# Darganfod Hen Dai Cymreig
# Discovering Old Welsh Houses

Reports: Welcome to the many Discovering Old Welsh Houses Reports which are available here on our website. All the reports - House Histories, Building Reports and Tree-ring Dating reports - can be accessed - *here*

Discovering Old Welsh Houses studies and celebrates the traditional houses of North Wales and the lives of the people who lived in them.



If you find the content useful, please consider becoming a *Member* to access the many benefits available.

Please note that these reports are being updated as part of an ongoing programme of revision. Older reports sometimes refer to the old names of the Group. Between 2005 and 2012 also known as The Snowdonia Dendrochronology Project, then the N W Wales Dendrochronology Project and then the Dating Old Welsh Houses Group.

New reports will be added from time to time. Keep an eye on our website for updates.

**TREE-RING DATING OF**
# PEN Y BRYN
**EDERN, NEFYN**
**(CAERNARFONSHIRE)**
**GWYNEDD**

**(NGR SH 276 394**

The tree-ring dating and analysis was commissioned by the North-west Wales Dendrochronology Project, in association with the RCAHMW and carried out in 2010 by the Oxford Dendrochronology Laboratory, Mill Farm, Mapledurham, Oxfordshire RG4 7TX (Dr Dan Miles). Additional research by Margaret Dunn and Richard Suggett.

## 1 SUMMARY

A small two-unit farmhouse of Snowdonian type with kitchen and parlour, both with end chimneys, and a slightly off-centre entrance. Gabled dormers light the upper storey. Service rooms are located in a lean-to at the rear of the house. The original internal lay out has been lost.

The tree-ring samples, taken from the principal rafters and also from a cross beam gave a felling date range of **1743/9**. The house history (see reference below) notes an otherwise uncorroborated reference inserted into a family Apocrypha to the effect that Anthony Griffith & Griffith Thomas, both of the parish of Edern, began to build a house called Pen y Bryn in Edern on 8th June 1745. The tree-ring date indicates that an inscription reading I / I M 1790 must commemorate a phase of rebuilding, possibly the addition of the rear service range, and

this may be associated with John Jones the preacher whose wife, Mary Williams, was heiress of Pen y Bryn (they married in 1787).

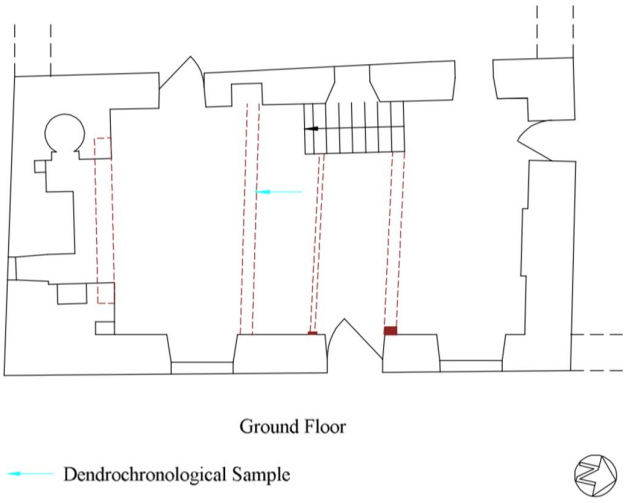


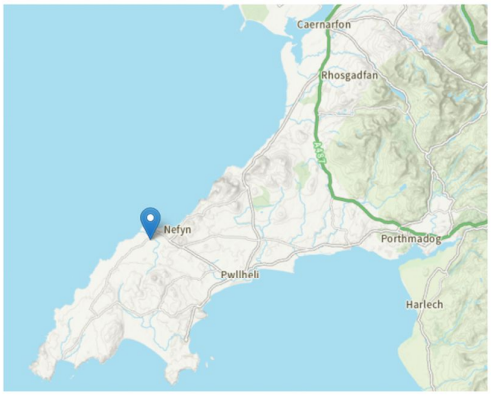

Figure 3: Pen-y-Bryn, Edern
Plan
Scale 1:100



Full details and references may be found in the house history by Eryl Lobley, Margaret Dunn, Wally Barr, Margaret Barr and Tom David. A full historic building survey and report was carried out by EAS LTD (I P Brooks & K Laws). Both of these are accessible via this web site. See also, RCAHMW, *Caernarvonshire Inventory III* (1964), 33, no.1563.

Substantial documentation is available at the NMR (some of it digitally via Coflein) at https://coflein.gov.uk/en/site/16711?term=pen%20y%20Bryn%20nefyn

RCAHMW National Primary Reference Number (NPRN): 16711

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## 2 TECHNICAL DATA

The following summary of technical data regarding Pen y Bryn is taken from *Vernacular Architecture* 41 (2010), 113 https://doi.org/10.1179/174962910X12838716154041

Key to abbreviations: Complete sapwood is indicated by 'C' and where the character of the final ring has been identified, the seasonal felling dates are given: C winter (October to February). For '*t*', see next section, which discusses reference chronologies (site masters) – in general, the higher the 't' value the more secure the dating.

*Felling date*: **Winter 1743/9**

Principal rafters 1743(32C), 1722(2), 1713(7); Cross beam 1724(5).
*Site Master* 1647–1743 LYNB (*t* = 6.6 BDGLRT5; 5.6 SCOTTS; 5.3 WHTOWR8).

## 3 BACKGROUND TO DENDROCHRONOLOGY (Daniel Miles)

The basis of dendrochronological dating is that trees of the same species, growing at the same time, in similar habitats, produce similar ring-width patterns. These patterns of varying ring-widths are unique to the period of growth. Each tree naturally has its own pattern superimposed on the basic 'signal', resulting from genetic variations in the response to external stimuli, the changing competitive regime between trees, damage, disease, management etc.

In much of Britain the major influence on the growth of a species like oak is, however, the weather conditions experienced from season to season. By taking several contemporaneous samples from a building or other timber structure, it is often possible to cross-match the ring-

width patterns, and by averaging the values for the sequences, maximise the common signal between trees. The resulting 'site chronology' may then be compared with existing 'master' or 'reference' chronologies.

This process can be done by a trained dendrochronologist using plots of the ring-widths and comparing them visually, which also serves as a check on measuring procedures. It is essentially a statistical process, and therefore requires sufficiently long sequences for one to be confident in the results. There is no defined minimum length of a tree-ring series that can be confidently cross-matched, but as a working hypothesis most dendrochronologists use series longer than at least fifty years.

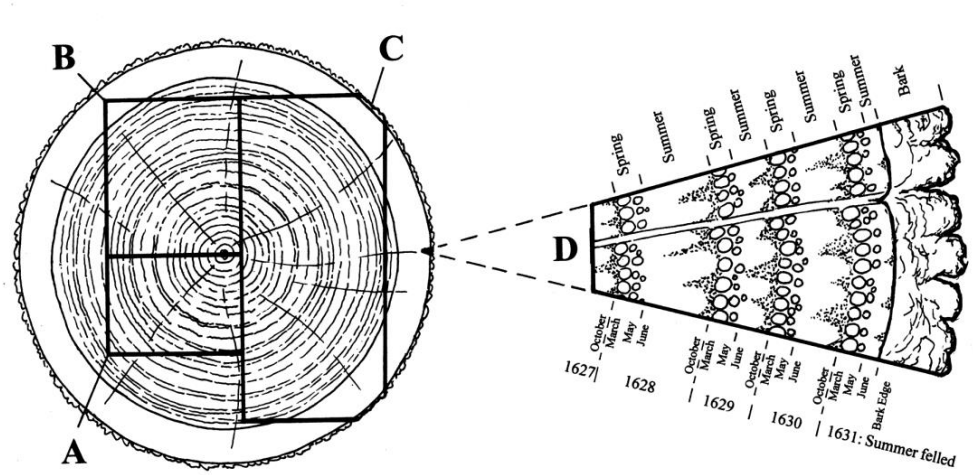
The dendrochronologist also uses objective statistical comparison techniques, these having the same constraints. The statistical comparison is based on programs by Baillie & Pilcher (1973, 1984) and uses the Student's t-test. The t-test compares the actual difference between two means in relation to the variation in the data, and is an established statistical technique for looking at the significance of matching between two datasets that has been adopted by dendrochronologists. The values of 't' which give an acceptable match have been the subject of some debate; originally values above 3.5 being regarded as acceptable (given at least 100 years of overlapping rings) but now 4.0 is often taken as the base value. It is possible for a random set of numbers to give an apparently acceptable statistical match against a single reference curve – although the visual analysis of plots of the two series usually shows the trained eye the reality of this match. When a series of ring-widths gives strong statistical matches in the same position against a number of independent chronologies the series becomes dated with an extremely high level of confidence.

One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites. Data now exist covering many thousands of years and it is, in theory, possible to match a sequence of unknown date to this reference material.
It follows from what has been stated above that the chances of matching a single sequence are not as great as for matching a tree-ring series derived from many individuals, since the process of aggregating individual series will remove variation unique to an individual tree, and reinforce the common signal resulting from widespread influences such as the weather. However, a single sequence can be successfully dated, particularly if it has a long ring sequence.

Growth characteristics vary over space and time, trees in south-eastern England generally growing comparatively quickly and with less year-to-year variation than in many other regions (Bridge, 1988). This means that even comparatively large timbers in this region often exhibit few annual rings and are less useful for dating by this technique.

When interpreting the information derived from the dating exercise it is important to take into account such factors as the presence or absence of sapwood on the sample(s), which indicates the outer margins of the tree. Where no sapwood is present it may not be possible to determine how much wood has been removed, and one can therefore only give a date after which the original tree must have been felled. Where the bark is still present on the timber, the year, and even the time of year of felling can be determined. In the case of incomplete sapwood, one can estimate the number of rings likely to have been on the timber by relating it to populations of living and historical timbers to give a statistically valid range of years

within which the tree was felled. For this region the estimate used is that 95% of oaks will have a sapwood ring number in the range 11 – 41.




Section of tree with conversion methods showing three types of sapwood retention resulting in A terminus post quem, B a felling date range, and C a precise felling date. Enlarged area D shows the outermost rings of the sapwood with growing seasons.

Notes compiled by Martin Cherry, June 2022, from material generated by the North-west Wales Tree-ring Dating Project. The origins of this programme of dating lay with the Beddgelert Historical Society under the direction of Margaret Dunn (see the 'About Us' page.) This report should be read in conjunction with the other reports in this section. Funding for this work was secured the Heritage Lottery Fund; the Society of Antiquaries, London; the Marc Fitch Fund; the Cambrian Archaeological Association, the Vernacular Architecture Group Grants Scheme, the Council for British Archaeology Challenge Fund and private donations.