

Bryn Celli Ddu Passage Tomb, Anglesey: Alignment, Construction, Date, and Ritual

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Bryn Celli Ddu is one of only two developed passage tombs in Wales, and has occupied a pivotal place in narratives of this region since the publication of excavations in the 1920s by W.J. Hemp. The construction sequence at the site has been at the centre of debate on several occasions with previous models raising important issues about the sequence of major monument types (notably the henge and the passage tomb) and the inter-regional links of the tomb's builders. This paper presents a new interpretation of the site's construction history, drawing on several sources, including: the recent demonstration that the tomb is aligned on the midsummer sunrise; Hemp's unpublished archive; and the results of a radiocarbon dating programme. The result is a two phase model which shows the tomb to have been built between 3074 and 2956 cal BC, and which sheds fresh light on the ritual practices of the community which built it.

Bryn Celli Ddu, on Anglesey, is one of the most frequently discussed of the Welsh tombs thanks to excavations in the 1920s which revealed a complexity to the site's construction history which is rarely apparent at other megalithic sites in this region. The tomb belongs to the developed passage tomb tradition, a type common in Ireland but rare in Britain, with only two certain examples being known in Wales. As such it plays a key role in demonstrating cultural links between the two islands at the end of the 4th millennium BC (Lynch *et al.* 2000, 73). Furthermore, Bryn Celli Ddu is one of the most visually impressive Neolithic monuments in Wales and forms a key part of the tourist experience on Anglesey (Yates & Longley 2001, 31–3). All of these factors make it important that the site's development and history are well understood.

The tomb is situated on a low spur of land in the valley of the Afon Braint which flows past the site 150 m to the east as a small stream (Fig. 1). The surrounding land is low rolling hills, with the

mountains of Snowdonia visible, *c.* 15 km to the south-east. The most striking local landmark, and one which may well have influenced the tomb builders in the selection of their site, is an outcrop of rock 140 m away to the north-west which is marked by up to 28 cupmarks arranged in groups (Nash *et al.* 2005, 12). Bryn Celli Wen, an anomalous enclosure excavated by Julian Thomas and Mark Edmonds in 1990–1993 and awaiting publication (see Thomas 2001) lies 350 m north-east of the tomb. Peterborough pottery discovered at this site hints at a date broadly comparable with, or slightly earlier, than the construction of Bryn Celli Ddu, making it another possible factor influencing the positioning of the tomb.

The tomb survives today as a chamber and passage covered by a low mound and bounded by a 25 m diameter ditch in which sits an outer kerb, although it should be noted that much of the mound visible today is the result of attempts to stabilise the site and make it accessible for visitors (Fig. 2).

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EARLY HISTORY

Bryn Celli Ddu is first mentioned in Henry Rowland's *Mona Antiqua* of 1723, which includes an illustration of the tomb as a cairn with a capstone protruding from the top. A large amount of mound material was

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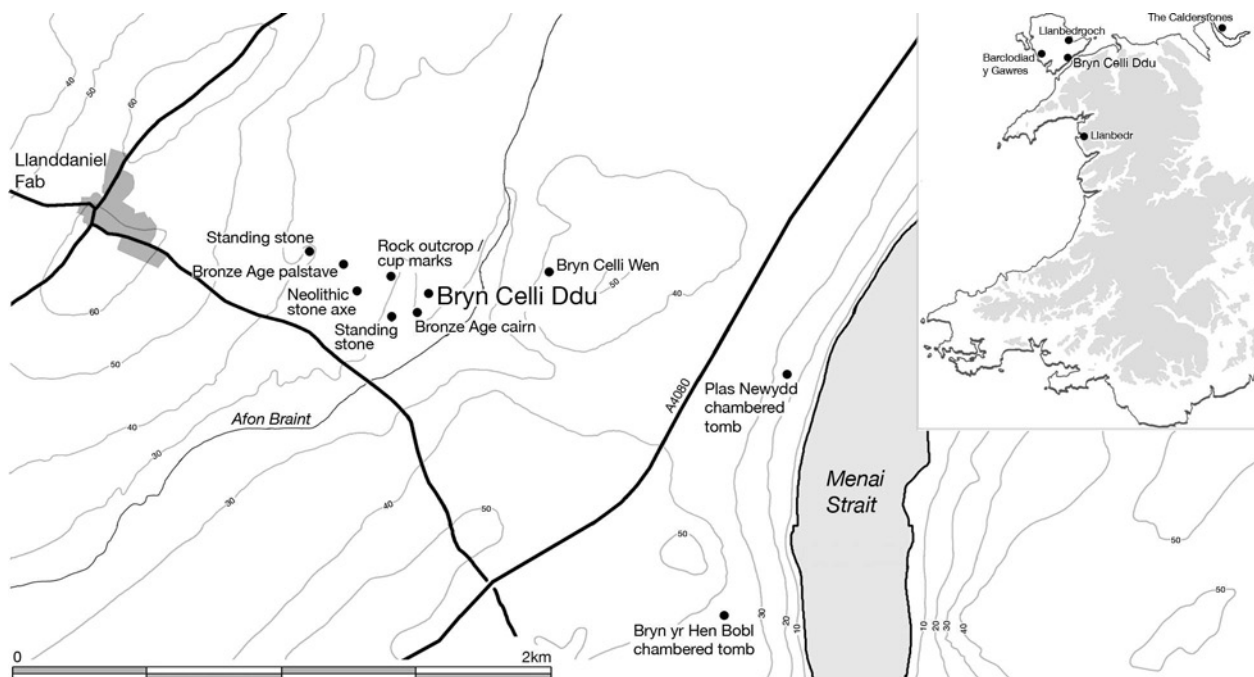


Fig. 1.
Location of Bryn Celli Ddu. Inset map indicates sites with evidence of passage tomb-related activity.
Main map shows Neolithic and Early Bronze Age sites in the vicinity of Bryn Celli Ddu

removed after this date and, by 1847, it is illustrated as a largely denuded chamber and passageway (Anon 1847, 3). Calls for its preservation at this time led to the planting of trees around it and the erection of an enclosing fence.

The chamber and passageway were dug in 1865 by François du Bois Lukis of Guernsey (Barnwell 1869, 142; Hemp 1930, 181), whose own notes make clear his belief that he had undertaken the work too carelessly. But most of our current knowledge about the site is the result of work by W.J. Hemp, then the Inspector of Ancient Monuments for Wales and, from 1928, Secretary to the Royal Commission on Ancient and Historical Monuments in Wales and Monmouthshire (Jenkins 2001, 92). Hemp began a programme of conservation and excavation work at Bryn Celli Ddu in 1925, following the gifting of the site into state care in 1923.

Hemp's publication of the site, just a year after the conclusion of his fieldwork, is commendable (Hemp 1930), as is the detail of his recording which allows nine stratigraphic and architecturally separate units to

be identified at the site (Fig. 2). These can be summarised as:

- an encircling ditch
- an arc of stones¹
- a central pit
- a decorated orthostat, known since its excavation as 'the pattern stone'
- a chamber and inner passage, consisting of substantial orthostats topped by capstones
- an outer passage consisting of drystone walling, three more orthostats which once supported a further capstone, and a series of low orthostats
- an outer kerb consisting of orthostats and drystone walling
- an inner kerb consisting of smaller stones
- a series of post-holes and an ox burial beyond the tomb entrance.

In addition, Hemp identified a 'purple clay floor' beneath the mound of the tomb and within the ditch, which he believed was a deliberate placed layer,

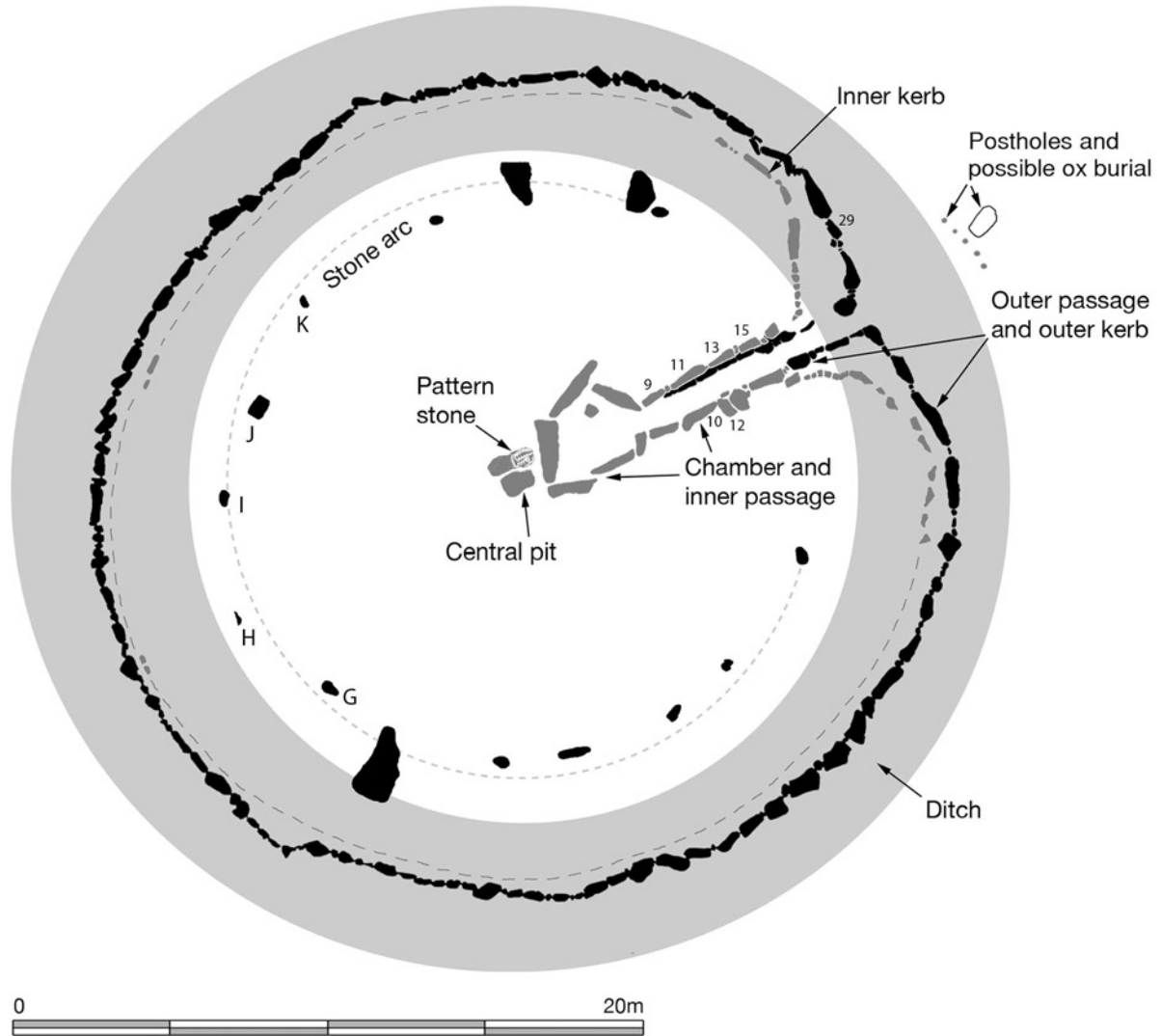


Fig. 2.

Site plan showing components of site identified during W.J. Hemp's excavations (redrawn from Hemp 1930, pl. lvi)

possibly brought to the site from the clay shores of the Menai Straits (Hemp 1930, 204 & 206). The nature of this soil layer has been the subject of much debate, as will be seen below.

In Hemp's view the site had been constructed to a single design with all of the structural elements working towards this end, but the level of detail in his report has allowed others to revisit his work and present alternative conclusions. Three of these

authors, Claire O'Kelly, George Eogan, and Richard Bradley, have suggested that the site was built in two separate phases (Fig. 3), while Frances Lynch's work has focused on the significance of deposits within the passageway (Lynch 1973). O'Kelly, the first to reinterpret Bryn Celli Ddu, argued that the site began as a henge (the encircling ditch) enclosing a stone circle (the stone arc), which was later subsumed beneath a passage tomb, while Eogan and Bradley

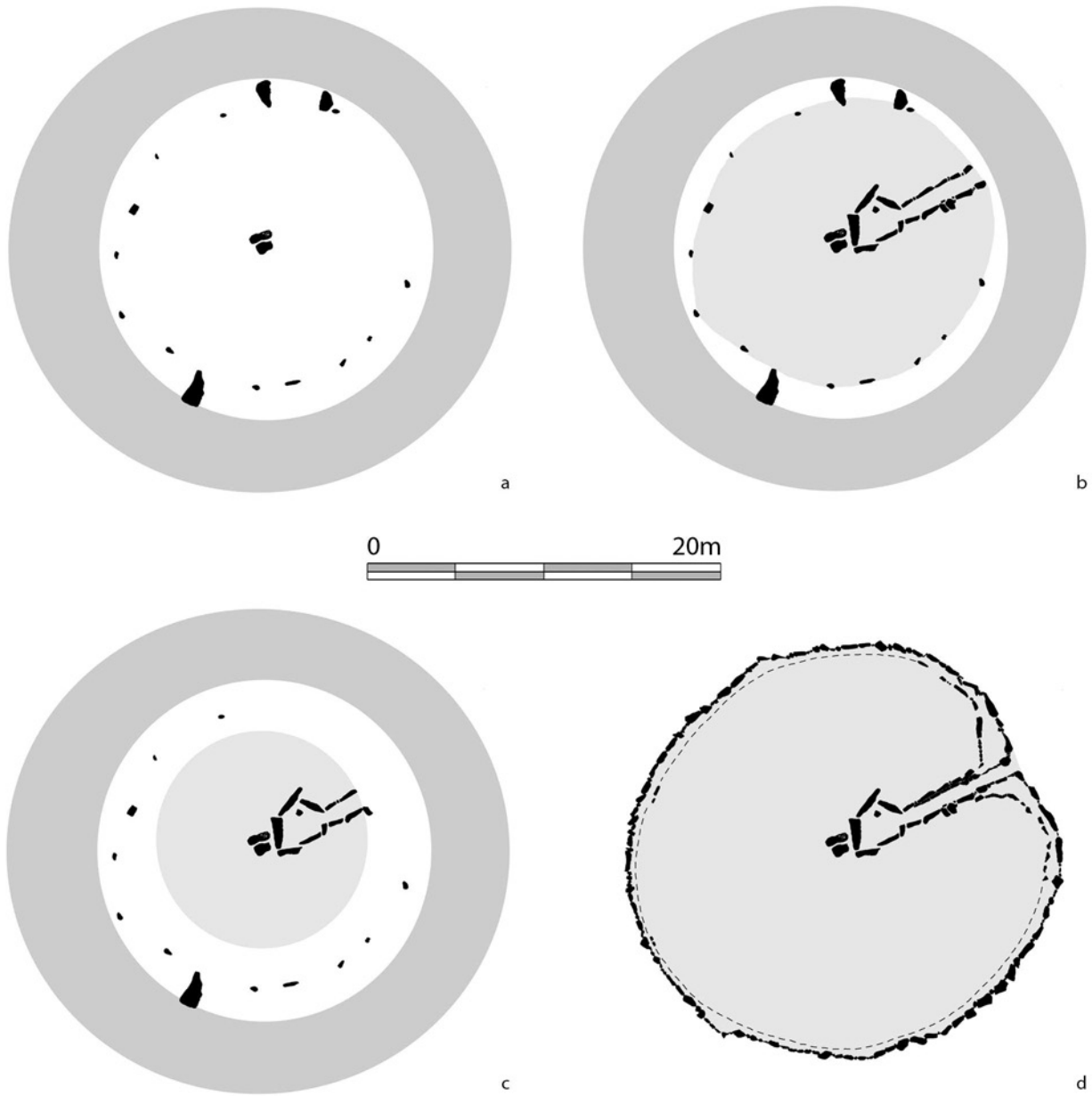


Fig. 3.
Construction phases suggested by earlier researchers. a. O’Kelly’s first phase (1969); b. Eogan’s first phase (1983);
c. Bradley’s first phase (1998); d. final phase agreed by all researchers

argued that the site began as a smaller tomb which was subsequently enlarged. Eogan's experience at Newgrange K (Eogan 1983) led him to argue that the mound of this first tomb was bounded by an orthostatic kerb (the stone arc), all set within the encircling ditch; Bradley drew on his work at the Clava Cairns (Bradley 1998) to suggest that the earlier tomb was small enough to leave the stone arc as a free-standing circle.

All of these authors have taken Hemp's report as their starting point, with their interpretative models being based on comparison with other Neolithic sites. This paper presents a further model for the construction of Bryn Celli Ddu based on Hemp's work and additional evidence: notably, Hemp's unpublished archive; the demonstration that the tomb is aligned on the midsummer sunrise; and the results of a radiocarbon dating programme based on material from Hemp's excavations.

THE ALIGNMENT OF BRYN CELLI DDU

The hypothesis that Bryn Celli Ddu is aligned on the midsummer sunrise was first proposed over a century ago by the astronomer Sir Norman Lockyer. His practical study of the alignment of British prehistoric monuments had begun in the spring of 1901 when he assessed the alignment of Stonehenge with a view to determining the monument's age (Lockyer 1906). This work encouraged him to study other sites across Britain and, to this end, he visited the Swansea Eisteddfod in 1907, where he called for the establishment of a *Society for the Astronomical Study of Ancient Stone Monuments* in Wales. Two men in particular headed his call, Lord Boston and E. Neil Baynes, both of whom were involved in fieldwork in north Wales.

A few months later, Boston and Baynes undertook a survey of the Anglesey tombs, with Lockyer and his wife joining them in the spring of 1908 to provide independent verification of their results. Based on their measurements down the passageway at Bryn Celli Ddu, Boston and Baynes believed that the tomb was aligned within 2° of the midsummer solstice; Lockyer's own measurements led him to the conclusion that the tomb was accurately aligned. This result was published in the 2nd edition of Lockyer's *Stonehenge and other British stone monuments* (1909).

Lockyer was a well-established astronomer with a

reputation for the quality of his observations, but his foray into archaeology was not a success. There is little evidence that his findings were ever accepted by Wales's archaeologists. This may have been because he diluted his most convincing discoveries, such as at Bryn Celli Ddu, within a sea of more ambiguous alignments based on tomb chambers which did not, themselves, have clear orientations. It is equally possible that his discoveries were met with a general lack of belief among the contemporary archaeological community that prehistoric people would have concerned themselves with astronomy. By 1914, Sir Henry Howarth, Vice President of the Cambrian Archaeological Association felt confident enough to say that 'he did not know anybody living except one great man who accepted [Lockyer's theories] and that great man was Sir Norman Lockyer!'. A few years later, Lockyer's work ceased to be referenced by archaeologists in Wales. Indeed Hemp makes no reference to it in his excavation report for Bryn Celli Ddu (Hemp 1930), and this rejection should probably be read in the context of developing antagonism between archaeologists and ley-hunters with whose linear studies Lockyer's alignment work may easily have been compounded (*cf.* Stout 2008, chap. 13).

In the summer of 2004, the author began a series of observations intended to test Lockyer's observations. Bad weather prevented verification in the first year but, in 2005, the alignment of Bryn Celli Ddu on the midsummer solstice was successfully observed and documented on Mini DV tape and 35 mm slide film (Fig. 4). Although the presumed solar alignment of Bryn Celli Ddu has been discussed by Burl (2000, 189), this is believed to be the first time that the event has been documented in film and the evidence published by an archaeologist (Pitts 2006, 6). The effect of the solar alignment consists of a beam of light from the rising sun penetrating the passage and illuminating the rear wall of the chamber with a well-defined yellow box; this narrows to a thin strip as the sun climbs eastwards over the course of about 30 minutes. The stone which is targeted by the sun is not significantly different from any other in the chamber, although it might be noted that it does contain chunks of quartz which, if the stone were clean, might reflect the light. These results vindicate Lockyer's conclusions at Bryn Celli Ddu and it is hoped will serve to encourage a more detailed investigation of his own publication and that of E. Neil Baynes (Lockyer 1909; Baynes 1912²).

RADIOCARBON DATING PROGRAMME



Fig. 4.

Sun rise at Bryn Celli Ddu, 23 June 2005. A copse obscures the line of the horizon at Bryn Celli Ddu but the trees are not planted so thickly as to prevent the alignment being recognised. On 21 June 2006 the alignment was witnessed again from the top of the mound, over 3 m above the floor of the chamber; this observation was sufficient to demonstrate that there is no significant time lag between the sun rising above the horizon and its becoming visible from within the chamber. Calculations by Frank Prendergast (pers. comm.) suggest that at 3000 cal BC, the sun would have risen two solar widths to the north (left in this picture), this change in the alignment does not alter the conclusions presented in this paper. A video of the 2005 alignment can be seen at the National Museum Cardiff

The documenting of Bryn Celli Ddu's alignment provided the inspiration for a radiocarbon dating programme drawing on Hemp's excavation archive, which is held at Amgueddfa Cymru – National Museum Wales. This archive consists of correspondence, unpublished site plans and sections, and the finds from the site, including bone and charcoal. Fortunately Hemp recorded the provenance of each of these finds and it is possible to match them to their published contexts. This detail encouraged Stephen Aldhouse-Green to consider dating the site (note in accession file 26.193), but it was only with the development of techniques for dating cremated bone that a full radiocarbon dating project became feasible.

As a first step, the charcoal from stratigraphically valuable contexts, and all of the bone from the site were re-analysed by Sheila Boardman (charcoal) and Jacqueline McKinley (human bone). Boardman's analysis largely supported the conclusions made by A. Hyde, the original analyst (Hyde in Hemp 1930, 214; Table 1), but re-analysis of the human bone from the site threw up more differences.

McKinley (2006) reports the human bone assemblage as comprising 30 fragments of unburnt and 611.6 g of cremated bone (Table 2), the latter being just a fraction of the amount that a single cremation would be expected to yield (McKinley 1989). Since only 0.25 inch and 0.5 inch sieves (*c.* 6.25 mm and 12.5 mm) were used at the site (Hemp 1930, 187), it is likely that many smaller fragments will also have been missed. Furthermore, early accounts of Bryn Celli Ddu suggest that a great deal more bone has been lost from antiquarian investigations of the chamber and passage (*ibid.*, 180). But it seems less likely that material sealed below mound material would have suffered the same disturbance. This 'earlier' material comprises two token deposits from below stones I and K in the stone arc, a 108.8 g deposit from beside stone J, and a token quantity from the central pit. Unlike the mix of burnt and unburnt bones found in the passage contexts, all of this material had been cremated.

The unburnt bone surviving from the passage may all have been derived from a single adult *c.* 21–40 years old, and the burnt bone from two adults (one >30 years old, one >18 years old) although, for reasons outlined above, this is likely to under-estimate

TABLE 1: CHARCOAL SAMPLES RETAINED FROM HEMP'S EXCAVATIONS AND RADIOCARBON DATES OBTAINED THEREFROM

Context [acc. no.]	Quantification	Radiocarbon date
<i>Contexts outside tomb structure</i>		
1 of 5 post-holes in front of entrance (Hemp 1930, 194) [36.165/2]	<i>Corylus</i> timber: 144 frags, 7.81 g <i>Corylus</i> roundwood: 3 frag, 0.17 g <i>Quercus</i> : 1 frag., 0.02 g	
1st post-hole in line beyond tomb entrance (Hemp 1930, 194) [36.165/3]	<i>Pinus</i> timber: 83 frags (6 partly vitrified), 1.77 g Indet. charcoal (vitrified): 7 frags, 0.13g	UB-6822: 6982±48 BP; -25.0 δ ¹³ C 5990–5730 cal BC
2nd post-hole in line beyond tomb entrance (Hemp 1930, 194) [36.165/4]	<i>Pinus</i> timber: 61 frags, 1.04 g <i>Pinus</i> bark: 48 frags, 0.34 g Indet. charcoal (vitrified): 7 frags, 0.13 g	UB-6823: 6968±47 BP; -25.0 δ ¹³ C (0.06 g of bark sampled) 5990–5730 cal BC
Large hole in front of entrance [36.165/8]	<i>Pinus</i> : 1 frag., 0.05 g <i>Quercus</i> : 1 frag., 0.64 g	
<i>Contexts below mound of tomb</i>		
Beneath Pattern Stone (Hemp 1930, 197) [36.165/9]	<i>Prunus spinosa</i> : 1 frag., 0.16 g <i>Prunus avium/padus</i> type: 1 frag., 0.08 g.	UB-6824: 4362±40 BP, -26.0 δ ¹³ C 3100–2890 cal BC
<i>In situ</i> burning beneath base of stone in outer kerb (Hemp 1930, 199, pl. lv, section 1) [36.165/10]	Pomoideae: 2 frags, 0.06 g Indet. charcoal: 1 frag., 0.05 g	UB-6825: 4374±40 BP, -25.0 δ ¹³ C 3270–2900 cal BC

Identifications by Sheila Boardman. All radiocarbon dates were on single fragments of wood and calibrations were produced using the IntCal04 dataset (Reimer *et al.* 2004) and Oxcal v4.1.3. Calibrations are to 2 standard deviations using the maximum intercept method (Stuiver & Reimer 1986)

the actual size of the tomb's population. Fragments of burnt animal bone, and possibly antler, mixed with these remains may be the remains of offerings. A further deposit of 57.2 g of cremated bone was found behind a stone in the tomb's outer kerb.

The radiocarbon dating programme was based on three charcoal and seven cremated bone samples drawn from the material described above, focusing on samples derived from short-life materials found in stratigraphically important contexts and with the added proviso that samples were only taken from unidentifiable human bone fragments, or from bones which could be sampled without completely destroying the specimen. This latter proviso was observed in order to preserve the integrity of the collection for future researchers. The results of this dating programme are summarised in Tables 1 and 2 and Figure 5, and are incorporated into the discussion which follows.

THE MESOLITHIC AT BRYN CELLI DDU

The earliest dates from Bryn Celli Ddu come from post-holes in front of the tomb entrance (see Figs 2 & 5; Table 1). Hemp (1930, 193) noted that this entrance area was the most complex part of the site to excavate and he allowed for the possibility that he might have misinterpreted the evidence. His uncertainty is clear from discrepancies between the details of plans for this area in the site archive. On some Hemp illustrates five post-holes in a line (as in his published report), but at one point he believed there were eight post-holes forming a three-sided structure. Mesolithic dates were obtained from two of the post-holes (5990–5730 cal BC; UB-6822 and 6823; Table 1), pre-dating the tomb by some 3000 years. There are no parallels for this discovery within Wales³.

A smaller pit to the north-east of this line of posts contained an ox burial, the skull and long bones of

TABLE 2: HUMAN BONE RETAINED FROM HEMP'S EXCAVATIONS AND RADIOCARBON DATES OBTAINED THEREFROM

<i>Context [acc. no.]</i>	<i>Quantification</i>	<i>Radiocarbon date</i>
<i>Contexts below mound of tomb</i>		
Hollow marked by upright stone, c. 0.9 m inside stone 'J' of stone arc (Hemp 1930, 202) [99.39H/2]	108.8 g (adult >25 yr, ??f)	UB-7113: 4384±46 BP; -24.0 δ ¹³ C 3310–2900 cal BC
Stonehole 'I' in stone arc (Hemp 1930, 203) [99.39H/14]	8.4 g (adult >18 yr)	UB-7116: 4573±40 BP; -21.0 δ ¹³ C 3500–3100 cal BC
Base of central pit (Hemp 1930, 196) [99.39H/13]	2.5 g (sub-adult)	
Beneath stone 'K' of stone arc (Hemp 1930, 203) [99.39H/8]	0.7 g (infant)	
<i>Contexts associated with use of tomb</i>		
Bottom layer of passage between stones 13 & 15 [99.39H/12]	30.1 g (sub-adult >13 yr) 0.1 g burnt animal bone	UB-7115: 4360±44 BP; -32.0 δ ¹³ C 3100–2890 cal BC
Passage, opposite stone 13, in lowest layer [99.39H/7]	37.3 g & 3 frags (adult >21 yr; adult >18 yr)	
South half of passage opposite stone 12 [99.39H/16]	25.7 g (adult >18 yr)	UB-7117: 4395±40 BP; -20.0 δ ¹³ C 3310–2900 cal BC
North half of passage opposite 11. [99.39H/9]	58.5g and 8 fragments. (adult >30 yr; adult >18 yr)	
Passage between stones 10 & 11 below, among & above 'pavement stone' [99.39H/5]	44.0 g & 3 frags (2 adults >18 yr; adult >18 yr)	
West end of passage between stones 10 & 11 [99.39H/11]	23.3 g (adult >21 yr)	UB-7114: 4409±39 BP; -24.0 δ ¹³ C 3330–2910 cal BC
Left side of passage stones 10 & 11 [99.39H/18]	0.3 g & 3 teeth (sub-adult >13 yr; adult c. 21–40 yr)	
Passage, opposite joint between stones 9 & 11 [99.39H/20]	1 tooth (adult c. 21–40 yr)	
South side of passage [99.39H/10]	17.2 g & 4 frags (adult >18 yr; sub-adult >13 yr)	
SW end of passage [99.39H/19]	1 tooth (adult c. 21–40 yr)	
Passage [99.39H/3]	37.1 g & 2 frags (adult >21 yr; adult >18 yr) 1.5 g burnt animal bone	
Passage [99.39H/6]	77.8 g & 5 frags (adult >30 yr; adult >18 yr) ?unburnt antler frag.	
Cavity behind stone 29 of outer kerb (Hemp 1930, 200) [99.39H/17]	57.2 g (adult >30 yr)	UB-7118: 4351±35 BP; -26.0 δ ¹³ C 3090–2890 cal BC

Identifications by Jacqueline McKinley. Cremated bone given by weight, unburnt bone by number of fragments

OxCal v4.1.3 Bronk Ramsey (2009); r:5 IntCal04 atmospheric curve (Reimer et al 2004)

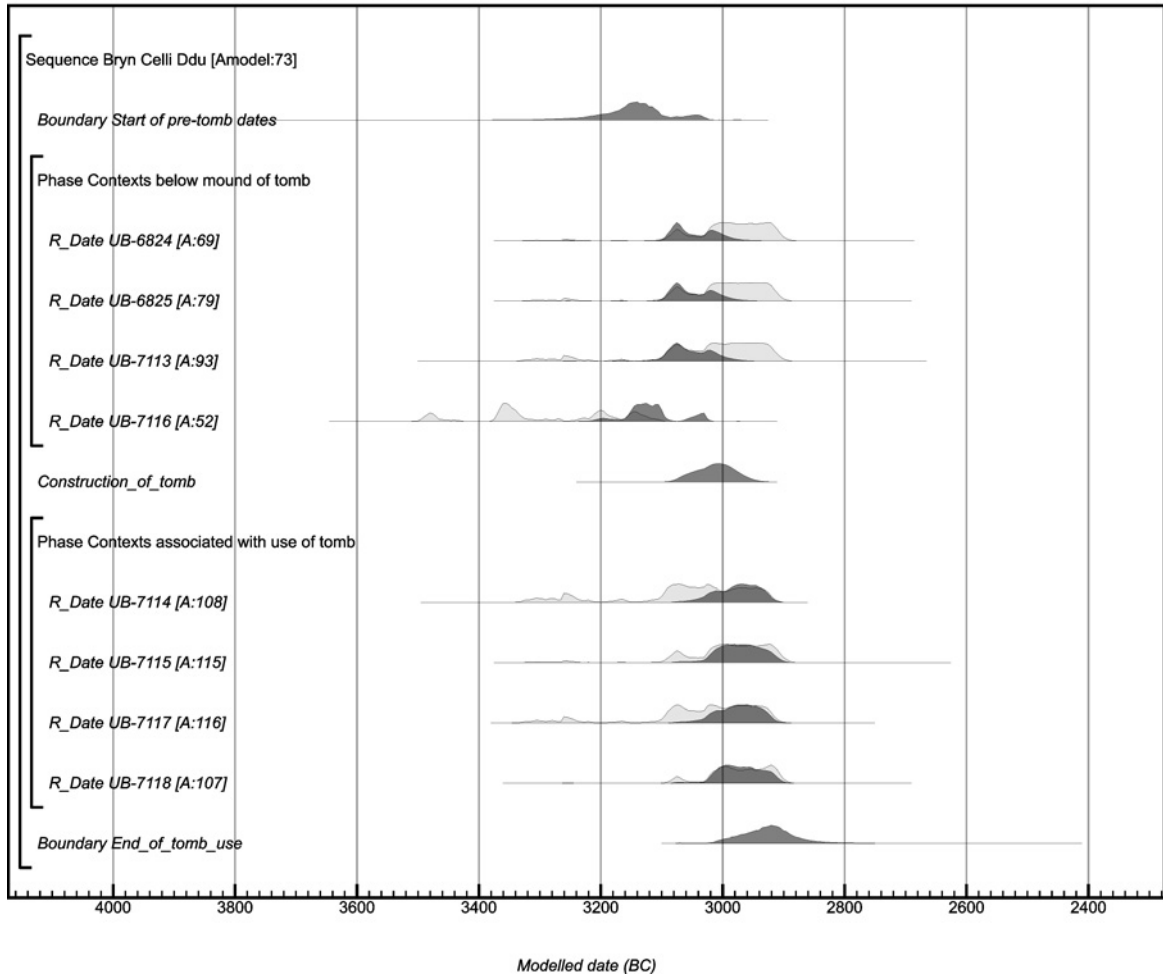


Fig. 5.

Bayesian model based on Neolithic radiocarbon dates from Bryn Celli Ddu, calculated using Oxcal v.4.1.3 (Bronk Ramsey 1995; 1998; 2001; 2009)

which were sent to Manchester Museum after the excavation but can no longer be found (Sitch pers. comm.); the remaining bones were reburied in the entrance area (Hemp 1930, 213). The possibility that this ox might be prehistoric is of particular interest.

THE CASE FOR A HENGE AT BRYN CELLI DDU

The identification of the first phase of Neolithic activity at Bryn Celli Ddu has been at the centre of

debate about the site for many years. The most widely publicised view has been that of Claire O’Kelly (1969) whose argument focused on the purple clay floor which Hemp had found below the mound and in the ditch, and which she believed was evidence for an earlier enclosure. Her view was based on parallels with Irish sites which led her to believe that this clay layer was the remains of a buried soil.

Paraphrasing O’Kelly’s model, she argued that, since the hypothetical ‘buried soil’ was found at the ‘base’ of the ditch, the ditch must have been open for an extended period before the construction of the

tomb. Furthermore, in order for this pedogenesis to have occurred, the ditch must have already eroded and filled until a stable profile had been reached. O'Kelly's thesis was that Hemp had only excavated down to a buried soil topping this 'stabilisation layer' and not to the base of the ditch – a view which draws indirect support from Hemp's own published statements that he did not bottom two of his three ditch sections (Hemp 1930, pl. lv).

Since the buried soil formed a layer across the interior of the site, O'Kelly argued that this area could not have been covered by the ditch spoil which, by implication, must have been mounded outside of the monument. Together, these points suggested to her that Bryn Celli Ddu had an initial phase of life as a henge containing a stone circle and that, when the henge ditch had been open for sufficient time for a buried soil to form, the monument was covered by a passage tomb. This model has been widely endorsed (eg, Herity 1974, 73; Holgate 1982, 159; Lynch 1991, 94), and has become embedded within Cadw's interpretation boards at the site. As such it has achieved prominence as a case study for the interaction of different Neolithic monument types – the henge and the passage tomb – with the apparent reversal of the expected chronology of these monument types doubtless adding to the level of interest in this model (*cf.* Burl 2000, 188–9).

But the interpretation of the ditch at Bryn Celli Ddu as a henge is problematic. No bank survived outside the ditch, neither did the ditch sections provide evidence for its former presence. It could be argued that an external bank had been built a sufficient distance from the ditch as to preclude it eroding into the ditch fills, but this is unproven. Conversely, the mound material covering the passage tomb must have come from somewhere, and the simplest assumption is that the ditch supplied it (as acknowledged by O'Kelly 1969, 24, and discussed further below). O'Kelly's contention that the ditch was open for a significant length of time prior to the construction of the tomb is also difficult to sustain for two main reasons.

First, Hemp's archive contains multiple drawings of the one section that he did apparently bottom: field drawing, rough-inked version, and the published illustration (Hemp 1930, pl. lv.2). The field version shows that he significantly over-cut the inner edge of the ditch down to the base but that, as he moved from field drawing to published illustration, he removed the over-cut from the drawing (Fig. 6). Had there been a

deeper cut to the ditch profile, it seems certain that he would have recognised it.

Second, there is no proof that the purple clay floor was a buried soil. In 1989, Mike Yates located this layer during conservation work on the site and, in 1996, Frances Lynch excavated a 2 m square area within the interior of the monument, specifically to examine it (Lynch n.d.). The context was identified and studied by the soil scientist David Jenkins. Jenkins concluded, on mineralogical grounds, that the purple clay layer was local to the area and had not been imported to the site, invalidating Hemp's hypothesis of a source in the Menai Straits. But, Jenkins's analysis also led him to argue that '[a]s to [the purple clay layer] being a possible buried organic horizon, the organic carbon analyses do not support such an interpretation. The colour difference which is not pronounced in the field and only just detectable in the Munsell code must be ascribed to some other pigmenting factor'.

Therefore, on current evidence, there seems no reason to believe that the ditch had been open for a length of time sufficient for a buried soil to form prior to the construction of the passage tomb. On these, and radiocarbon grounds, O'Kelly's model of an early ditched enclosure at Bryn Celli Ddu does not seem sustainable⁴.

A NEW CONSTRUCTION MODEL

The model which I present here begins, as Hemp's did, with the digging of a pit at what was to become the centre of the monument (Hemp 1930, 206). Cremated bone had been placed at the base of this pit which may well have then served to hold a post (see O'Kelly 1969, 27). This pit/post was used as a marker during the laying out of the stone arc, with opposing pairs of stones being joined by lines which cross this central feature (Hemp 1930, 203). Small quantities of cremated bone were placed beneath, or close to, several of these stones, as detailed in Table 2.

Three of the stones in the arc ('G', 'H', and 'I') do not have opposing partners (Fig. 7). Working from Hemp's plan of the site, it seems likely that 'H' and the central pit were used to orientate the monument on the solstice alignment. In addition to this central alignment, lines following the walls of the inner passage converge on stone 'H', suggesting that this

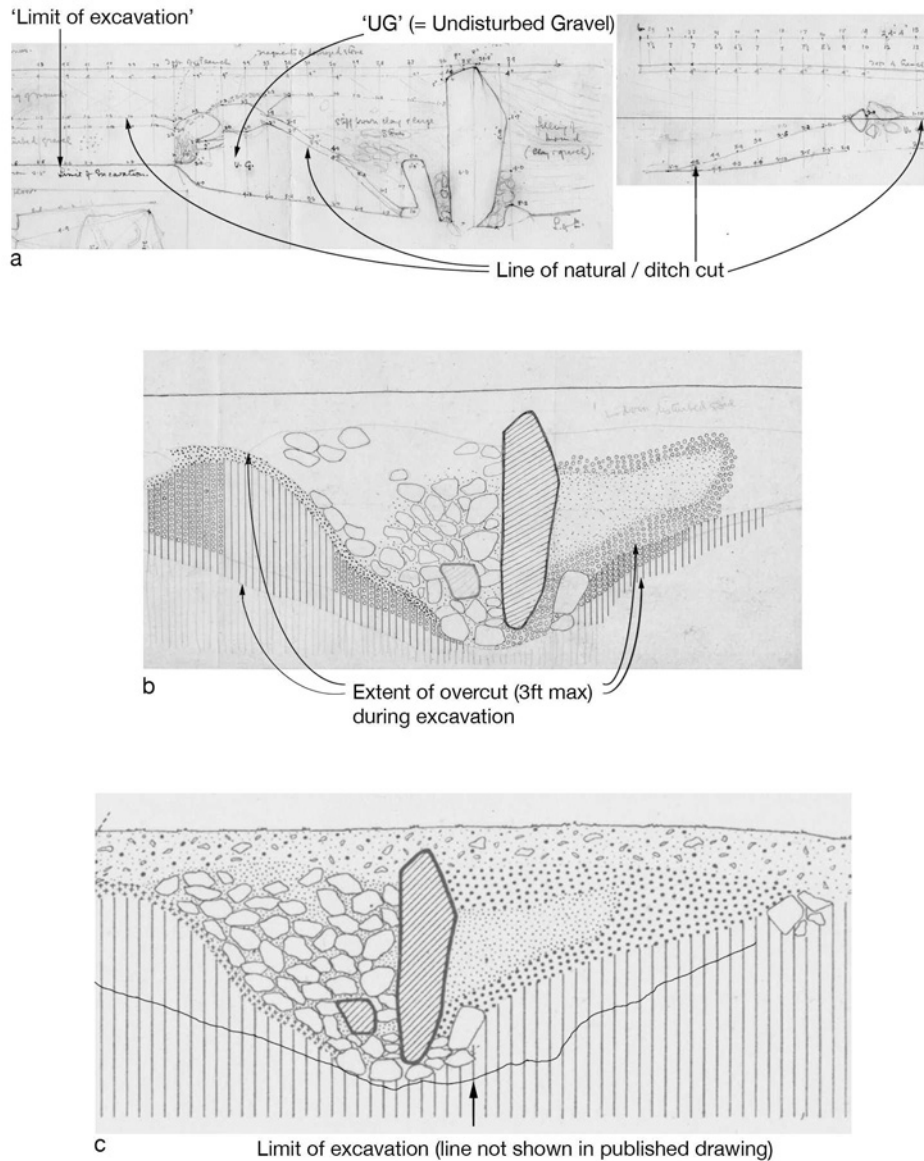


Fig. 6.

Ditch section bottomed by Hemp: a. site drawing with annotations indicating the areas that were over-dug; b. inked version still indicating over dug areas; c. published plan (Hemp 1930, pl. lv, section 2) which does not show the over dug area

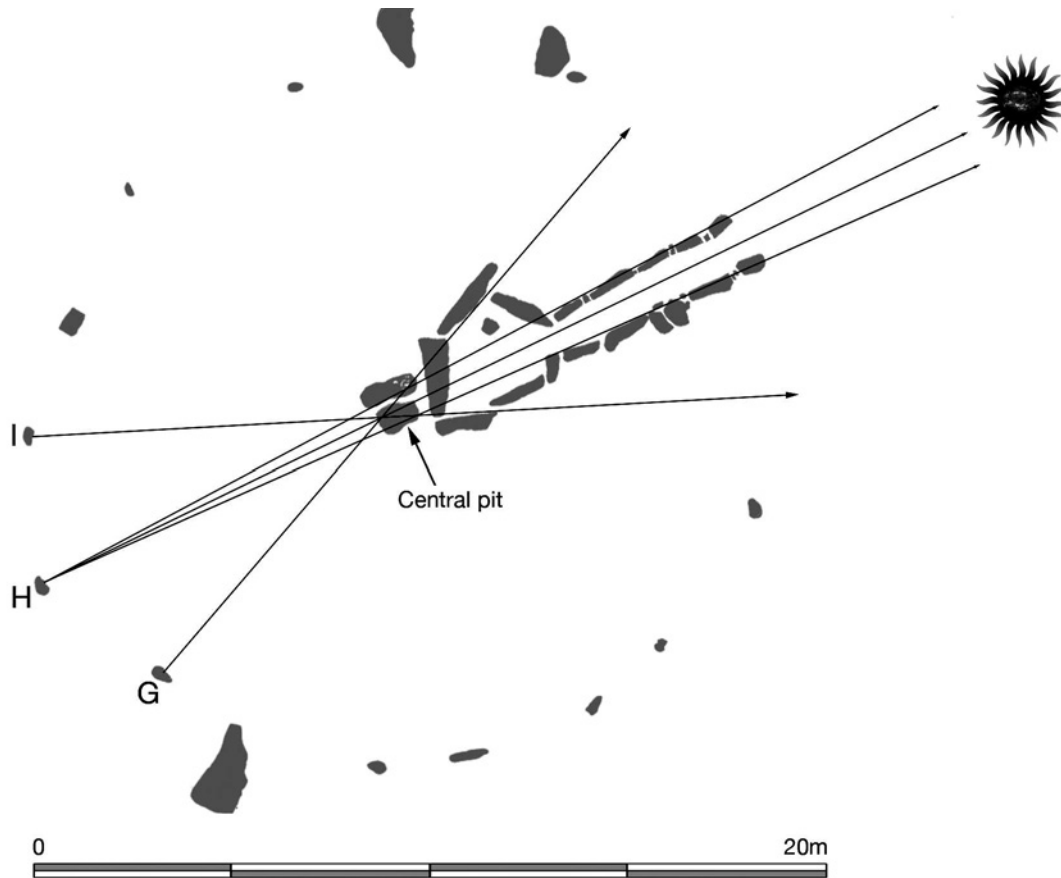


Fig. 7.

Site plan indicating the relationship of the stone arc and central pit to the orientation and arrangement of the chamber and passage orthostats

stone was also used as a guide to ensure that the passage opening was sufficiently wide to frame the solstice sunrise when viewed from within the chamber. Furthermore, lines marked out from both 'G' and 'I' across the central pit are mirrored by the alignment of two orthostats in the tomb chamber (Fig. 6)⁵. In combination, this evidence suggests that the construction of the stone arc was closely related to the laying out of the chamber and the inner passage. The remaining 12 stones of the arc do not have an obvious role. Possibly they were intended either to 'capture'

the sun within the enclosing arms of the arc, or to begin the demarcation of the interior of the arc as a sacred space for monument building.

The two radiocarbon dates produced from cremated bone found in these pre-mound contexts are presented in Figure 5 (see UB-7113 and UB-7116). These can be viewed beside the results of short-life charcoal dates from other pre-mound contexts (see below), albeit with UB-7116 sitting as a statistical outlier (*individual agreement index* 51.5%, a little lower than the 60% agreement recommended by

Bronk Ramsey 2009). If UB-7116 is indeed older, rather than being a statistical anomaly, then it presumably represents the accidental incorporation of residual bone or perhaps the deliberate use of curated bone during the construction of Bryn Celli Ddu⁶.

The building of the inner passage and chamber was probably undertaken at the same time as the digging of the ditch which is the obvious source of the mound material which would have been needed to stabilise the shallowly-bedded orthostats. In addition, scrub clearance and burning probably took place across the site, since short life charcoal was found in *in situ* burning at the base of the ditch and in the centre of the monument beneath a decorated slab (sampled as UB-6825 and UB-6824 respectively) which itself lay flat beside the central pit and below the later mound. This decorated slab, known since its excavation as the 'pattern stone' is of particular interest. It has a pecked design of spirals and curvilinear lines running around three of its sides (Fig. 8), with the coherency of the design suggesting that the stone was carved while upright, although it cannot be certain that it was intended to be viewed this way. This suggests that it was the knowledge that it had been carved which was more important to the builders than its display as an art work in the contemporary sense. As such its carving probably dates to the planning of the monument, the work perhaps encouraging an appropriate mindset for the project as a whole, and since it was found lying flat beneath the approximate centre of the mound, it seems reasonable to view it as the symbolic heart of the tomb.

The size of the mound which could have been raised from the ditch material alone is also of interest. Bryn Celli Ddu's ditch has a central diameter of *c.* 26 m and is *c.* 5 m across and *c.* 1.5 m deep. It does not seem to have been broken by an entrance causeway, although this is not certain. This ditch would have been sufficient to provide between 200 m and 240 m³ of gravelly soil, enough to cover the chamber's capstone with a 3 m high domed mound⁷ 13–14 m in diameter, but not sufficient to have covered the tomb to this height up to the edge of the ditch. In consequence, it is argued that the tomb was initially covered by a small, off-centre, mound enclosing just the chamber and inner passage (Fig. 9a).

As well as stabilising the orthostats, the mound would also have assisted in eliminating the light from the interior of the monument, allowing the accuracy of the sunrise alignment to be assessed. The open ditch

could itself have served to further demarcate the sacred space of the tomb, a point re-inforced by the apparent lack of entrance causeway which would have made access to the monument physically difficult at this stage in its construction.

The view of the horizon down the passage of this first phase monument would have been much wider than it appears today (Fig. 9a), with much of the left (northern) side of the opening being unnecessary since the sun would have appeared broadly in the middle of the doorway and then risen to the right (south). The design of the outer passage suggests that the enlargement of Bryn Celli Ddu from its first phase to the final phase tomb (Fig. 9b) was an attempt to refine this solstice view, narrowing the entrance and passage in order to increase its drama.

The outer passage extends the length of the passage into the ditch, beginning as a drystone lining butting the north side of the inner passage. This drystone lining was identified by Hemp (1930, 188) as a clay-set wall preserved to the height of the passage's primary fills, but which was probably originally a full height wall (Fig. 10). At the original entrance to the inner passage, its character changes, consisting of three tall orthostats which once supported a capstone and which restricted considerably the width of the entrance at this point. Beyond this point, the passage continues for 3 m as a line of 0.6 m high orthostats. At the north-east end the outer passage joins with the outer kerb of the tomb and it is likely that both these features were constructed at the same time. This kerb of substantial stones sits in the base of the ditch where, Hemp argued, it must have been set shortly after the ditch was opened (Fig. 6). A layer of mound material was built up against the inner face of this kerb, presumably forming a low platform covering the remaining open ground enclosed by the ditch. A second, less substantial inner kerb was then built on top of this layer, providing further definition to the entrance area and the circumference of the monument (see Fig. 6 and plan view in Fig. 2). Convention would suggest that the whole monument was then completely covered by a domed mound although there is no evidence to support this view. As an alternative, it could be argued that the monument was left as a low stepped platform with only the first phase mound raised to any significant height. If the latter hypothesis is correct, the finished monument would have looked similar to its present day appearance, albeit with a slightly larger mound covering the chamber.

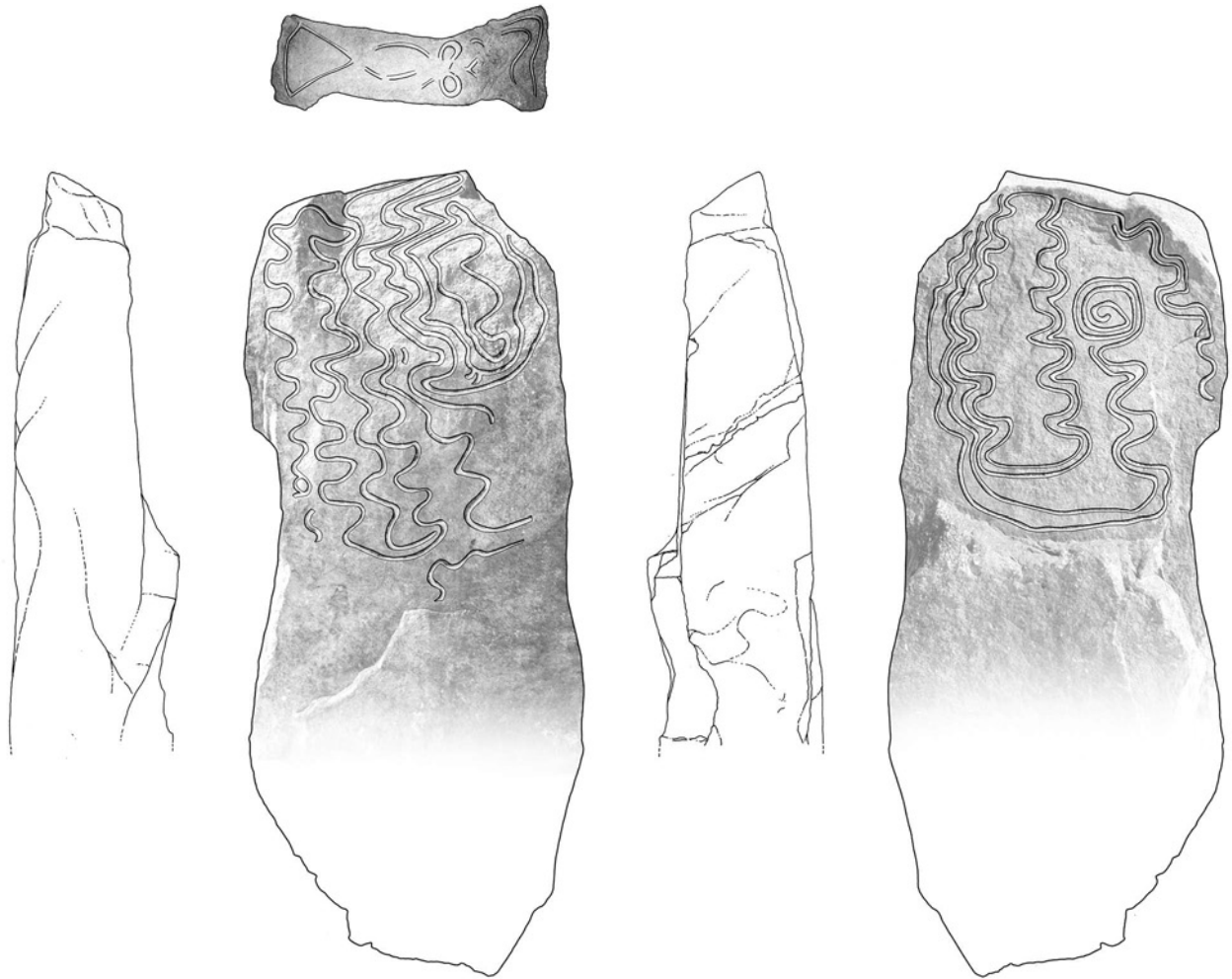


Fig. 8.

The pattern stone. The lower part of the stone has been roughly shaped, probably by burning and breaking off a projection on the lower right to increase the symmetry of the piece. The decoration on the stone accentuates flaws and fracture lines in the stone, and it seems likely that the design was produced on the basis of what the stone could offer, rather than being in line with an entirely preconceived concept (The pattern stone is stored upright in a removable metal frame which prevents ready access to the lower part of the stone. The outline shape of the stone was produced when the stone was lifted for redisplay in a new gallery. It was not possible to draw the entire stone during this narrow window of opportunity, but its surface was inspected carefully for additional markings, none of which were found.)

DATING THE TOMB'S CONSTRUCTION

Eight dates were derived from contexts stratigraphically linked to the development or use of the tomb. Four from contexts which were sealed by mound material, and four which relate to the use of the tomb as a burial place (Table 2). With the possible exception of UB-7116, discussed above, all have

calibrated ranges falling between 3500 and 2910 cal BC, which includes an unfortunately flat portion of the calibration curve. Nonetheless, the stratigraphic distinction between pre-tomb and tomb contexts allows a Bayesian model to be constructed which suggests that the tomb was built sometime between 3045 and 2978 cal BC at 1 sd and 3074 and 2956 cal

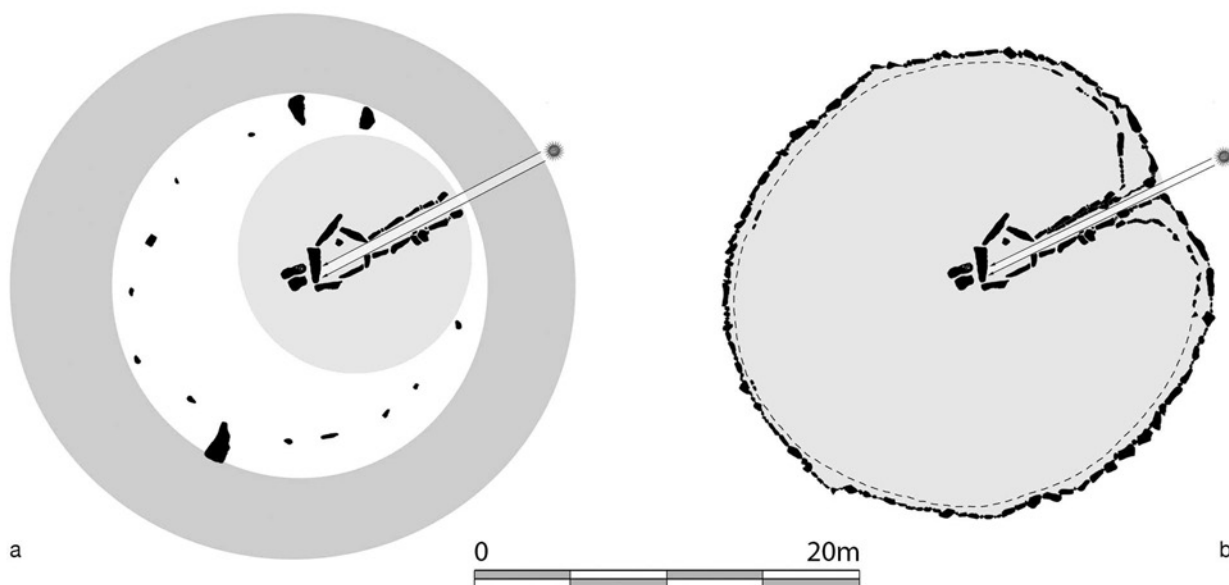


Fig. 9.

Phased construction model suggested by the author: a. first phase consisting of central pit, ditch, chamber, inner passage, and small mound; b. final phase including the outer passage, kerbs, and enlarged mound

BC at 2 sd. If enough labourers were available the construction sequence described above need not have taken long to complete. Just 2 years would have been sufficient, to mark out the solstice, build the tomb, and then double-check and refine the alignment in the second year.

There are very few dates from developed passage tombs in the Irish Sea area. The Mound of the Hostages, Co. Meath, is the most securely dated (O'Sullivan 2006), and a construction date towards the end of the 4th millennium BC can be suggested on the basis of these determinations. Dates from other sites in the Boyne Valley, such as Knowth and Newgrange, also suggest a major building phase in the last centuries of the 4th millennium (O'Kelly 1982; Eogan 1986; Grogan 1991). On present evidence it seems, therefore, that the spread of passage tombs to Anglesey occurred late in the history of this tomb-type.

RITUALS OF DEATH

The disturbance of chamber and passage deposits in the 18th and 19th centuries severely limits our knowledge of Bryn Celli Ddu as a burial place. Early records describe the discovery of human bone but without detailed indications of context or quantity (Hemp 1930, 179). Even so, Hemp recovered a very small quantity of bone from the passage during his own excavations and three radiocarbon dates were obtained from this (UB-7114, 7115, 7117), along with a single date from a cremation deposited behind a stone of the outer kerb near the entrance (UB-7118). Only unidentifiable bone fragments were dated, raising the possibility that these all derive from the same cremated individual, but this seems unlikely since the samples were recovered from primary contexts at different points along or outside the passage. Bayesian modelling of these dates suggests

Bryn Celli Ddu was in use as a burial site for between 5 and 182 years (at 2 sd).

But the rites of death at Bryn Celli Ddu extended beyond the deposition of bone and several features of the site's architecture provide some clues as to what was considered an appropriate reverence for these human remains. The tomb's careful alignment on the summer solstice clearly linked the dead to an annual solar rhythm and, specifically, to the warmest and most physically comfortable part of that rhythm. In this the tomb builders were mirroring developments at other passage tombs, as detailed below. Frances Lynch (1973) has also argued, from evidence in Hemp's report, that the outer passage may have been deliberately blocked during the Neolithic so that the dead were sealed off from the living, and the sun's rays could only penetrate the chamber as a narrow slit (Fig. 10). Once this blocking was in place, the only way to add more remains to the chamber would have been to either throw them in or to crawl over or dig out the clay-set packing.

Given the possibility that the chamber may have been sealed off at an early stage in its history, it is interesting to note that the dead seem to have been provided with a symbolic companion. In the north side of the chamber is a free-standing stone pillar, which rises *c.* 1.70 m above ground level (Fig. 11).

Burl (1999, 167) interpreted this as a 'protectress', analogous to similar stones found in Breton tombs or, indeed, to the apparently anthropomorphic decoration on stone 22 at Barclodiad y Gawres, also on Anglesey (see also Powell & Daniel 1956, 42). Within the gloom of the tomb, the pillar certainly appears anthropomorphic, although phallic symbolism could also be argued. What is especially interesting is that the pillar was set in a position within the tomb which is permanently in shadow. To extend the protectress metaphor, the pillar has watched over the bones in the chamber since their deposition and has witnessed the solstice sun shining on the quartz-rich rear wall of the chamber, while never being illuminated itself.

If Lynch is correct in her view that the outer passage was blocked shortly after its construction – and the radiocarbon dates support her in this – then it is possible that the protectress was the only witness to the sunrise effect until the tomb was disturbed in more recent times. This has important implications for an understanding of the purpose of the solstice alignment, suggesting that it was created to nourish the dead rather than the living. For anyone performing ceremonies outside the tomb, the ray of light striking the rear wall of the chamber would have provided a rare and limited view of a normally dark and inaccessible space.

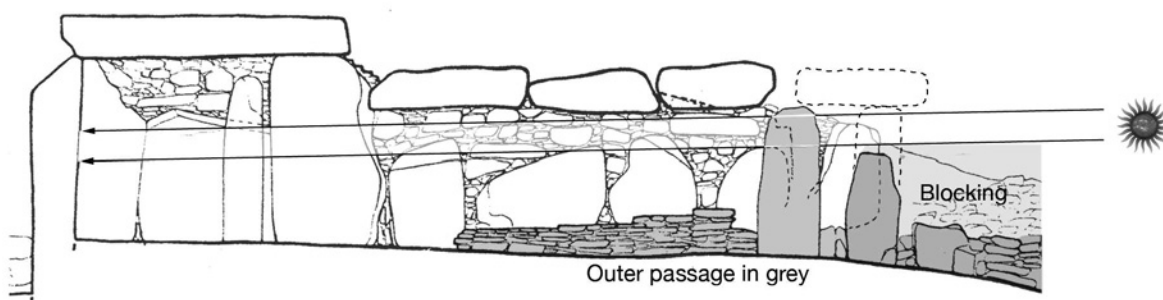


Fig. 10.

Section view of the passage distinguishing between first and final phase construction elements (based on an unpublished field plan produced November 1928, rather than the published plan which includes amendments to the entrance area).

First phase, chamber and inner passage shown in white; final phase, outer passage and outer kerb shown in grey. The possible implications of the now-missing outer capstone and the blocking of the outer passage on the solar alignment, as argued by Lynch (1973), is indicated



Fig. 11.
The pillar stone set within the chamber (photo from
Hemp's excavation archive)

SECRET KNOWLEDGE

The inaccessibility of the chamber's contents, the purpose of the passage's alignment (only obvious if pointed out on the solstice), and the pillar stone, all suggest that Bryn Celli Ddu was deliberately imbued with 'secret knowledge' which would have required a level of initiation before it could be understood. And it is likely that this process of texturing the monument with meaning was begun at the very start of construction work, as evidenced by the token cremation deposits concealed beneath the stone arc, and the pattern stone laid flat and sealed by the mound. Many of these features find parallels at other passage tombs, suggesting that the builders were conversant not just with the constructional elements of this monument type, but also with the associated symbolism of the construction process. Either the builders were local to Anglesey, but were immersed in the detail of passage tomb ritual as practised in Ireland, Brittany, or further south along the Atlantic seaboard, or they were an immigrant community from one of these areas.

Some elements of the secret knowledge at Bryn Celli Ddu are widespread across areas in which passage tombs were built. Hidden decoration is known from the Boyne valley and Brittany (eg, Eogan 1998; Le Roux 1985), while solar alignments are known from the Boyne Valley (Newgrange, midwinter sunrise; Patrick 1974), Orkney (Maes Howe, midwinter sunset; MacKie 1988), and the Channel Islands (Le Hougue Bie, spring equinox; Patton *et al.* 1999). In this context, the suggestion raised by Pollard and Ruggles (2001) that the solar alignment at Stonehenge may have been observed when this monument was first built (around 2950 cal BC) becomes particularly interesting.

Other features at Bryn Celli Ddu serve to re-inforce the link between this tomb and structures in Ireland. Ó Súilleabháin (1988, 169) has argued that the inner kerb at Bryn Celli Ddu has parallels with Fourknocks I in Co. Meath, Ireland (Hartnett 1957, pl. lxiv), while the continuous ditch, central pit, and hidden decoration has parallels at Fourknocks II (Hartnett 1971). Eogan's suggestion of a parallel between the Bryn Celli Ddu ditch and that found at Newgrange K has already been noted (Eogan 1983). The decoration on the pattern stone has been linked to that found at Drumreagh, Co. Down, Ireland, and Monté do Eiró in Portugal (Ó Súilleabháin 1988, 167; Shee Twohig

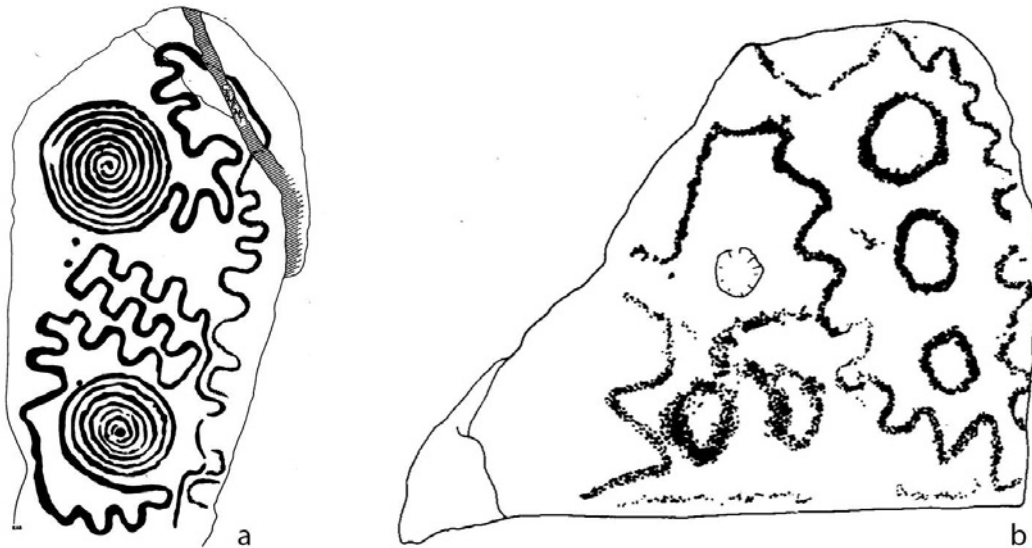


Fig. 12.

Suggested parallels for the Pattern Stone: a. Monté do Eiró, Portugal; b. Drumreagh stone Co. Down (after Shee Twohig 1981, figs 272, 277. By permission of Oxford University Press)

1981, figs 272, 277; Fig. 12), while Lynch (1967, 20) has suggested a stylistic link with Gavrinis in Brittany. On the basis of the evidence presented above, it seems likely that the inspiration for, and perhaps the builders of, Bryn Celli Ddu came from Ireland, but the possibility that the tomb has its origins in Brittany or Iberia cannot be ruled out.

Other evidence for an intrusive 'classic' passage tomb culture within this part of Britain is sparse. Most prominent is the tomb of Barclodiad y Gawres set on a sea cliff, 18 km west of Bryn Celli Ddu; the extensive decoration at this site has been linked to sources in Iberia (Powell & Daniel 1956, 57) and Ireland (Lynch 1967, 22). A Carrowkeel ware bowl has also been found 10 km to the north in a pit at Llanbedrgoch (Redknap 1996; identification by A. Sheridan, pers. comm.). To date this example of an Irish pottery style, typically associated with passage tombs, is unique in the Welsh Neolithic. Further afield is the spiral-decorated stone now in the Church of St Peter, Llanbedr, which may be derived from a passage tomb (Lynch 1992), and the Calderstones, near Liverpool (Forde-Johnston 1957).

TOMB USE AND MONUMENTAL ARCHITECTURE IN WALES AROUND 3000 CAL. BC

These passage tomb intrusions were built in a region which already had a long tradition of megalithic construction, including such forms as portal dolmens and Clyde-related cairns and, further south, Cotswold-Severn tombs (Burrow 2006; Nash 2006). Many of these monuments, built in the first half of the 4th millennium cal BC, were probably still relevant to the lives of later generations as sites of ritual activity. This is demonstrated on Anglesey at Trefignath, where Peterborough pottery was deposited in the forecourt of a tomb related to the Clyde Cairn series (Smith & Lynch 1987, 78), and further south at Gwernvale in Powys, where the same pottery style was buried in pits in front of the entrance to a Cotswold-Severn tomb (Britnell & Savory 1984, 88).

Other Cotswold-Severn tombs in south Wales continued to be used as burial sites, albeit intermittently, for example at Parc le Breos Cwm on Gower, where a body was interred 3350–2910 cal BC (OxA-6489 4445±60 BP; Whittle & Wysocki 1998, 148), and Thornwell Farm in Monmouthshire, where

two individuals were buried in 3340–3020 cal BC and 3020–2890 cal BC (OxA-18899, 4833±30 BP and OxA-18897, 4325±29 BP; Maylan 1991). And burial also continued at the portal dolmen at Carreg Coetan Arthur in Pembrokeshire with a cremation being interred 3100–2890 cal BC (UB-6752, 3214±70 BP; Kytmanow 2008, 101). But while old tombs continued to have value in south and west Wales there is no proof that new tombs were built in these areas around 3000 cal BC.

This was not the case in north Wales as Bryn Celli Ddu demonstrates, and it may not have been the only tomb to be built at this time, with Bryn yr Hen Bobl, just 1.5 km away, providing the best evidence to support this claim. Bryn yr Hen Bobl, also excavated by Hemp, consisted of a kidney-shaped mound opening to a single chamber, butted by a *c.* 90 m long terrace (Hemp 1935). Peterborough sherds were used as foundation deposits beneath this terrace (Leivers *et al.* 2001, 9) indicating a construction date after 3400 cal BC, while radiocarbon dates on inhumed bone in the tomb chamber show that this was in use by 3330–2920 cal BC (OxA-12742, 4441±34 BP; Schulting, pers. comm.). Bryn yr Hen Bobl does not fit easily into a classic typological group – it lacks a passage and its builders practiced inhumation rather than cremation – but as Herity (1974) has argued, some of its features bear comparison with passage tomb design and ritual. For example, it has a monumental mound, up to 37 m in diameter, and a central chamber which is comparable to that in the Mound of the Hostages, Tara. A bone ball found in this chamber is also comparable with finds in Irish passage tombs. Although it is not a typical passage tomb, Bryn yr Hen Bobl suggests the work of a community influenced by passage tomb culture. And the possibility that it is part of a wider burial tradition on the island is suggested by the tomb at Pant y Saer (Scott 1933) which also has a kidney-shaped mound and inhumed burials.

Although it is not known with certainty when Bryn yr Hen Bobl was built, OxA-12742 demonstrates a likelihood that it was in use before the construction of Bryn Celli Ddu, as dated by the model presented above. If this is indeed the case, then it suggests that the builders of this latter monument may have begun their work in an area which was already well-aware of passage tomb culture, even if the details of this tradition's architecture and ritual may not have been widely appreciated.

These substantial tombs must have stood out at this time as dramatic and permanent statements, contrasting with the ephemeral architecture of settlement. Indeed, contemporary domestic structures are entirely unknown on Anglesey, with occupation features being largely confined to pit sites like those at Capel Eithin (3350–2870 cal BC, CAR-488, 4380±80 BP; White & Smith 1999), Cleifiog Uchaf (3370–2490 cal BC, Beta-127199, 4300±150 BP; Davidson unpublished), and Llanbedrgoch (3500–3090 cal BC, Beta-90547, 4560±50 BP; Redknap 1996). Another well-dated group containing Peterborough Ware has also been found just 8.5 km from Bryn Celli Ddu, across the Menai Straits at Parc Bryn Cegin (Kenney 2005).

The only other substantial construction project in north Wales which radiocarbon dates place as a near contemporary of Bryn Celli Ddu is Llandegai A, adjacent to Parc Bryn Cegin (Lynch & Musson 2001). This consists of an 80 m diameter circular enclosure with bank inside ditch. The enclosure is not itself directly dated but cremated bone and oak charcoal from pits in the interior have returned dates of 3370–2930 cal BC and 3350–2920 cal BC respectively (GrN-22954, 4480±50 BP and GrN-27192, 4450±40 BP). Furthermore, immediately outside the narrow south-west entrance was dug a small circle of elongated pits which contained cremated remains from at least six individuals. Two oak charcoal dates from these returned 3020–2880 cal BC and 3330–2910 cal BC (GrN-26817, 4320±30 BP and GrN-26818, 4420±40 BP). The function of Llandegai A is unknown, although its association with the dead suggests its use had a ritual component. Its size, precise circularity, and narrow entrance has led several authors to compare it with Stonehenge Phase 1, a comparison re-inforced by the cremation deposits found at both sites (Parker Pearson *et al.* 2009), but it has more local parallels in Wales and the Borders, including Castell Bryn Gwyn on Anglesey (Wainwright 1962), and Ysceifiog in Flintshire (Fox 1926) (see Burrow 2010 for further possible examples). Given that enclosures like these appears to have been among the most pronounced architectural statements made in north Wales at the end of the 4th millennium cal BC it might perhaps be reasonable to see the encircling ditch at Bryn Celli Ddu as being inspired in part by this tradition, rather than purely by rare Irish passage tomb precedent. Certainly the builders of this passage tomb must have been aware

that they were going about their work in a region with its own contemporary monumental traditions.

Although the present study has provided fresh information about Bryn Celli Ddu's construction date and initial use as a burial site there is no evidence to indicate that it served this role for very long, or that it provided a focus for much subsequent Late Neolithic activity. Indeed, evidence of continued use of the area around it is absent until the construction of a round barrow and standing stones in the Early Bronze Age (Newell 1931). This might seem surprising given the apparent continuity of use and re-use at passage tombs in the Boyne Valley (Stout 2002), but it is possible that it is a consequence of Bryn Celli Ddu's peripheral position within the geographical area over which passage tombs were common. Indeed, while Bryn Celli Ddu went out of use, Llandegai – part of a more 'British' tradition of 'formative henges' – continued to be an important ritual centre with its circular enclosure being replaced by a henge which closely mirrored the size and alignment of the earlier monument. After a brief moment of drama, the planting of a passage tomb tradition in Wales appears to have withered to nothing.

Endnotes

¹It has become normal to describe this feature as a stone circle although excavation failed to locate stone-holes on the otherwise open north-eastern side of the arc (see Hemp 1930, 204). In the absence of evidence for a complete stone circle it seems unreasonable to perpetuate this descriptive term at Bryn Celli Ddu.

²Baynes (1912, 23) notes that the chamber of Presaddfed is remarkably similar in design to Bryn Celli Ddu, and he proposes that this site may also have had a passageway aligned on the midsummer sunrise. This conclusion is worth investigating.

³Bryony Coles (pers. comm.) has suggested that these pine posts may have been made from bog wood. If this is the case the possibility remains that the structure outside the entrance of Bryn Celli Ddu may still date from the time of the tomb. Mesolithic pine charcoal has also been dated at two other later sites in Wales: a ring ditch at Four Crosses (CAR-850, 6990±80 BP; Warrilow *et al.* 1986, 62), and in a feature below the enclosure bank of Llandegai A (GrN-27193, 7965±25 BP; Lynch & Musson 2001, 117). Beyond Wales, Mesolithic pine posts have also been found in the carpark at Stonehenge, a site which bears other comparisons with Bryn Celli Ddu (HAR-455, 9130±180 BP; HAR-456, 8090±140 BP) (Cleal *et al.* 1995, 43–7).

⁴The stratigraphy of the encircling ditch has become pivotal to interpretation of Bryn Celli Ddu and yet the various interpretations which have been proposed are entirely reliant on the results of excavations conducted almost 90

years ago. While the author believes that the model proposed here makes the best use of the available published and unpublished evidence relating to the ditch, it is clear that re-excavation of a section is the only way to provide complete clarity over this issue.

⁵Hemp undertook significant reconstruction work at Bryn Celli Ddu but there is no evidence that his restoration changed the position of any stones relevant to the discussion presented here.

⁶See Cleal *et al.* (1995, 529) for a broadly contemporary example of curated animal bone at Stonehenge

⁷A drawing of Bryn Celli Ddu published in 1847 clearly shows spoil on the top of the capstone, indicating that the mound was once this high (Anon 1847, 3). This piece of evidence was pivotal to 19th century efforts to demonstrate that Welsh 'cromlechs' were originally mound-covered tombs and were not open as druid altars (see Burrow 2006, 133).

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