

Stone Age Surveys (Archive pdf)

New Evidence of Megalithic Surveying

Recent research (2010-12) suggests that, prior to 3000BC, accurate surveying techniques were employed to locate megalithic monuments within the prehistoric landscape. Further evidence suggests that this aspect of the landscape was both understood and then adapted by 'saints' in the Celtic Christian Church, from the 6th-10th century AD.

KEYWORDS : Neolithic, Surveying, Geometry, Geodetic, Megalithic architecture

This report is one result of on-site surveying at major megalithic monuments of West Wales during 2009 and 2010. It reveals strong quantifiable evidence that the locations of an important group of these monuments were chosen geodetically, following accurate isometric surveying of the landscape over long distances. Fortunately, these sites have survived, and using their locations has enabled an entire section of an isometric 'grid' to be reconstructed. This grid is aligned to a practical and impressively convincing 'north' point, and it has been possible to suggest a mechanism by which prehistoric surveyors set up this alignment. The attained accuracy of this prehistoric feat can be quantitatively assessed, because the locations of megalithic sites are fixed - their latitude and longitude remain constant! The survey data are given here in full in order to draw attention to what may be a much wider phenomenon, namely, that the locations of many other megalithic monuments were chosen by careful design, following a geodetic survey, rather than by random choice or coincidence.

BACKGROUND TO THE RESEARCH

Two small islands, Bardsey and Lundy, can sometimes be seen from the Preseli hills. Holy islands once formed gateways to the Otherworld and the illustrious dead would be ferried there, 'to be buried with solemn rite amid the spirits of their forefathers'. Caer Sidi, often translated as 'the fortress of the faery folk', or the wise and spiritually minded, is another example of this Otherworld kingdom. The Welsh bard Taliesin tells of its 'corners being washed by ocean's currents' - which informs us that these places were clearly islands.

But how ancient is this Otherworld belief and associated folklore? The higher landscapes of the Preseli hills offer visitors perspectives which are often remarkable and always memorable. On a clear day, Bardsey Island, off the western tip of the Lleyn peninsula, and Lundy Island, in the Bristol Channel, can be seen with the naked eye. Bardsey stands out like a dark pyramid rising from the sea horizon off the Lleyn Peninsula. Most of the island remains under the curvature of the earth when seen from this distance (47 miles).

During horizon surveys at Pentre Ifan and Llech y Drybedd, two astronomically rich sites that are covered elsewhere on the website www.skyandlandscape.com, it became noted that both these sites are intervisible and also that a line from Pentre Ifan to Llech y Drybedd, if projected northwards, would eventually strike Bardsey Island as a conspicuous third point on an alignment over 50 miles in length. These three sites form an accurate north-south alignment and is most unlikely to have occurred by chance.

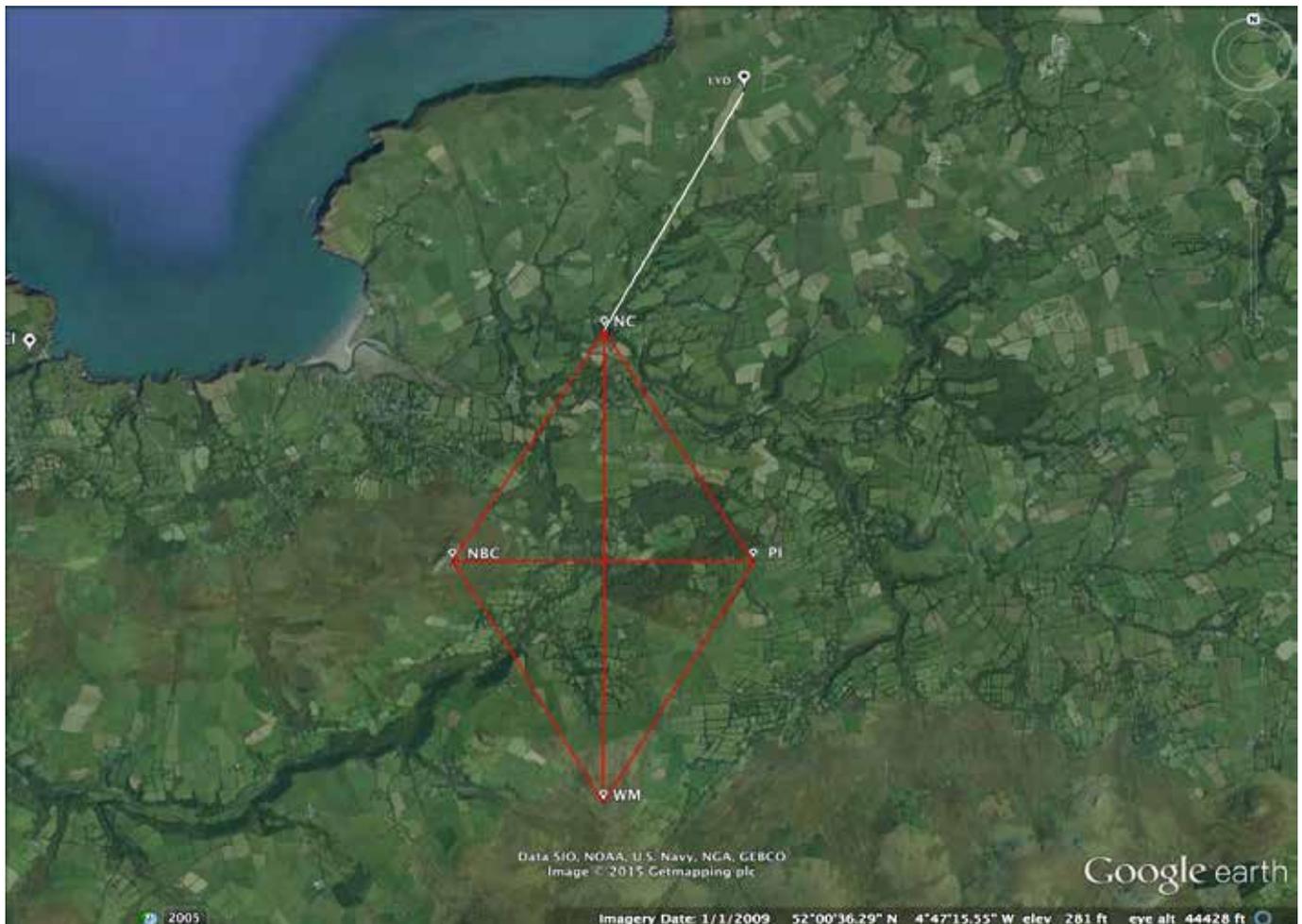
While undertaking this work I was pleasantly surprised to discover that a triangulation station ('Trig point') on the top of the almost flat plateau of Carnedd Meibion Owen, about half a mile distant from Pentre Ifan, was sited directly and precisely south of Bardsey, and en route to Bardsey this alignment also touches the

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highest ground on the Moylegrove to Newport coastal road, some 607 feet above sea level. Here may be found a second Trig point half buried within a gorse-infested hedge, and which also is marking the north-south line, adjacent to a farmstead called, perhaps not surprisingly...Lleine. Llech y Drybedd forms an identical function to this second concrete trig point, standing on the summit of the coastal ridge above Moylgrove and spaced at a similar distance (of about half a mile) as Pentre Ifan is from the first trig point.



This suggests a remarkable continuity of process and intent, and informs us that the Ordnance Survey were emphatically not the first people to utilise Bardsey as a natural 'north-point' landscape feature from Preseli - they were just repeating a technique begun about 5,000 years previously! Pentre Ifan and Llech y Drybedd now become seen as neolithic 'trig points' in an impressively accurate surveying exercise which established a pretty accurate



orientation to true north. Bardsey, it appears, was thus duly recognised, honoured and incorporated into the neolithic landscape by the culture that then constructed these fine dolmens. Their builders appear to have understood the importance of establishing true north as a first step in any process of surveying. Once one recognises that they indeed undertook such a task it reveals a previously unknown and certainly unsuspected aspect of the purpose and function of their monuments, and of the evident capabilities of the culture that erected them. This changes our historical landscape.

If one were to climb onto the top of the huge capstone of Llech y Drybedd (*shown above*) it would be possible to see Bardsey Island. Had the monument been once covered in an earthen mound, as it is thought by some archaeologists to have been, such an observation would be routinely possible. The angle to Bardsey from this

point falls a small amount short of being truly North-South, at $359^{\circ} 22'$, or 38 minutes of a degree west of True North. Directly south from Llech y Drybedd one can see Pentre Ifan - the defining monument of the Preselis - and from the front of the capstone at Pentre Ifan, Llech y Drybedd lies at an azimuth of just 37 minutes west of True North.

Llech y Drybedd acts as a northern foresight to Bardsey from Pentre Ifan - it stands directly in line with Bardsey and Pentre Ifan, on the very top of the ridge which prevents intervisibility between these two locations. Llech y Drybedd connects an observer at Pentre Ifan with Bardsey, perhaps as a sign-post to this Otherworld island, but certainly to a impressively accurate alignment to true north. It is hard to imagine this is coincidental.

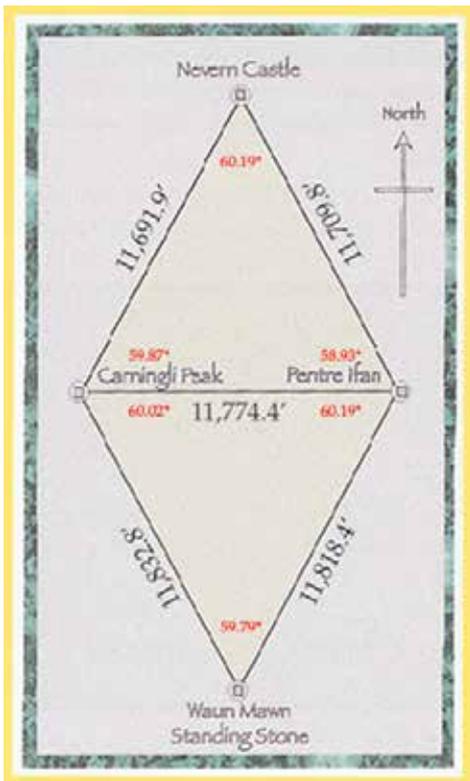
In other reports found on the [skyandlandscape](http://skyandlandscape.com) website the astronomy of Llech y Drybedd and Pentre Ifan are discussed at length. Now these sites emerge as key players in an impressive interplay between astronomic and geodetic qualities. This demands a re-evaluation of their historical importance. Llech y Drybedd is archaeologically dated no later than 2800 BC, Pentre Ifan up to eight centuries previously, making the evidence presented here perhaps the oldest example of applied surveying yet discovered.

While this first aspect of the work in hand stands alone as strong evidence of prehistoric intent to define true north, it leads on to the second and supportive major piece of evidence for prehistoric surveying having taken place within the local landscape of the Preseli during the Neolithic.

THE PREHISTORY OF ISOMETRICS

To those unfamiliar with the word, isometrics simply means 'equal lengths'. The geometry of isometrics is therefore the geometry of equilateral triangles, those having equal side lengths and where each internal angle of the triangle's three points or apices is exactly 60 degrees. It is the stuff of Buckmeister Fuller's 'geodetic' architecture and Barnes Wallis's Wellington bomber; a form of 3-D sculpture that is termed geodetic, after its origin in surveying techniques. Those origins appear now to have been pushed back 5000 years in time - because a remarkably accurate geodetic form is clearly seen to emerge from the locations of significant Neolithic and Bronze Age monuments found in the Preseli hills.

THE PRESELI SITE DATA



Sites placed on an isometric triangulation. On the left is the 'Very Special Works' (VSW) at Nevern Castle, a local beauty spot recently taken apart by archaeologists from Durham University, lead by Dr Chris Caple. The middle photograph shows Waun Mawn standing stone, sighted on a spring. To the right is the platform in the Bronze Age fort near the summit of Carningli, known locally as 'Angel mountain'. These sites are well worth a visit, as are Llech y Drybedd and Pentre Ifan, the other monuments in this geodetic arrangement.

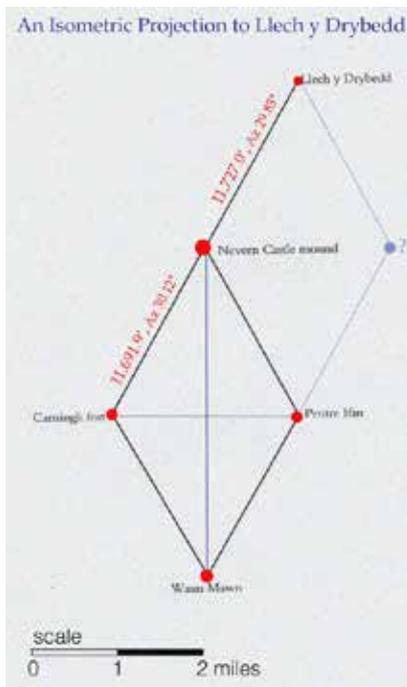
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Two complete equilateral (isometric) triangles have been identified, each sharing a common side. There is evidence supporting a third equilateral triangle. The coordinates of the sites were obtained from a GPS, whose latitude and longitude settings were set to those defined by the geoid form adopted by the Ordnance Survey and known as OSGB36.

Site	Latitude(N)	Longitude (W)	Height
Pentre Ifan	51.9987°	4.7689°	492'
Carningli Fort	51.99909°	4.82047°	948'
Waun Mawn	51.97055°	4.794017°	826'
Nevern Castle	52.0263°	4.79635°	204'

Distances between sites (in feet) and azimuth angle (*see also graphic on page 6*)

1. From Pentre Ifan to Carningli Fort 'platform' is 11,774.4' ; Az 270.4* [intervisible].
2. From Pentre Ifan to Nevern Castle 'VSW' is 11,709.8' ; Az 328.932* [intervisible]
3. From Pentre Ifan to Waun Mawn is 11,818.4' ; Az 209.8076* [not intervisible].



4. From Carningli Fort 'platform' to Waun Mawn is 11,832.8';Az 150.017*[not intervisible].

5. From Carningli Fort to Nevern Castle VSW is 11,691.9';Az 30.1238* [intervisible]. (Note: There is a dolmen structure (labelled 'NBC' on archaeological maps, which fits the isometric geometry even better. Since this original report, NBC has replaced the Carningli 'platform' as the most westerly point of the structure.

The geometry connecting these four sites (see previous page) comprises two equilateral triangles placed back to back. It is the basis of the construction of the vesica piscis in sacred geometry (see graphic on page 6).

The distance from Nevern Castle mound to Llech y Drybedd dolmen (see below) is of the same length and this provides a hint that there may have been a further triangulation involved in this prehistoric project. The diagram shows this equi-angular extension to Llech y Drybedd which supports the proposed hypothesis that all five sites were located on an isometric grid system during the prehistoric period. The discovery of the remains of a prehistoric site near Cwm Eog farm would show completion of this third triangle (*see left, location marked with a '?'*) and further work

is required to investigate this possibility. The owner of the farm has been contacted.

A PRELIMINARY ANALYSIS

The mean value for the six lengths is **11,759 feet**, which is 3.584 Km or 2.2271 miles. There are insufficient data samples to apply statistical analysis, which cover the range from 11,691.9' - 11,832.8' , a spread of 140.9'. All six lengths therefore lie within **99.4%** of the mean value.

The angular coherence of triangles is always such that their internal angles add to 180 degrees. The variation from the ideal 60 degrees per angle is as follows:

Upper (northern) Triangle angles : Pentre Ifan -1.068° ; Nevern Castle +1.1918° ; Carningli -1.1238°

Lower (southern) triangle angles : Pentre Ifan +0.1924° ; Waun Mawn -0.2094° ; Carningli +0.017°

The variation from 60° is from +1.1918° to -1.1238° or a maximum ± deviation of **+ 1.99%** to **- 1.873%**. This angular

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deviation would all but vanish at the expense of the range of lengths if the Nevern site were to be taken to lie a little to the north of the 'VSW', and the NBC site on the flank of Carningli used as the most western point of the structure. It is suggested that the VSW site provided an ideal ready made site for this scheme, inviting a compromise. The peak of Carn Ingli runs along the line at 210 degrees from Nevern, and the site of the required traingulation point could therefore be defined accurately at the correct location. It is clear from the southern triangle that the surveyors were capable of good angular accuracy, even when the targets were not all intervisible.

SUMMARY & COMMENTARY

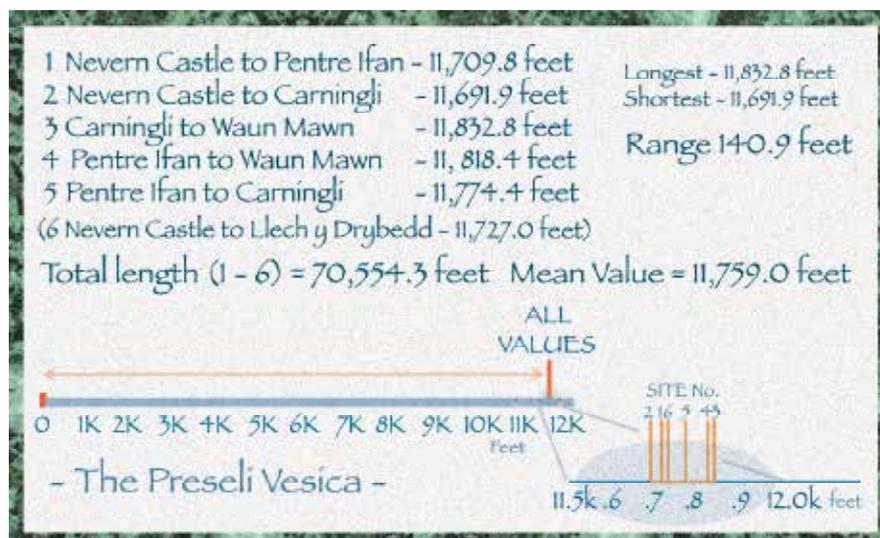
Pentre Ifan is now thought to have been constructed around 3500 BC, and the evidence here therefore suggests that by this date the first known application of accurate surveying techniques anywhere in Britain had been completed. This is comparable only to sites around Carnac, Brittany, which date to pre-4000 BC, several of which have also been recently surveyed by the Heath brothers (see articles elsewhere on this website). Work is in hand to discover if there are more prehistoric sites at other locations defined by the apices or 'corners' of extended & re-iterated triangles. Evidence and information is here made available to robustly support the hypothesis that prehistoric surveying, was being undertaken in the Preseli region before 3000 BC. The North-South alignment between Pentre Ifan, Llech y Drybedd and Bardsey Island suggests a reason for the otherwise odd choice of siting of Pentre Ifan. Its unique and majestic design suggests a supreme and previously unrecognised importance within the culture that originally constructed it.

APPENDIX ONE - ANALYSIS OF THE SURVEY NETWORK

The five site locations which form the nodal points of the network or mesh consist of two natural landscape features and three built structures. There is considerable leeway in the positioning of the nodal point along the summit ridge of Carningli. A reasonable question to consider is: How might the geometry have originally been defined, and the accuracy attained?

Isometric surveying without theodolite can be undertaken with high angular and dimensional accuracies. A base line of known length is measured between and this defines two of the nodal points. From these nodal points an angle of 60 degrees may be simply constructed using only a rope and pegs. The technique is well known from High School and is both extremely simple to apply and yet capable of high angular accuracy, certainly better than to one degree. Once this angle is established then staves are 'walked' in-line across the landscape in two converging paths which eventually meet at the third nodal point of the mesh - the third 'corner' of the equilateral triangle.

Which section of this discovered geometry was used to define the key base length? It would be better for this choice to involve sites separated by flattish land, without deep valleys or inaccessible territory, and
Above: Pentre Ifan, the largest and most elegant megalithic dolmen in Wales, built around 3500BC





intervisible, each site from the other. The surveyor's choice - now as then - would be the East-West line from Carningli to what would become the site of Pentre Ifan - Wales' most famed dolmen (*see photograph overleaf*). The paths from either end of this base line meet at a point intervisible from both origins, within a few feet of the separate and 'Very Special Works' of Nevern Castle. One should not underestimate the problems in establishing an accurately known base-line anywhere within this territory. Waun Mawn, the third point of the southern triangle, is not visible from either Carningli or Pentre Ifan and here the projected lines involve crossing a more complex landscape. Whichever routes were chosen the evidence here supports this task being completed, and with an impressive accuracy. The survey reveals a built structure, which has remained hidden within the landscape around Carningli for five thousand years or more. Its rediscovery throws a whole new perspective on the technology and capabilities of Neolithic culture. I wonder if anyone out there is interested?

For further information concerning this research and its connections with local folklore, legend and the later Celtic Christian Church, together with fine colour photographs of all the sites mentioned here, there's a newly (2010) published book, *Bluestone Magic - A Guide to the Prehistoric Monuments of West Wales*, by Robin Heath, (available from the book section of this website) for just £10 plus p&p.

Printed on quality paper, 184pp, full colour throughout, over 100 colour photographs, soft cover.

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