

## Tomb L, Carnbane West, Loughcrew Hills, County Meath – an archaeoastronomical assessment

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The national monument known as Tomb L (ME015-003010-) is situated on the summit of Carnbane West in the Loughcrew Hills. It is one of 15 passage tombs occurring within a broader complex of 32 megalithic monuments comprised of tombs, cairns and unclassified structures. With the exception of the nearby passage tomb in the adjacent townland of Thomastown, all are clustered on three hilltops including Carnbane East and Patrickstown (Figure 1).

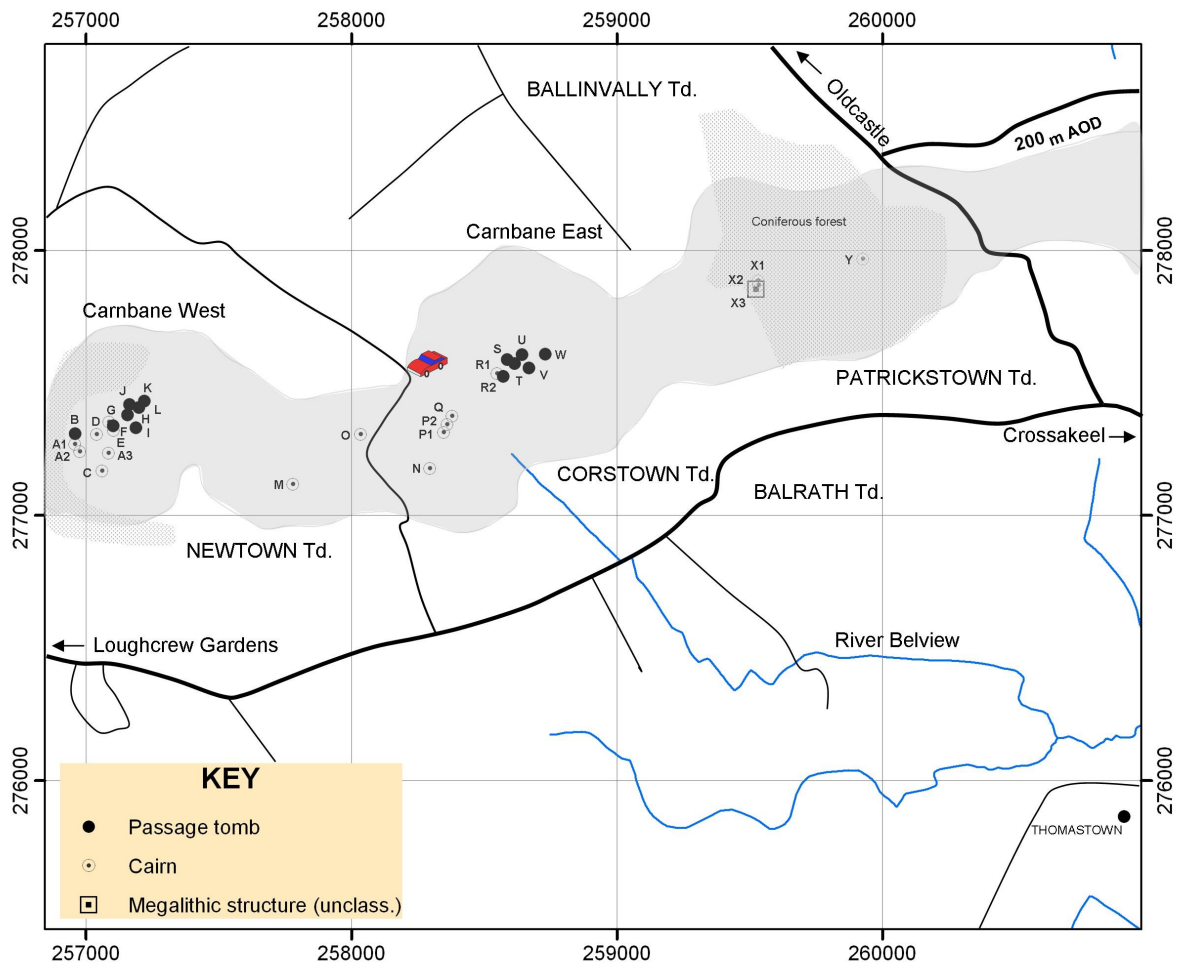


Figure 1 Plan of the Loughcrew passage tomb complex

Tomb L is the dominant and most easterly tomb of the cluster on Carnbane West. It has a kerbed cairn with an eight-celled burial chamber and a corbelled roof. Two of the cells (or recesses) contain a basin stone but the right-hand of the pair is more emphasised in terms of the size of the basin stone and the embellishment on its back stone (C16). Within the cairn, 16 of the structural orthostats, two of the corbels, and two of the non-structural stones have passage tomb art incised on their obverse faces. Two of these also have hidden decoration (Twohig 1981, pp. 211-13). The chamber is accessed by an easterly-facing passage (Figure 2 and see Figure 5).

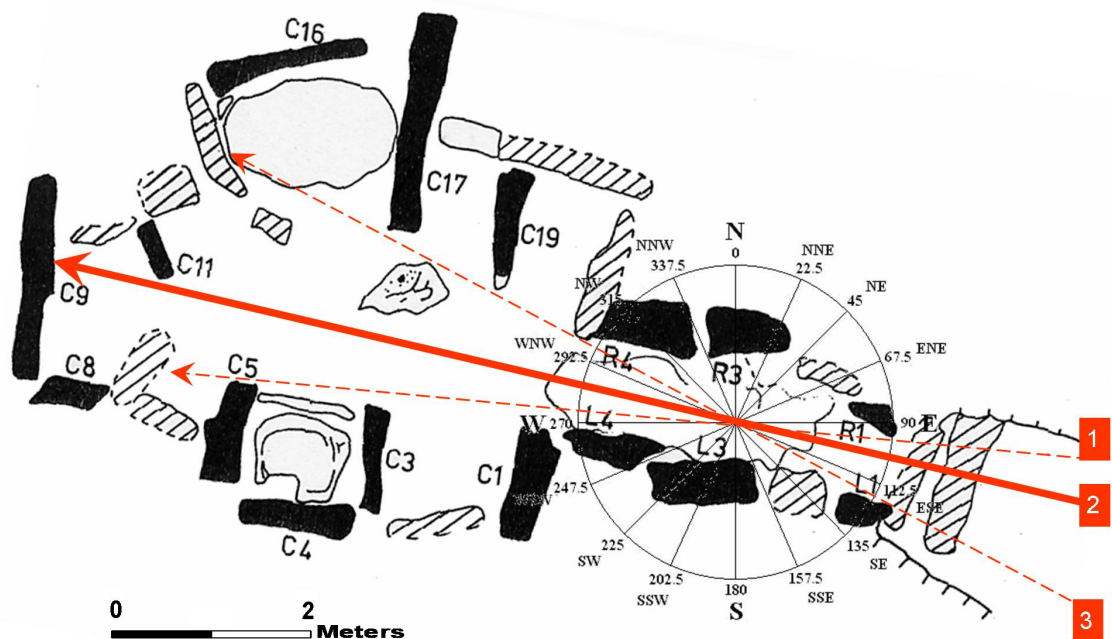


Figure 2 Plan of Cairn L (after Shee Twohig 1981, Figure 222 with additions)

Structural stones bearing passage tomb art are shown in black. Solar alignment events discussed in the text are numbered 1–3. The north point of the compass rose indicates true north.

In Figure 3, the view direction is along the axial line from the entrance to the end recess (cell 4). Cell 2 (which contains a basin stone) is bounded by C3 and C5 positioned on either side of an entrance sill stone; this is visible on the left side of the image. In cell 4, the back stone C9 is flanked by C11 on the right-hand side.



*Figure 3 The chamber in Tomb L*

The megalithic art on C9 is described by Shee Twohig (1981, 212 and Figure 225). On the left-half of that stone there are three large horizontal in-phase serpentine motifs with the top two joined at their ends on the right-hand side. Above these on the right, there is a single and a double U motif. Shorter serpentine motifs also occur on the bottom of the stone. The only decoration on the left side is a damaged circle and some picking marks.

Cell 6 is the most elaborate in terms of its relative scale, the size of the basin stone, and the concentration of megalithic art. The back stone C16 bears a range of motifs including concentric circles, nested U/arcs with a dot, triangles, concentric circles, lozenges, serpentine and parallel lines (Figure 4). Because the art embellishes the whole surface of the stone, it is sometimes described as being in the plastic style. Eogan (2011, p. 22) additionally suggests that the main motifs possibly represent the head and body of an inclined 'stylised human'.



Figure 4 Back stone C16 in cell 6, Cain L

#### ***Tomb orientation and archaeoastronomy***

The chamber and passage are orientated east–south-east (see Table 1). There are no apparent distinctive topographical or monumental features on the horizon in this direction. This could suggest an alternative imperative for the orientation of the tomb.

The summary astronomical investigation presented here was undertaken as part of a national survey of passage tombs undertaken by the writer (Prendergast 2011). From that, the measured passage orientation (azimuth or direction relative to true north), the horizon altitude and the geographical location of Tomb L were used to calculate the indicative astronomical declination ( $\delta$ ). From  $\delta$ , the likely dates of sunrise for the north and south azimuth limits of the tomb/passage (alignments 1 and 3 in Figure 2) and the central axis (alignment 2 in Figure 2) were determined (Table 1).

Table 1 Archaeoastronomical analysis of Tomb L

Solar alignments as shown in Figure 1	Description of phenomenon for current date (lower limb of sun on the horizon <i>i.e.</i> sun risen)	Azimuth <sup>o</sup>	Astronomical Declination $\delta^{\circ}$	Dates (accuracy $\pm 1-2$ days)
1	Direct sunlight reaches Cell 3	95	-3.2	1st October, 11th March
2	Direct sunlight reaches Cell 4	104	-8.5	15th October, 27th February
3	Direct sunlight reaches Cell 6	118	-16.4	7th November, 4th February

Although the azimuths were derived from compass bearings, the above data are sufficiently accurate to allow for a determination of the dates and date ranges of solar illumination within the tomb to an accuracy of a few days. These should be consistent with what would be seen by an observer located in the chamber.

### **Findings**

The orientation limits of Tomb L lie within the annual range of sunrise and moonrise. Accordingly, there will be periods in the year when, inevitably, the direction of sunrise and moonrise will coincide with the orientation of the tomb/passage. An assessment of the indicated astronomical declinations in Table 1 permits the following interpretations:

- the tomb is not aligned towards any of the extreme solar limits *i.e.* winter or summer solstices;
- the tomb is not aligned towards any of the extreme (major) lunar limits;
- the tomb is aligned such that direct sunlight will reach the chamber at two periods of the year;
- for the first period, and when the sun is diurnally moving from north to south along the horizon (from alignment 1 to alignment 3), illumination within the tomb will commence at dawn on c. 1<sup>st</sup> October and end similarly on c. 7<sup>th</sup> November;
- for the second period, and when the sun is diurnally moving in reverse from south to north along the horizon (from alignment 3 to alignment 1),

illumination within the tomb will commence at dawn on c. 4<sup>th</sup> February and end similarly on c. 11<sup>th</sup> March;

- during both of the above periods, illumination of the end recess (alignment 2) would occur for a few days centred around 15<sup>th</sup> October and 27<sup>th</sup> February;
- illumination of the outer passage orthostats (but not the chamber) would occur at dates sooner/later than those indicated above;
- in all cases, the phenomena should last for approximately 15–20 minutes after sunrise and until the disc of the sun is out of alignment with the passage and the chamber.

The degree to which these computationally predicted phenomena would agree with true/actual events is dependent on the accuracy of the survey data. For this reason, the error bands indicated in Table 1 are intended to fairly model such uncertainties. Furthermore, the light pattern projected by the sun into the tomb is determined by the morphology of the entrance and the profile of the irregularly shaped orthostats in the passage. In Figure 5, the out-view of the entrance provides an impression (if reversed) of the likely shape of the light pattern that would be projected onto the back stone C9 *i.e.* when the sun and the axis of the tomb are co-aligned. Away from that alignment, a cropped version of this illuminated shape would be observed.



*Figure 5 The entrance to Tomb L*

***Discussion***

In assessing the significance and meaning of tomb orientation, numerous criteria/factors (including astronomical) can explain any possible intentionality and, thus, deliberate axial alignment. There is also the possibility that tomb orientation can be random. In the case of Tomb L, and in the apparent absence of any indicative/distinctive natural or built horizon feature that might have acted as a focal target, the tomb may have been simply built to face the rising sun. If so, such an orientation would have ensured periodic illumination of the burial chamber after dawn on the dates indicated in Table 1 (with minor changes to allow for the prevailing obliquity of the earth's axis).

These phenomena are interpreted by the writer as not having had any calendrical significance in the prehistoric past and popular ideas of Tomb L being aligned towards the mid-quarter dates of November 5/February 4 are thus challenged here for several reasons. Although sunlight will penetrate to the edge of cell 6 (see Figure 2) around these dates, any claim for the alignment of the passage axis being calendrically significant in an early prehistoric context has little basis in fact. Tomb L was built in the Neolithic and, as such, predates (by almost three millennia) any late Iron Age/early Medieval evidence for calendrical subdivision of the solar year. Elsewhere, support for this argument is considerable (Mc Cluskey 1989, 1998; Ruggles 1999; Ruggles 2005, p. 265) nor is there evidence for it in the wider Irish passage tomb tradition either (Prendergast 2011).

The solar illumination of Tomb L is a spectacular and profound experience for those privileged to observe it but is thought unlikely to have had any calendrical role or purpose. Rather, it may have been symbolic and more related to the wider funerary role of the tomb. Furthermore, to ignore the broad period of time (up to 5 weeks) during which the phenomenon occurs within the passage and chamber, and to focus merely on its northerly limit and associated dates, is selective and speculative. Nonetheless, by visiting the tomb at the dates and times described here is to re-experience what would have been seen when the tomb was in use during the Neolithic in c. 3000 BC. This affords the modern visitor a rare opportunity to identify and link with our cultural origins and heritage and to reflect on the role and profound meaning of such tombs in ancient times.

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