Darganfod Hen Dai Cymreig
Discovering Old Welsh Houses

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

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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.

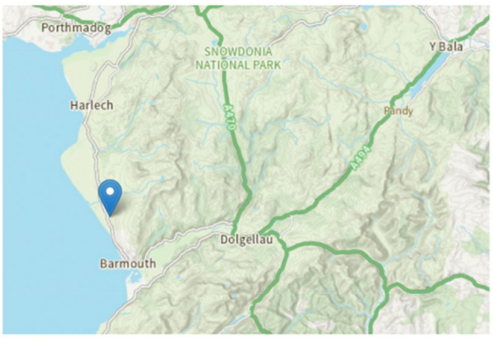
TREE-RING DATING OF
EGRYN
LLANABER
(MERIONETH)
GWYNEDD

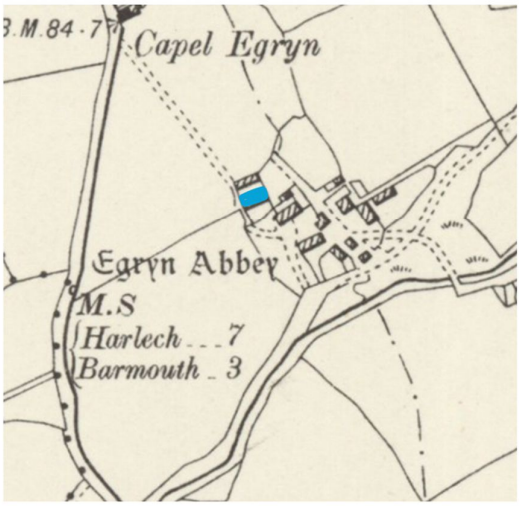
(NGR SH 595 203)

The tree-ring sampling, analysis and report (2003-4) was commissioned by Elizabeth Biblio for the National Trust in Wales in association with the Royal Commission for the Ancient and Historical Monuments of Wales and carried out by the Oxford Dendrochronology Laboratory, Mill Farm, Mapledurham, Oxfordshire RG4 7TX (Dr. Daniel Miles, who also provided the 'Background to Dendrochronology' below). Additional research by Margaret Dunn.

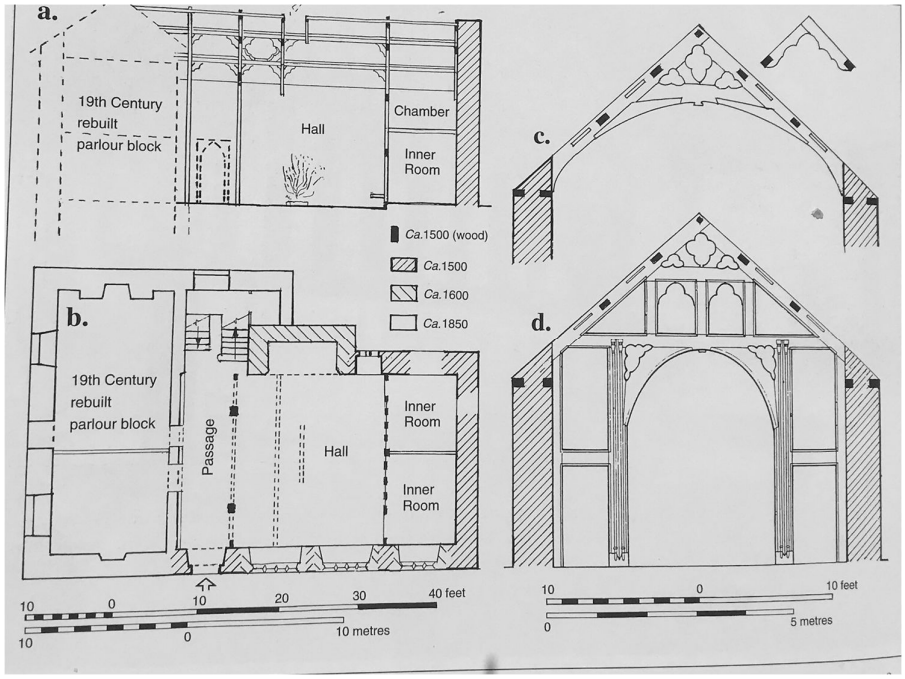
1 SUMMARY

A remarkable stone-walled, gentry hall-house built most likely by Gruffydd ap Ednyfed ap Gruffydd Lloyd, descended from one of the fifteen tribes of Gwynedd.The outer room has been replaced by a nineteenth-century cross wing but otherwise the house is virtually complete and retains its multi-cusped roof, carefully restored by the National Trust for Wales. A cusped aisle (or spere) truss with moulded posts – a statement of prestige and social status – stands at the entrance to the hall. The hall roof is divided into two unequal bays by an arch-braced collar-beam truss with cusped apex. A cusped louvre-truss (which proves the hall was originally heated by an open hearth) is perched on the purlins of the larger (inner) bay. It is from the timbers sampled from this roof that the tree-ring dates were derived. These indicated a felling campaign between summer 1507 and winter 1509/10, making construction likely in **1510**, or within a year or two thereafter. The dais-end truss has a two-tier post-and-panel partition set under and morticed into the tie beam, and is half-timbered above the collar, with two doorways formerly giving into two small private rooms. The open hall was closed in the early 16th century: an inserted beam in the aisle truss relating to this had a long felling date range of 1592-1622 (contemporary documentation confirms that it was still open in 1594); this may also be the date of the distinctive first-floor dormers and ovolo-moulded windows.





Reconstruction of open hall (above) and plans and sections (below): (a) long section showing hall in original state; (b) plan; (c) hall truss and louvre; and (d) aisle (or spere) truss between hall and passage. Crown Copyright RCAHMW.



Egryn is fully described by Richard Suggett and Margaret Dunn, *Discovering the Historic Houses of* Snowdonia (2014), 102-7 and by Peter Smith in J. and Ll. Beverley Smith (eds), *The History of Merioneth, II: The Middle Ages* (Cardiff: 2003), 446, figs 10.8-10.10; see also P. Smith, *Houses of the Welsh Countryside,* figs 45, 55a, 62a. Further information (including digital photographs) on Coflein https://coflein.gov.uk/en/site/28371?term=Egryn%20Abbey

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2 TECHNICAL DATA

The following summary of technical data regarding Egryn Abbey is taken from *Vernacular Architecture* 35 (2004), 111 https://doi.org/10.1179/vea.2004.35.1.73 . 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: winter (C) (October to February) and summer (½ C) (May to June). For '*t*', see next section, which discusses reference chronologies (site masters) – in general, the higher the 't' value the more secure the dating.

(a) Primary phase *Felling dates:* **Summer 1507; Winter 1507/8; Winter 1508/9; Winter 1509/10**

Principal rafters (3/4) 1506(16 ½ C), 1507(18C); Rafters 1508(25C), 1509(19C, 24C).

(b) Flooring over of hall *Felling date range:* **1592-1622**

Lower girt (ceiling beam) 1584(3).

Site Masters (a) 1433-1509 LLANABR1 *(t* = 7.2 PLASMWR1; 5.9 ARDEN2; 5.8 OLDWORD2); (b) 1447-1584 egr8 *(t* = 5.8 PENGWERN; 4.8 NWTNNTTG; 4.8 LLANABR2)

An early sixteenth-century tree-ring date for the hall as 'after 1496' was obtained by J Esling before the roof was fully accessible *(Studia Celtica* **30** (1996), 246) and Egryn's dating may be compared with the 'after 1476' date obtained for Penarth-fawr *(VA* **23** (1992), 45).

3 BACKGROUND TO DENDROCHRONOLOGY

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.

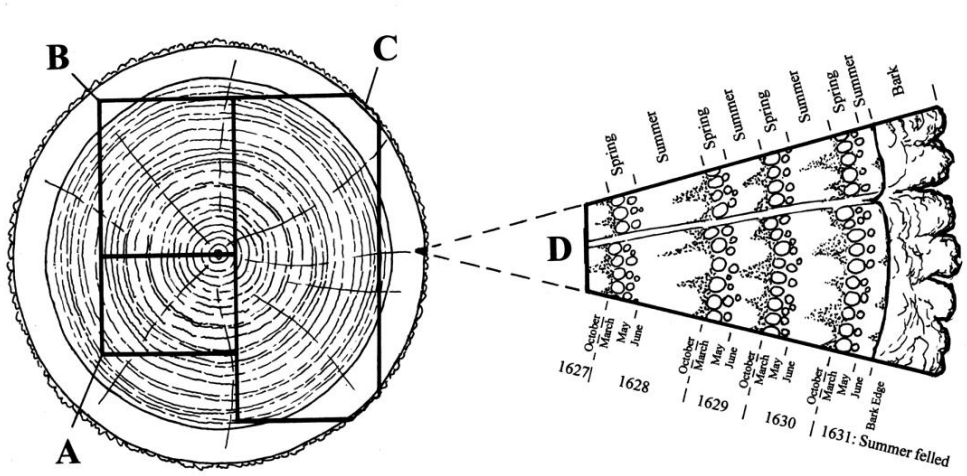
The dendrochronologist also uses objective statistical comparison techniques, these having the same constraints. The statistical comparison is based on programs by Baillie & Pilcher (1973, 1984) and uses the Student's t-test. The t-test compares the actual difference between two means in relation to 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 (Miles 1997).



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 (Miles 1997a, 42)

Notes compiled by Martin Cherry, June 2022, from material generated by the National Trust for Wales and the RCAHMW.