



# Darganfod Hen Dai Cymreig Discovering Old Welsh Houses

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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.



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**TREE-RING DATING OF  
TŶ FRY  
PENRHYNDEUDRAETH.  
(MERIONETH)  
GWYNEDD**

**(NGR SH 606 396)**



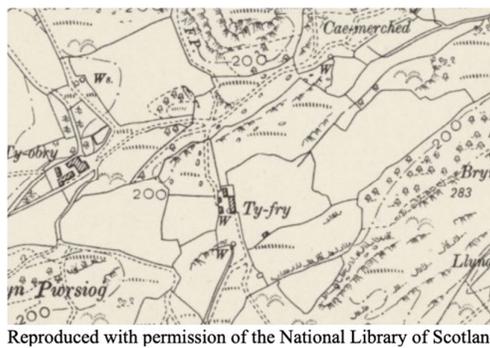
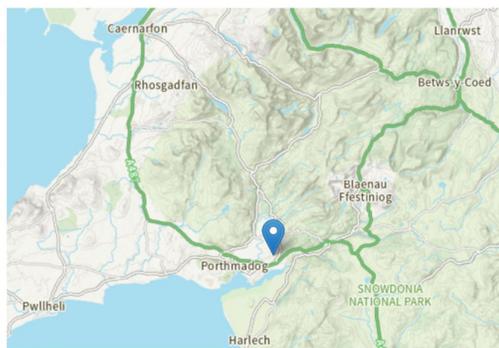
The dendrochronological sampling, analysis and report (2008) were commissioned by the Beddgelert History Society in association with the RCAHMW and carried out by Dr M. C. Bridge FSA and Dr. D. Miles FSA Oxford Dendrochronology Laboratory, Mill Farm, Mapledurham, Oxfordshire RG4 7TX who also provided the 'Background to Dendrochronology' below.

## **1 SUMMARY**

Tŷ Fry is a two-unit fully-storeyed house of Snowdonian type situated at above 600m above O.D. on a rocky series of ridges between Traeth Mawr and Traeth Bach estuaries. It contains remnants of a 16<sup>th</sup>-century house of Snowdonian plan type, with a large end fireplace, mural stair, and post-and-panel partition, which was radically remodelled in the 18<sup>th</sup> century. Timbers associated with the original build did not date. Those that did date belong to the rebuilding. The tree-ring samples, taken from a number of ground- and first-floor ceiling joists and two tiebeams, provide close felling dates (winter 1754/5; winter 1755/6; spring 1756), making re-construction likely in **1756**, or within a year or two thereafter. The re-modelling involved raising the roof level and created a house with a central stair (replacing the mural stair) and a service room opposite the entrance standing between the parlour and kitchen (hall) and symmetrical fenestration of the main south front with the windows set

slightly to one side to accommodate the deep kitchen fireplace – typical of the mid 18<sup>th</sup> century.

The first documentary reference to the house is 1656. Another range was added in the 20<sup>th</sup> century (to the left in the photo above). Full details may be found in the house history by Gwenda Paul.



The house is noted on Coflein (NPRN 28806) (<https://coflein.gov.uk/en/site/28806/archives?term=Ty%20Fry>)

RCAHMW National Primary Reference Number (NPRN): 28806

## 2 TECHNICAL DATA

The following summary of technical data regarding Tŷ Fry is taken from *Vernacular Architecture* 38 (2007), 137 (DOI: 10.1179/174962907X248092). 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) and spring (¼C), referring approximately to October to February and March to May; h/s indicates the presence of the heartwood-sapwood boundary. For 't', see next section, which discusses reference chronologies (site masters) – in general, the higher the 't' value the more secure the dating.

**Felling dates: Winter 1754/5; Winter 1755/6; Spring 1756**

Joists 1755(3¾ C, 32C, 30C, 2¾C, 11¼C), 1754(35C, 16C), 1741(1), 1734(h/s);  
Tiebeams 1755(31C), 1753(22+2C NM); Mantel-beam (O/I); Transverse beams (0/2).  
Site Master 1637-1755 BDGLRTI8 (t=7.8 WALES97; 7.5 BDGLRT5; 6.4 BDGLRT9; 6.4 EASTMID).

## 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.

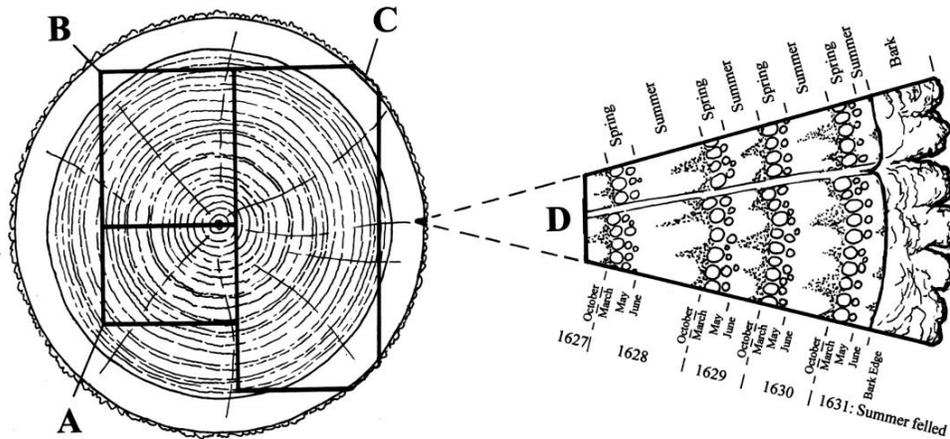
One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites. Data now exist covering many thousands of years and it is, in theory, possible to match a sequence 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, May 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.