to Roger Gale, undated, quoted in Hutchinson's Cumberland, published 1794, refers to two heaps of stones inside the circle, which he thought were probably from field clearance. These heaps are long gone and we can only guess what their original use was. It is quite possible that they did the same sort of thing as the Sanctuary does in Castlerigg.

Three days later, armed with that knowledge I witnessed a similar occurrence at Avebury in Wiltshire (SU102699) with the sunrise shadow from the Cove [on] the 8th January 2003 reaching Stone 44 - that is the stone adjacent to the Swindon Stone, which is a vast standing diamond shape and should have received the First Gleam on the winter solstice at the time of construction. Due to various obstructions on the site, including a hedge, it was difficult to see the shadow reaching the target stone, some 20 minutes after first gleam. [Figure 164].

Figure 164 Avebury 08/01/03. The shadow from the Cove pointing at Stone 44, partly hidden by the hedge. Photo by JME

Long evening shadows are seen at Castlerigg and Stonehenge as mentioned before.

As mentioned before, the Stonehenge calendar uses the apertures in the outer ring shining over the Bun Altar Stones 160a, b, & c with the shadow from the lintel touching the tops of the blue stones, whose heights are graded.

[Conclusion]

From these discoveries it is fair to assume that all of the Great Circles will have built-in calendars, some working on the First Gleam and others using the shadows to produce a calendar some time away from First and Last Gleams, with both systems in many places.

CHAPTER 13 The Moon.

Insert from the Megalithic Portal, Jack's Article 6a[40]

Figure 165 The full moon setting at Swinside taken from Stone 12, over Stone 30, the Great Stone, taken at 4.25am on the 2nd June 1996 by JME.

The Moon Cycles

[Figure 165 shows] *the full moon setting at Swinside taken from Stone 12, a table top altar, over Stone 30, the Great Stone. This was a chance photo, which happened to be one of the occasions when the Moon was at or near its Minor Standstill, taken at 4.25am on the 2nd June 1996 whilst waiting for the sunrise.* [Posted July 7th 2005]

I am told that the moon moves to its extremes every 18.6 years and that 2005 is one of those years. If you miss seeing it this year you will have to wait for a long time, which is why I have decided to jump ahead to the cycles of the moon before finishing the sun movements.

The ancients were much more concerned with the moon cycles than we are today, and they invested a great deal of energy building moonrise and set indicators within the circles. They erected these stones to show the north/south change in azimuths (that is the bearing from True North at which the moon rises above the skyline) and, more surprisingly, either used existing skyline markers or built new ones at great effort. To top it all, they indicated where the moon rose and set at the extremes on a flat plain, even when there was never a hope of seeing it because of the hills!

[40] http://www.megalithic.co.uk/article.php?sid=2146412237

Let us start with what we can all see from our houses, providing we are not in an over-lit city with the view of the sky completely obliterated. It is much harder to observe the moon rises and sets due to the fact that half of them occur during daylight hours. Often they are obscured by a bright sun or even worse, by cloud cover.

After a few nights of watching, it will have been noticed that the moon's shape alters from nothing to full and back again in just over 29 days, taking approximately a week (actually 7 days and 8 hours) on average to go through each quarter as it is called. The half-moon shape is actually called the quarter. This is because of the time in the cycle, not the size of the moon itself. It should also be noted that the word 'average' always occurs with moon descriptions as it wobbles about a bit.

You will also have noticed that the moon's rising and setting positions move gradually north or south each night in a cycle of approximately 27 days. At the same time it gets either higher or lower as it passes through the southern part of the sky. If you cannot see the skyline, find some method of measuring its elevation - I lie in bed and observe its position through the small panes of the window. This gives me … a very good idea of where it is in its cycle without much effort, and has the added bonus of being warm!

Most of the daily papers provide the forecast time of when the moon is likely to rise or set alongside the weather forecast. You will soon discover that if you live west of Greenwich it will be slightly later, and if you are looking over a skyline with an elevation above 0°? it will be later still for the rising moon but earlier for the setting one.

During your period of observation, you will have noticed that when the moon is at the most northern end of its travels it gets later every night by as little as 8 minutes. As it moves south this time delay increases, until eventually at the southern extreme, which occurs every 18.6 years, it can be delayed by as much as up to 2 hours. The year 2005 is one of these years. This extreme is called a Major Standstill, because the moon appears to standstill several times during the year, both at the northern and southern extremes of risings and settings.

Over the nine-year period the length of the moon's swings decreases, while the azimuth also diminishes to what is referred to as the Minor Standstill pictured here at

Swinside .[Figure 166]

Figure 166 Minor Standstill taken at Swinside on 19th September 1996 from the triple [Stones 6,7,8 from the left] over Stone 38 by JME

Both Major and Minor Standstills take their names from the fact that the moon appears to be in virtually the same place at the end of its travels on two consecutive rises and sets. It is fairly easy to fix these points, but once the moon has started to swing back it travels rapidly along the skyline. This can be up to 11? or more on successive nights especially when rising level with the Equinox.

These standstills occur about 10? [nights] *either side of the sun's solstice rises and sets. At Stonehenge it is considered that the postholes found in the area of the Heel Stone represent six 18.6-year observation cycles of the northern moonrise between the Major Standstill and the Minor Standstill, approximately 111 years in total. These are not quite in straight lines because the moon wobbles about and it is doubtful if the ancients would have been able to assess accurately the exact maximum position reached in any year because of the changes in the weather affecting the refraction of light etc. It is also highly probable, as is often the case today, that there would have been cloud on some vital nights.*

Some readers will know that the moon cycles affect the tides, both in their daily variations and their height. Every commercial port has its tide tables indicating when it is safe to enter and leave over the dock sill or the local bar.

In an attempt to try and understand this phenomena, the azimuth of the rising moon, the moon phases, the daily time difference, and the tide heights were all plotted on to a single graph with a common date line. The azimuths, time differences and moon phases were taken from the computer program Redshift 3 and the tide heights came from the local tide tables, which also gave the moon phases. I am glad to say the moon phases from both sources agreed!

This graph was plotted for three months from the 9th November AD2004, from the 16th March AD2005 and finally, to see if there was any change in the pattern, for the 3rd month of 2005BC. The model was very similar in all three graphs, it being noted that the current dates are close to the Major Standstills while that in 2005BC was near to a Minor Standstill period.

The tides relative to the phases of the moon were fairly easy to see from the graph, with high tides occurring two or three days after either a full moon or no moon period. Obviously there were no tide tables available for the period 2005BC, but it would be ,,, fair to guess that the same thing happened then.

You will have noticed that there are 3 different cycles of the moon:

1. Full moon to full moon in 29.3 days.
2. The north and south cycle every 27.5 days.
3. The north/south swings over a cycle of 18.6 years.

It must be noted that the full moon cycle and the north/south cycle are of differing lengths so the full moon does not occur at the same azimuth each lunar month and this period of 29.3 days does not divide nicely into the year of 365 days. It is hopelessly wrong therefore to talk about the Solstice or any other festival full moon happening on a given day, as this only happens very occasionally.

The Moslems base their year on a cycle of 12 full moons, thus Ramadan moves 11 days earlier each year. The stones suggest that the ancient people may have counted forward 19 days, creating the Festival of the Returning Sun (FORS). Perhaps they had a long Yuletide holiday, more on this later.

Mental health troubles are often referred to as lunacy (from the Latin for moon – luna), which on the surface sounds a little far-fetched, but some bright spark in the German police force realised that disturbance figures increased during the periods of the full moon. Thus they altered their shift patterns accordingly to cope with the extra workloads in these periods.

The Moon Cycles - Swinside Moon Northern Rise.

Figure 167 A crescent moon shaped stone (Stone2) at Swinside. Photo by JME

At Swinside there are stones further north of where the sun could ever have possibly risen, and upon closer inspection I discovered one of these seemed to be shaped like a crescent moon (Stone 2 – see photo above [Figure 167]*). A simple computer program showed that the Moon Major Standstill Most Northerly Rise (MMaSMNR) was at about 36 degrees, and taking a back bearing from Stone 2, the target turned out to be Stone 39 (the back sight for the midsummer sunrise) as seen in this diagram.* [Link expired] *When I approached this stone, it appeared that the stones across the circle all*

lined up with prominent features on the skyline. [Figure 168]

Figure 168 The arc of stones acting as foresights for the Moon Northern Rise sector at Swinside Photo by JME

These included hill peaks, dips and other features which looked as if they had been manmade such as a shaped rock, a fallen standing stone and a boulder perched on the crest. Elsewhere mounds have been created. This strongly suggested nine steps equalling the nine years between the MMaS [Moon Major Standstill] *and MmiS* [Moon minor standstill] *with the boulder making ten, another step over Stone 10, which is a table top type altar stone.*

Stone 39 is a fallen diamond shaped stone with a point at the top. The thickness of this point, when viewed over would have given a slightly different sight in comparison to a theodolite pivoting on a sharp point. These constructions are so accurate that this type of difference shows time and again. If we assume that roughly half of the moon rises and half of the sets are at night time, this does not explain why they built skyline markers for the moon which … cannot be seen in the dark. Whilst equally the other way round during daylight hours, the moon is difficult to see.

It appears therefore that the ancient builders went to tremendous efforts to provide skyline markers for the moon rises and sets between the Major and Minor Standstills. Where the skyline had no suitable natural markers they used a nearer horizon, and built their own markers, as is shown in these next three photos of the markers around

Swinside including the shaped rock on Thwaite Yeat, [Figure 169] *These shaped rocks are also seen from Lacra D and from The Standing Stones, Kirkstanton.*

Figure 169 Shaped rock as Moon marker on Thwaite Yeat land near Swinside.. Photo by JME

Figure 170 The Fallen standing stone, a moon marker near Swinside. Photo by JME

The fallen standing stone [Figure 170] *and the boulder on the crest .* [Figure 171]

Figure 171 The moon marker boulder on the crest near Swinside. Photo by JME

In many other places they dug away the ground from below rocks to emphasise the line or used mounds as can be seen at Castlerigg on Latterigg [Latrigg] and elsewhere. These were most probably never designed as burial mounds or barrows as they are often called.

There are four sectors where the moon rises or sets between the Moon Major Standstills (MMaS) and Moon Minor Standstills (MMiS), and all of these are visible at Swinside, and indeed all of the Great Circles that have been visited. Everywhere these annual steps are indicated by the stones, using the same principles but with some variations on the theme. Each sector has the 10th position over an altar shaped stone which is at the southern end of the sector where the moon passes each time. It is next to the Minor Standstill in the northern sectors and the Major Standstill in the southern sectors.

It took a great deal of time to confirm the observation or back sight stones for the other three sectors at Swinside, but in the end it was quite simple, with the moonrises seen from the back sights used for the solstice sunrises, and the solstice sunrise triples used as back sights for the setting moons. It should be noted however that it does not happen this way at all the circles.

The only piece left in the jigsaw then was Stone 1, a moon shaped pointed stone with no obvious moon use - the moon could never have been seen in this position over the hills. Eventually I realised that Stone 1 marked the MMaSMNR [moon major standstill

most northerly rise] *on a flat plain at a very early date, which I have termed 'the invisible MMaSMNR. It is difficult to understand how and why did they did this, but it demonstrates that the builders were aware of this fact and able to mark it out.*

End of insert

[Insert by the Editor

The editor started a thread on the Megalithic Portal to discuss Jack's findings of Invisible Moonrises[41] because he hypothesized that one way this could come about was if Standstill (and other phenomena such as sunrises at the solstice) were first noticed on the sea shore, where Man first colonised. The position of the celestial objects - in this case the moon- setting or rising over the sea became a pattern which they wished to record. This could have been done with marker poles, later, stones on the beach.

Then their friends, or the same people on exploration/migration inland, would want to know that direction in their particular locality without having to wait 18.6 years. This could be done by measuring the angle between the True N/S line (see Chapter 11 for the method to find this) and the event horizon. Take this angle to the new site and mark it with stones. This would give an approximate angle, not taking into account the height of the local horizon, which they would have adjusted on the great day or night itself.]

41 http://www.megalithic.co.uk/modules.php?op=modload&name=Forum&file=viewtopic&topic=7487&forum=4&start=0

The Moon Cycles - Swinside Moon Northern Set

Insert from Megalithic Portal Article 6c[42]

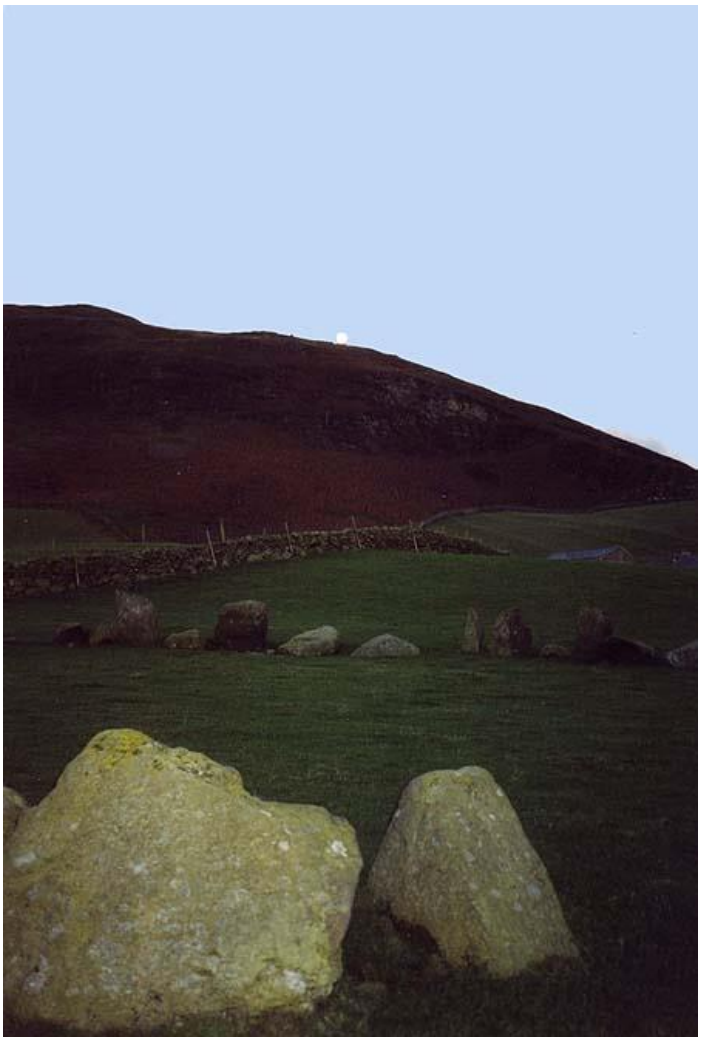


Figure 172 The Moon Full Orb setting at Swinside on 28.11.04. Photo by JME

As mentioned in the last article there are four sectors where the moon rises or sets between the Moon Major Standstills (MMaS) and Moon Minor Standstills (MMiS), and all of these are marked at Swinside, and indeed in all of the Great Circles that have

[42] http://www.megalithic.co.uk/article.php?sid=2146412255

been visited. Everywhere these annual steps are indicated by the stones, using the same principles but with some variations on the theme. Each sector has the 10th position over an altar shaped stone which is at the southern end of the sector where the moon passes each time. It is next to the Minor Standstill in the northern sectors and the Major Standstill in the southern sectors.

Figure 173 Swinside Stones 40 - 51, showing the visible moon arc (Stones 44 to 49) with Stone 41 as the altar. Photo by JME

At Swinside the sector showing the northern moon settings [Figure 173] *demonstrates admirably how the ancient people marked the position of where the moon could be seen setting from the circle, in relation to the surrounding landscape. This 'visible moon arc' was achieved in the sweep of Stones 44 to 49 and at the end of the sector the altar stone is replaced by the Double 42/43, as you will see at Castlerigg next week, with a stone on the skyline.*

What is even more incredible is that they also appear to have marked the invisible moonsets (i.e. the position where the moon actually eventually sets on the horizon beyond the surrounding topography, which cannot be seen from the circle, or to put it simply where the moon would be seen setting if the circle were built on a flat plain). At Swinside this 'invisible moon arc' is formed by Stone 50 through to Stone 1, with

possibly Stone 48 acting as the altar, as seen in this photograph. [Figure 174]

Figure 174 Swinside Stones 48 to 2, showing the invisible moon arc (Stones 50 to 51) with Stone 48 as the possible altar. The picture is taken over Stone 15. Photo by JME

At Swinside the arcs do not overlap each other, making it much easier to sort out which stones do what. Stone 52, which has a bevelled right edge, marks the invisible midsummer sunset (i.e. the position where the sun would actually be seen setting if the circle were constructed on a flat plain and the horizon was not obscured by intervening hills etc.) This feature is seen at several other sites and I have referred to it as the 'banana' shape. It is one of the five traditional shapes seen in the circle of Bluestones at Stonehenge.

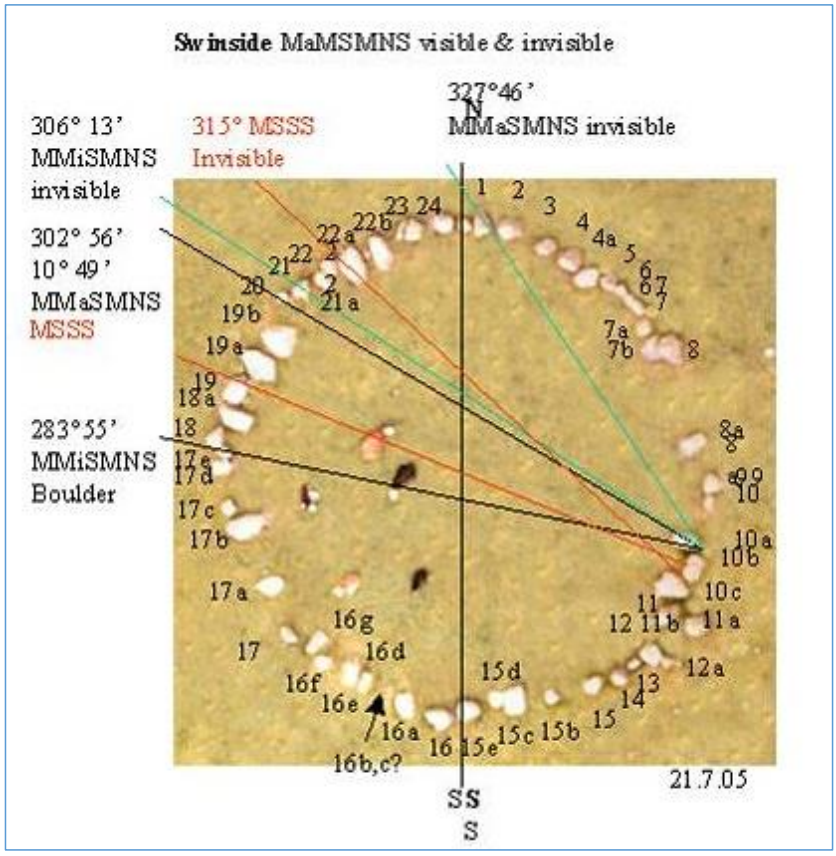


Figure 175 Swinside Moon Northern Set by JME [NB this numbering system was later abandoned by Jack]

Diagram of the Swinside Moon Northern Set.

As can be seen in this diagram[43], [Figure 175] *the Midsummer Sunset (MSSS - i.e. the position where the sun can be seen setting from the circle) runs from the cut in the top of Stone 16, while the line of the Invisible MSSS (i.e. the one where it eventually sets on the flat horizon), runs from the junction of 16/17, this is no mistake.[44] The edge of Stone 17 has both a half round hole and an inverted notch. As yet I have no firm ideas as to what these are for, but I hope the answer will appear as work continues.*

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[43] http://www.megalithic.co.uk/modules.php?op=modload&name=My_eGallery&file=index&do=showpic&pid=15918

[44] Jack is using his later numbering system here to refer to this older system. So 10a above became the later 15. Ed.

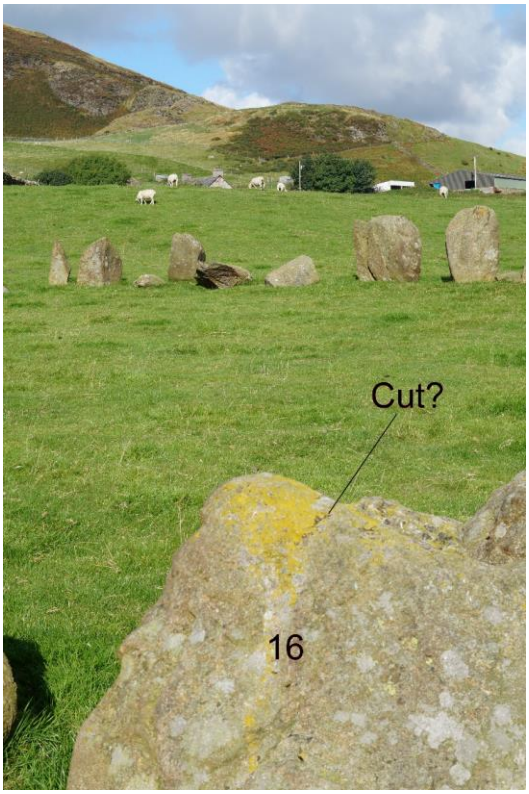


Figure 176 The top of Stone 16. Photo by David Smyth 19/9/17

[Note from the Editor: Figure 175 uses an early numbering system Jack used briefly, then abandoned, after CW Dymond TCWAAS(OS) 1881 from 'The Stone Circles of Cumbria' by John Waterhouse. In his unpublished notes, Jack says "this diagram has known faults and should not be used for measurements". The editor used the written azimuths and compared them with 'Horizon' figures. They were within 2 degrees of each other, which is probably acceptable as the NW horizon is so close here, making Horizon's figures less dependable. For instance, Horizon returns the Moon minor standstill most northern set as 281.6° Elevation +14.1°, (Jack made it 283°55") Declination +18.5 and the Moon major standstill most northern set as 304.1° (Jack made it 302°56") Elevation +10.8° Declination +28.2. Nor is it clear which 'cut' in the top of 16 Jack is referring to. See Figure 176]

Depending on where it is in its cycle, the moon always either rises or sets at night time, so the ancient people would have been able to perform whatever ceremony they did at these times on any night, as the moon passed over these points whilst rising or setting.

I shall continue with Castlerigg[45] for the fourth moon article, the other two sectors at

[45] http://www.megalithic.co.uk/article.php?sid=2146412277&mode=thread&order=0

Swinside follow the same simple pattern. In the meantime try to look at the moonrise or set at your favourite site, you will find out how difficult it is.

Figure 177 The Sanctuary at Castlerigg where the stones appear to have been used to mark the moonsets. Photo by JME

Castlerigg - The Sanctuary and the Moon

Before I continue with this next article, I must remind people that during my research I have worked entirely upon my own observations and not on mathematics, most of which I have forgotten since taking Higher School Certificate many years ago! I have also been taken to task for failing to mention Professor Thom's work on the Moon Major and Minor Standstills, but like many others I was unable to follow most of it. So far I have shown how the ancient people used to mark the annual steps between the Major and the Minor Standstills at Swinside, including some completely new concepts. All I can say is that before dismissing this lot out of hand, go and have a look at Castlerigg for yourself, and you will see what thousands of people must have looked at, but never noticed. Your observations will add to the pool of knowledge.
Some years ago I noticed at Castlerigg that the mounds on the horizon on Latteriggg [Lattrig] *could all be lined up with the outer circle stones and from those in the Sanctuary by stepping sideways. This surely could not just be down to chance, so what were they for?*

When I was beginning to solve the Swinside moon movements, on the 19th September

1996 I witnessed the moonset at Swinside through the triple 6, 7, 8, over Stone 38, a large pointed stone. The following night I saw the moon do the same thing at Castlerigg from the triple 2, 3, 4, over Stone 29 again a pointed stone … over Robinson (a large hill at NX203169) [NY203169]*, and was most disappointed when it failed to flash in the valley. This provided the MMiSMSS* [Moon Minor Standstill Most Northerly Set] *with the sector running from the Great Stone (Stone 21) acting as the MMaSMSS* [Moon Major Standstill Most Southerly Set] *marker (see diagram* [Figure 178] *for stone numbers.) Diagram to accompany the article on the moons at Castlerigg. The black lines are those shown in the photos associated with the article. The yellow line is as seen on the 20th February 2005. MMaSMNS* [Moon Major Standstill Most Northerly Set] *would be from Stone 43, a triangular moon shape over Stone 36 to the 5th mound on the horizon. The green lines indicate the Invisible Moon sets with Invisible MaSMNS going to Skiddaw.*

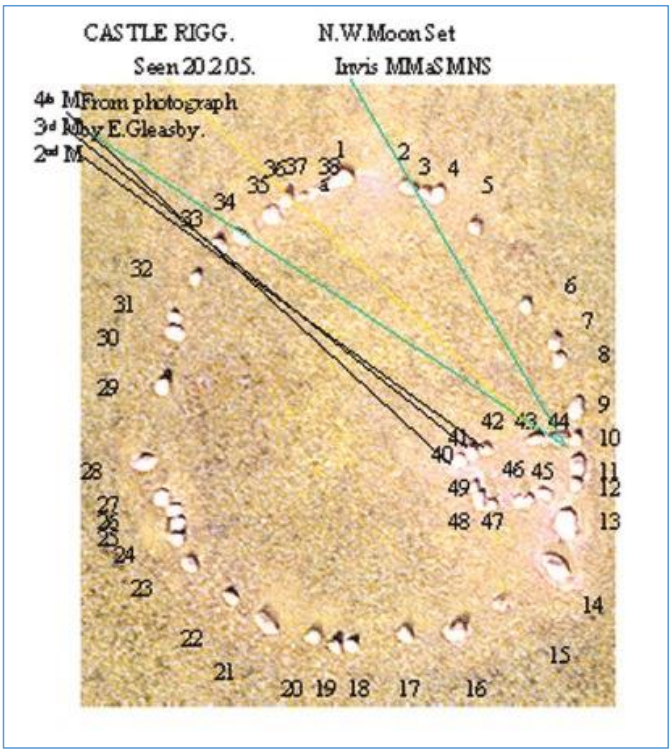


Figure 178 Diagram to accompany the article on the moons at Castlerigg by JME

Following this observation I then made many daytime visits to try and resolve the rest of the moon sectors at Castlerigg. Fairly quickly I discovered that the southern moonrise sector worked from the junction of Stone 38 and Stone 1, similar to that at Swinside, but I am still yet to view any moons in this sector thanks to the often-present

cloud on the top of Helvelyn!

I also soon learnt that Castlerigg simply did not work like Swinside in the northern sectors. Having seen the Midsummer sun set over the mounds on Latterigg, it seemed logical that the moon would also have utilised these same mounds. Upon walking along the skyline I could see that the mounds were formed from bedrock, which could have been 'enhanced', although there was no obvious evidence for this. As I walked away to the east I 'felt' that I was on a serious line with little to show on the ground except perhaps the remains of a grassy mound, which was so slight that I discounted it at the time. Now that I have been using a theodolite from the Sanctuary, the telescope clearly shows this up on the skyline as the 5th mound, and from this I deduce that the ancients constructed a series of marker mounds along this crest, continuing down the slope to the west, judging by the wavy skyline.

On 20th February 2005, I observed the moon setting from between Stones 43 and 44 over Stone 36, which confirmed to me that the stones on the north side of the Sanctuary were put there as back sights for the northern moon markers. The position of the row being determined by Stone 40 (a Bun Altar), which lines up with the Midwinter sunrise past Stone 14, and Midwinter setting sun shadow from the Great Stone (Stone 21). Due to the high skyline over Helvelyn in Midwinter there is no way that shadows from Stone 14 could ever reach across the circle. There does not appear to be anything similar to the Sanctuary at Castlerigg, except perhaps at Ballynoe in County Down, Northern Ireland, [J4812740378] *which could perhaps have a similar feature, but I have not had chance to return there since working this out.*

There are two stones on the south side of Sanctuary group, for which I have yet to find a use. All erected stones everywhere have a purpose, so there must be one for these.

This diagram [Figure 178, above] *explains the photos below. The black lines are those shown in the photos. The yellow line is as seen on the 20th February 2005. MMaSMNS* [Moon Major Standstill Most Northerly Set] *would be from Stone 43, a triangular moon shape over Stone 36 to the 5th mound on the horizon. The green lines indicate the Invisible Moon sets with Invisible MMaSMNS going to Skiddaw. This series of photos shows the alignments of the stones with the 4th, 3rd, and 2nd mounds.* [Immediately below]

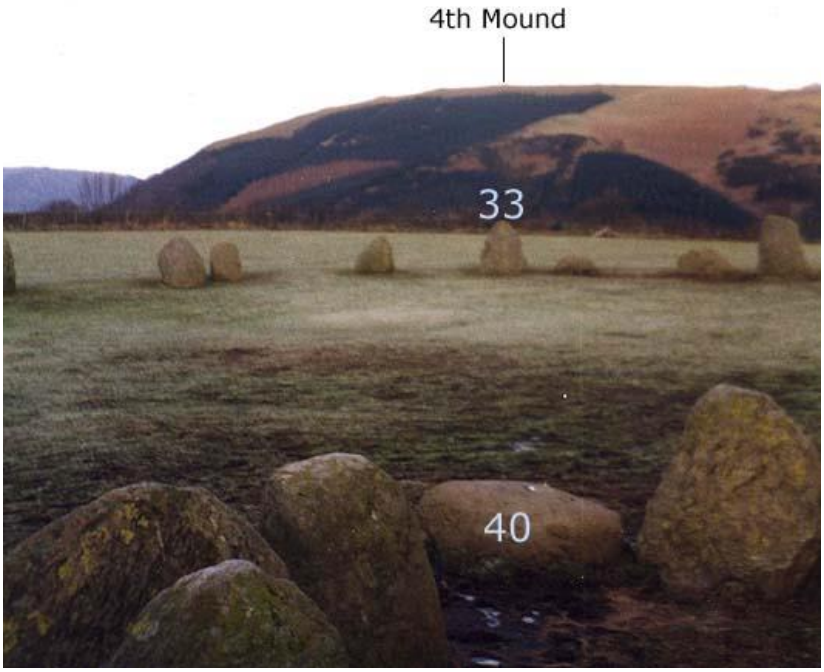


Figure 179 View of Castlerigg from Round Bun Stone 40 over Stone 33 to 4th Mound Photo by JME

Figure 180 View of Castlerigg from Stone 41 over Stone 33 to 3rd Mound. Photo by JME

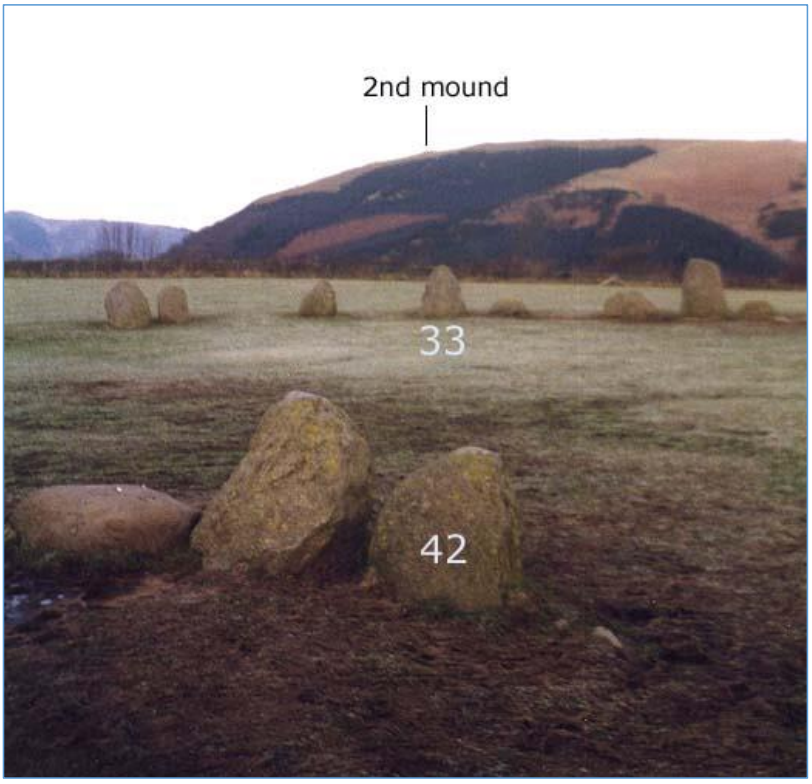


Figure 181 View of Castlerigg from Stone 42 over Stone 33 to 2nd Mound. Photo by JME

Without the knowledge of how the moon movements are indicated at Swinside, it would have been very difficult to unravel the system at Castlerigg. Similarly without the knowledge of the Castlerigg side stepping system, it would be virtually impossible to work out how the moon movements are indicated at Stonehenge. This series of articles will finish with Stonehenge. At the time of writing there are still areas with the observation proofs missing and I would greatly welcome help from someone living nearer. Next week I shall take a look at the location of Swinside.

End of Jack's insert

I have read most of Professor A. Thom's 'Megalithic Lunar Observatories' [(Thom, 1971)] which is extremely hard going, as it contains much maths and when first published, the archaeological community failed to understand it and ignored him. Without [his] book this research could not have begun. He explained the 3 moon cycles. Here it is in a simpler form.

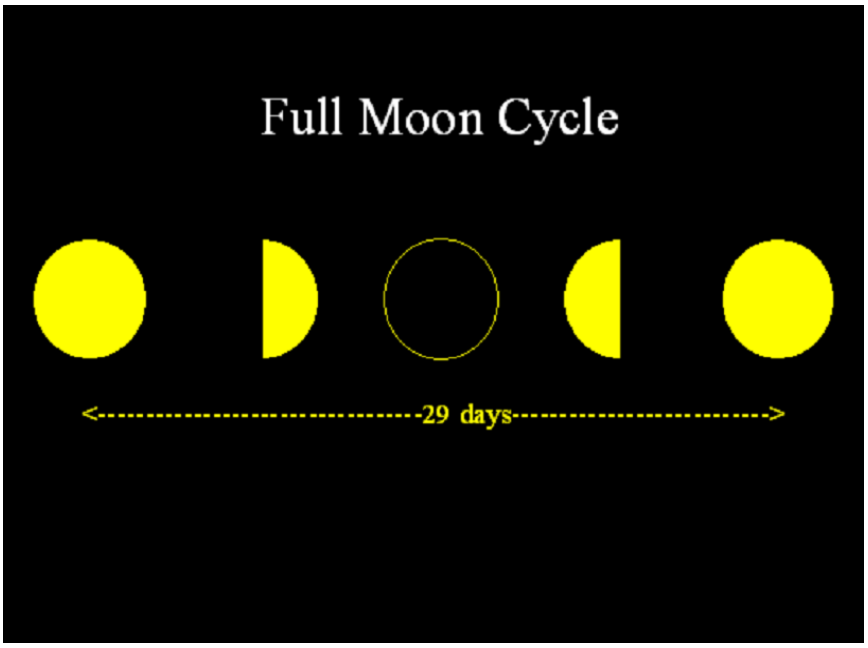


Figure 182 Full moon cycle [Unknown source by JME]

The common cycle seen by everybody is full moon to no moon and back to full moon … [averaging] 29.53 days [Figure 182]. Notice the quarter takes about a week.

At the same time, the moon moves north and south over an average cycle of 27.32 days. This compares with the sun taking a year to cover roughly the same north south arc.

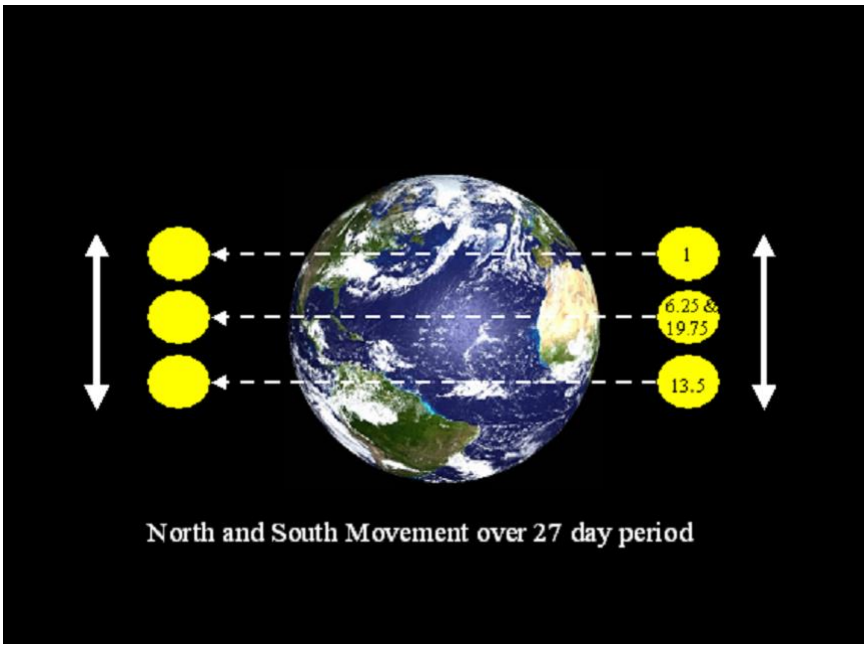


Figure 183 N/S movement [Unknown source by JME]

N.B. These 2 moon cycles are not of the same length, *so they do not work together.* [This is] because the earth has moved on around the sun and the moon takes another 2 days to catch up to produce the next full moon [Figure 183].

The size of this north/south movement varies over an 18.6 year cycle. "North and South Movement over 27 day period"

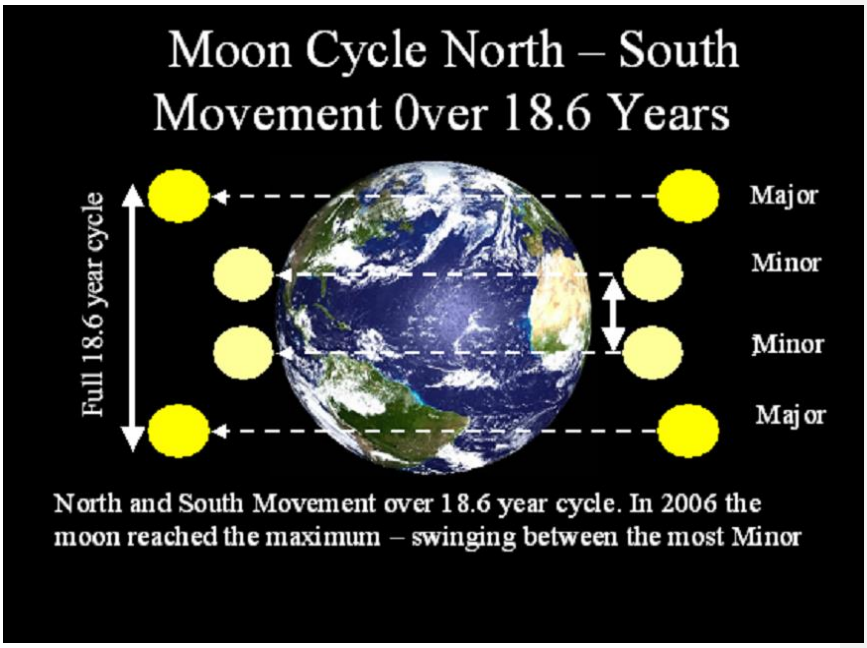


Figure 184 N/S movement over 18.6 yrs. [Unknown source by JME]

[Jack notes:] (Computer problem. Last phrase needs completing or scrubbing?)

The ends of these movements Professor Thom called …. Standstills because often the moon appears to rise in virtually the same place 2 nights running when it is changing direction. For 9+ years the movement increases, then follows 9+ years when movement gets less. He called the ends of the largest movements Major Standstills and in those years when the moon travelled least he called the ends the Minor Standstills, as it reversed its direction [Figure 184].

Figure 185 [Great Stone 1 and Moon shaped rock at Swinside no.2] Photo by JME

Swinside

It was suspected that somehow the moon movements would be marked at Swinside.

It was noticed that Stone 2 had a crescent shaped top, which suggested the moon. The original computer program, pirated from the US Navy, said the moon Major Standstill Most Northern Rise happen[s] at about 36° from true north today. On taking a compass to near this stone it pointed to the area of Stone 39, which is the fallen diamond shaped stone, acting as the back sight for the midsummer solstice observations. From the original socket of this Stone 39 a lot of the stones to the right of Stone 2 lined up with prominent skyline features in the Coniston Old Man range, and continuing on around past the position of the midsummer sunrise to several more markers on the nearer horizon, some of which could have been man made or enhanced.

Prehistoric people made tremendous efforts to have indicators to mark each year's variation of where the moon was expected to rise and set. This was repeated for each of the 4 sectors between the major and the minor standstills for the northern risings and settings, and the southern risings and settings, using 9+1 stones in each sector or a variation of it. Even more surprisingly, they either used natural markers such as hill tops or valleys on the skyline, in line with the stones in the circle, [or] where these did not exist they either modified what was there to create a marker, such as by shaping a rock, or digging out the low side of rocks to make a step, or erecting a stone, or mound, which is often mistaken for a burial barrow. Where the skyline was too level, or too far away, they used a nearer horizon to put the markers on. The big question remains 'WHY skyline markers' when you can't see them in the dark and you can't normally see the moon in daylight?

In all circles, the 10th stone, or its equivalent where side stepping occurs, at the southern end of each sector, is one of the altar types, over which the moon passes, every time that it is in that sector, and often has a major feature on the skyline.

The Redshift 3 computer program indicates that the moon rises approximately 10° further north at its moon Major Standstill Most Northerly Rise (MMaSMNR) than the sunrises at the summer solstice, and the Minor Standstill (MMiSMNR) is approximately 10° less than the midsummer sunrise as if on a flat plain. This is repeated for the four sectors - the Most

Northerly Rise, and Most Northerly Set, and the Most Southerly Rise and Set - with stones marking the yearly change.

Originally the use of Stone 1 at Swinside, a tall stone casting a shadow from the midsummer rising sun on the double 42/43, was not fully understood. It [appeared to be] an obvious moon shape, until it was realised that the builders had marked the position where the moon would have risen on a flat plain, but could never have been seen because of the hills, so it is called the "Invisible". This was checked out with the theodolite. How did they do it and why?

At Swinside, Stone 1, the tallest stone, marks both the Invisible Moon Most Northern Rise from Stone 39, and the Invisible Set from Stone 15, with a long distance marker near *Irton Church* at about 14.1 km away. There are several major circles with these long distance markers at about 14.1 km radius.

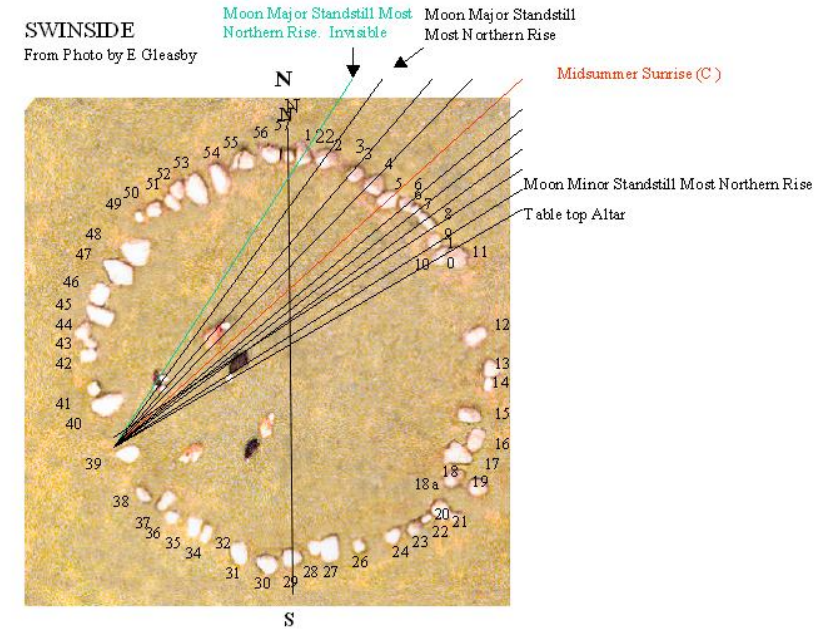


Figure 186 moon standstills at Swinside [aerial photograph taken by E Cleasby]

The spacing of the lines reflects the skyline elevation. [Jack's note:] (This diagram is to be re-done to remove ghost numbers and centralise).

[Insert by Editor: North-Eastern Alignments

In an effort to double check and illustrate Jack's findings, the Editor plotted out the major alignments from Figure 186 on 'Horizon' and transferred these to Jack's diagram. Then he drew them out pictorially on his clearer drone's aerial view (though this is slightly skewed so readings cannot be taken from it). See Figure 189. *It is not known what the intermediate lines are for.*

One of the comparisons showed no difference (the midsummer sunrise), but two varied by 3°. 'Horizon' returns the Moon major standstill most northern rise as 39.7^{o} elevation +1.9^{o} declination +28.13, ie 3° more than Jack's, over the moon shaped Stone 2. See Figure 187 for the Editor's photo using Jack's diagram, with an estimate of the position of the socket Jack talks about for the fallen Stone 39. In Figure 188, Jack's midsummer rising is 49°, Horizon returns azimuth 48.7°, elevation 1.5, and declination 23.67, though the Minor Standstill is again 3° difference.

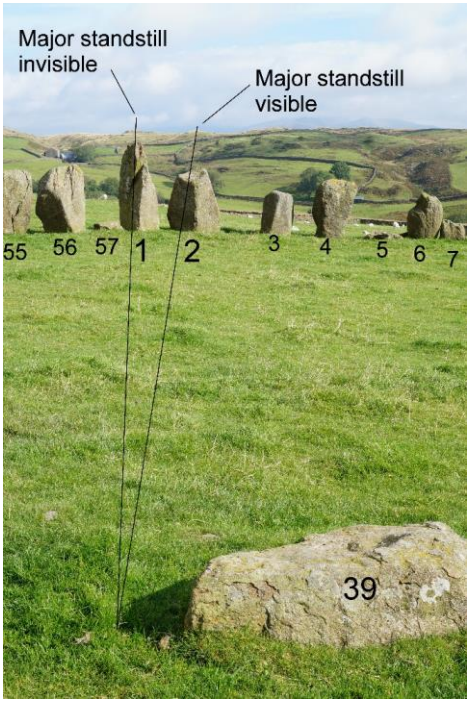


Figure 187 Major standstill drawn from Jack's diagram. Picture by David Smyth 11:10am 19/9/17

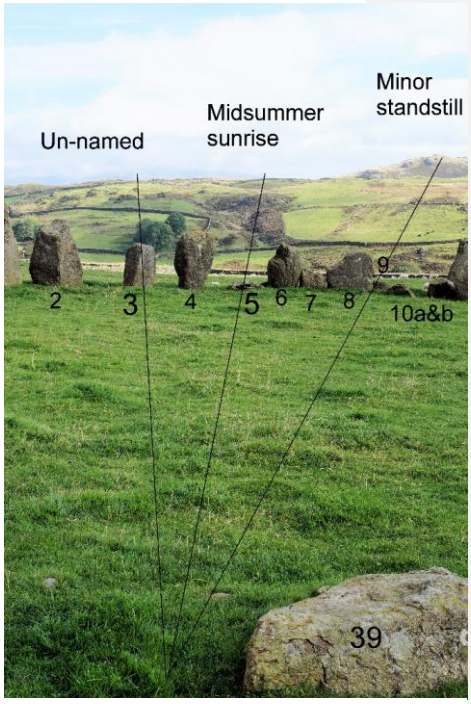


Figure 188 Midsummer sunrise. . Picture by David Smyth 11:11am 19/9/17

	Major standstill	*Midsummer sunrise*	*Minor standstill*
Jack	*37*	*49*	*58*
Horizon	*40*	*49*	*61*

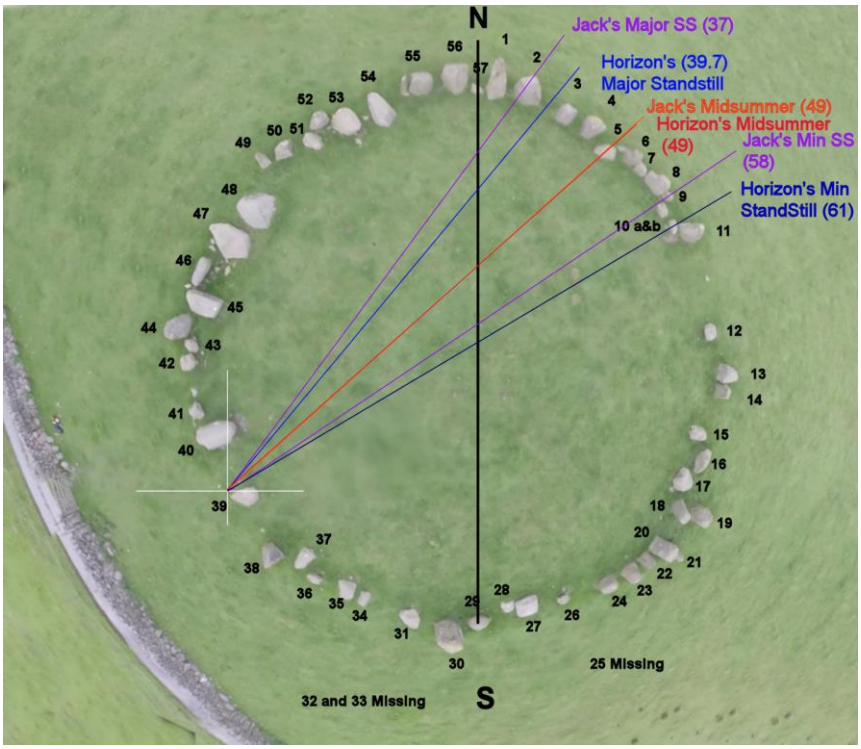


Figure 189 Comparison between 'Horizon' and Jack's NE alignments. Picture taken and drawn by David Smyth

End of Editor's insert]

Figure 190 Swinside 7.9.04 moonrise from 39 over Stone 4 Photo by JME

The bottom speck [Figure 190] is a torch on Stone 4 with the moon above. This photo is put in to show that the moon does move its rising position as the stones indicate.

Research then moved to looking for the moon's southern rise sector.

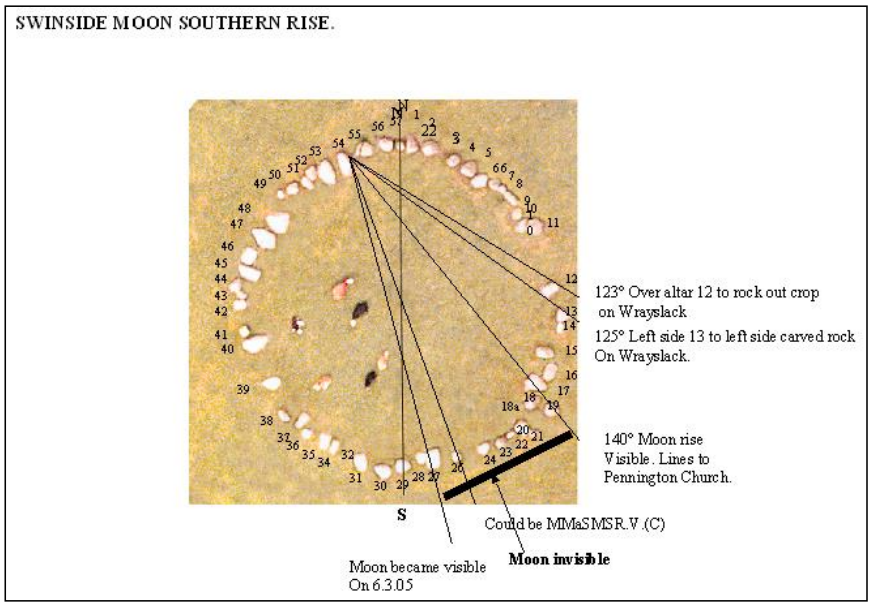


Figure 191 Swinside moon S rise [aerial photograph taken by E Cleasby]

After several tries the base was found to be on the side of the tall, fallen, diamond shaped Stone 54. [Figure 191] This stone is one of the bases from which the midwinter sunrise is observed over the Triple 15, 16, 17. *I.e*. this is the same principle as exemplified by Stone 39. From here the edge of Stone 13 lined up with the edge of the carved rock on *Wrayslack*, SD 186872, and it was expected that the moon, at the Most Southern Rise would have been seen to run up the slope of *Knott Hill*, SD175873. However, this does not happen, as was discovered one cold morning waiting for moonrise, only to discover that it had risen behind the hill! The stones in the circle mark the position of the Invisible Moonrises. The moon eventually appeared over the top of the hill over the small Stone 26, and the Full Orb over 27, which is shaped the same as for the Full Orb of the sun: a flat top with an off-centre hump. [This] was another surprise, as this shape is normally associated with the sun. It must be said that at this stage the sun was well up and the moon was hardly visible, so the observation may not be absolutely accurate, and will have to wait another 18 years to be checked.

It is only on writing this many years after the first discovery of the northern moonrise sector that the realisation occurred as to how lucky it was that Stone 2 had started the moon hunt, as it is the one sector at Swinside which is both the simplest and … complete.

[Insert by the Editor to illustrate Figure 191

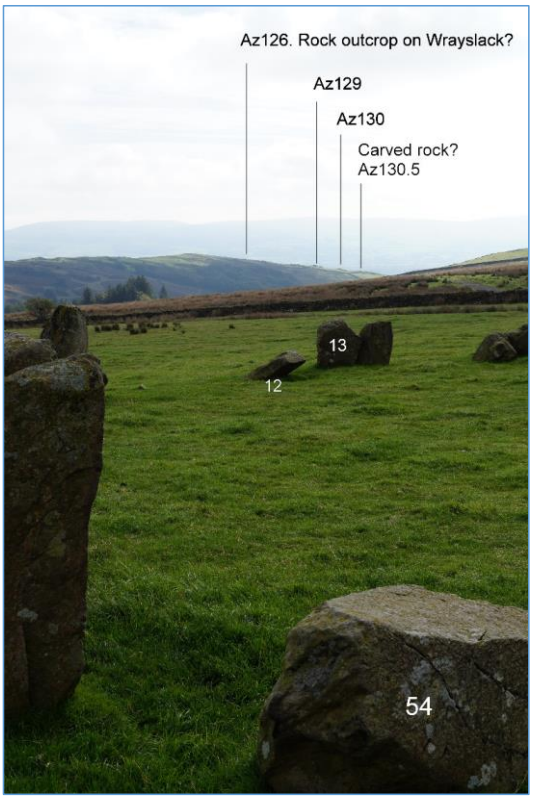


Figure 193 Left side of 54 to 12 and 13.
Picture by David Smyth 11:19am 19/9/17

From the left (N) edge of 54 to left (N) edge of Stone 13 measures Azimuth 130.5 see Figure 193. This shows the Editor had trouble agreeing with Jack's measurements. One reason for this might well be the uncertainty of 'the side of Stone 54'. Is this where it is lying nowadays, or estimated as if it were standing? Figure 192 shows the flat, North, side (there are actually two flat sides showing in this picture) and rough base. The indicated point is where all the Editor's measurements were taken from.

Figure 192 Stone 54 Picture by David Smyth 11:30am 19/9/17

From the left edge of 54 to Stones 18/19

Jack records this as "140° Moon rise Visible. Lines to Pennington Church." However, the Editor made this Az 146.5°. The 140° didn't pass through Stones 18 and 19. See Figure 195

From the left edge of 54 to Stones 27 and 28

Figure 196 partially shows the arc of the moon invisible with the Editor's measurement of Az 168° which is the line between Stones 27 and 28. When Jack says this arc covers the moon invisible, presumably he means when it rises at sea level. The major standstill, however, would have been seen appearing over Knott Hill (on the red line, as being indicated in Horizon by AK Smith (Smith, 2017) *at 160° in Figure 194), which is rather confusing.*

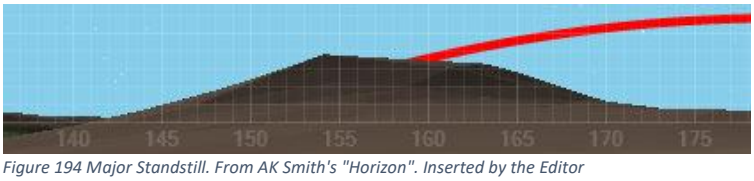


Figure 194 Major Standstill. From AK Smith's "Horizon". Inserted by the Editor

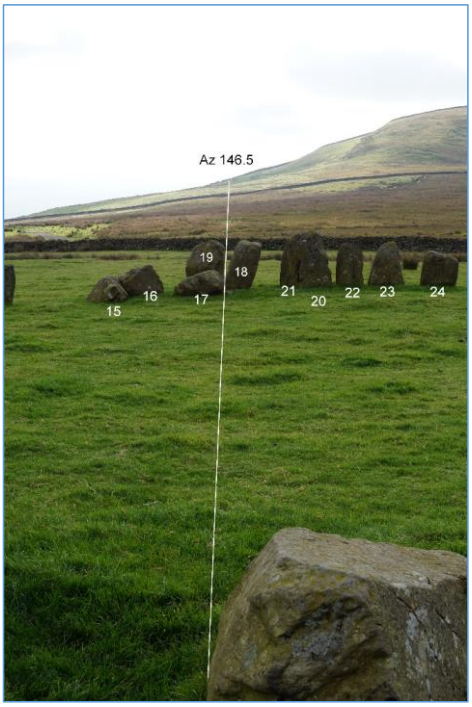


Figure 195 Pennington Church line? Picture by David Smyth 11:33am 19/9/17

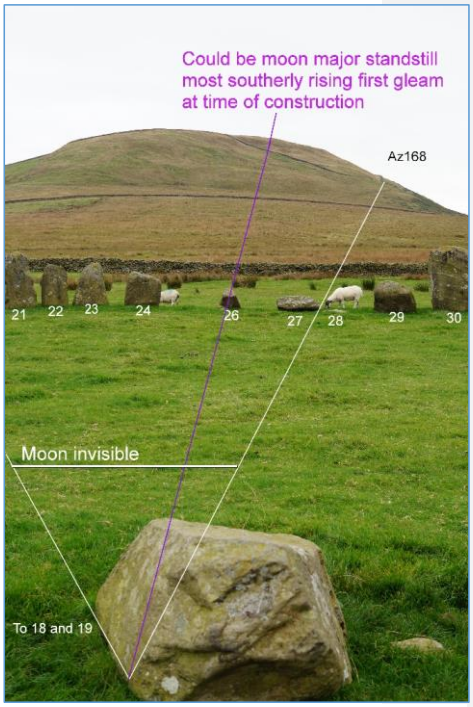


Figure 196 Invisible moon. Picture by David Smyth 3:41 pm 20/9/17

End of Editor's insert]

Moon southern sector sets.

On … 19/9/96, Redshift 3 computer predicted that the moon would be setting at the Moon Minor Standstill Most Southern Set position at Swinside. Having first seen this on 2/6/96 at 4.25 am. [The] high skyline makes this time early against the computer prediction. *[A reference here to possible inaccuracies in Redshift 3, similar to Horizon, perhaps because of the closeness of the horizon. Ed]*

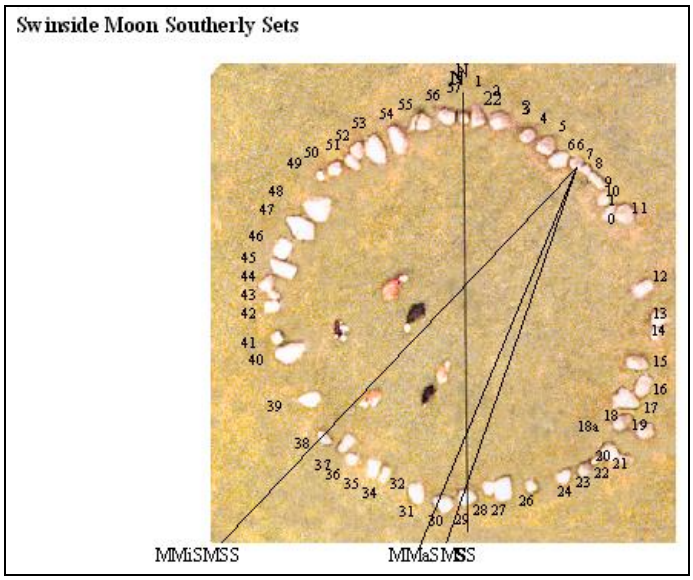


Figure 197 Swinside moon S sets [aerial photograph taken by E Cleasby]

Figure 198 Swinside. Moon over stone 7 in the triple Photo by JME

Swinside. Moon over Stone 7 in the triple 6, 7, 8 over Stone 38 on 19/9/96 [Figure 198]. Computer prediction 9:46pm. Left site 9.30pm.

Figure 199 Swinside Stone 38 Photo by JME

Swinside Stone 38 [Figure 199]. A pointed, moon-shaped stone, marking the minor standstill at the end of the moon southern setting sector.

Figure 200 Minor standstill over Stone 38 from 7. Picture by David Smyth 7:42am 19/9/17

[*Note by the Editor: Jack's alignment for this (moon minor standstill most southerly set over Stone 38 from 7) is 225°, Horizon's 223° though as the distance to the horizon is 1.195km, there may be similar inaccuracies in both programmes.*

As for the Major Standstill, it is unclear which line Jack was referring to in Figure 197, but the Editor chose the closest to Horizon's reading of 206.5°, whereas Jack's measures 202°.]

This was followed the next night by a visit to Castlerigg, when the following photo was taken of the moon doing exactly the same thing, confirming that both circles worked on the same principles. The difference between the two circles is due to the high elevation of the skyline at Swinside while that at Castlerigg is low, causing different stones to be used for the fore sight.

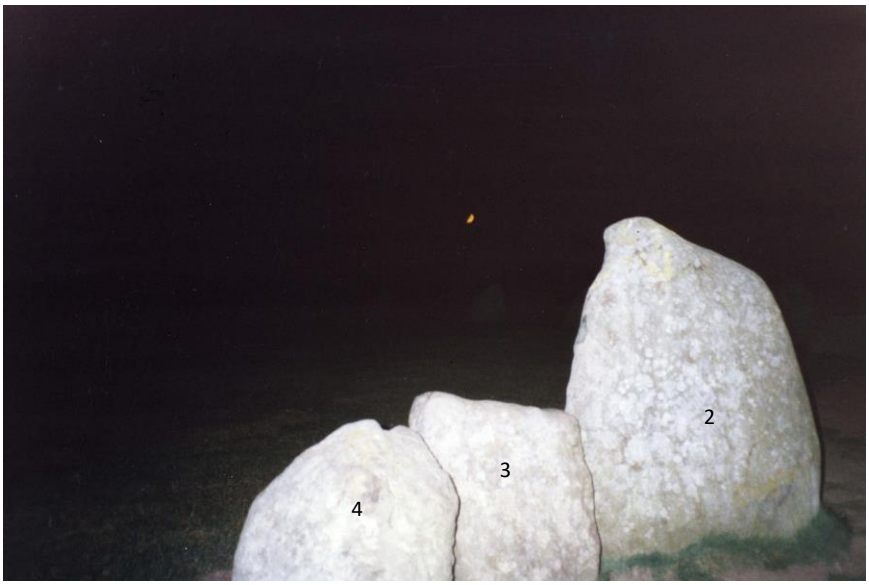


Figure 201 Castlerigg Moon setting over Stone 3 Photo by JME

Castlerigg over Stone 3 of triple 2, 3, 4 over Stone 29, on 20/9/96 [Figure 201]. Left site at 11:1 pm. Here the moon was seen to settle into the top of the hill called *Robinson* NY203169, and was expected to be seen as a flash in the valley, but it did not happen on this occasion.

This leaves the northern moon setting sector at Swinside to be defined.

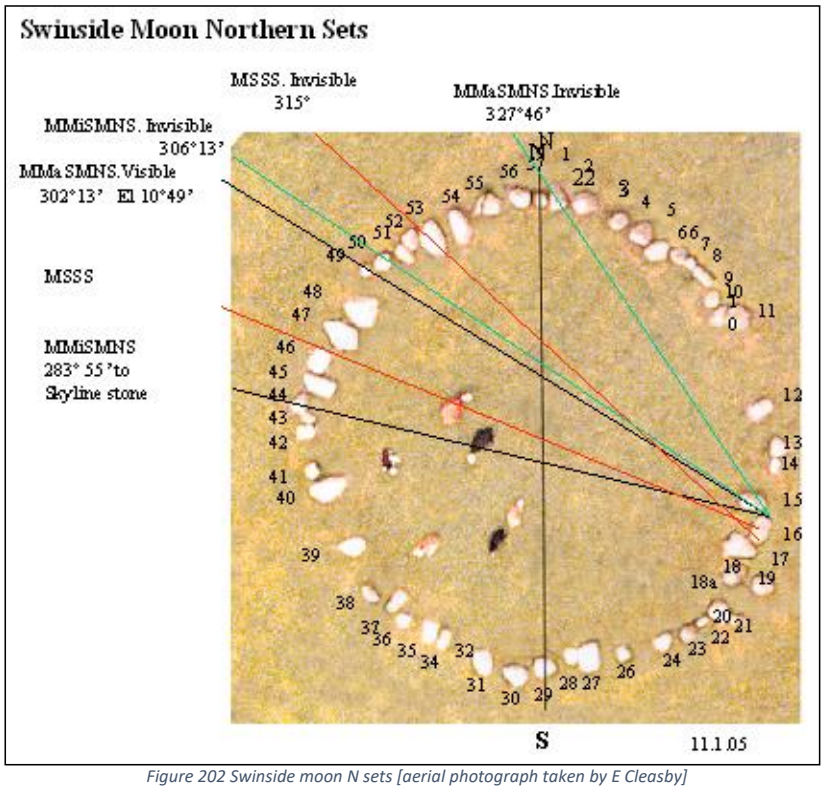


Figure 202 Swinside moon N sets [aerial photograph taken by E Cleasby]

[Legend inserted by Ed.

MSSS	*Mid-summer sunset, visible and invisible*
MMaSMNS	*Moon major standstill most northern set*
MMiSMNS	*Minor moon standstill most northern set]*

Note here [Figure 202]. The visible sector is from Stone 44 with a rock on the skyline to Stone 49, small pointed stone. It then moves on to Stone 50 marking the invisible minor standstill, through the invisible midsummer sunset line to Stone 1 marking the invisible major standstill most northern set with an out station at 14.1kms, probably the base of the old cross in *Irton Church.* NY092 005

[Insert from the Editor- Moon Northern Sets

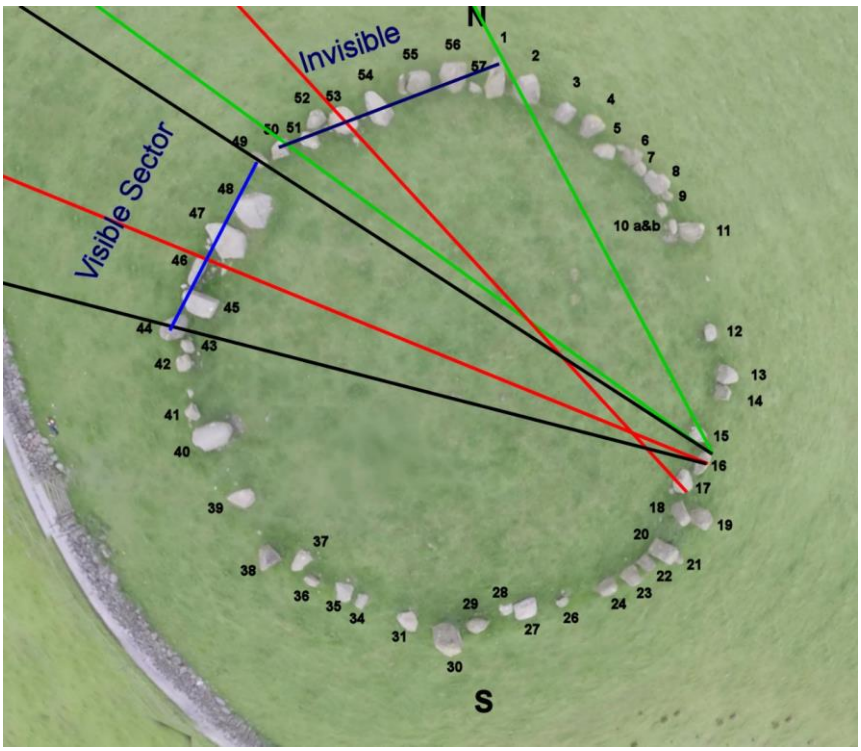


Figure 203 Moon Northern Sets by David Smyth attempting to clarify the fore-sights in Jack's diagram

'Horizon' returns the Moon major standstill most northern set as 304.2° Elevation +10.7° Declination +28.17 (the red line in Figure 204), the Moon minor standstill most northern set as 281.4° Elevation +14.1° Declination +17.99 (the green line) and the midsummer sunset as 290.6° Elevation +14.6° Declination +23.74 (the yellow line). Is the difference of 2 degrees (see the table below) because of the difference in algorithms between the Redshift 3 programme Jack used and the more modern Horizon? However, Horizon uses 90m tiles which become less accurate the closer the horizon.

Commented [DS2]: To check

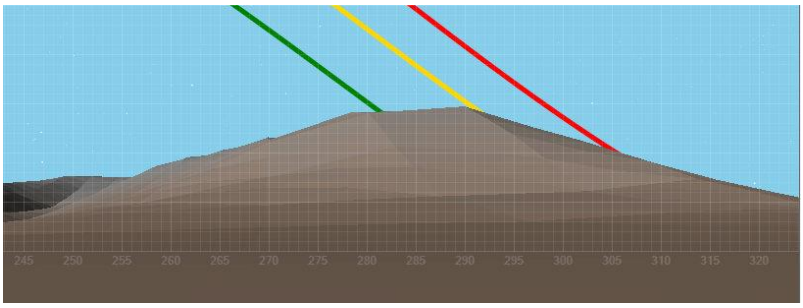


Figure 204 'Horizon'portrayal of Northern Sun and Moon Sets

Label	*Red Shift 3*	*Horizon*	*Editor's*
Major Standstill visible	*302°13"*	*304.8° +10.3°*	*299° +11°*
Minor Standstill visible	*283°55"*	*281.4° +14.1°*	*279° +14°*
Midsummer Sunset visible	*292°*	*290.6° +14.4°*	*290° +13°*
Minor standstill invisible	*306°13"*	-	*302° +10°*

There is obviously variation in the readings in this table. Jack presumably obtained his readings from Red Shift 3. This programme is now obsolete and it is very difficult to reproduce the measurements. The Editor's sighted across the indicated stones with a handheld marine compass and survey instrument, and as previously stated, Horizon (and perhaps RedShift3) is less accurate with close horizons.

Moon major and minor standstills most northern set invisible

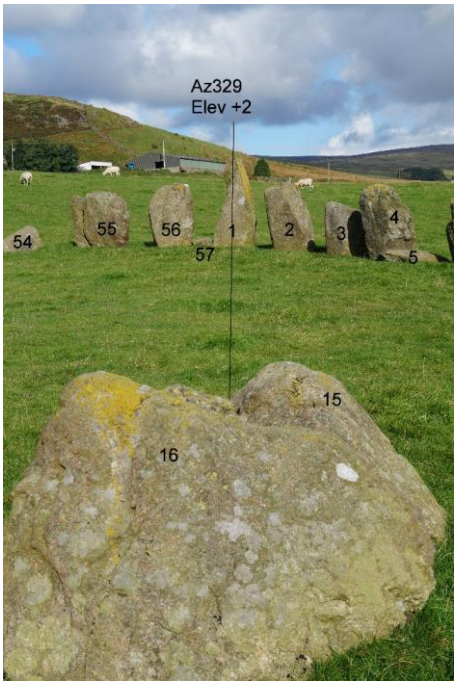


Figure 206 Major Standstill invisible.
Picture by David Smyth 10:40 19/9/17

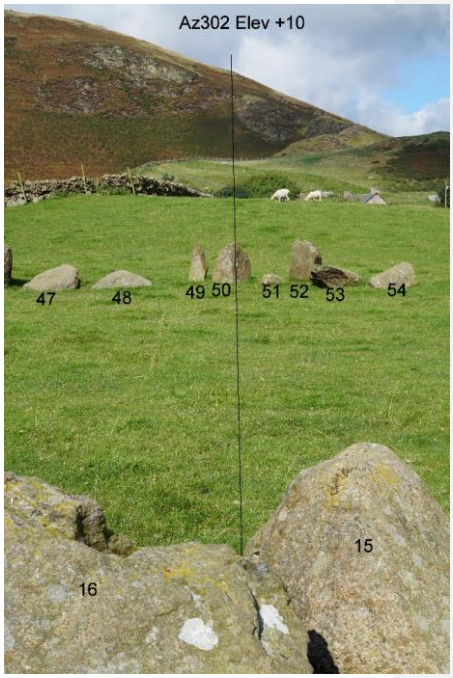


Figure 205 Minor Standstill invisible.
Picture by David Smyth 10:49 19/9/17

Here (Figure 206) the Editor took his reading from what seemed the most obvious place – the junction of the two stones, though Jack's diagram (Figure 202) seems to suggest the right hand side of 16, which, as it was sloping, was more problematical. It was noticed that in general, azimuths would vary widely depending on which part of the stone you were

observing from and to. This is why the Editor has reproduced as many views as possible marking his exact viewpoints.

Moon major and minor standstills most northern set visible

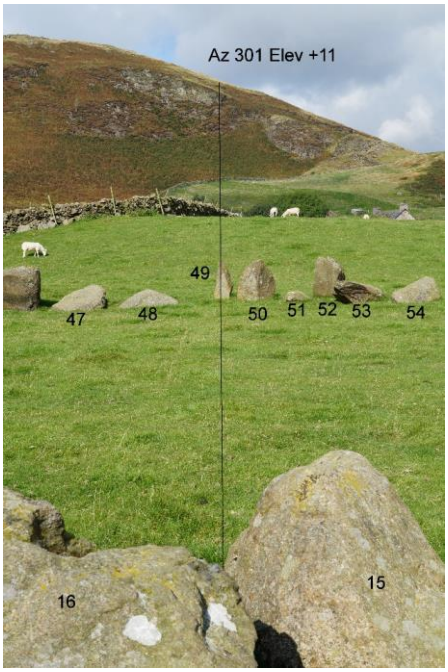


Figure 208 Major Standstill visible. Picture by David Smyth 10:52 am 19/9/17

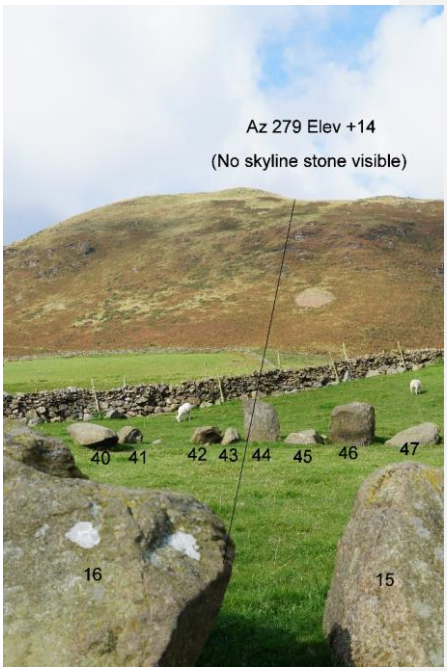


Figure 207 Minor Standstill visible. Picture by David Smyth 10:56 am 19/9/17

Midsummer sunset visible

In Figure 209 It was not clear which part of the fore-sight (Stone 16) to take the readings from, but the Editor found that from the edge indicated, to the right hand side of 46, (which was clear in Jack's diagram) a boulder lined up on the horizon at Azimuth 290° Elevation +13. However, Jack didn't note this, which one thought he would have. Jack did, however, note a rock on the horizon for the adjacent alignment (Figure 207) over Stone 44, where the Editor couldn't see one. Did Jack confuse the two?

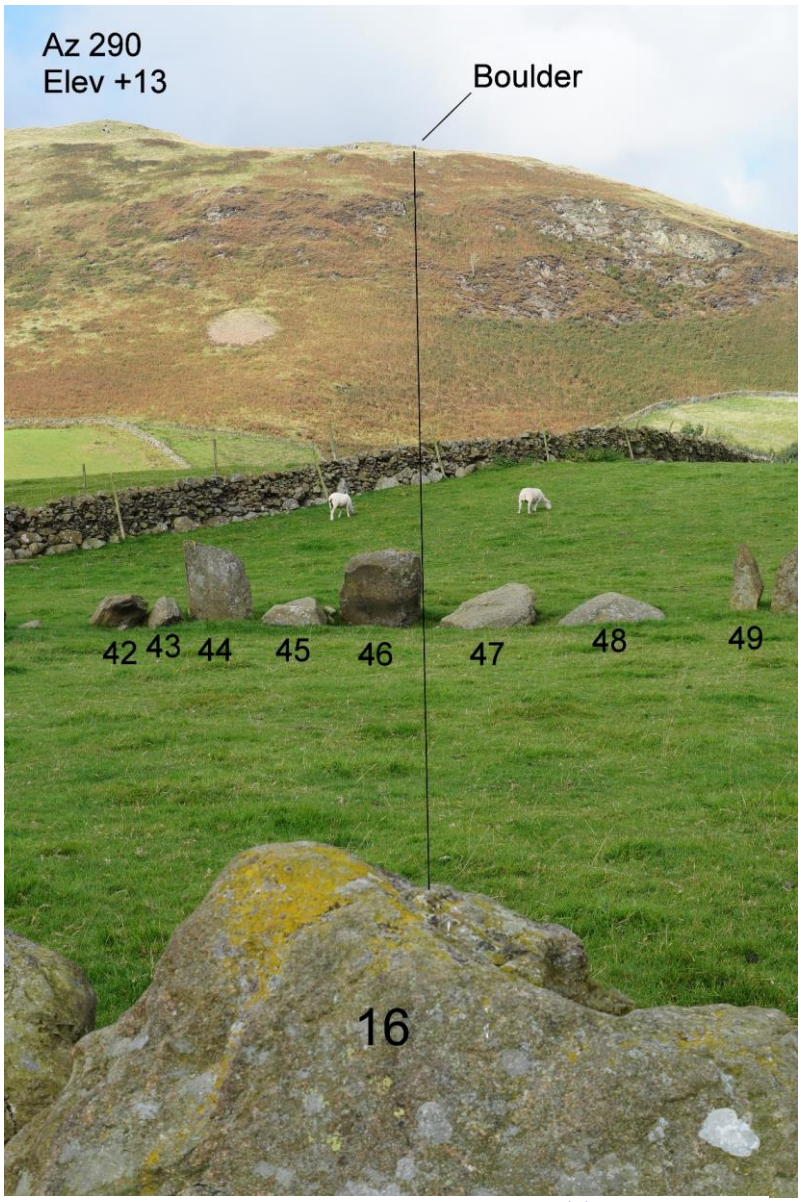


Figure 209 Midsummer sunset, visible. Picture by David Smyth 11:03am 19/9/17

End of Editor's insert]

[Castlerigg]

After many visits to Castlerigg trying to work out the rest of the moon system, it was accepted that the moon southern rises were observed from Triple 1, 37, 36 over the stones and hills to the south east, but this has not been prove[n] by observation, due to weather, time, and distance.

Side stepping

While standing in the Sanctuary looking towards *Latterigg* [Latrigg] NY280246, it was noticed that the mounds on the skyline lined up in sequence with the stones in the outer circle when the observer side stepped from stone to stone along the north side of the Sanctuary.

The next 3 photos demonstrate the effect of this side stepping.

Figure 210 Castlerigg A. Photo by JME

Castlerigg JPCr0782

Figure 211 Castlerigg B. Photo by JME

Castlerigg JPCr 0783

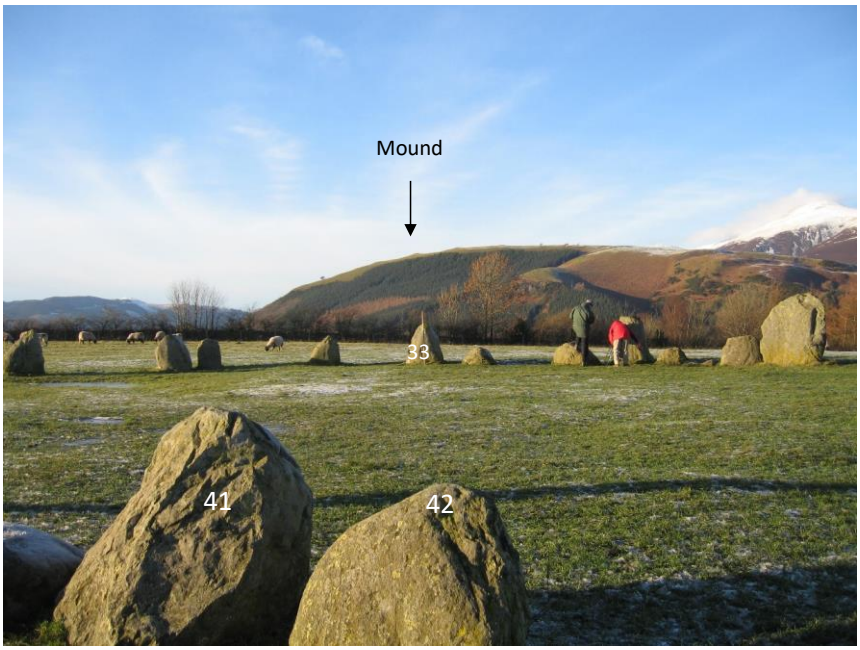


Figure 212 Castlerigg C. Photo by JME

JPCr 0784 *[Number of the photo?]*

Note Stone 33 is of typical moon shape [Figure 210 to Figure 212]. All the northern moon settings are indicated by side stepping the stones in the north side of the Sanctuary, with Stone 44 over Stone 2 indicating the Invisible Most Northern Set behind Skiddaw.

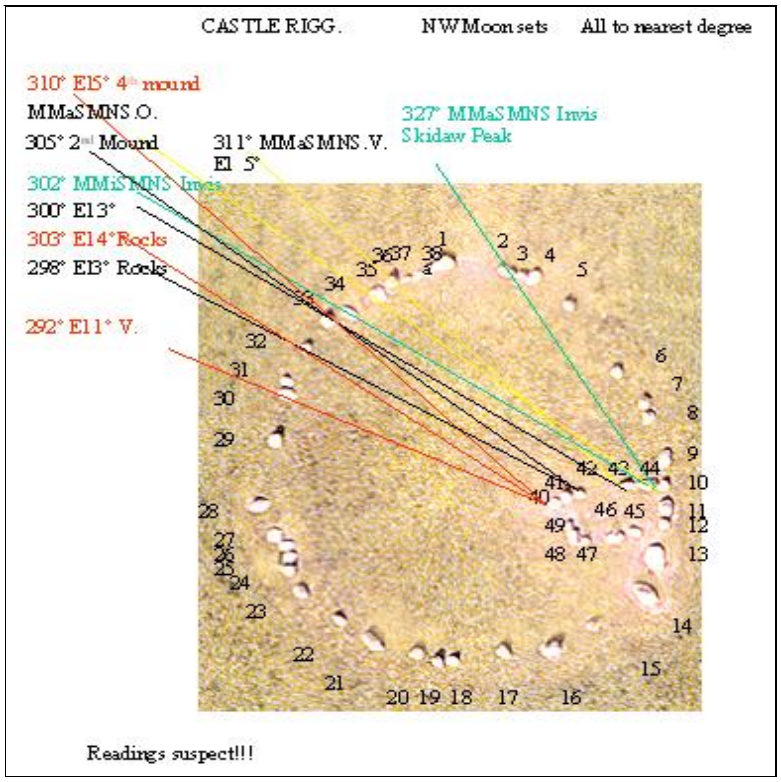


Figure 213 Castlerigg NW moon sets aerial photograph taken by E Cleasby

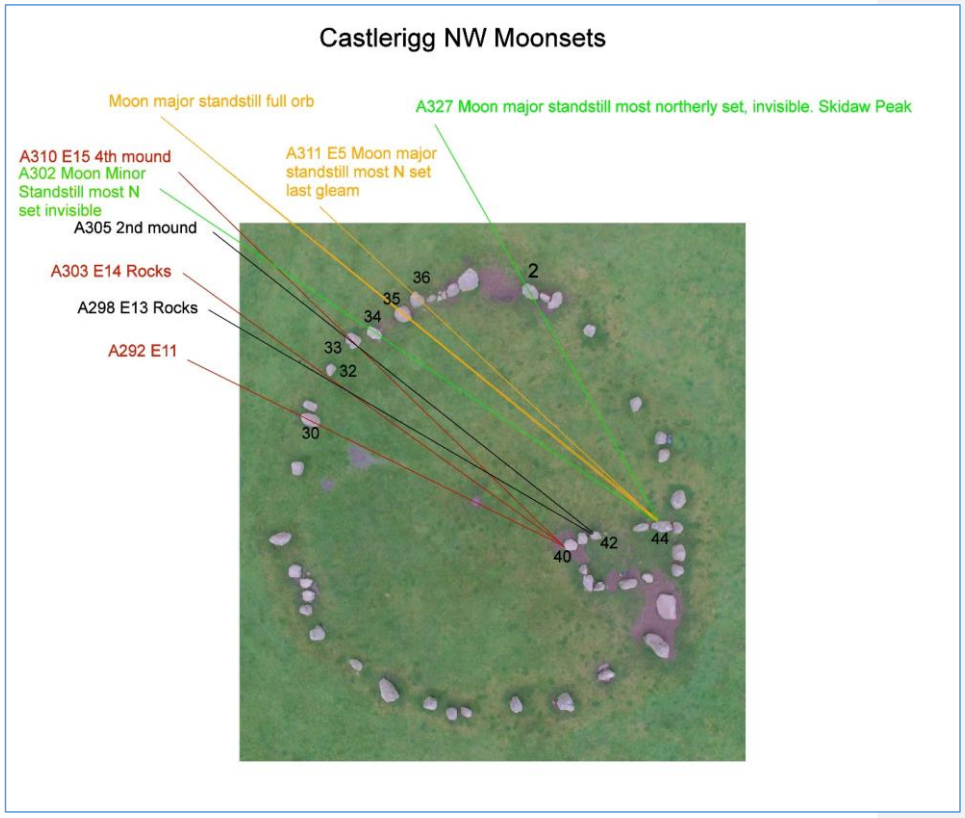


Figure 214 Castlerigg NW moonsets redrawn by the Editor from photo taken on 29/8/16 at 5:05pm by Shaun Bunting©

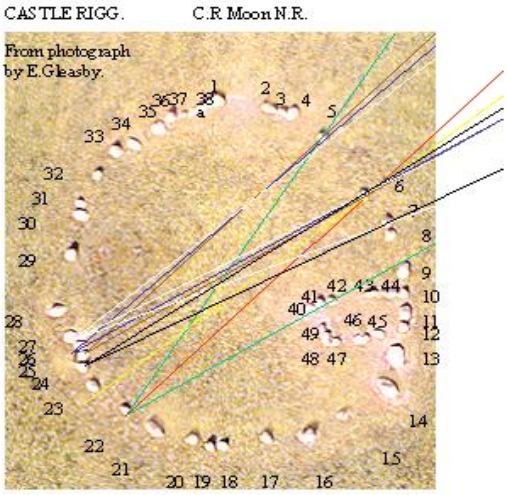
[A is Azimuth, E Elevation, to the nearest degree, readings suspect.]

The sector makes use of all the stones on the north side of the Sanctuary.

This discovery of 'Side Stepping' is one of the most important made, as without it, it would have been impossible to work out how Stonehenge was used for moon observations.

The mounds on *Latterigg* [Latrigg] appear to have been shaped by cutting away the crest, leaving the bedrock exposed. It is very difficult to imagine these mounds [are] natural [with] such regular intervals. The right hand mound is actually a low built mound, and is so low that it is quite difficult to see it when walking on the ground.

The northern moon rises at Castlerigg are indicated in a similar way.



Seen 8/9/04. From 26 over 5

Green = Invisible

Red = Midsummer Sunrise Invisible.

Yellow = Midsummer Sunrise

Blue = Moonrises

Figure 215 Castlerigg CR moon NR aerial photograph taken by E Cleasby

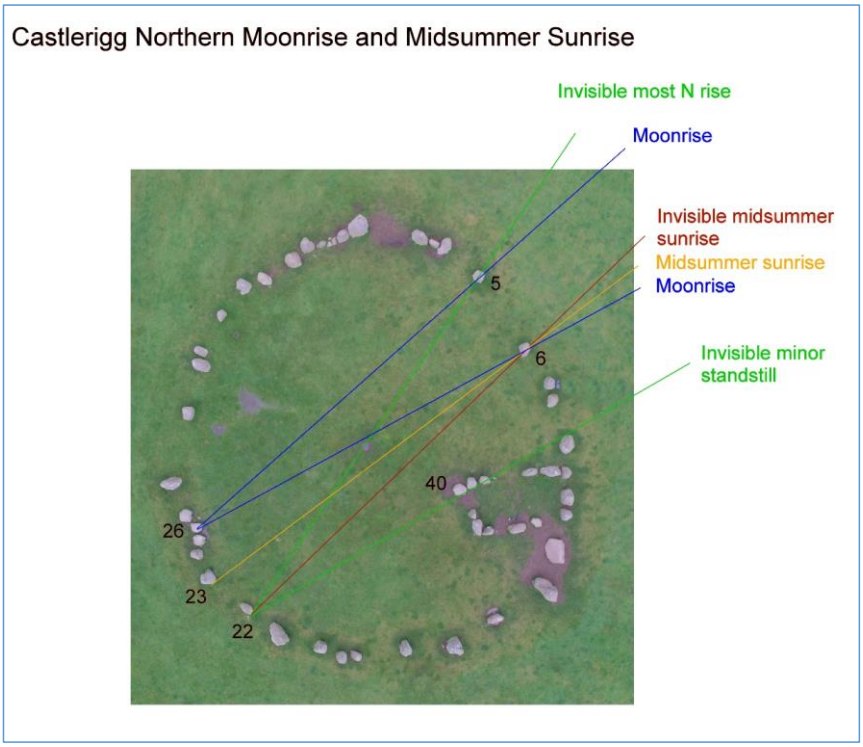


Figure 216 Castlerigg N moonrise. Redrawn by the Editor from photo by Shaun Bunting©

[Insert by Editor: this drawing (Figure 215) was obviously unfinished and it is unknown what the black and white lines meant, nor CR, so the Editor has left them out for clarity in Figure 216. Jack thought it very important to put the diagram in though, because it illustrated side-stepping. Jack mentions Thom's work, though he didn't refer to it to find his alignments, but worked them out entirely independently. Accordingly, I have re-drawn Thom's 'Castle Rigg' alignments and inserted them here for comparison (Figure 217) (Thom, 1971, p. 150).

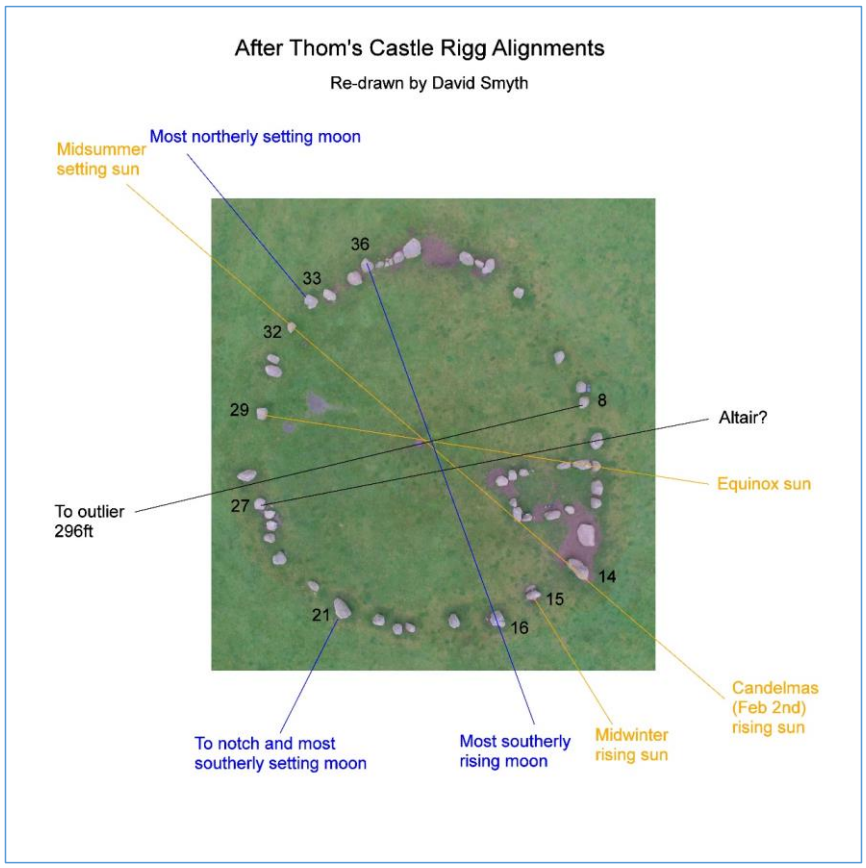


Figure 217 After Thom's Castle Rigg alignments by David Smyth on photo by Shaun Bunting

End of Editor's insert]

Stone 5 when looked at from this side is a Z shape, with the Invisible Most Northern Rise from Stone 22 a triangular moon shape and the Invisible Minor Standstill over Bun Altar 40. Invisible Midsummer Sunrise is indicated from Stone 22 over Stone 6.

Here we see both the back sights and the foresights [by] side stepping.

It is worth noting at this stage that it was unnecessary to build in a shadow system for the moon, as it can always be viewed direct, but where moon shadows do occur they are much sharper than those cast by the sun.

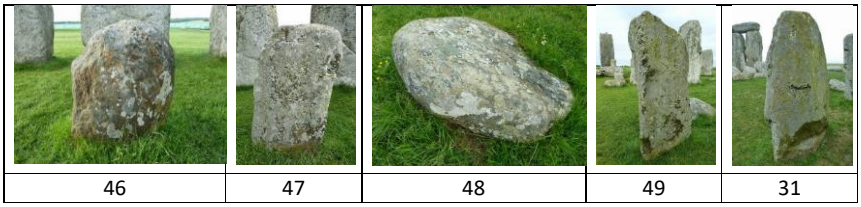
[Jack makes an entry here, which one assumes refers to the preceding section:] *This section is still being worked on and is in rough. It is probably the most significant discovery I have made, and at this stage must treated with utmost caution, and not disclosed.*

Stonehenge moon alignments.

(It had been planned to check this lot out over the solstice period, but weather prevented it happening.)

All this block tie up visually but the figures do not work simply, suggesting that in some places the builders used the First and Last Gleams, and in others they used the Full Orb position. Probably they built the mounds/barrows to fit the sight lines through the stones, and /or the wrong date has been used in the calculations.

Looking around Stonehenge there is a group of stones in the traditional shapes: Stones 46, 47, 48, 49 and 31, which must have special meanings otherwise they would have been squared.



46	47	48	49	31

Figure 218 Stonehenge Stones 46,47,48,49,31

[Figure 218 Inserted by the Editor under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.]

None of these stones could have anything to do with the rising midsummer sun, because they are all screened from the sun by the stones in the outer ring…. Following this line of stones around, there is a ring of smaller stones, some of which are of the traditional shapes.

On the summer solstice [of] 2005, seen along with thousands of others, the setting moon was seen in its southern sector from Stone 49 across the circle above the heads of the crowd, sometime before it actually set. It was a poor observation because of the crowd, but just sufficient to indicate that Stones 46 to 31 formed a line of side stepping back sights for the southern sector of the setting moon. In daylight this was confirmed on 3/4/06, by lining up Stone 46, the round topped altar-type stone, passing the left side of Stone 56, *i.e*. through where the gap would have been had Stone 55 still been standing, out to *Bush Barrow* on the skyline. On side stepping along the row they all lined up with mounds as per the diagram, and it was deduced that the Moon Minor Standstill Most Southerly Set was likely to be near a long barrow, from map bearings over a broken off stump, 40g, which has since been exposed. The long barrow appears to be slightly of[f] line with several other barrows looking more likely.

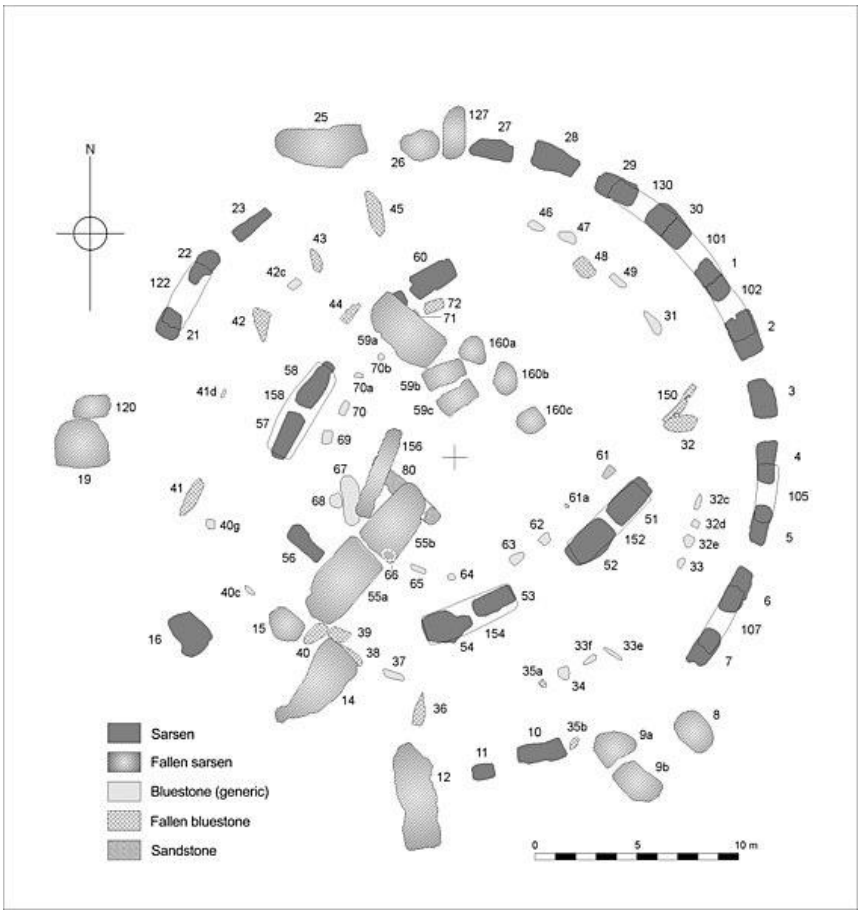

N
Sarsen
Fallen sarsen
Bluestone (generic)
Fallen bluestone
Sandstone
0
5
10 m

Figure 219

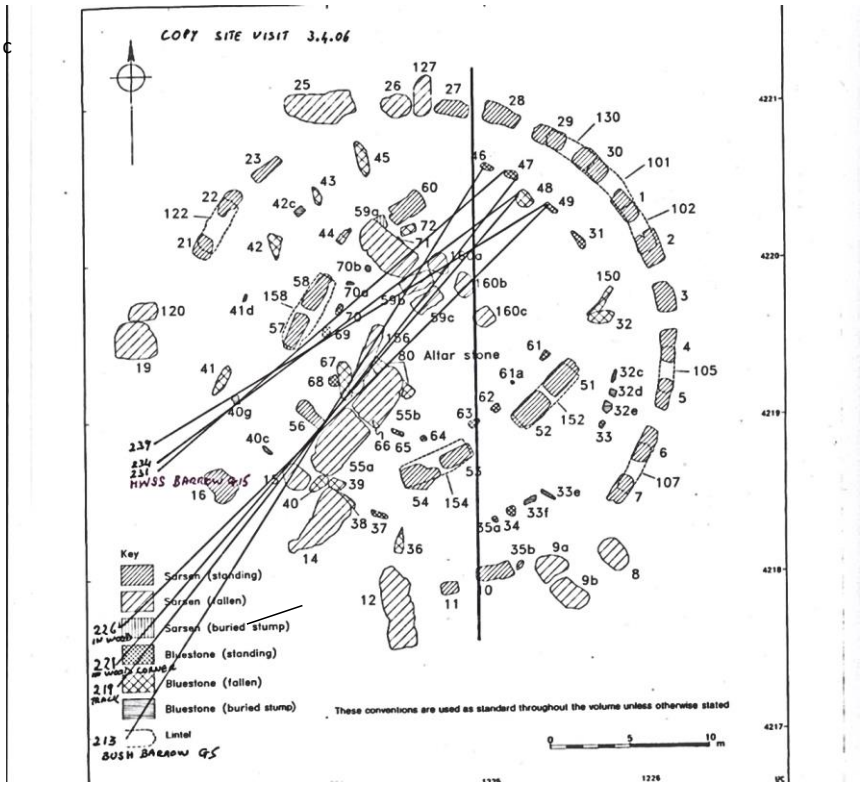


Figure 220 Stonehenge. From 'Stonehenge in its Landscape' twentieth-century excavations by R M.J Cleal, K.E.Walker and R.Montague. Published by English Heritage. Diagram 14 Page 27 [Reproduced under the terms of the Archaeology Data Service copyright ©English Heritage]

On careful drawing it is deduced that the line from Stone 47 between Blue Stones 69/70 past 40G was the midwinter setting sun Last Gleam [Figure 220 and re-drawn in Figure 222]. This is an extremely narrow sight line to the northern edge of Barrow 15.

All this batch of bearings have been read off the diagram marked from observations in the field. In conjunction with the Redshift 3 computer program a table was made of the First Gleam angles of the sun and moon rises and sets for the period between 2015 BC and 2006.

Date	Type	Redshift	Off draqwing	From Stone	Passed	Target.
5.5.2015BC	MMaSMNR	39 11'	39 00	40c	46 28/29	Lt cursus gr
3.1.2014BC		39 40'				
2.16.2013BC		41 14				
4.03.2012Bc		43 49'				
2.24.2011BC		46 26		46	38 edge 1	
7.11.2010BC	MSSR	48 18		48	56 edge 1	
3.31.2010BC		50 30		50 55(f)/56	30-Jan	Heel stone?
3.31.2009		53 37		53	40 01-Feb	
3.21.2008		56 32				
4.8.2007		58 53				
3.30.2006BC		59 26				
3.19.2005BC	MMiSMNR	58 08				
4.6.2004BC		57 31				
MOON Most : Northern						
5.5.2015BC	MMaSMNS	320 49'	320 00	33 angus	23	
3.1.2014 BC		320 21'				
2.16.2013BC		318 20'		318 33e 23		
02 07.2012		316 33		316 32c over 45(f)		
2.24.2011BC		313 08		313 32c edge 60		
7.11.2010	MSSS	311 40		311 33f 57/58		
4.11.2010BC		309 15		309 33f	57/58	
3.21.2009BC		306 24		306 32c	59g/60	
3.21.2008BC		303 38				
4.8.2007BC		301 23				
3.30.2006BC	MMiSMNS	300 28				
3.20.2005BC		300 46				
4.6.2004		302 30				
MOON MOST SOUTHERN						
5.16.2015BC	MMaSMSR	140 59		140 42c	33e 8	
3.14.2014BC		140 43				
3.31.2013		139 05		139	43 edge 52	
2.22.2012BC		136 59'		42c	62 edge52	
3.12.2011BC		133 34		133	45 32c edge5	
1.6.2009	MWSR	128 58		129 42c	51/52 6/7	
4.25.2010		129 36	can not separate.			
4.14.2009		126 28		126 45(f)	04-May	
4.4.2008BC		123 47				
3.25.2007		121 50				
3.16.2006BC	MMiMSR	120 36				
4.2.2005BC		121 04				
3.23.2004BC		122 23				
5.17.2015BC	MMaSMSS	219 24		219 47 Bannana	55f/56	Bush barrow
3.14.2014BC		219 12'				
3.31.2013BC		221 13		221	48 55/56(f)	
2.22.2012BC		223 21'		223 48 rt eye edge	55f/56	in wood
3.12.2011BC		226 11		226	49 55(f)/56	
1.6.2009BC	MWSS	231 01		231	31 55(f)/56	
4.25.2010BC		230 27	can not separate			
4.14.2009BC		233 39		233	47 40g	
4.4.2008BC		236 23				
3.25.2007		238 15				
3.16.2006BC		239 06				
4.2.2005BC	MMiSMSS	239 20				
3.23.2004BC		237 18				

Figure 221 [Stonehenge table by Jack]

[Insert by Editor: This table is pretty confusing, so in an effort to understand it better, he drew most of the more obvious alignments below, Figure 222

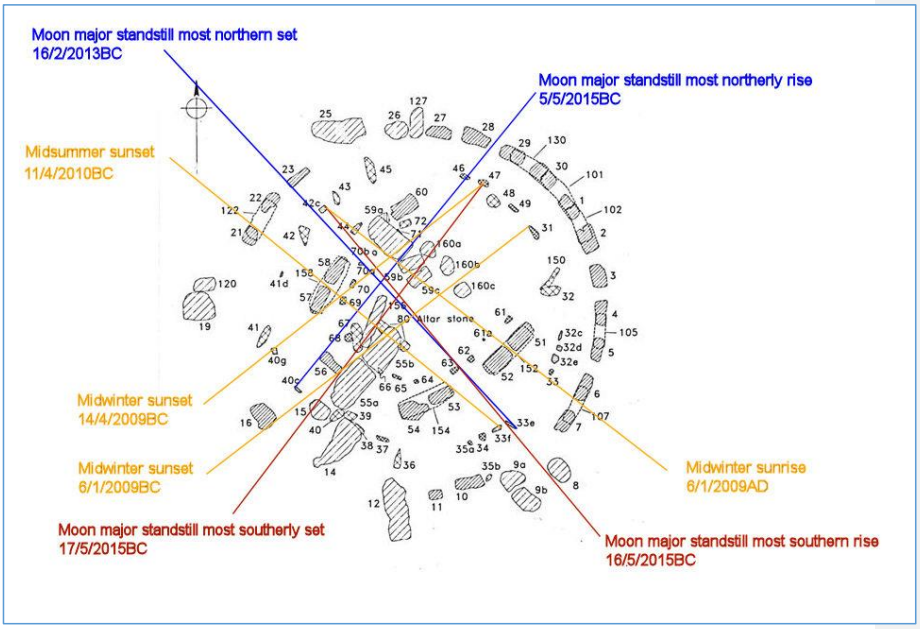


Figure 222 From the Stonehenge table (Figure 221) drawn by the Editor

Figure 223 MMaSSMNS Illustrated by the Editor from a photo by Simon Charlesworth taken on 3 April 2011 08:50

Figure 224 Close up of the MMaSSMNS barrow above in Figure 223. Photo by Simon Charlesworth 3 April 2011 08:50

End of Editor's insert]

[Moon Minor Standstill most Northerly Rise]

Redshift 3 predicted that the moon would rise on 5/12/01 in the northern sector at about 9pm near the bearing for the minor standstill. This was observed from Stone 39 over Stone 32. The notes say that by Full Orb it was from 15 over 32, through the gap between Stones 2 and 3. This suggested that the fallen jumble of Stones 37, 38, 39, 40, 15 [coloured purple, below] makes up a side stepping line of back sights for the northern sector of the moon rises. But on plotting, this appears not to be true, as the only back sight that works is from Stone 15 through the gap between 55 and 56, needing a gap much wider than assumed, with the MMiSMNR [Moon Minor Standstill most Northerly Rise] being from 40c through the gap. This does not negate the observation, but shows yet another set of parallel lines. Efforts to get an accurate width of the gap failed because the mortise holes on the fallen lintel are at different distances from its ends, and the tenon on the top of Stone 55 is missing. Both could have been damaged by … visitors hiring hammers from Amesbury to collect chips. [See drawing by the Editor Figure 225]

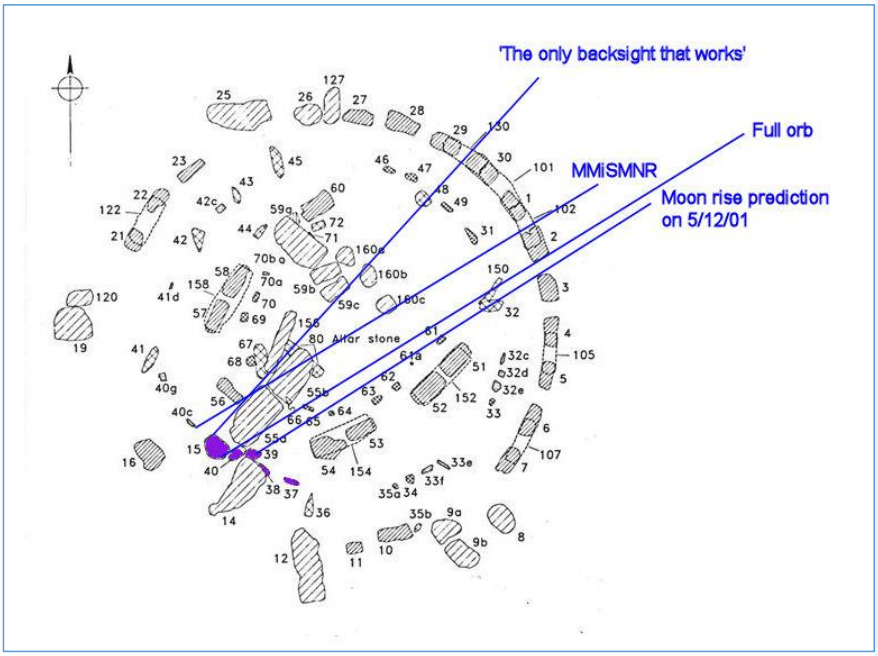


Figure 225 Stonehenge Moon minor standstill most northern rise by David Smyth

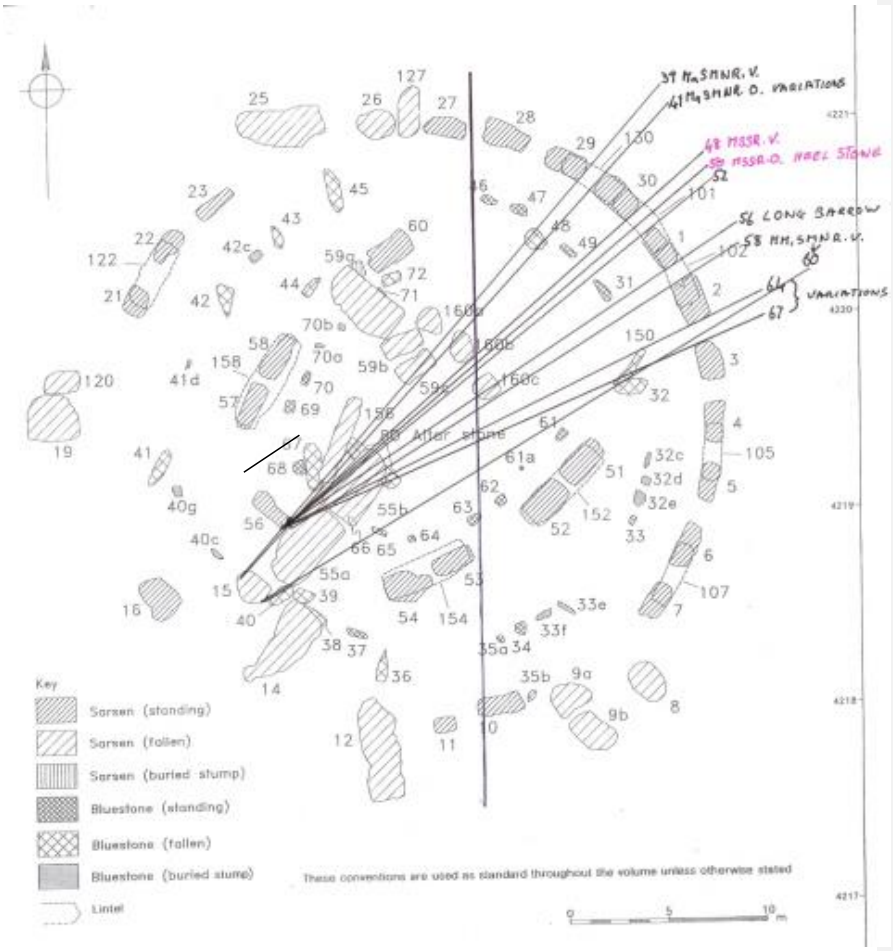


Figure 226 Stonehenge. Northern moon and sun rises [Reproduced under the terms of the Archaeology Data Service copyright ©English Heritage]

It was realised that the ring of smaller stones between the large sarsens and the outer ring were probably side stepping back sights for the 4 moon sectors. For a long time little progress was made, because another aspect was being concentrated on.

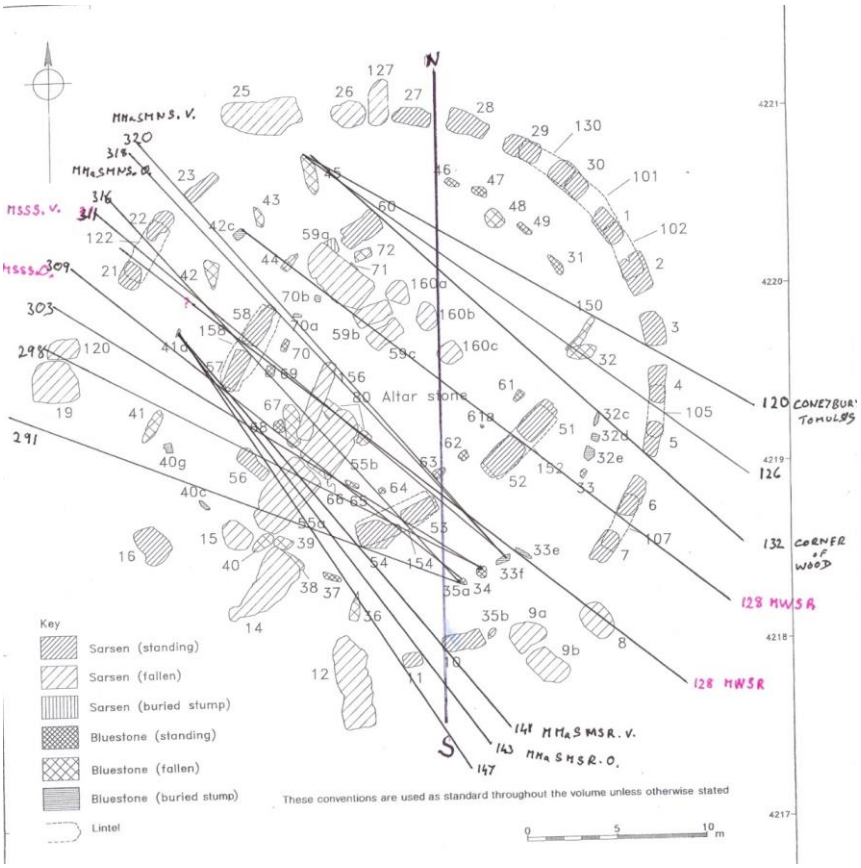


Figure 227 Most Northern sets and Most Southern rises.[Reproduced under the terms of the Archaeology Data Service copyright ©English Heritage]

By plotting these lines on the expanded photo copy [Figure 233] of the diagram found on page 36 in "Stonehenge in its landscape", which shows all the known barrows/mounds around the site including those known to have been levelled, it was found that many of the barrows or mounds were very near the positions where the Full Orb of both the sun and moon rose or set. In several places both the First [Gleam] and the Full Orb positions were used.

Photocopied and expanded from 'Stonehenge in its Landscape'.

This plan is more useful than the normal Ordnance Survey map as it shows those barrows/mounds that have been destroyed.

Insert by the Editor

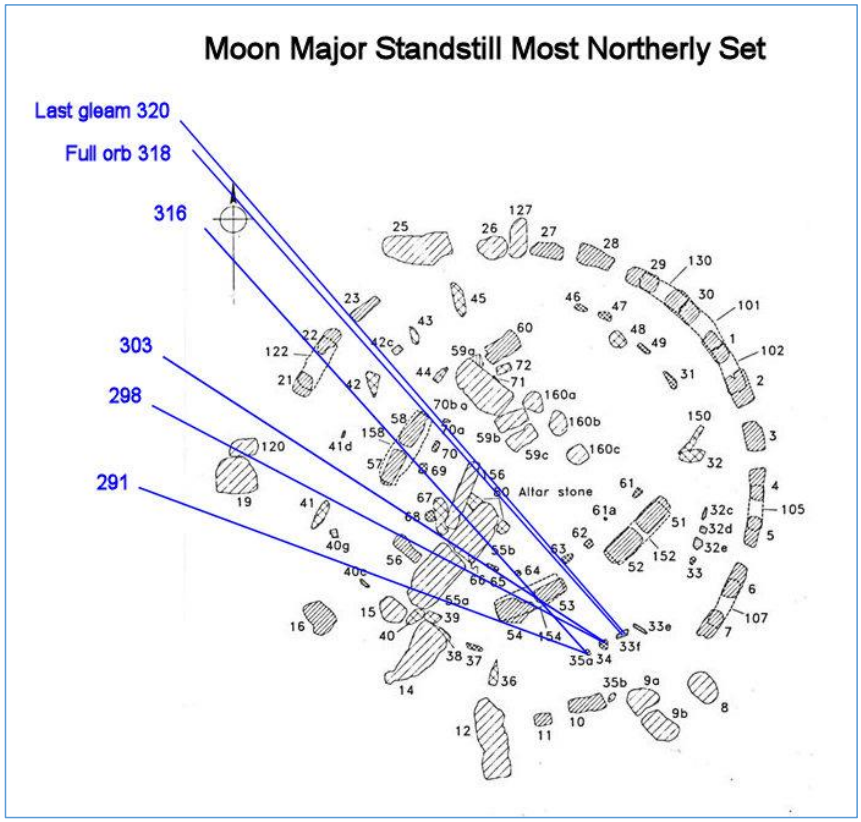


Figure 228 Stonehenge MMaSSMNS by David Smyth

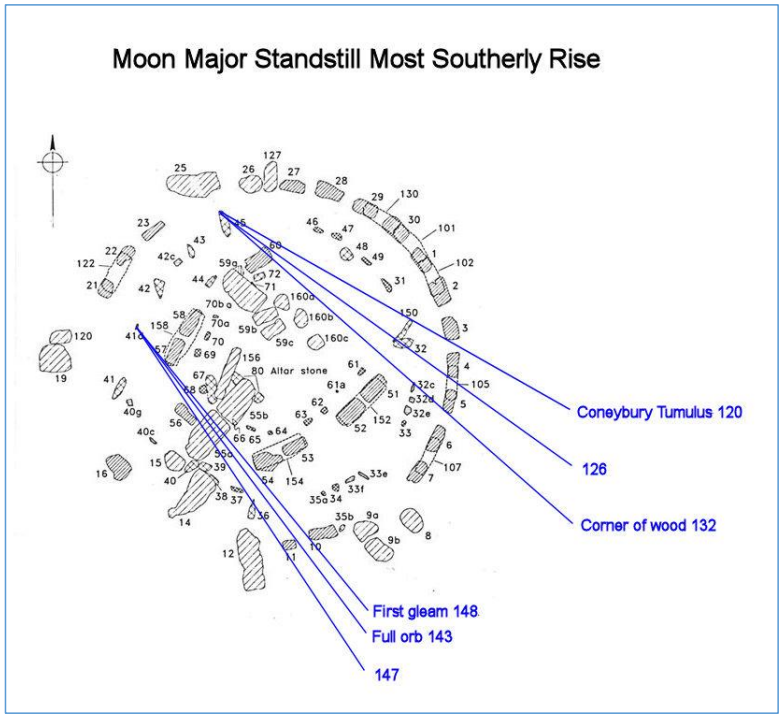


Figure 229 Stonehenge MMSMSR drawn by David Smyth

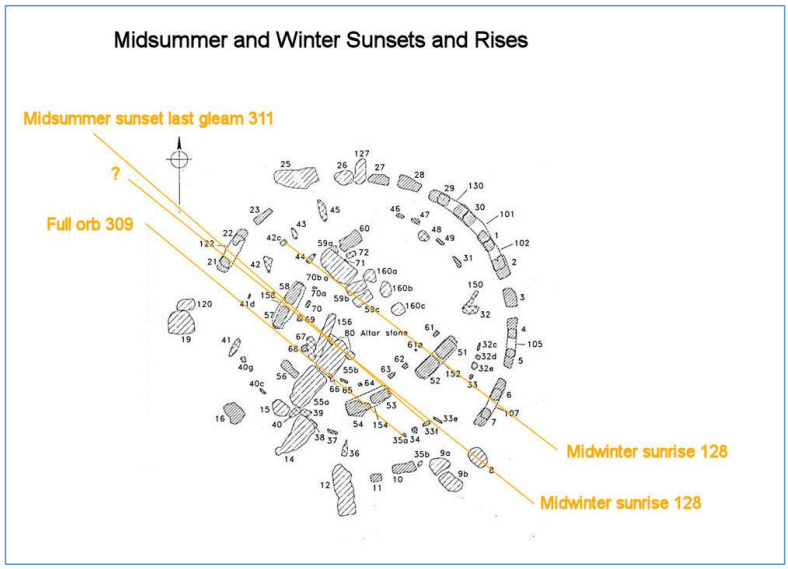


Figure 230 Stonehenge Sun sets and rises drawn by David Smyth

Figure 231 Midwinter sunrise line (128 degrees) from a photo by Simon Charlesworth 3 April 2011 08:33

Figure 232 A possible midwinter sunrise line (119 degrees) from a photo by Simon Charlesworth 3 April 2011 08:41

End of Editor's insert

This [Figure 233] is a working diagram shown to give an idea of the system, and needs tidying up and refining (I want to get this finished).

The bearings were put on to this plan using a simple protractor. They are drawn as if from a point, but they originate from side stepping within the stones looking through the gaps, and this could cause another slight inaccuracy.

The next diagram [Figure 233] shows the known use or otherwise of the mounds/barrows within sight of the stones if there were no trees in the way.

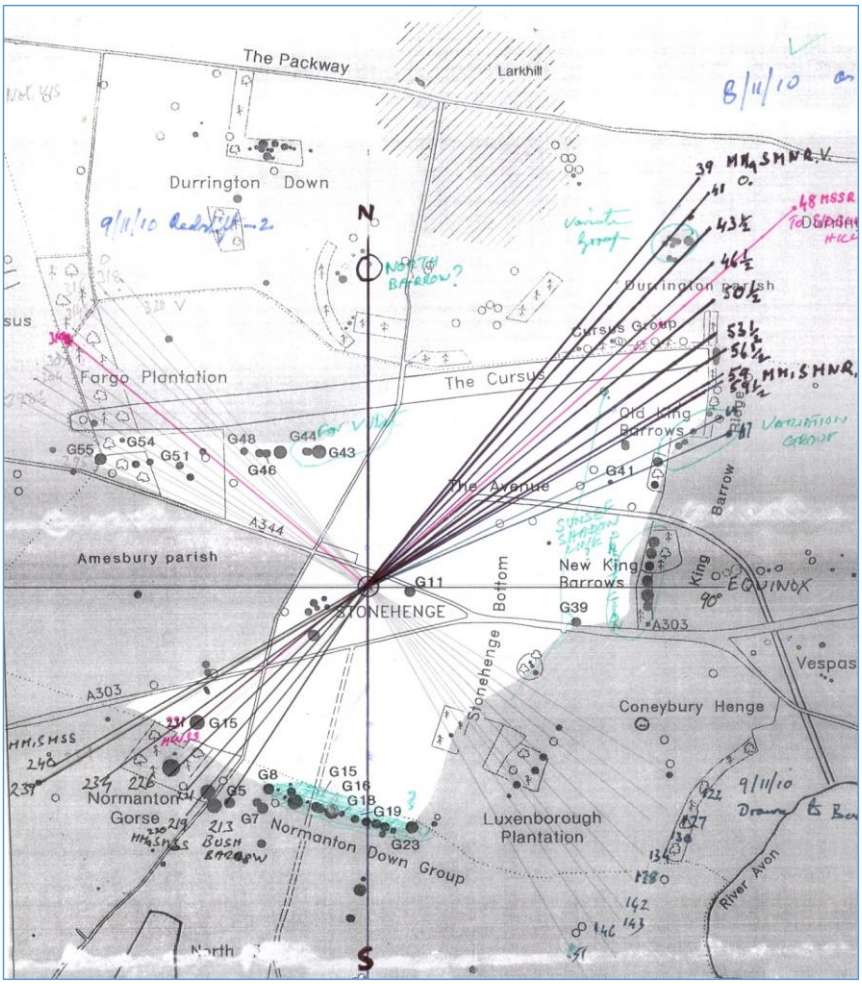


Figure 233 This shows how most of the barrows within sight of the stones have a connected use. [From Stonehenge in its Landscape p36 [Reproduced with the kind permission of Javis Gurr,Archive Licensing Officer, Historic England. Copyright © Historic England]

(The diagrams are very rough but I consider it is time to move on and tidy up later).

Insert by the Editor

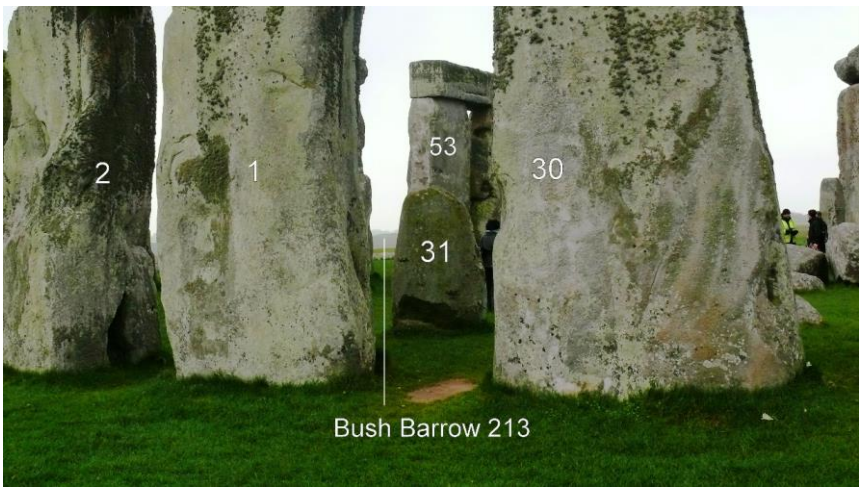


Figure 234 Bush Barrow line. Drawn by the Editor from a photo by Simon Charlesworth 3 April 2011 08:47

Figure 235 Close up of Bush Barrow photo by Simon Charlesworth 3 April 2011 08:46

Figure 236 14 degrees over Stone 37 from a photo by Simon Charlesworth 3 April 2011 08:36

These next three alignments have not been illustrated by Jack, but he asked Simon to take photos of them. On looking at the Stonehenge environs, there is a track way on the 14 degree line stretching to Normanton Down, (Figure 236). The New King Barrows (Figure 238) bears 81°. The alignment over Stone 49 is at 197°. It is assumed Jack was going to include these at a later date.

Figure 237 14 deg. close up (Normanton Down) from a photo by Simon Charlesworth 3 April 2011 08:36

Figure 238 New King Barrows alignment over Stone 33 from a photo by Simon Charlesworth 3 April 2011 08:39

Figure 239 Alignment over 49 from 30/29 from a photo by Simon Charlesworth 3 April 2011 08:45

Figure 240 Close up of New King Barrows. Photo by Simon Charlesworth 3 April 2011 08:38

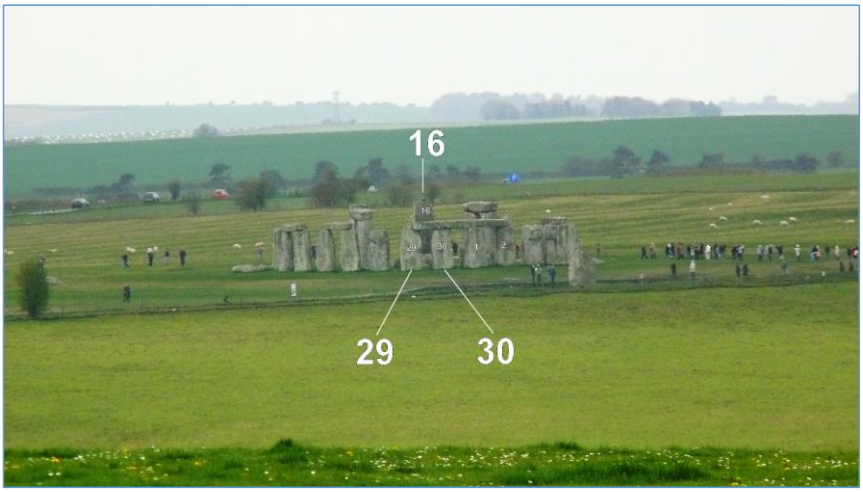


Figure 241 From a photo taken from the Long Barrow at 52 degrees by Simon Charlesworth 3 April 2011 12:29

End of insert by the Editor

Rox Hill Clump is a small wood some 3 ½ kilometres due south, seen on the skyline from Stonehenge, and has been used to fix south. It is on private land with no public access. It appears that a very old yew has gone leaving a ring of young yews perhaps about 100 years old with a mixture of other trees including ash. Yew trees were planted on prominent religious sites in many places, eg *Sidbury Hill*, North Tidworth, on the line of the midsummer sunrise. Yew trees were taken off Barrow 28 some 10 years ago to protect the barrow after 4000 years, which seems nonsense. The old trunks are still lying in a pile behind the barrow. This confirms the importance of the yew trees on Rox Hill.

Just to the west of the Rox Hill clump there is a mound, used as farm reservoir, [which] has been so used since the 1930s, which might be the actual south point. The farmer claims his father built it, but as a farmer, I think that if it was a new structure, it would have been built right next to the clump. This family pioneered the milking of cows out on the open down at this period and needed a good supply of drinking water for the cows. More careful surveying is necessary without upsetting my relationship with that family.

There is a barrow on the line north from the stones, but is not visible, because of trees.

Chapter 14. Stone Shapes

22/02/2011

Insert from Megalithic Portal Shapes of Stones Part 1[46]

On visiting any circle we observe stones of various shapes and sizes. In the Great Circles these stones have either been very carefully selected or laboriously worked into the desired shape. This is often only seen when viewed from across the circle. All of the diagrams following are not to scale as the size of the stones varies from circle to circle, but they will hopefully provide a guide to the rough shapes which commonly occur and give an idea of what each one signifies.

Great Stones

Figure 242 Stone 1 at Swinside. Photo by JME

We will begin with what I have referred to as 'The Great Stone', (e.g. Stone [1] *at Swinside),* [Figure 242] *which is estimated to be the heaviest in the circle. These Great Stones are normally to be found in the southwest sector of the stone circle* [though at Swinside it is almost perfectly true north]. *Although having said that, at Lough Gur near Limerick in Ireland the Great Stone is located in the northeast sector.*

[46] Italics denote entries from article Part 5a http://www.megalithic.co.uk/article.php?sid=2146412217

Figure 243 Lough Gur Picture by Angie Lake

This seems to be an Irish variation which also extends into the Gors Fawr Circle in the Preseli Mountains in South West Wales.

Figure 244 Gors Fawr. The near stone is the tallest. Photo by kind permission of Paul Blades (Bladup) Posted Oct 04 2013

The Great Stones fall into several basic shapes, which seem to be dependent on local choice. At Swinside it is a big, tall square block; at Castlerigg it is longer than it is tall, and similarly at Long Meg. These shapes have several variations culminating in the Great Trilithon at Stonehenge.

Tall Stones

Around the circle there are several much taller stones. The height of these is dictated by their necessity to cast a long shadow which reaches a predetermined target stone at a certain time on a particular day. An example of this is the shadow from Stone 1 at Swinside (pictured above) [Figure 242] *which appears at First Gleam on Midsummer's day. At the time of construction this would have struck Stone 42 and as the sun rose to Full Orb the shadow would have covered Stone 43 (where the First Gleam now touches), before the edge of the shadow moved on to touch the side of Stone 48 for the 'Festival position' which will be explained later.*

The interior surface of many stone circles has been very carefully graded in order to facilitate this, whilst at others the site was specifically chosen because of its slope, as at Long Meg which provides shadows at the time of the setting sun right across the circle. The shadow is not always designed to target a stone within the circle, however. At Castlerigg, as previously mentioned, one shadow at the Midsummer sunset is cast over a great distance down into the valley below as seen in this photograph [Figure 266 p259]. The dark line across the picture is the shadow of the ridge on which the circle stands and at the time of construction, that shadow would have reached the bottom of the target at the same time as the shadow from the stone in the circle would have covered the target stone. At Midwinter the shadow is cast in the opposite direction, creating a shaft of light onto the Bun Altar (Stone 40) at the corner of the Sanctuary as seen here [Figure 245].

Figure 245 Castlerigg midwinter shadow onto the Bun Altar [40]. Photo by JME

The pillar type of tall stone can be fairly bulbous with a straight edge to give a good shadow line, particularly to the Great Stone. Other component stones in the circles not required to cast shadows are generally shorter regardless of their importance.

Bun & Table Top Altars.

The shadows from these tall stones are designed to touch various target stones, which I call altars, because the light/shadow edge reaches them either at First Gleam or after a set time, which is universal, after sunrise when the sun has risen above the morning cloud or visa-versa in the evening. There are normally 3 or more of these stones per circle.

Diamond Shapes.

Often the First and/or Last Gleam of the sun at the solstices at the time of construction were marked with a diamond shaped stone, either as the fore sight or the back sight apparently according to local choice. The biggest is the Swindon Stone at Avebury.

Figure 246 Swindon Stone and Jane at Avebury. Posted on Megalithic Portal Jun 24 2005 Photo by JME

Commented [d3]: Duplicated?

Shapes of Stones Part 2 [47]

[47] Italics in this section from Part 5b http://www.megalithic.co.uk/article.php?sid=2146412224

Multiple Use Stones

All of the stones have more than one use, normally two or three. Some stones have several lines passing through them in different places from a common back sight, due to the fact that the moon travels further north and south in its 27.5-day cycle than the sun does in its yearly cycle. This provides lines which are very close together, passing through one stone, and makes it necessary for those stones to have several points, edges, and dips acting as sight line markers. A good example of this is the chair shaped stone at Wet Withens on Eyam Moor in Derbyshire. [Figure 247]

Figure 247 The largest 'chair-shaped' stone at Wet Withens Stone Circle, Derbyshire. Posted on Megalithic Portal 1/9/2001. Photo by JME

Moon shapes

There are several shapes generally marking the ends of the moon sectors. The last two shapes appear to be moon markers and in those circles that do not have one of these, the Long Meg type takes its place. This stone normally has a diagonal line on it, perhaps representing the central leg of the Z. This Z with a line looks as if it could be the origin of the Pictish symbol.

All of these moon shapes are often found in 'stand-alone' observation sites and it is their shape which is often the first clue to the complex. Examples include The Shepherd and Two Dogs in Caithness . [Figure 248]

Figure 248 The Shepherd and Two Dogs in Caithness. Photo posted on Megalithic Portal 30/6/2005 by JME

The Shepherd and Two Dogs in Caithness, a 'stand-alone' observation site showing an example of a moon shaped stone.

This photo is taken from a man-made cutting in the hillside some 60m long, 4-5m deep, probably created to give a Moon second flash sighting at the MMaSMNS [moon major standstill most northern set]. The standing stone in the distance is a large Z type and made me look for the Northern Moon Setting sector from the stone. This sort of landscape shaping is nothing uncommon.

Solstice sunrise or sunset at Full Orb

This type of stone, which is fairly rare, is marked by a spoon shaped stone as pictured here. [Link no longer available] *Examples can be found at Swinside ,*[Figure 252] *Barnhouse Stone, Maeshowe* [Figure 249] *and Drizzlecombe. The largest of this type is seen at Carnac.*

Insert by the Editor

Figure 249 Barnhouse Stone, Maeshow. [Photo by kind permission of Martin Howe]

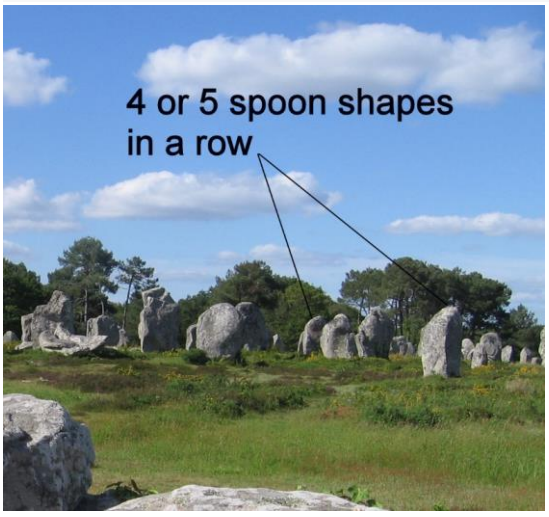


Figure 250 Spoon shaped stones at Carnac. Photo by David Smyth 16:58 19/5/06

Jack did not leave any photos of these three sites, but the Editor had visited Carnac in 2006 and discovered these spoon shaped stones in his files. It is unlikely to be merely coincidental that they are in a row, with the slope of the 'spoon' all in the same direction.
He then visited Drizzlecombe 2 in Dartmoor to illustrate Jack's claims that this was a Solstice spoon shaped stone.

Figure 251 Drizzlecombe 2 looking at the summer solstice set alignment (306 Azimuth). Picture by David Smyth 1:36 15/10/17. End of Editor's insert

Solstice sunrise or sunset gleam

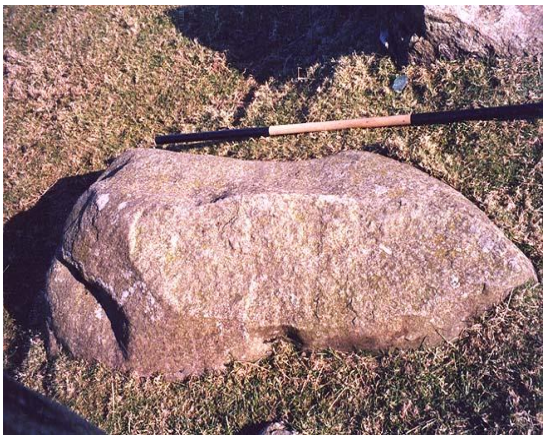


Figure 252 The 'lying dagger' stone at Swinside. Posted on Megalithic Portal July 1st 2005. Photo by JME

The solstice sunrise or sunset gleam is marked by a 'lying dagger' shaped stone.

These were never standing and are found in the Great Circles of the Swinside series, and at some prediction sites.

The best example is seen at Swinside …. [Figure 252] with the thickest end normally lying towards the sun. The quality of the shaping of these stones varies tremendously. That at Lacra is very rough [Figure 253].

Figure 253 The 'lying dagger' shaped stone at Lacra D Posted by J.M-E on Megalithic Portal 30/6/2005

Others I had been referring to as ‘ridge backed coffin stones’, not realising that this stone shape represented both solstice sunrises and sunsets until the 19th December 2004 when a well-shaped stone was seen at the Cloven Stone , a prediction site on Thwaites Fell, at sunrise. This must have been a very early site as a natural rock is used as the pointer stone [Figure 254].

Every stone in a circle has a purpose, and the main function of that stone dictates its shape, except for Stonehenge, where only few are in the traditional shapes. Most stones have more than one use.

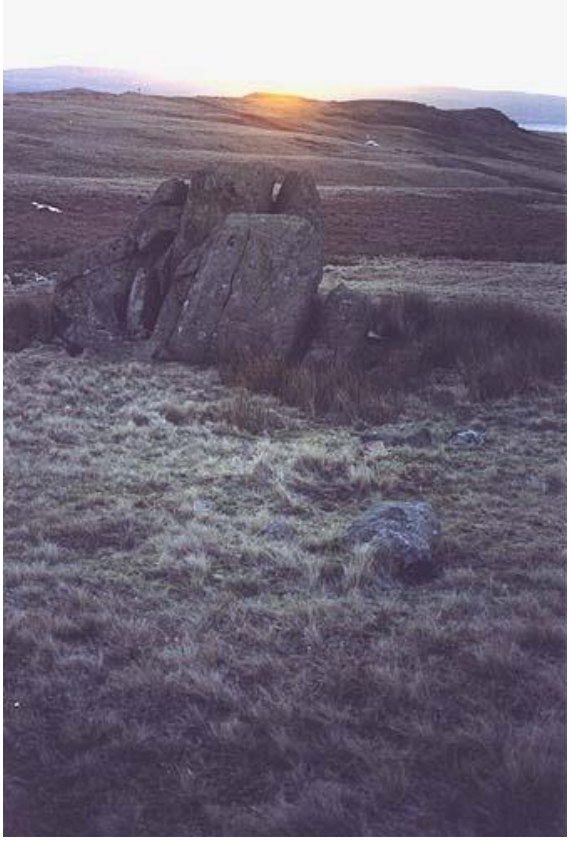


Figure 254 The Cloven Stone taken 19th December 2004 by JME

The Cloven Stone, a 'ridge backed coffin stone', represented both solstice sunrises and sunsets taken 19th December 2004. This prediction site on Thwaites Fell, must have been a very early site as a natural rock is used as the pointer stone.

Tall stones

Around most of the great stone circles there are several much taller stones. The height of these is dictated by the necessity to cast long shadows across the central area, which reach a predetermined target stone within the circle, or outside, at a certain time on [a] particular day. Other stones in the circles that are not required to cast shadows are generally shorter, regardless of their importance.

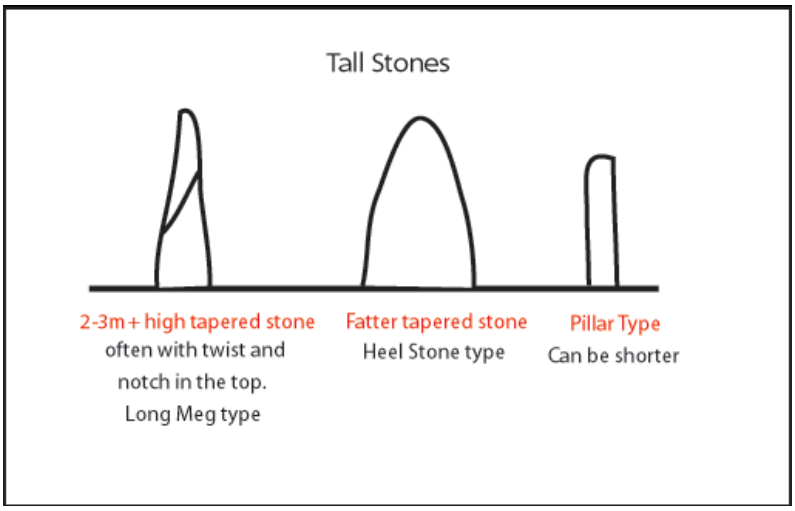


Figure 255 Tall stone shapes [Diagram by JME]

Normally the ground surface of most circles has been carefully graded so that the shadow system works, whilst at others the site was specifically chosen because of its slope, as at *Long Meg* [Figure 256], which provides shadows at the time of the setting sun right across the circle.

[3 examples of tapered tall stones: Long Meg, Swinside Stone 1 and Castlerigg No. 14]

Figure 256 Long Meg Herself 708 Photo by JME

Note from Dimitrios Dendrinos: Figure 256 clearly identifies the Long Meg menhir as a sundial. I have argued in my papers that this is the (astronomical, as menhirs played other monumental functions - symbolic and ceremonial as well) role of all menhirs. Jack's photo is evidence to that effect.

Figure 257 Swinside Stone 1. A split boulder Photo by JME

Very frequently these stones have some form of diagonal line on them.

Note from Dimitrios Dendrinos: In so far as Figure 257 is concerned, this carry-on shadow shown on the menhir of the photo clearly demonstrates that this particular shadow was used as a more accurate (sharp) clock - maybe a finer division of time than the clock function of the menhir's cast off shadow. This could be a nodal menhir in this regard.

Figure 258 Castlerigg Number 14 Stone made from boulder. Photo by JME

[2 examples of the stouter, tall stones,] the Heel Stone at Stonehenge and Stone 11 at Swinside are both fatter, tapered stones but again they are designed to cast shadows at key times to target stones, and on some occasions act as the target, as here the light is seen to strike the circle on the Heel Stone on January 6th, The Festival of the Returning Sun. This does not happen at Swinside.

Figure 259 [Heel stone at Stonehenge] Photo by JME

Figure 260 Swinside Stone 11 Photo by JME

[Note by Dimitrios Dendrinos: Jack presents photos of two stones he thinks are "similar"; this might be so, but the issue begs the question: on what basis can one draw criteria to determine the extent to which two stone images are "similar". This is a much broader issue than Jack intended to tackle - and this must be pointed out, since the subject is central in Jack's classification of stones; thus it's the backbone of his theories about these monuments.]

Figure 261 Stonehenge, showing various pillar type stones. Photo by JME

The pillar type of tall stone can be fairly bulbous with a straight edge [as 16, above] to give a good shadow line, which was often arranged to just touch the Great Stone at the solstices at the time of construction.

Arbor Low, Derbyshire

(SK 160636)

This is a large circle with all the stones fallen [Figure 262], encircled by a deep ditch and high surrounding bank. Stone H…, a fallen stone, is outside [the] circle. No photo of the rising sun, as a field wall got in the way. It appears to cast a shadow to the Great Stone 27 [Figure 263], which is also fallen.

Figure 262 Numbered diagram of Arbor Low re-drawn by the editor after a diagram by John Barnatt.

Figure 263 Arbor Low 4.1.03, showing the fallen Great Stone 27 with the big ditch and bank behind. Photo by JME

Castlerigg

(NY 292236)

Figure 264 Stone 17 at Castlerigg Photo by JME

One of the indicated lines of the midwinter sunrise is over 17 [Figure 264] from the double 30/31 and was seen at 9:25am on 30/12/00. This is another use of a pillar type of stone, with double 30/31 being the pivot for a calendar.

Figure 265 Swinside. A lying dagger stone always marks one end of a Solstice line at Full Orb. Photo by JME

The date probably adjusts for the time difference from the time of construction. 5:04am 26/6/03. [Figure 265] 147

The shadow is not always designed to target a stone within the circle. At Castlerigg, the shadow from Stone 14 [Figure 266], at the midsummer sunset, is cast over a great distance down into the valley below. The dark line across the picture is the shadow of the ridge on which the circle stands. ….At the time of construction that ground shadow would have reached the target at the same time as the top of the shadow from …. Stone 14.

This concept of vertical lines giving the time and horizontal lines giving the date is seen in many places.

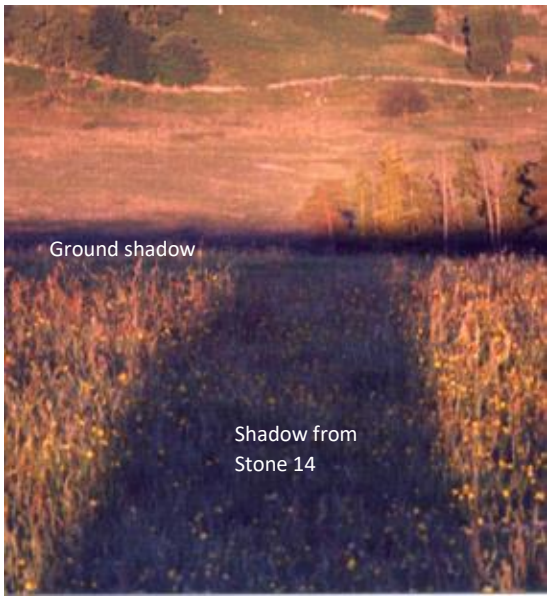


Figure 266 The solstice setting sun shadow as seen at Castlerigg Photo by JME

The solstice setting sun shadow as seen at Castlerigg, taken at 9:02pm on 28th June 2003. The shadow from Stone 14 is lost in the trees, reputedly at a Holy Well, which has not been seen.

At midwinter the shadow from Stone 14 appears to be designed to cross the road, but the wall and bushes now prevent it, reaching into the Goosewell Wood.

Round Bun Altars.

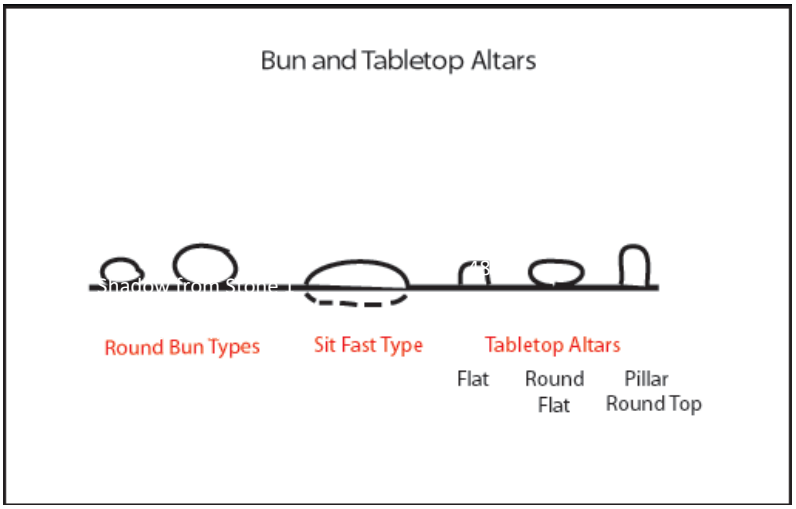


Figure 267 Bun and tabletop altars by JME

Typically there are 4 of these of various sizes in most of the great circles. [48]

Swinside

Here the North and South stones and Stone 41 are Bun Altars, with the "sit fast" Stone 48 making up the number. The term "sit fast" comes from the farming term used for a buried stone that sits fast and stops the plough. This stone must be in the place the glaciers left it, as I can't see anybody digging it in.

(all these photos 17/11/2006)

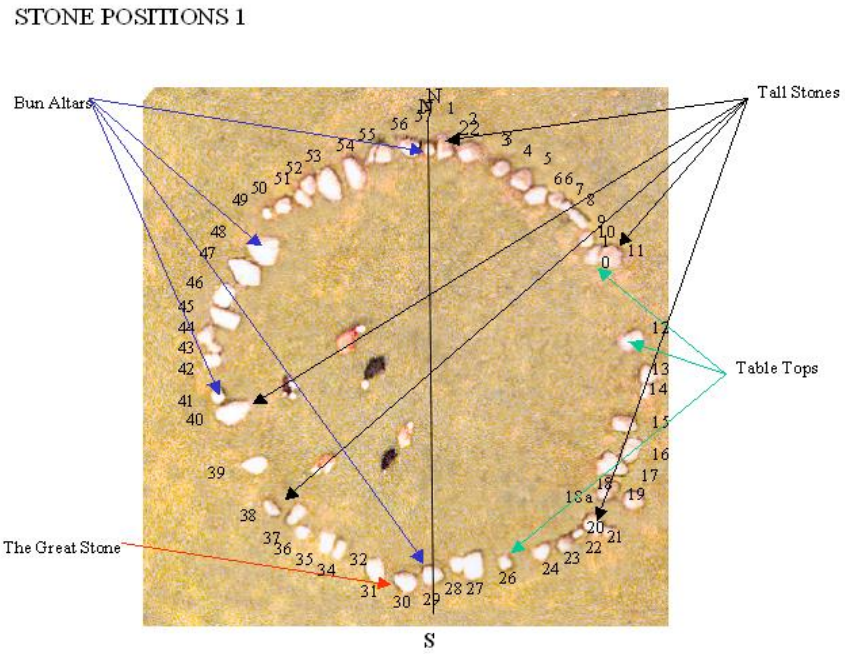


Figure 268 Stone positions 1 [aerial photograph taken by E Cleasby]

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[48] Note from Angie Lake: Stone 15 (Stonehenge) should have once stood, so not necessarily what he describes as a 'bun altar', the same applying to all his other bun altars. Unless they were pushed over during the building of [Stonehenge], ie: as intended in the original design, I don't see how they could be planned observatory features

Figure 269 Swinside Stone 29. The South Stone Photo by JME

The midsummer sunrise and sunset both would have been lit it up with sunlight passing the Great Stone 30

Figure 270 Swinside. Stone 57, the North Stone Photo by JME

Here is a very small, but important stone [Figure 270]. It has been rolled over, exposing its rough [base]. At the time of construction the midsummer sunrise …. sunlight would have passed over it between Stone 1 and 56 to light up Stone 42, but now goes to Stone 43.

Figure 271 Swinside, midsummer sunrise. Again the double acting as pivot for one of the calendars Photo by JME

Figure 272 ['Board' experiment] Photo by JME

At midwinter sunset the experiment of erecting a board [Figure 272] to act in place of the fallen stone 40 cast a shadow to Stone 57. Because of the 1° difference between now and the time of construction, the shadow was very weak near last gleam, whereas originally it would have been at Full Orb.

Figure 273 Stone 41 Bun Altar that has also been rolled over again showing the rough base. Photo by JME

Figure 274 Swinside. Stone 48. A sit fast Altar Photo by JME

Figure 275 Swinside, 21/6/04 some 20 minutes after First Gleam shadow from Stone 1 just touching Stone 48. 12 Photo by JME

Castlerigg.

Again we see a similar pattern of Bun Altars.

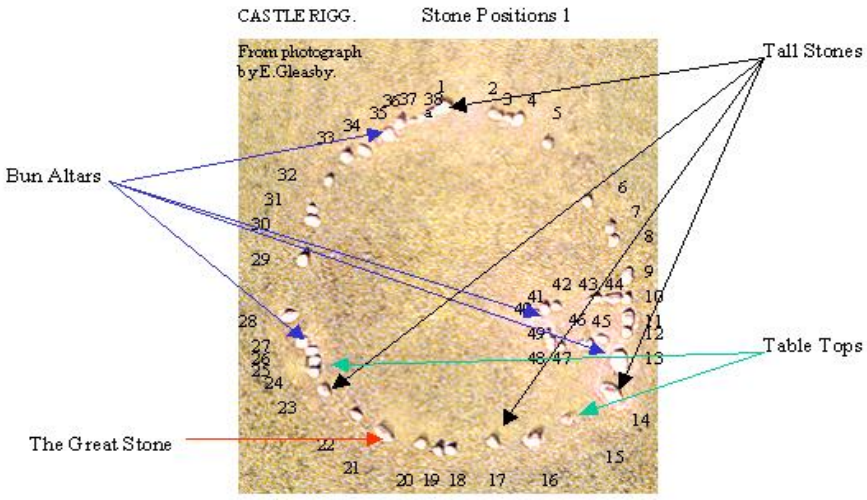

Figure 276 Castlerigg stone positions 1[aerial photograph taken by E Cleasby]

Figure 277 Castlerigg stone numbers re-drawn by David Smyth from a photo taken on 10/10/16 at 3:45 by kind permission of Shaun Bunting©

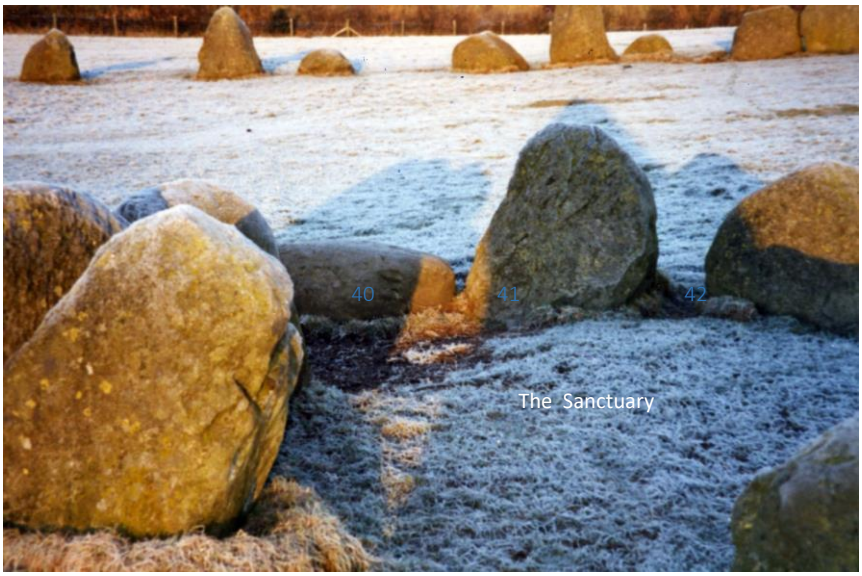

Figure 278 Castlerigg. Stone 40 Flat Round Bun in corner of Sanctuary. Sunlight striking edge. Photo by JME

Diamond Shapes.

Some stones that have been selected, or worked, to provide the appearance of a standing diamond shape [are] seen in nearly all of the great stone circles. The largest of these is at Avebury, called the Swindon Stone, which is where the mid-winter solstice sunrise would have lit up at the time of construction, and the shadow from the Cove would have reached it.

Figure 279 The Swindon Stone at Avebury with Jane, Jack's wife. Photo by JME

Diamond shaped stones were used either as foresight or back sight markers – with the decision which way to use them probably made locally. Generally, viewing is over the top of

the point – with the exception of Avebury, which is too large to see over. Here the sunlight would have struck the stone.

Figure 280 Swinside Stone 39(f) from which the midsummer sunrise is seen over triple 6, 7, and 8. Photo by JME

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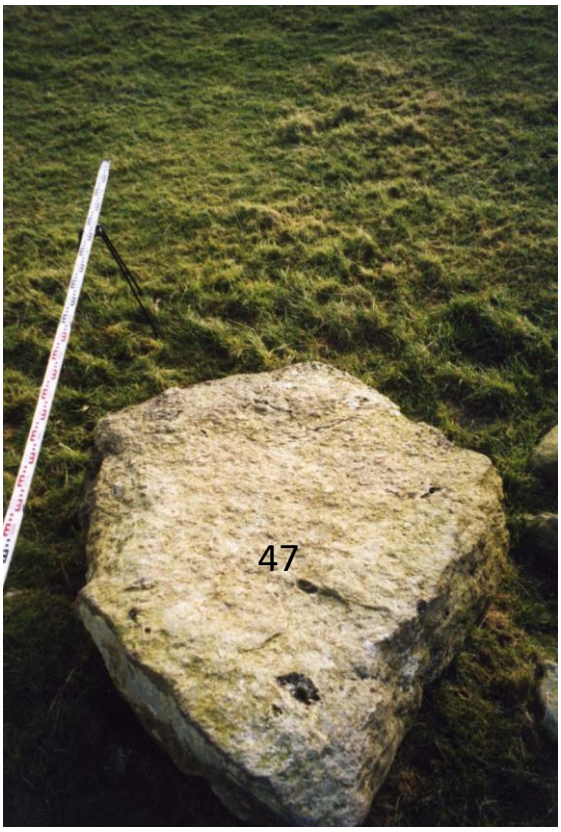


Figure 281 Swinside Stone 47 – fallen diamond shape indicating the midsummer sunset last gleam. (MSSS.v) from Stone 16 part of Triple 15,16,17. Photo by JME

Figure 282 Castlerigg, Stone 29 Photo by JME

Here its position confirms that it is of the diamond shape [Figure 282]. Back sight for midsummer sunrise [First Gleam] (MSSR.V) over triple 2,3,4.

Multiple Use Stones

All of the stones have a number of uses. Some stones have several lines passing through them in different places from a common back sight, due to the fact that the moon travels further north and south in its 27.5-day cycle than the sun does in its yearly cycle. This provides lines which are very close together, when viewed from a common back sight, while passing through one stone, and makes it necessary for those stones to have several points, edges, and dips acting as sight line markers.

Not all stone circles use this system. In each sector, the moon passes the sun's solstice positions at sunrise and sunsets by some 10° during its 18.6 year cycle. See the chapter on moon movements.

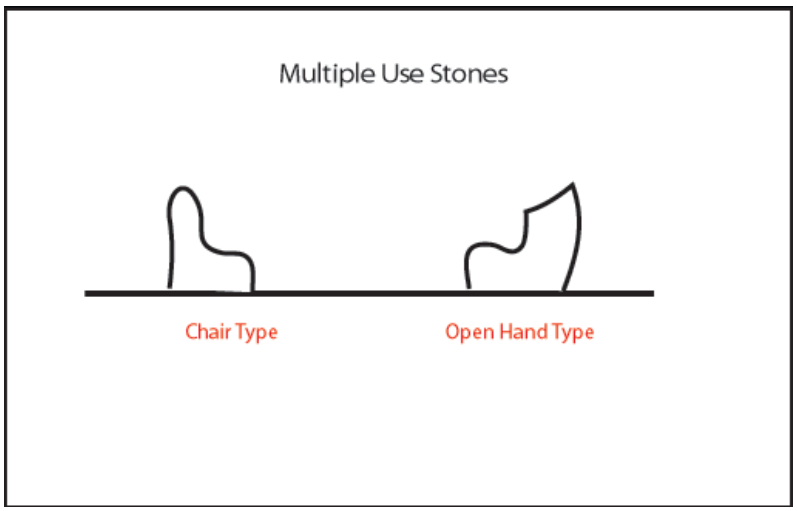


Figure 283 Multiple use stones

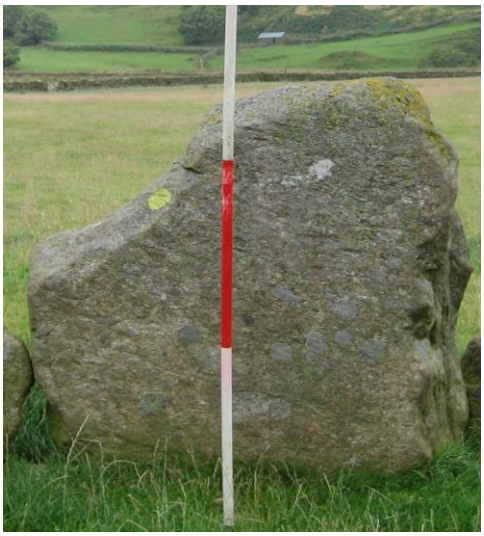


*Figure 284 Swinside Stone 8, a multiuse stone. (Angle photo does not show the shape well)** Photo by JME*

Figure 285 A good example of this is the chair shaped stone at Wet Withens on Eyam Moor in Derbyshire. SK 225790 Photo by JME

Moon Shapes

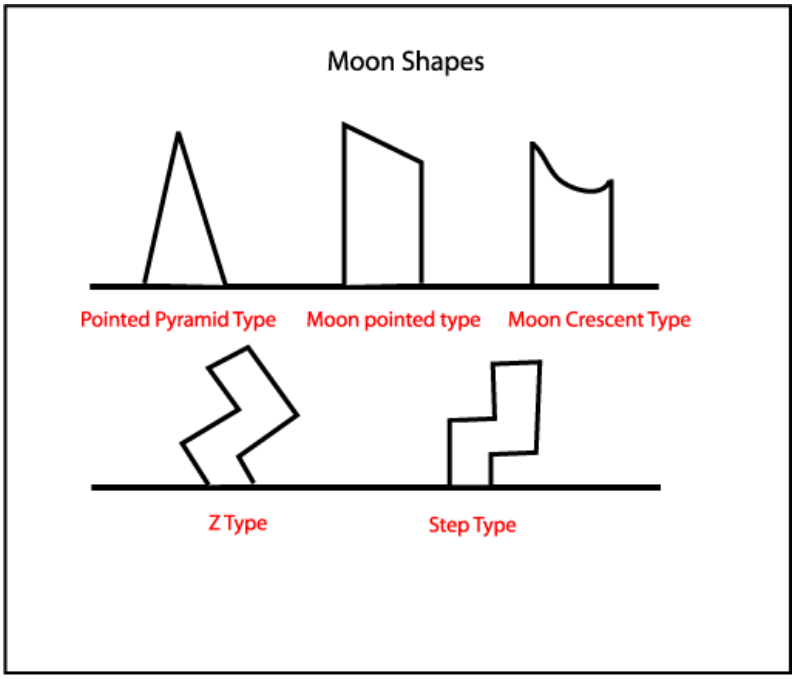
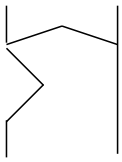


Figure 286 Moon shapes

The step type has a different use than the others. More later.

The shapes shown in the diagram above [Figure 286] relate to the moon movements and mark the ends of the moon sectors (see chapter 13 for more details). The **Z** type is often replaced by the Long Meg type as shown under tall stones above. These stones often have a diagonal line on them, which could be the origin of the Pictish symbol. [It's unknown which Pictish symbol Jack was referring to].

There is a simpler version of the Z type doing the same job of marking a moon standstill.



This shape is often quite small with a distinctive notch or worked hollow on one side, as seen at Stonehenge Stone 34. [Figure 287 inserted by the Editor].

[Figure 287 Stone 34, Stonehenge. Image from http://www.stonesofstonehenge.org.uk is licensed under a Creative Commons Attribution-Non-commercial-No Derivatives 4.0 International License.]

Figure 288 2 Stones at Swinside Photo by JME

[Figure 288 shows 2 moon-shaped stones]
Stone 1: Tall moon shape marking both the Invisible Moon Major Standstills Most Northern Rise from Stone 39 and the most Northern Set from Stone 16.
Stone 2 with crescent top. Marking the Visible Moon Major Standstill Most Northern Rise from Stone 39.

Figure 289 Stone 38, pointed with sloping top at Swinside Photo by JME

Marking the moon Minor Standstill Most Southern Set from Stone 6 [Figure 289].

In addition to being found in stone circles, all of these moon shapes are often found in 'standalone' observation sites. Examples include:

The standing stones at *Penrhos Feilw*, near Holyhead, SH 227809 [Figure 290] and at *Kirksanton*, Cumbria, SD 135811 [Figure 291] with many other sites quoted by Prof Thom up the west coast of Scotland.

Figure 290 Penrhos Feilw near Holyhead SH 227809 Photo by JME

Figure 291 The Standing Stones, Kirksanton, also called the Giants Grave Photo by JME

Note points on both and possible Z shape on the far one, marking all of the standstills across the various faces [Figure 291].

Figure 292 Giants Stones, Kikstanton. Picture by David Smyth 4:34pm 18/9/17

Insert from Meg Port 15th in the series[49]

Standing Stones of Kirksanton or The Giants Grave (GR: SD136811). These were never part of a stone circle as some would try to say, but are a very accurate moon observation site as is indicated by both stones being of the pointed moon type, as discussed in one of my previous articles. Most pairs of standing stones have one pointed moon type and one with a rather flatter top indicating the sun. The further stone is marked with a cupmark, which plays an important role in a lunar alignment on this site. Nicol Wood can be seen to the left on the skyline with Lacra to the right.

On December 26th 2004 I had an extremely lucky day at Kirksanton. I went to watch the moonset close to its Most Northerly Standstill position in the morning. The setting moon lined with the bottom face of the Western Stone on its eastern side. The upper half of this face could align for the Moon Major Standstill Most Southern Rise, but this still has not been observed. The Moon gradually faded into the morning murk, but was visible slightly longer

[49] Insert from Meg Port 15th in the series http://www.megalithic.co.uk/article.php?sid=2146412387

than the photograph shows. [Figure 293]

Figure 293 The Standing Stones of Kirksanton or The Giants Grave on December 26th 2004 Photo by JME

Figure 294 Whilst watching the moon slowly setting at the Kirksanton Stones on 26th December, the sun came up behind me.

This photo [Figure 294] *shows the sun well up at Full Orb over the village. I wondered if the setting sun would line back to the cupmark in the other stone as suggested by Dougie Scott, so I returned that evening but it was nowhere near in line, setting over some slightly higher ground by Southfield Farm (SD128806). No face of either stone aligned to it. However, upon turning around to my delight I discovered the full moon just clear of Nicol Wood (SD141816) on the side of Lacra. This must be an extremely rare occurrence for anyone to see the full moon rising and setting very near to both its Northern Extremes, within a few minutes of*

Figure 295 Lacra full moon

both the rising and setting sun, on a day so close to the Solstice. Mathematicians please calculate. This photo [Figure 296]
shows the full moon between the stones having risen in Nicol Wood on the left.
A few days later I went up into Nicol Wood and eventually found a shaped rock or standing stone in the middle of a gorse bush which was protecting it from people and the cows

Figure 296 The shaped rock or standing stone in Nicol Wood close to the Kirksanton standing stones.Photo by JME

I could not get a clear view of the standing stones through the trees so moved down the hill to where it became clear that this rock lined through the stones at a very narrow angle.

To watch the near full moon very close to its MMaSMSS [Moon Major Standstill Mid-Summer Sunset] *setting I had to wait until the 19th July 2005 at 1.30am, when the very important alignment occurred. The moon when viewed from the cupmark on the eastern stone was seen touching the northern edge of the western stone at the same time as it touched the sea. It was very difficult to take this photo as my old film camera only has a horizontal viewfinder and the ground was very wet so I had to squat with my head as near the cupmark as possible and click. Unfortunately I must have wobbled a bit as two out of the three photos failed, missing the moon completely and then the usual cloud spoilt things. The resulting photo is quite poor as the cloud has discoloured the moon, with the lower*

Figure 297 MMaSMSS setting, Kriksanton. Photo by JME

light being the reflection off the sea, but nevertheless it demonstrates this wonderful alignment. [Figure 297]

By this date I had tried on several mornings to observe the midsummer sunrise from this site, without luck due to cloud. I had already watched the midsummer sunset on the 9th July 2004 as seen in this photograph [Figure 298] *when the sun was seen to go down beside a small hillock known as Salt Hill, again no face of either stone lined to it.*

Figure 298 The midsummer sunset at the Kirksanton stones on the 9th July 2004 …. when the sun was seen to go down beside a small hillock known as Salt Hill Photo by JME

For this reason I believe that the ancients were not concerned with sight lines to the sunsets at Kirksanton and that this site is wholly a moon site, as both stones are moon shaped, and not one moon and one sun shaped stone, as is often seen.
The points of the stones align to between 32 to 33 degrees, which is the same angle as seen at Swinside and is assumed to point to the Invisible MMaSMNR [Moon Major Standstill Most Northerly Rise] *that can never have been seen because of the hills in the way, probably at a very much earlier date than the construction of either Swinside or these stones.*[50]

Castlerigg stones.

Here most of the moon stones, being glacial erratics, are not of the very sharp pointed type, but of the more rounded type.

[50] Insert from Meg Port 15th in the series
http://www.megalithic.co.uk/article.php?sid=2146412387

Figure 299 Castlerigg The rectangular feature and the nearby stone that's the quirkiest shape in the circle. 25th Sept.2015 Photo by kind permission Angie Lake

Stone 22. Pointed moon shape. As back sight for the Invisible Moon Major Standstill over Z Stone 5 to top of Skiddaw. [No picture but refer to Figure 277 p266]

Stonehenge

There are only two true moon shapes here:

Stones 49 & 34 along with several others of traditional shapes. (New photos required). [But never done, unfortunately, inserted by the Editor, below]

Figure 300 Stone 49, Stonehenge

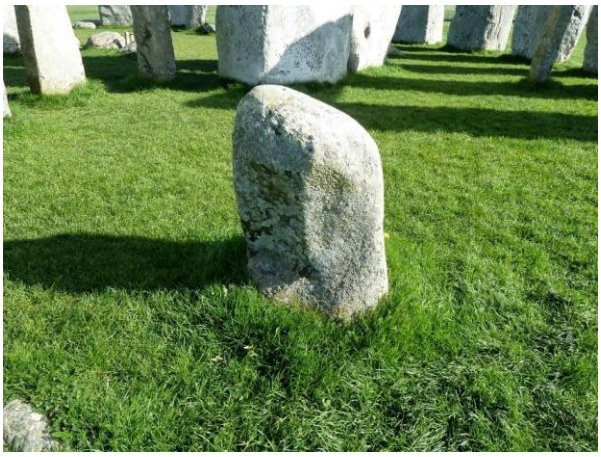


Figure 301 Stone 34, Stonehenge

[Figure 300 and Figure 301 have been inserted by the Editor from The Stones of Stonehenge by http://www.stonesofstonehenge.org.uk which is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Avebury

Figure 302 Z type and moon pointed stones at Avebury Photo by JME

There are not sufficient stones left to work out how these fitted in

Sun Types.

Similarly there are several types representing the sun as shown below:

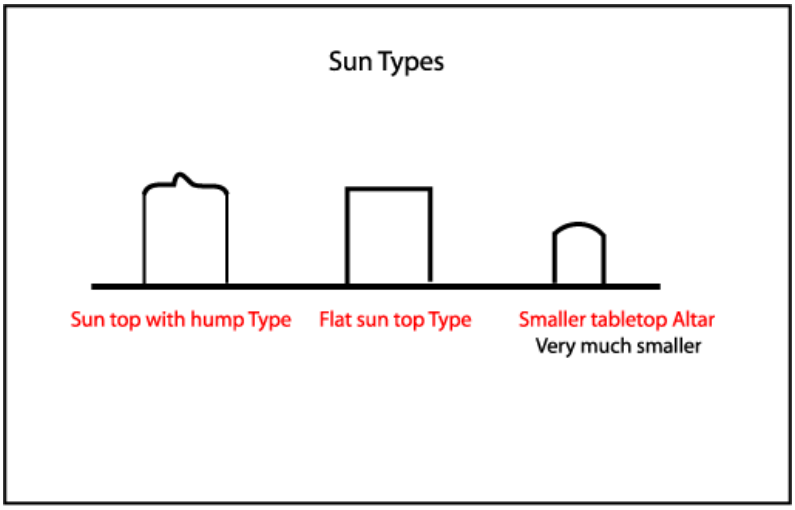


Figure 303 Sun types Diagram by JackME

It has to be remembered that the sun does not go as far north or south as it did at the time of construction.

The foresight for the full sun, both rising and setting normally at the …. solstices, or occasionally for the moon at the extremes, is often a flat-topped stone with a slight hump somewhere along its top, not central. A good example of this is Stone 46 at Swinside [Figure

304]. In other places the sun tops are flat and nearly level, having been broken across the grain of the stone.

Figure 304 Swinside stone 46 Photo by JME

Insert from the Megalithic Portal, Sun Types[51]
A good example of this is The Bullstones at Wincle near Macclesfield as can be seen in this photograph [Figure 305, posted .June 21st, 2005[52]. The Editor has tried to contact Paul M but he appears to have left the Megalithic Portal and can no longer be reached.]

[51] Italics denote notes taken from Jack's article 5b
http://www.megalithic.co.uk/article.php?sid=2146412224
[52]
http://www.megalithic.co.uk/modules.php?op=modload&name=a312&file=index&do=showpic&pid=14858

Figure 305 Bullstones, photo by Paul M on The Megalithic Portal

taken this year [2005] *at the midsummer sunrise. All of these descriptions have to be taken generally as each circle appears to have had its own interpretation of the building regulations. The winter solstice sunrise is still celebrated at Bullstones. End of Jack's insert.*

Solstice sunrise or sunset at Full Orb

This type of stone, which is fairly rare, is marked by a spoon shaped stone as pictured below

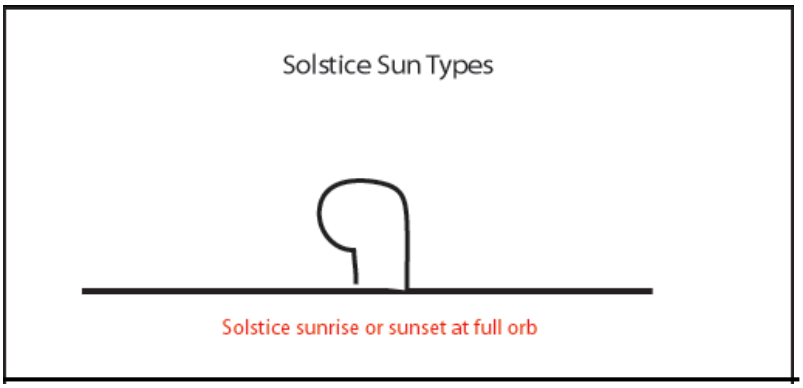


Figure 306 Solstice sun types

Figure 307 Swinside Spoon shaped Stone 4. A poor photo not showing the spoon effect. Photo by JME

Examples can be found at *Swinside* Stone 4 [Figure 307]; the *Barnhouse Stone, Maeshowe* [Figure 308] and at *Drizzlecombe*, normally at the solstice. The largest of this type is found at *Carnac*.

Figure 308 Barnhouse Standing Stone in Orkney Photo by JME

Commented [DS4]: already got one like this Keep

Both of these are for the solstice. Swinside is the target stone for midwinter sunset, and the Barnhouse Stone is the foresight from *Maeshowe* for the MWSS [mid-winter sunset], maybe for FORS [Festival of the Returning Sun]. Informant did not say how this stone appeared on 7th Jan.

Insert by the Editor

Jack mentions the spoon shaped stone at Drizzlecombe for the solstice sunset, but does not include photos. Accordingly, the Editor visited Drizzlecombe on the 15th October 2017 to research this stone a little more. *See p 248.*

Solstice sunrise or sunset Full Orb.

The solstice sunrise or sunset is marked by a 'lying dagger' shaped stone [Figure 309]. These were never standing and are found in the great circles of the Swinside series, and at some prediction sites – see Chapter 5 for more information on prediction sites.

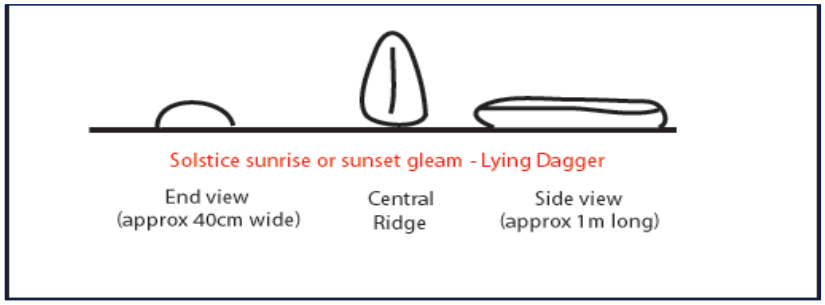


Figure 309 Solstice sunrise or sunset Full Orb

Stones looking like a ridge backed coffin do the same thing.

Figure 310 Swinside, stone 37 Photo by JME

The best example is seen at Swinside, Stone 37 [Figure 310], as shown above with the thickest end lying towards the setting sun, but they did not always hold to this. The quality of the shaping of these stones varies tremendously.

Figure 311 Lacra. Lying Dagger Stone with the small end to the sun Photo by JME

Figure 312 The Lying Dagger Stone at Swinside. Photo by JME

Figure 313 Castlerigg. Stone 34. Photo by JME

Castlerigg. Stone 34 [Figure 313]. Much more a ridge backed coffin type. This stone marks midwinter sunrise Full Orb over Stone 15. The middle stone of the triple 14, 15, and 16 as occurs at Swinside.

Figure 314 Stonehenge. The Slaughter Stone. The biggest and worst. Showing its central ridge. Photo by JME

The Slaughter Stone [Figure 314] might have been shaped by a chalk plaster, which has since washed off over time. It has been exposed by excavation; originally it would have only had its top exposed. It lines from the Heel Stone to the midwinter setting sun at Full Orb.

Figure 315 The Slaughter stone inserted by the Editor from http://www.stonesofstonehenge.org.uk is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Figure 316 Stonehenge. 18.12.07. Full Orb over the Slaughter Stone from the Heel Stone. Photo by JME

[Goddess Stones]

[Type 1 human-like stones]

Figure 317 The fat, pregnant figurine found in the Grimes Graves. Drawing by Chris Smyth ©Chris Smyth

There is now doubt about its provenance [Figure 317]. I went to Grimes Graves to see it and was told that it was in the British Museum, but might be returning this year, 2011.

[Jack included a picture here of the figurine from "Introduction to British Prehistory" edited by J.V.S.Megaw & D.D.A.Simpson. Leicester University Press. This now seems to be discontinued and copyright probably lapsed. Leicester University Press was acquired by Cassell, which was in turn acquired by Continuum, which is now part of Bloomsbury Publishing. This was communicated from them:

"As this title is not on the system and the editorial department have no information on it, it appears that the rights must have reverted at some point. Unfortunately, under the circumstances, we are not able to give permission for this. I don't know what the credit line for the image is in the book, but we don't always have the rights included for images – usually we obtain permission ourselves for the use".

Therefore included here is a drawing by Chris Smyth of the figurine. There is also some controversy over the authenticity of the figurine:

> The most memorable discovery at Grimes Graves is what appears to be a fertlity shrine set up in an abandoned shaft. The shaft is quite short - we can assume that the miners failed to hit the seam of flint they were after and gave up on further digging.
>
> But before they quit the gallery they carved out a ledge, or altar, upon which was found a godess figurine of chalk, either very obese or pregnant. Beside the female figure was a phallus of chalk. Surrounding both was a pile of antler picks.
>
> The accepted reading of this shrine is that the miners, disappointed at their failure to find the flint they needed, made a religious offering to the godess to ensure the continued "fertility" of the mine. As is usual in historical investigation, there is a second interpretation which considers the shrine to be a much later addition. (Ross, 2017)

See also Andy Burnham's comment below]

Next [we go] to the *Druids Circle*, also called *Penmaenmawr* SH723746, North Wales, where the Goddess looks towards the rising sun [Figure 318].

Figure 318 Druids Circle, North Wales Photo by JME

This Stone is the most like a human figure that I have found in [the] UK.[53] *It appears to be facing the Midsummer sunrise, but I have not seen this happen. I saw a better one in the Alepo Museum, Syria, but was not allowed to photograph it. However it makes a good starting point for this request for help in locating any other likely stones.*

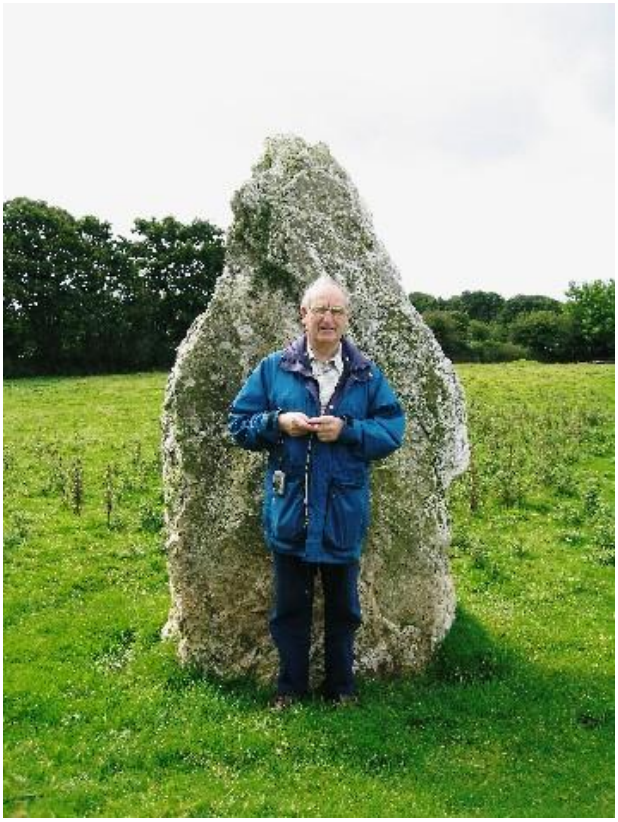
Type 1 - I think this symbol means life as depicted by:
a. The human figure as seen at Druids North Wales [Figure 318]
b. Stonehenge Stone 16 [Figure 54 p84] .

[53] Italics denote Megalithic Portal article by Jack http://www.megalithic.co.uk/article.php?sid=2146413506

[c] Full statue of a fat lady, similar to the tubby female figurine [54]*that was dug up at Grime's Graves and depicted in "Introduction to British Prehistory" edited by J.V.S.Megaw and D.D.A.Simpson. Leicester University Press* [The editor of the Megalithic Portal, Andy Burnham, inserted at this point a comment: "This book dates from 1979, these days the goddess is generally considered to be a modern hoax, even by that great pagan scholar Ronald Hutton" (Hutton, 2001). Andy gives as a link http://pastscape.org.uk/hob.aspx?hob_id=382869 which states:

> More notorious still was the carved chalk figurine, or "goddess" which, along with other items of carved chalk, was found at the bottom of Pit 15 during Armstrong's last summer at the site, 1939. Although long regarded as an authentic piece of Neolithic sculpture, there is sufficient circumstantial evidence to suggest that the piece is of rather more recent origin. (Historic England, 2010)].

Insert by the Editor



Angie visited The Duloe circle in Cornwall (SX23585831) with Jack on the 2nd September, 2008, where both of them were attracted by this figure-like stone. (Figure 319)

Commented [DS5]: Date needed

Figure 319 Jack in front of a Goddess Stone at Duloe 2nd September 2008. Picture by Angie Lake

[54] To be found at http://www.knowth.com/fourknocks-mdier.htm

Figure 320 2 views of the same stone 2/9/08. Pictures by Angie Lake

Angie writes on 19th July 2005:

> *This huge dramatic stone in the south of Duloe circle was constantly haunting me as I surveyed and dowsed this lovely circle (why only 3 for ambience?) one sunny early evening at the end of May 2005. I was convinced someone else was there, just out of the corner of my eye, but it was the almost-human shape of this stone - like some kind of ancient priest in a billowing robe! In the left half of this double pic, [Figure*

320] where he's facing us, you can almost decipher a face and headdress too. On the right side, he's looking towards the pyramid-shaped tower of Duloe church."

No wonder there are so many legends about people being turned to stone attached to these circles!

And on the 5th September, 2008, she wrote:

I went there on Tuesday with JackME, and noticed that there is a bird shape (like the curved 'V' you'd draw to indicate a bird flying) on his chest! Unless 'he' is a lady, and that is her décolletage?! It's at the South of the circle, facing outwards, by the way[55]

Figure 321 The Water Music Stone, 5/9/2008, picture by Angie Lake

They also visited The Water Music Stone in Cornwall at the same time, SW9055068697, alternative Name: Bogee Common Longstone (Figure 321). She writes "This towering stone is

[55] From http://www.megalithic.co.uk/modules.php?op=modload&name=a312&file=index&do=showpic&pid=15748

weirdly 'human' from certain angles. You can imagine what the Ancients must have thought of it."

End of Editor's insert

At Swinside and Castlerigg there are rough stones with a protrusion, which could be imagined as a head, and could also represent the above figure. In both circles these stones are so positioned that the Midsummer rising sun at Full Orb is seen behind them.

Figure 322 Castlerigg Stone 2 Photo by JME

A goddess stone. [Figure 322] (More by position than looks).

The point is roughly where the sun is seen today, sorry about the drunken effect. (Will replace). The date of the photo is immaterial as MSSR [Mid-summer sunrise] makes this photo impossible.

At Swinside we look at the Midsummer sunrise over Stone 6 [Figure 323] from across the

circle whilst at Castlerigg the ‘Head’ on Stone 2 is exactly where midsummer sunrise full sun is seen. [Figure 324]

Figure 323 Stone 6 Swinside Photo by JME

Note point of 6 touching Coniston Old Man [Figure 323]. Here we look at the midsummer sunrise over this stone from across the circle representing the shape of the fat pregnant figurine found in the Grimes Graves. The same thing is seen at Castlerigg in the same position.

Figure 324 Castlerigg Stone Circle Stone 2 Photo by JME posted on Megalithic Portal July 6th 2008

Type 2 [Bird symbol][56]

I think that this bird symbol means Death. Corpses were laid out on platforms, protected from carnivorous animals, by a wooden paling fence, for the carrion eating birds to pick the bones clean, which were then put into a passage tomb, normally facing one of major Sun positions at Full Orb or higher. The Sun then lit up the back wall of the tomb. Those tombs facing due south were lit up by the midday sun at the midwinter.

[56] Continuation of Jack's article on Megalithic Portal
http://www.megalithic.co.uk/article.php?sid=2146413506

This Figure on Hesk Fell SD1728 9419 [Figure 325] *may be chance, except that it has been most carefully propped up with surrounding stonework, and has a probable area for the de-fleshing of corpses. Within a few hundred yards there is a large burial cairn field recorded by the National Park Archaeologist, with over 200 cairns of various types, from small heaps of stones, which could be just field clearance, small round cairns, and on to small long cairns pointing in various directions to the major Sun positions. I only had a general walk through*

Figure 325 Goddess Stone Hesk Fell SD1728 9419 near Swinside. Photo by J.M-E posted on Megalithic Portal July 6th 2008

the cairn field with the Local History Survey Group, and I noticed that several of the cairns had been dug into in the past. This gives credence to the idea that the bird symbol is the sign of Death.

Another similar example of this is the Pictish Stone, Broomend of Crichie (NJ 779196) as posted to the Megalithic portal by rldixon on 17.1.08.[Figure 326]*. Were these Pictish* Stones

with the bird on them grave stones?

Figure 326 Broomend of Crichie pictish stone 2007 Reproduced with the kind permission of RL Dixon.

Appendix A Stonehenge's Avenue and 'Bluestonehenge'

Research

Stonehenge's Avenue and 'Bluestonehenge' (Mike Parker Pearson, 2016)

Michael J. Allen[1], Ben Chan[2], Ros Cleal[3], Charles French[4], Peter Marshall[5], Joshua Pollard[6], Rebecca Pullen[7], Colin Richards[8], Clive Ruggles[9], David Robinson[10], Jim Rylatt[11], Julian Thomas[8], Kate Welham[12] &Mike Parker Pearson[13,*]

Stonehenge is a site that continues to yield surprises. Excavation in 2009 added a new and unexpected feature: a smaller, dismantled stone circle on the banks of the River Avon, connected to Stonehenge itself by the Avenue. This new structure has been labelled 'Bluestonehenge' from the evidence that it once held a circle of bluestones that were later removed to Stonehenge. Investigation of the Avenue closer to Stonehenge revealed deep periglacial fissures within it. Their alignment on Stonehenge's solstitial axis (midwinter sunset–midsummer sunrise) raises questions about the early origins of this ritual landscape.

Keywords: Stonehenge, Bluestonehenge, Stonehenge Avenue, West Amesbury, Neolithic, Bronze Age, henge, stone circle

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Figure 1. The Stonehenge landscape, showing Stonehenge, the Stonehenge Avenue and Bluestonehenge (drawn by Joshua Pollard).

Introduction

Stonehenge has long been known to form part of a larger prehistoric landscape (Figure 1). In particular, it is part of a composite monument that includes the Stonehenge Avenue and the newly discovered West Amesbury henge, which is situated at the eastern end of the Avenue beside the River Avon. Inside that henge lies an earlier circle of stoneholes, formerly holding

small standing stones; this is known as ‘Bluestonehenge’. The Avenue was first mapped in 1719–1723 byWilliam Stukeley, who recorded that it ran from Stonehenge’s north-eastern

Research

entrance for over a kilometre towards the River Avon, bending south-east and crossing King Barrow Ridge, before disappearing under ploughed ground. He also noted that its initial 500m-long stretch from Stonehenge was aligned towards the midsummer solstice sunrise. Archaeological excavations during the twentieth century revealed that the Avenue consists of two parallel banks with external, V-profile ditches, about 22m apart. The dating, phasing and extent of the Avenue, however, remained uncertain. Its length could be traced no closer than 200m from the River Avon (Smith 1973); its two ends were thought to have possibly been built at different times, and there was no knowledge of any monument at its riverside end.

In August 2008, the Stonehenge Riverside Project re-opened and extended eight trenches dug across the Avenue during the twentieth century and, in 2008–2009, cut new trenches atWest Amesbury beyond the known limit of the Avenue. The aim was to establish whether the Avenue was built in more than one phase, and whether it actually reached the river, thereby addressing the theory that Stonehenge was part of a larger complex linked by the river toDurringtonWalls henge and its newly discovered avenue, twomiles upstream (Parker Pearson & Ramilisonina 1998; Parker Pearson *et al.* 2007).

In August 2013, Wessex Archaeology carried out an excavation along the line of the decommissioned A344 road (constructed in the 1760s) that ran across the Avenue close to Stonehenge, with the aim of examining the condition of the Avenue and its ditches where it lay under the road.

The solstice-aligned section of the Stonehenge Avenue

One of the eight re-opened twentieth-century trenches, Richard Atkinson’s 1956 trench C48 (Cleal *et al.* 1995: fig. 178), was re-opened and extended 2m southwards to form a trench 4 × 26m in size (Trench 45; Figure 2). Atkinson’s photographs and section drawing revealed gullies within the Avenue that were interpreted as periglacial fissures (Cleal *et al.* 1995: 311), but their orientation parallel with the Avenue’s axis suggested the possibility that they were, in fact, artificial features.

On excavation in 2008, the gullies were confirmed to be surprisingly large and deep periglacial stripes, consisting of 0.5m-deep and 0.4m-wide fissures in the chalk bedrock (Figure 3). They were filled with clean, beige-coloured silt formed from an admixture of material derived fromweathered or soliflucted chalk and reworked aeolian loessic silt deposits (Figure 4). They were considerablymore substantial than themuch smaller periglacial stripes (less than 0.2m wide and 0.1m deep) observed in other trenches beside the Avenue and at its bend, and considerably deeper than many others regularly recorded on the chalk.

Earth resistance and fluxgate magnetometer surveys reveal linear anomalies running along the line of the Avenue, but cart-tracks running within it on the same axis are most probably responsible, in large part, for these geophysical linear anomalies (see alsoDarvill *et al.* 2012a: 83–84). These ruts are only 0.08–0.18m deep, far shallower than the periglacial fissures. Periglacial stripes are frost-heave cryoturbation features primarily created by *in situ* freeze–thaw alteration of the chalk, combined with ice removal and solution of loose chalk material. On the Wiltshire chalk, these cryoturbation structures are found on slopes of less than 5° (Williams 1973: 26–27): the “general result is [. . .] of parallel gullies orientated in a

Figure 2. Trench 45 across the Avenue; the north-eastern half is the part excavated by Atkinson in 1956 (and re-excavated
in 2008) and shows the outer ditches as well as the periglacial stripes. The south-western half was excavated in 2008 and shows the outer ditches and the wheel-ruts overlying the periglacial stripes (drawn by Irene de Luis).
downhill direction" (Evans 1968: 14), and usually at a slight diagonal direction across the slope.
The presence of extraordinarily large and closely spaced stripes within the Avenue is possibly explained by the presence of natural ridges on either side of the concentration of

Figure 3. The long section through the central part of Trench 45 with the topsoil removed; the periglacial fissures are especially
deep and wide between the two chalk ridges (drawn by Irene de Luis).
Figure 4. Trench 45, viewed from the north-east (photograph by Adam Stanford).

Figure 5. Stonehenge Avenue earthwork, with the natural ridges marked in blue and a suspected natural gully marked in green. The Early Mesolithic postholes lie 200m west-north-west of Trench 45. Trenches excavated along the Avenue in 2008
are outlined in red (from Field et al. *2012, courtesy of English Heritage).*
stripes, and a natural dishing of the area between. This would have acted to concentrate water—and thus freeze–thaw action—within and between these two ridges, thereby accentuating periglacial cryoturbation and infill processes and enlarging the periglacial stripes. The ridges can be seen in Hawley's photograph of his excavations outside Stonehenge's north-eastern entrance (Hawley 1925: pl. X; Cleal *et al*. 1995: fig. 184), and are visible as earthwork features running for 150m or so from the Heel Stone (Field *et al*. 2012: fig. 10) but not as far as the Avenue bend (Figure 5).
These two natural ridges (each 6m wide) were initially thought to result from differential weathering of the chalk surface, with those areas beneath the Avenue banks being protected to a greater degree. The ridges are, however, far wider than the banks, which are up to 4.3m wide and stand only 0.1m high. As is the case with the Stonehenge bank and ditch, such a degree of differential preservation of bedrock can only be achieved at the base of a very substantial bank (see Cleal *et al*. 1995: fig. 48), and is certainly not possible in the case of the Stonehenge Avenue's insubstantial banks.
The 2008 excavation revealed a small number of features. One of these was a small treehole cutting through the ancient land surface. An irregular, shallow pit (or a pair of pits) lay within the Avenue. The pit went undetected during the 1956 excavation but was found in 2008 to be 1.7m east–west × 1.4m north–south × 0.23m deep, and contained sarsen and

Figure 6. Excavation beneath the tarmac of the A344 road, viewed from the east and showing periglacial stripes between the Avenue ditches; the position of the 2008 trench is marked in red (photograph by Adam Stanford).
bluestone chips as well as a small antler pick at its base. The pit was partly covered by the edge of the Avenue bank but whether this was primary upcast or secondary material from

re-cutting the ditch could not be determined. The slightly 'dirty' appearance of the upcast chalk in this part of the bank suggests the latter.

Many of the 3535 small flakes and fragments of sarsen and 71 bluestone fragments in Trench 45 came from two patches of buried soil beneath the Avenue banks, confirming that dressing of Stonehenge's stones was carried out prior to theAvenue's construction. Excavation of another trench (Trench 44) 50m to the north-west confirmed that the Avenue was cut through the eastern edge of a 100m-wide (east–west) spread of sarsen debris deriving from the dressing of monoliths outside the Stonehenge enclosure (Parker Pearson 2012: 248–52).

Towards the end of the solstitial-aligned part of the Avenue, before it bends eastwards at its 'elbow', it runs along a very pronounced natural landform (in the area of Trench 48 in Figure 5) before it drops into the dry valley of Stonehenge Bottom. This provides a further indication that those who laid out the Avenue paid close attention to the local topography and the lie of the land.

The 2013 excavation by Wessex Archaeology along the line of the A344 road

The road surface and sub-base were removed by machine, down to the lowest chalk and flint bedding layer, which lay directly over the natural chalk (Figure 6). Some, but not all, of this

Figure 7. Periglacial stripes showing as vegetation marks in lightly grazed grassland at Grimes Graves, Norfolk (photograph by Joshua Pollard).

bedding layer was also removed, exposing parts of both Avenue ditches. These were cleaned by hand, and slots excavated through them; the northern edge of the Heel Stone ring-ditch was also exposed, and a narrow slot excavated through it. Finds from the Avenue ditches included 110 pieces of struck flint, recovered from throughout their fills, and 9 fragments of bluestone and sarsen from their tertiary fills.

As some of the bedding layer remained unstripped, the sides of the Avenue ditches were only established at the two excavated slots, and not across the full width of the road. In areas within the Avenue where the bedding layer was removed, the natural geology was exposed; this consisted of degraded chalk with the periglacial stripes aligned north-east to south-west. The Avenue ditches (and the natural geology) had not been significantly truncated by the road construction, both ditches surviving to depths of 0.75–0.8m, comparable with the sections to the immediate north and south previously excavated by the Vatchers and by Pitts (Pitts 1982: fig. 13; Cleal *et al.* 1995: fig. 180). Not surprisingly, there were no surviving traces of the Avenue banks.

Geology and the solstice: a meeting of the earth and heavens

It is possible that the parallel ridges would have been noticed by prehistoric people as earthworks, and the periglacial stripes as areas of lusher vegetation growing on the greater depth of soil in the fissures, in this largely open landscape of Salisbury Plain in the early Holocene (Figure 7; Allen & Gardiner 2009, 2012). This remarkable coincidence of a geological landform on a solstitial axis has to be considered as a feature that was meaningful to people of the third millennium BC—somuch so that they later embellished and accentuated it by heightening the ridges with artificial banks flanked by ditches.

The discovery that the Avenue ditches follow the general direction of this series of natural striations adds a new dimension to the interpretation of the solstitial alignment of the Avenue. It could be argued that, if these periglacial features formed a natural approach to the monument, and were in fact a key factor in defining its axial orientation, then the solstitial alignment is fortuitous. But to argue in this way would be to follow an ethnocentric perspective in which the approximate solstitial orientation of the natural striations is viewed

as a coincidence of nature. If, on the other hand, the striations were already visible in the

landscape and were seen to be aligned upon the setting winter solstice sun, then this would surely have been a powerful affirmation of cosmic harmony (cf. Ruggles 2007: 318, 2014: 2239–41 for examples in Polynesia).

A similar phenomenon has been noted at another Neolithic ceremonial complex in Britain, the Ness of Brodgar in Orkney, Scotland (Card 2013), where a large, walled settlement is located on a natural peninsula between the stone circles of the Ring of Brodgar and the Stones of Stenness (Richards 2013: 64–118). The Brodgar peninsula is aligned roughly south-east to north-west along the solstitial line of midwinter sunrise–midsummer sunset (Nick Card & Euan MacKie *pers. comm.*). As seen from the Ness, the mid-winter solstice sunset (on the other solstitial line) occurs behind the prominent Hills of Hoy (Nick Card *pers. comm.*). The Ness was thus a prominent natural place in the Neolithic not only because of the terrestrial landscape but also because of the natural solstitial possibilities that it offered.

Closer to Stonehenge, the 100m-long Durrington Walls avenue (see Figure 1) is aligned within 1° of the midsummer solstice sunset (Ruggles 2006: 19–20; Parker Pearson *et al*. 2007: 633). Its artificial flint surface, constructed in *2515–2480 cal BC* (*95% probability*) and leading to the midwinter solstice sunrise-oriented entrance of the Southern Circle (a concentric timber circle), was laid upon a natural deposit of frost-shattered flint that formed a natural 'avenue' along the bottom of this roughly solstice-aligned, dry valley.

Finally, Stonehenge's proximity to a line of three Early Mesolithic postholes that held large pine posts (1m in diameter), just 250m to the west of the Avenue (Allen 1995), hints at the possibility that this unusual solstitial alignment, formed by the ridges and stripes, was recognised long before the Neolithic. These vertical pine posts or tree-trunks were erected, probably one after the other, in the centuries around 7000 BC by hunter-gatherers, three millennia before the beginning of agriculture in Britain. Monuments built by huntergatherers
are generally rare; although large pits are known from this period, the Stonehenge postholes are unparalleled anywhere for the Early Mesolithic of Northern Europe. It is also notable that the adjacent stretch of the River Avon has revealed traces of Mesolithic activity from the beginning of the eighth millennium BC—earlier than the postholes—through to the early fifth millennium BC (Jacques&Phillips 2014), making it, potentially, an unusually 'persistent place' (Barton *et al.* 1995) within the early Holocene.

West Amesbury henge and the riverside end of the Avenue

Two trenches excavated in 2008 and 2009 at the riverside end of the Avenue revealed its two ditches running south-east towards the River Avon (Figure 8). The width of the Avenue here is 19.3m, slightly narrower than at the Stonehenge end. Its ditches here are up to 1m wide × 0.6m deep, containing closely spaced holes for posts or stakes at their base, 0.08m–0.18m in diameter. The basal fill of the east ditch produced a large quantity of worked flints, including a flint core and a ripple-flaked oblique arrowhead, a projectile form dating to *c*. 2600–2400 cal BC.

The evidence for palisades in the Avenue ditches raises questions about the possible extent of these structures.Did they run from this end of the Avenue for just 100m or so, as far as the nearest previous excavation of the Avenue ditch (Smith 1973)?Or,might a palisade line have

been partially or wholly re-cut by a ditch? The riverside terminal of the Stonehenge Avenue remains unfound; it was not revealed by geophysical survey, and the extent of excavation in this area was restricted by the protected status of this site as a Scheduled AncientMonument.

Figure 8. Trenches at the riverside end of the Stonehenge Avenue, showing the Avenue ditches, West Amesbury henge ditch and the stoneholes of Bluestonehenge; the estimated extent of the Avenue is marked in brown (drawn by Irene de Luis).

Nonetheless, the Avenue must have ended within 5m north ofWest Amesbury henge, the small henge at the riverside.

This henge was originally around 30m in diameter. Its bank was approximately 3m wide but is almost entirely missing (although its eroded remnants have preserved a pocket of brown forest soils containing a modest assemblage of 268 Mesolithic–EarlyNeolithic flints). The lack of redeposited bank material in the henge ditch suggests that it had a relatively wide berm; it was probably circular, 2.6m wide × 1.2m deep with a V-shaped profile (Figure 9). On its eastern side, the ditch appeared to be narrowing to a terminal that probably formed the northern side of an east-facing causeway or entranceway. On the northern side, two opposite, protruding ditch sides suggest the former presence of a north-facing entrance, 2m wide, but removed before silts began to accumulate in the ditch bottom. At least a third of the henge ditch on its southern side has been eroded by the River Avon.

The primary fill of the ditch on its north-eastern side produced a broken-off tip of an antler pick, embedded in a pocket in the bedrock and dating to 2460–2210 cal BC (95% confidence; weighted mean of SUERC-23207; 3825±30 BP; OxA-20351; 3891±29 BP and OxA-20357; 3858±27 BP–3859±17 BP (T'=2.5; T' (5%)=6.0; ν=2)). Farther east, a placed deposit in the ditch terminal consisted of two large pieces of antler, an antler pick, a cattle sacrum, a cattle rib, a small, quartzite hammer-stone, small sherds of GroovedWare and a small assemblage of worked flints. Beaker pottery came from the layer above this.

Bluestonehenge

Within the centre ofWest Amesbury henge, nine stoneholes (Table 1) were identified within two trenches dug in the western and northern sides of the monument (Figure 10). Five lay entirely within the trenches (B–E & J), and four lay partially or largely within the baulks (A, F, I&K). All the stoneholes had ramps positioned on the outside of the circle, perpendicular to its circumference, and all were set within an inter-connecting arc-shaped feature. The ramps give the arc of stoneholes a scalloped fringe. Distances between centres of stoneholes A–F average 1.16m. If this spacing was continuous around the circle then its radius would be about 4.85m and its circumference 30.45m, providing spaces for 26 standing stones.

Table 1. Dimensions (in metres) of the Bluestonehenge stoneholes and their ramps.

Stonehole	Pit Depth	Pit Width	Pit Length	Ramp Width	Ramp Length	Ramp Angle°	Basal impression Depth	Basal impression Width	Basal impression Length
A	1.00	1.40	0.75	1.20	0.80	10	0.10	0.30	0.33
B	1.15	1.10	0.95	0.95	0.90	10	0.06	0.43	0.34
C	1.20	1.00	1.00	1.00	0.85	35	0.18	0.55	0.40
D	1.30	1.50	1.80	–	0.90	15	0.14	0.60	0.60
E	0.95	1.20	1.45	1.10	1.20	32	–	–	–
F	–	1.75	–	–	–	–	–	–	–
I	–	–	–	–	–	–	–	–	–
J	1.10	1.50	1.50	1.20	1.25	20	–	0.70	0.65
K	–	–	–	–	–	–	–	–	–

Figure 9. West Amesbury henge ditch enclosing the stoneholes (A–K) of Bluestonehenge. Later features (apart from the large posthole) have been omitted (drawn by Irene de Luis).

The stone circle was preceded by a flat-bottomed, 0.85m-deep pit (pit AA), cut by stoneholes A and B.Within the stoneholes, finds from contexts associated with the removal of the stones included a Grooved Ware sherd and an indeterminate sherd (in stoneholes A and B), a chisel arrowhead (from stonehole A), a micro-denticulate blade and a flake of micaceous Mesozoic sandstone (of southern English provenance) from stonehole D, and two antler picks. One pick from the ramp of stonehole A dates to 2470–2210 cal BC

Figure 10. Bluestonehenge under excavation, viewed from the north; each person stands in a dug-out stonehole (photograph by Adam Stanford).

(95% confidence; OxA-21278; 3884±30 BP). The other, from the fill of stonehole C, dates to 2470–2200 cal BC (95% confidence; SUERC-27051; 3855±30 BP). A fissured and pitted fragment of pig humerus from the void left by removal of the stone in stoneholeCwas radiocarbon-dated to 2840–2470 cal BC(95% confidence; SUERC-26460; 4040±35 BP).

There were very few finds from construction layers. Packing layers in stonehole J included a micro-denticulate blade, a deer tooth and the tip of a worked bone point, whereas those in stonehole K included a chisel arrowhead. The deer tooth dates to 2480–2230 cal BC (95% confidence; SUERC-32162; 3890±30 BP).

Bluestone monoliths

There are good reasons for identifying the holes A–F and I–K as stoneholes and not pits or postholes:

1. The holes are too shallow for posts, given their widths. They are most closely comparable with the bluestoneholes at Stonehenge (see Parker Pearson *et al*. 2009: fig. 8).
2. A direct comparison of posthole and stonehole was possible within the circle itself, as a posthole of similar diameter (with post pipe) was inserted into the backfilled, dismantled circle; it was deeper (1.4m below the top of the bedrock) than any of the stoneholes.

3. There was no evidence for any hourglass-shaped disturbance that might have been caused by levering posts back and forth to loosen them.
4. The considerable weight of the uprights, enough to cause compression through the

cushion layers (see below) and into the soft, decayed chalk bedrock beneath, indicates the presence of stone, rather than timber, uprights.
5. The imprints left by such compression reveal a variety of basal cross-sections from oval to rectilinear to triangular and indented, in contrast to the usual circular cross-sections of Neolithic timber posts.

Although no bluestone chips were found within Bluestonehenge, we can be confident that these stones were bluestones rather than local sarsens because:

1. The dimensions of the imprints and voids left by the stones are directly comparable to those of the Stonehenge bluestones, whose thin pillar-shaped forms are much narrower than any of the slab-like sarsens from either Stonehenge or Avebury.
2. The basal imprints of each stone exhibit characteristics shared with Stonehenge's bluestones, namely rectangular, oval and triangular cross-sections. In particular, the imprint of stone D is similar to the distinctively indented cross-section of Bluestone 68 at Stonehenge (Cleal *et al.* 1995: figs 116 & 124).

Sequences of erection and dismantling

One of the curious features of the construction of the stoneholes was the diversity of methods for preparing the hole to take the stone. In stoneholes A, C, D and F, this involved the laying of a relatively flint-free cushion of clay. In stoneholes B and J, a pad of compacted clay and flint noduleswas laid down first, followed by a flint-free clay 'cushion'. In stonehole E, an elaborate nest of flint nodules was constructed but without a clay 'cushion'. Packing layers also varied, with some laid horizontally and others tipped in at an angle. The variation in stonehole preparation suggests that different methods were involved in erecting each of the stones, perhaps employed by separate groups with responsibility for each stone.

The current ground surface has been built up by centuries of deposition and cultivation in this area of West Amesbury's medieval village. Topsoil depth of 0.3m is probably far greater than it was in prehistory; a best-guess estimate for soil depth when the circle was constructed might be 0.1m. The standing stones might thus have been set 0.85m–1.35m (average 1.12m) into the ground. This compares closely to the depths of bluestone oval and circle sockets at Stonehenge, mostly 0.8–1.3m below ground surface (BGS) (average 0.98m–0.99m BGS).

The sequence of standing-stone removal involved first loosening, with varying degrees of disturbance of the packing, and then hauling out the stone, estimated to have weighed around 2 tonnes, at angles between 30° and 70° to the horizontal (Figure 11). Some of these angles are considerably steeper than the probable average angle of 35° for withdrawal of stones from the Aubrey Holes, and may even have required heavy-lifting gear in the form of a large, timber A-frame. The ramps may be associated with the stones' removal

rather than their erection: their unusual asymmetrical shapes are not like erection ramps for postholes.

Dating the Avenue

Six radiocarbon measurements from samples from excavations at various locations along the Avenue have previously been obtained; one from AERE Harwell (HAR-2013), two from the British Museum (BM-1079 and BM-1164), two from the Oxford Radiocarbon Accelerator Unit (ORAU) (OxA-4884 and OxA-4905), and one from Teledyne Isotopes (USA) (Allen&Bayliss 1995). Two of these measurements can be excluded (Allen&Bayliss 1995: 518–19): I-3216, on the grounds that it contains bones from different trenches, and

BM-1079, because of potential contamination by humic acids. Replicate samples from a small antler pick laid on the base of a pit within the Avenue (Figure 2) were dated at ORAU and the Scottish Universities Environmental Research Centre (SUERC).

The three measurements on the antler pick from Trench 45 (OxA-20011, OxA-20350 and SUERC-23205) are statistically consistent (T'=5.8; T' (5%)=6.0; ν =2; Ward &

Wilson 1978) and a weighted mean has therefore been taken before calibration (SAV 045, (1027): 3827±17 BP).

Stratigraphy indicates that the antler pick from the 2008 excavation was deposited after initial construction of the Avenue bank but prior to the rebuilding of the bank associated with a second episode of re-cutting of the Avenue ditch. The most suitable model is:

1. Ditch cutting, dated by OxA-4884.
2. Below/within junction of primary fill and re-cut, dated by HAR-2013.
3. Under bank of re-cut, dated by OxA-20011, OxA-20350 and SUERC-23205.
4. About 0.5m above the ditch bottom in a re-cut, dated by BM-1164.

This model shows good overall agreement between the radiocarbon dates and stratigraphy (A_{model}=70; Figure 12a). The antler (OxA-4884) recovered from the bottom of the Stonehenge terminal of the north ditch provides the best estimate for the date of construction of the Avenue of *2500–2270 cal BC* (*93% probability*; Figure 12a) and probably *2420–2285 cal BC* (*68% probability*). The model also provides an estimate for the re-cutting of *2250–2135 cal BC* (*67% probability*; *re_cut*; Figure 12a).

Dating Bluestonehenge

Four samples were dated from contexts that were most probably associated with the removal of uprights from the stoneholes. The deer tooth from the primary fill of stonehole J only provides a *terminus post quem* (*TPQ*) of 2480–2230 cal BC (SUERC-32162; Figure 12b). It could potentially be residual butmay just as probably have been introduced as a contaminant into this packing layer when the standing stone was removed. The pig humerus from the disturbed upper fill of stonehole C provides a *TPQ* for the removal of its stone of 2840–2470 cal BC (SUERC-26460; Figure 12b).

The radiocarbon dates are for the dismantling of Bluestonehenge, not its construction. Dates on charred cereal grains from the primary fills of the stoneholes were all medieval, highlighting the problems of bioturbation on small items in chalkland stratigraphy (Atkinson 1957). The only diagnostic finds from the primary fills of the stoneholes were two chisel arrowheads (*c*. 3400–2600 cal BC). We suspect that Bluestonehenge was either erected and dismantled after 2465–2295 cal BC (at 68% probability) if the deer tooth with that date is not intrusive, or that it was erected early in the third millennium BC—perhaps contemporary with a bluestone circle in the 56 Aubrey Holes in 3000–2920 cal BC (Parker Pearson *et al.* 2009; Darvill *et al.* 2012b: 1026)—and dismantled after the first quarter of the twenty-fifth century cal BC.

While the date of construction of Bluestonehenge remains unclear, the date of its dismantling falls in the same time-period as the construction of the Avenue and West Amesbury henge. In engineering terms, it is logical that the orthostats were removed prior to the construction of the henge's bank and ditch. But what happened to the 26 or so bluestones? The answer is that they probably went to Stonehenge, perhaps transported along the line of the Avenue, as this provides the gentlest gradients between the two points, albeit as far as the Avenue bend. Stonehenge stage 3 dates to this period (*2405–2225 cal BC* to *2300–2105 cal BC* (*95% probability*); Figure 12b), when its hitherto-blocked entrance

Figure 12. Probability distributions of dates from the Stonehenge Avenue (a) and from Bluestonehenge (b), with selected parameters for the Stonehenge Avenue, the introduction of Beakers into Wessex (Parker Pearson et al. *2016: fig. 2), the end of Grooved Ware (Barclay* et al. *2011) and the beginning and end of stage 3 at Stonehenge (Darvill* et al. *2012b: fig. 2). Each distribution represents the relative probability that an event occurs at a particular time.*

was re-opened by removing sarsen stones D and E, and an arc or circle of bluestones was erected in the centre (Darvill *et al.* 2012b: 1026). Although not enough of the central area of Stonehenge has been excavated to reveal more than an arc of five bluestoneholes, they have a similar spacing and estimated ring diameter to Bluestonehenge.

Conclusion

Although the date of construction of Bluestonehenge remains uncertain, its dismantling occurred around the same time as the digging of the Avenue's ditches, the building of West Amesbury henge and a rearrangement of bluestones at Stonehenge during its stage 3, from which time onwards Stonehenge displayed the 80 or so bluestones estimated to have been set up there (Atkinson 1956: 49 & 68). Just why the two monuments were merged into one at this time is a mystery, but the sequence in the ditch ofWest Amesbury henge—constructed at or shortly after the dismantling—provides a clue. The structured deposit placed in the terminal of this henge ditch contained only indeterminate fragments of sherds, although the layer immediately above, and subsequent layers, contained Beaker sherds. The date of ditch-digging fits well with estimates for the start of Beakers in *2475–2360 cal BC* (*95% probability;* Parker Pearson *et al.* 2016) and the end of Grooved Ware in the Stonehenge area in *2460–2320 cal BC* (Figure 12; Barclay *et al.* 2011: 180). The arrival of Beakers and accompanying continental European styles of mortuary practice and material culture signalled a major social and cultural transition in Britain, including the decline of large-scale labour mobilisation for megalith-building.

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Appendix B Angie Lake's Dowsing

Angie Lake's dowsing findings, as requested by Jack:

> Jack kindly sent me a photocopy of the plan he kept of the 'sight-lines' I dowsed that morning.
> He asked me to dowse for any special alignments to surrounding features that the builders of Stonehenge had particularly had in mind when setting up these stones. It was from about 7.30am – 8.00am approximately (maybe a bit earlier) that I walked around, clockwise – first inside the circle, then between the stones near the outer ring, then finally right outside the circle. It was very cold, with a biting wind, and I was concentrating hard on focussing my request. Each time I stopped (and it didn't seem *that* often), Jack would pencil in the angle the rods pointed to. On this plan he has noted various moon and sun rises and sets, but I'm not able to read them clearly. I've highlighted the arrows for the rods' directions in colour, and also highlighted the stones we've been discussing earlier. There is one longish line in the centre, SW/NE, that I may have misread, as it was rather faint. Perhaps he meant to draw it where the one below lies (he *has* written 'MWSS', which sounds like Mid-Winter Sun Set, near it.)
> It may be sufficient for us to just look at where the 'out' movements of the rods (green) and the 'in' movements (blue) from outside the circle took place. Further discoveries will tell, perhaps.

The following text is copied from Angie's report to her local dowsing group, in their annual Journal for 2016:

> *"Jack kindly sent me a photocopy of the plan he kept of the 'sight-lines' I dowsed that morning.*
> *He asked me to dowse for any special alignments to surrounding features that the builders of Stonehenge had particularly had in mind when setting up these stones. It was from about 7.30am – 8.00am approximately (maybe a bit earlier) that I walked around, clockwise – first inside the circle, then between the stones near the outer ring, then finally right outside the circle. It was very cold, with a biting wind, and I was concentrating hard on focussing my request. Each time I stopped (and it didn't seem that often), Jack would pencil in the angle the rods pointed to. On this plan he has noted various moon and sun rises and sets, but I'm not able to read them clearly. I've highlighted the arrows for the rods' directions in colour, and also highlighted the stones we've been discussing earlier. There is one longish line in the centre, SW/NE, that I may have misread, as it was rather faint. Perhaps he meant to draw it where the one below lies (he has written 'MWSS', which sounds like Mid Winter Sun Set, near it.)*
> *It may be sufficient for us to just look at where the 'out' movements of the rods (green) and the 'in' movements (blue) from outside the circle took place. Further discoveries will tell, perhaps."*

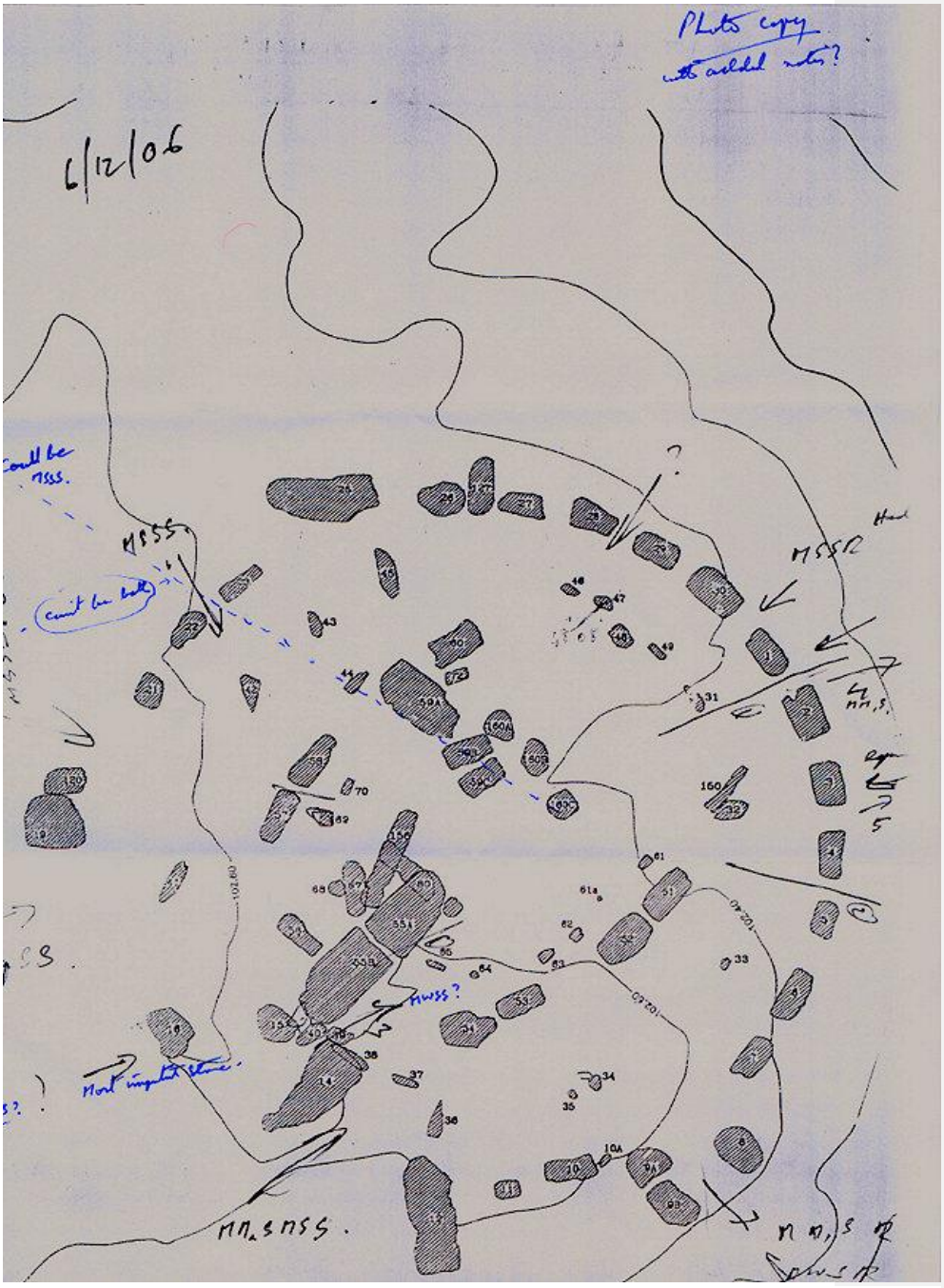

Figure 327 Jack's photocopy of Angie's dowsing plan of Stonehenge (01). Picture by Angie Lake

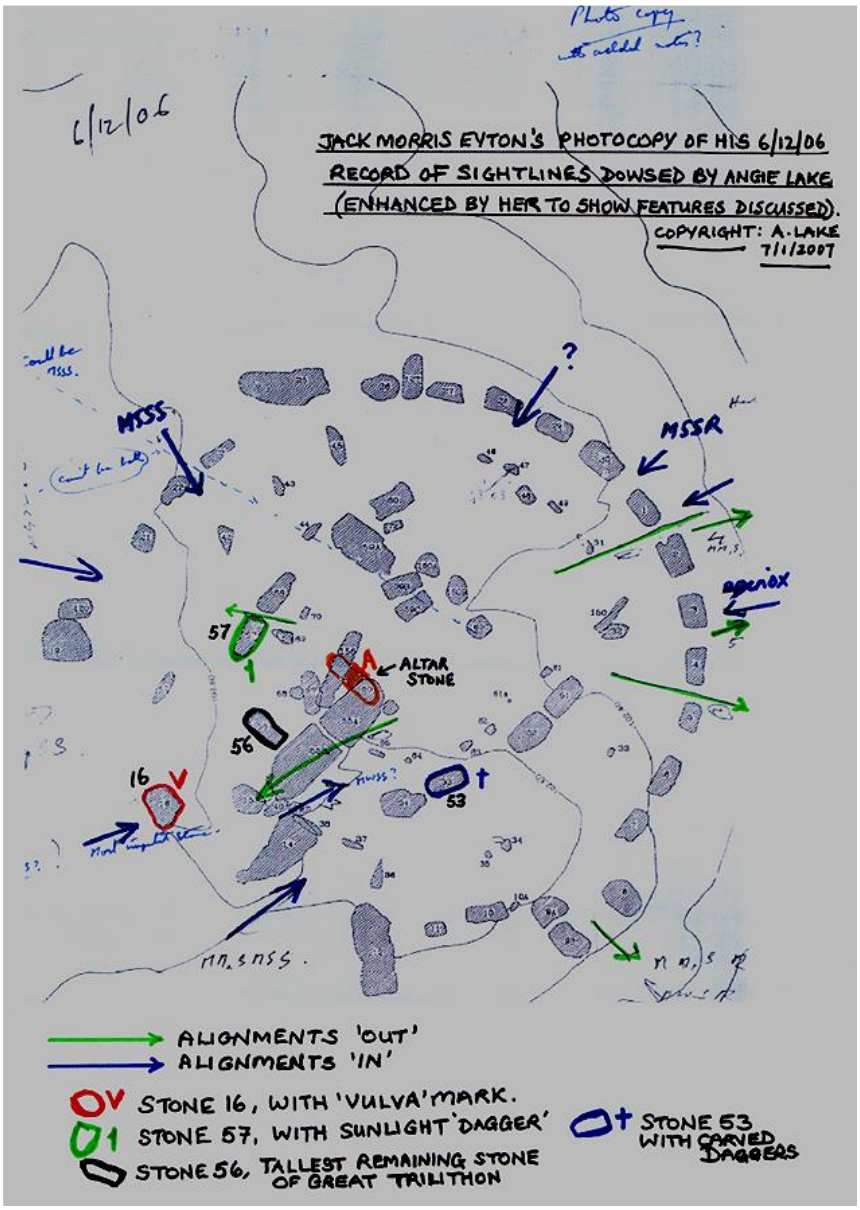

Figure 328 Jack's photocopy of Angie's dowsing plan of Stonehenge (02). Picture by Angie Lake

Appendix C Locations

- Abbot Park Estimated at SD313880
- Annaside Circle SD098853
- Arbor Low, SK160636
- Ash House standing stones SD19288729
- Avebury SU102699
- Ballynoe J4812740378
- Blenkett Wood, Allithwaite SD391756
- Brattshill Stone Circle NY173023
- Buttermere Lake edge NY1753915461
- Castlerigg NY 291 236
- Devoke Water SD165 972
- Elva Plain NY176317
- Gleaston Mill, Furness SD 260711
- Guide Best Circle [Guidebest] ND 181351
- Hall Foss circle SD 112857
- Hazel Mount gate SD 188869
- Hesk Fell SD1728 9419
- Irton Church NY092 005
- Irton Church. NY092 005
- Kirksanton, Cumbria, SD 135811
- Knott Hill SD 17444 87291
- Lacra SD1498381326
- Ladyhall SD187863
- Lake Village SU135391
- Latterigg [Latrigg] NY280246
- Logan Beck SD 254878
- Long Meg and her Daughters NY571372
- Millom Holy Trinity church yard SD 171814
- Moss Cottage Field in Cumbria SD 186922
- Pennington Church SD263774
- Penny Bridge SD 30988 83291
- Penrhos Feilw, near Holyhead, SH 227809
- Pictish Stone, Broomend of Crichie NJ 779196
- Poulton, SJ 40232 58597
- Raven Crag NY 30345 18757
- Raven Crag SD17148 88242,
- Raven Nest Howe SD257991
- Ravenglass SD 08288 96675
- Robinson NY203169
- Rollright Stones SP296310
- Seathwaite Tarn SD2578699278
- Shovel Down SX65908620
- Stonehenge SU 122 422
- Swinside SD17168817
- The Druid's Circle SD29247396
- The Grey Cairns of Camster Caithness ND 261441
- The Kirk Circle SD2507082693
- the Kirk on Kirkby Moor SD251827
- The Pen, SD18930 90259
- Thwaites Fell SD 17672 89339
- Walney Island circle SD1688273804
- Wrayslake marker stone SD190869

Appendix D Insert by Angie Lake: Jack at Metherall

Figure 329 Jack at Metherall. Picture by Angie Lake, added to the Megalithic Portal Oct 15 2006

This is Hut 2 on the Metherall Settlement site page's sketch map (after Butler). JackME is standing above the walls*, taking a photo of me beside the huge stone in the other photo.
*(The huge triangular stone is the one beside the gorse in the first pic.)
The track is just above him, and there's a 'Fernworthy Reservoir' interpretation board near that point.

Figure 330 Metherall, Hut 3. Picture by Angie Lake

We were amazed at the sizes of these wall stones compared to the ones nearer the water. Butler says that: "Some of the wall stones of hut 2 (7.7m) are particularly massive, one measuring 3.7m long and standing about 2m high. A flint spear head and a hammer or whetstone were found, together with some Bronze Age pottery shards and a scatter of charcoal." Jack and I thought that this hut was probably the most important dwelling in the

settlement, and it would have been very cosy, as it is dug into the side of the hill.
Figure 330 shows the passage entrance, foreground. The lower, flooded section with the lovely wall stone is hidden by others on the left of photo. JackME is photographing a large stone upon which he found what he believes is an animal - sheep's? - head in relief.

Figure 331 Metherall, Hut 5. Picture by Angie Lake

Because JackME was convinced that Hut 5 was once a circle I photographed some more of its stones. This one (and Jack) [Figure 331] is at 310 degs of centre circle.

Figure 332 Metherall, Hut 5. Picture by Angie Lake

On September 11th 2006 JackME came to Metherall with me to look at Hut 5 more closely. He is convinced that it originated as a circle, and that the kerb stones inside were added later to convert it into a cairn. This photo [Figure 332] shows the inner kerbstones at north-to-east.

R H Worth excavated these huts in 1934-36 and came to the conclusion that this one had once been a cairn, but that all the small stones had been removed from it. (See my comment of 26 Aug on site page for more of Butler's history details). For the record: I did dowse Hut 6 to see what happened to the senior male of that hut when he died, [contemporary with their use as 'cairn' and 'dwelling'] and was taken in a semi-circular route from Hut 6 into this 'cairn' just to the right of this point (N), and going anti-clockwise inside, was then led into the centre from a point just in front of JackME.

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