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
CAE'N Y COED UCHAF
MAENTWROG
(MERIONETH)
GWYNEDD

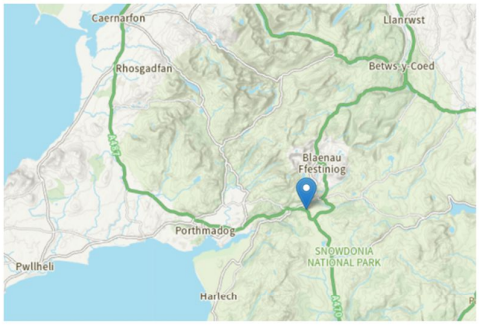
(NGR SH 683 406)

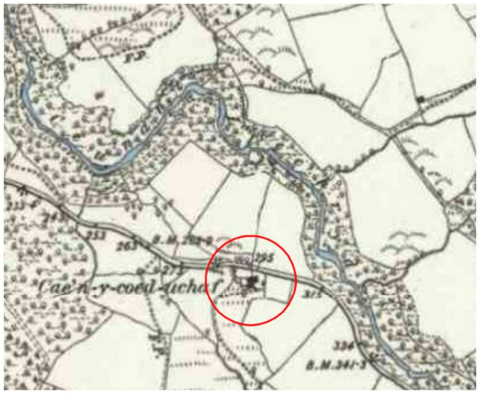
The tree-ring sampling, analysis and report (2007) were commissioned by the Beddgelert History Society in association with the RCAHMW and carried out by Dr M. C. Bridge FSA and Dr. D. Miles FSA of the Oxford Dendrochronology Laboratory, Mill Farm, Mapledurham, Oxfordshire RG4 7TX who also provided the 'Background to Dendrochronology' below.

1 SUMMARY

A storeyed, stone-built house of classic two-unit Snowdonian type with end chimneys and a stone fireplace stair with an attached byre, since converted to domestic use. Timber details include: a post-and-panel partition dividing hall from outer rooms; a timber diamond-mullioned window to the hall; a plain mullioned window to the service-room; and heavy trusses with morticed collar beams and trenched purlins. The principal roof timbers and ceiling beams indicated a felling campaign between summer 1576 and spring 1579, making construction likely in **1579**, or within a year or two thereafter. The farmstead was considerably expanded in the 18th century (there is a re-positioned datestone of 1767) and the

house altered in the 19th century when a central wooden stair and boarded partitions were inserted.





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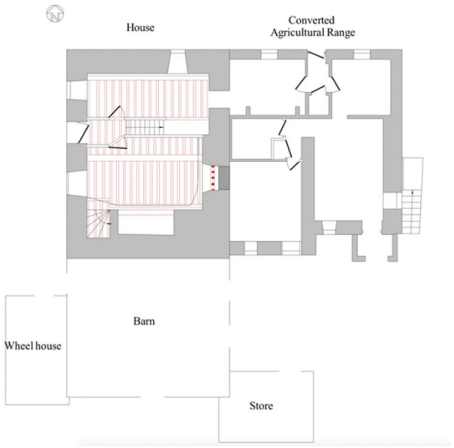
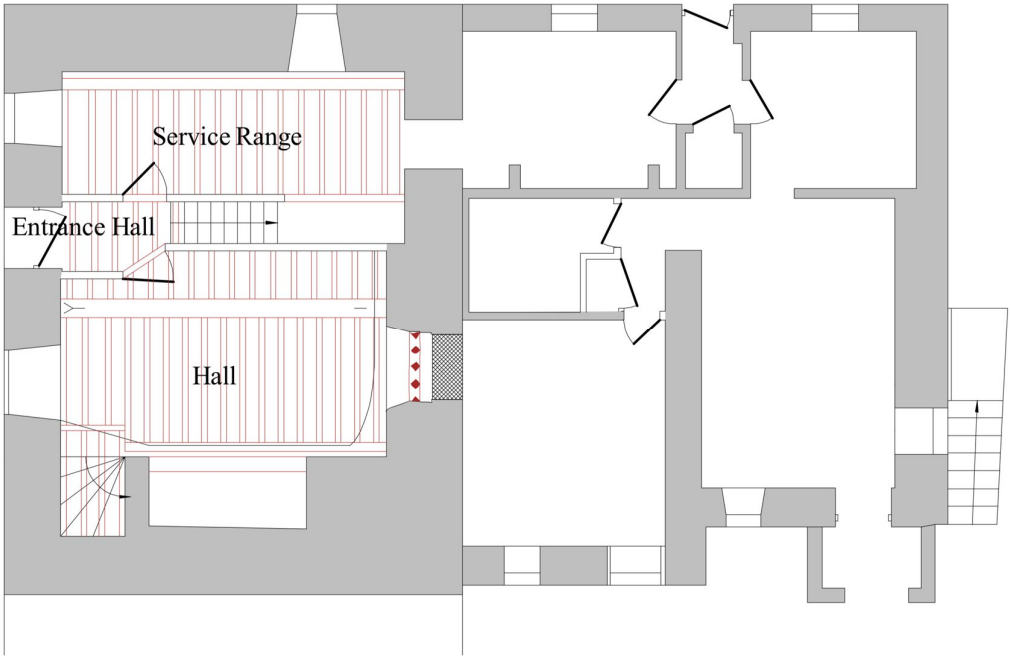


Plan (to left) showing the house with its associated farm buildings. © I P Brooks, Engineering Archaeological Services, Client Report 2015/07.



Ground-floor plan (reconstructed). Scale 1:100. © I P Brooks, Engineering Archaeological Services, 2015.

This report should be read in conjunction with the full historic building report by I P Brooks (2015)

The earliest documentation that may relate to this house is dated 1623. Further details are available in the house history by Margaret Dunn on this and also on the NMR website, Coflein at https://coflein.gov.uk/en/site/28251?term=Cae%27n%20y%20Coed

RCAHMW National Primary Reference Number (NPRN) 28251

2 TECHNICAL DATA

The following summary of technical data regarding Cae'n y Coed is taken from *Vernacular Architecture* 38 (2007), 136 (https://doi.org/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), spring (¼C), summer (½ C), referring approximately to October to February, March to May and June to September respectively; 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.

(a) Primary phase *Felling dates:* **Summer 1576; Winter 1578/9; Spring 1579**

Principal rafters *1578(45 ¼ C2);* Rafters (1/2) I578(32C); Transverse beam 1577(31 ¼ C); Joist I575(42 ½ C); Collar 1565(22+7 NM); Mantel-beam l509(h/s); Tiebeam *(0/1)*

(b) Alteration or repair phase *Felling dates:* **Summer 1593?**

Joist 1592(31 *½ C?).*

Site Master 1407-1592 BDGLRT17 *(t* = 10.7 BDGLRT22; 10.0
BDGLRTlO; 8.4 WALES97; 8.3 BEDD_T6)

It is interesting to note that the central cross beam came from a tree that was 172 years old at the time of felling (i.e., planted around 1407).

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.

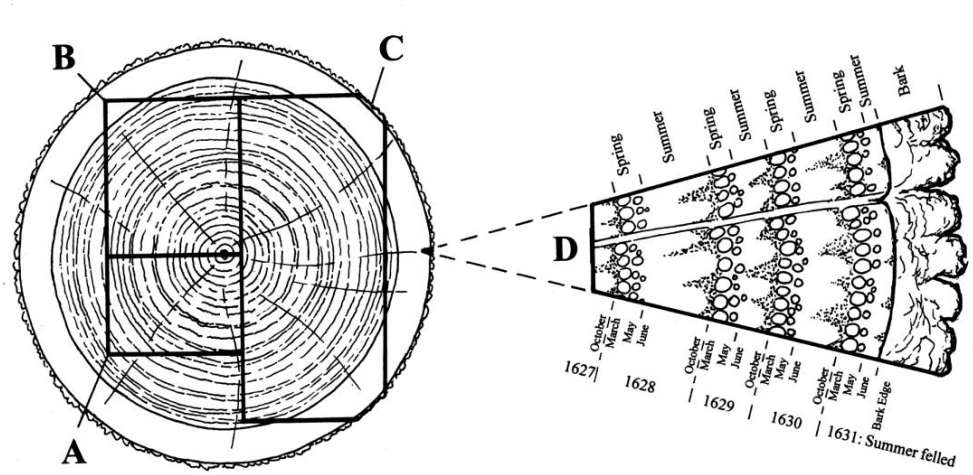
One can develop long reference chronologies by cross-matching the innermost rings of modern timbers with the outermost rings of older timbers successively back in time, adding data from numerous sites. Data now exist covering many thousands of years and it is, in theory, possible to match a sequence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