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.

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THE TREE-RING DATING OF

GWASTADANNAS

NANTGWYNANT, BEDDGELERT
(CAERNARFONSHIRE)
GWYNEDD

(NGR SH 656 536)

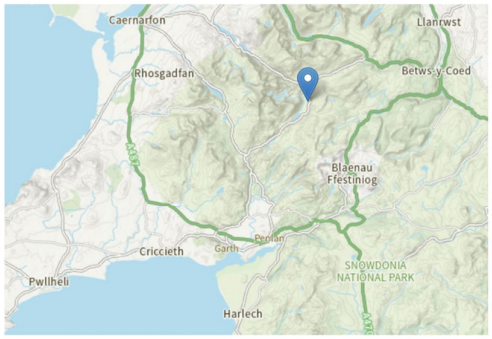
Gwastadannas is fully discussed in Richard Suggett and Margaret Dunn, *Discovering the Historic Houses of Snowdonia* (2014), 108-13 with plans, elevations and photographs. The tree-ring analysis was commissioned by Beddgelert Historical Society as part of a community grant from the Snowdonia National Park and carried out in 2005 by Professor Nigel Nayling of the University of Wales, Trinity St David (Lampeter) and his full report appears below.

This was the first standing house in north Wales for which tree-ring analysis gave a tree-felling date. That date corresponded exactly to the earliest documentary evidence for the house and this success prompted the start of further research carried out by what is now known as Discovering Old Welsh Houses.

1 SUMMARY

Gwastadannas is an early-sixteenth century upland stone-built, cruck-framed hall house. It lies on a level shelf 100m above O.D., in an area of rocky outcrops above the valley bottom on the E side of the upper Nantgwynant valley. 'Gwastad' refers to the relatively flat site; 'Annas' may be a personal name. It formed part of the extensive Nanhwynan grange

(monastic farm) belonging to Aberconwy Abbey. Maredudd ab Ieuan ap Robert, appointed steward of the grange for life in 1506, was granted the lease of lands including Gwastadannas in 1508. He must have built the house for a tenant immediately afterward because one of the cruck trusses sampled for tree-ring dating provided a specific felling date of **winter 1508-9**, making construction likely in that year, or within a year or two thereafter. The farm, which was always tenanted, specialised in livestock – primarily cattle in the late-sixteenth/early seventeenth centuries, sheep by the eighteenth.



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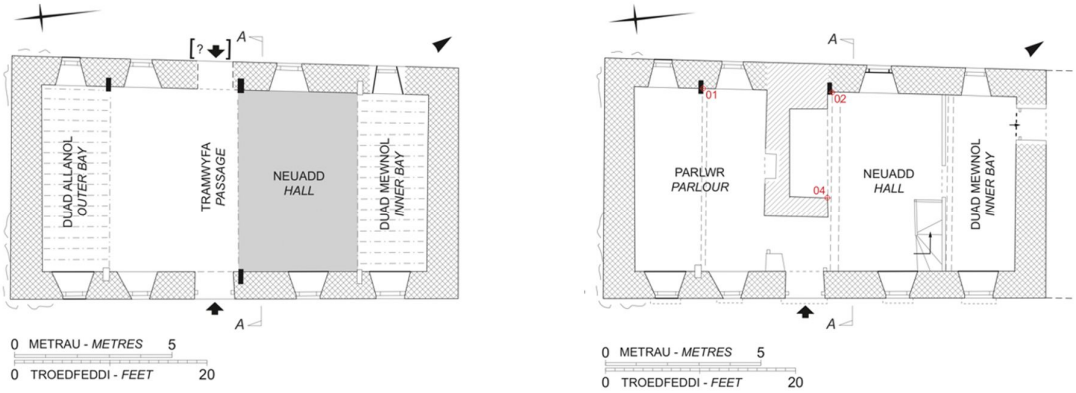
The original house conformed to the classic plan comprising a wide cross passage with open hall and an inner bay to one side and an outer bay to the other; at some point not later than the 1570s, it was modernised by the insertion of a large fireplace and chimney stack and a ceiling over the hall.



Plan (left) as built 1508-9, (right) after modernisation, by the 1570s.
Reproduced from *Discovering the Historic Houses of Snowdonia* (2014), 108, 109 © RCAHMW

The holding is well documented and readers are recommended to refer to the house history by Margaret Dunn as well as *Discovering the Historic Houses of Snowdonia*, cited above.

The NMR record can be accessed via Coflein at https://coflein.gov.uk/en/site/26549?term=Gwastadannas

RCAHMW National Primary Reference Number (NPRN): 26549

2 TECHNICAL DATA

The following summary of technical data regarding Gwastadannas is taken from *Vernacular Architecture* 46 (2015), 116 https://doi.org/10.1080/03055477.2015.1123415

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); 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 date: cruck blades **1508;** fireplace lintel **1539-75?**

(a) Cruck blades (2/2) 1483(16); 1508(45C); (b) Lintel (1/1) 1529(h/s?); undated: collar.
Site Master (sites 1 and 2 together) 1302–1529 BEDD_T6 (*t* = 6.7 Penrhyn Weir; 6.4 Belfast; 6.4 Llangelynin Church); sapwood estimate 10–46 rings.

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

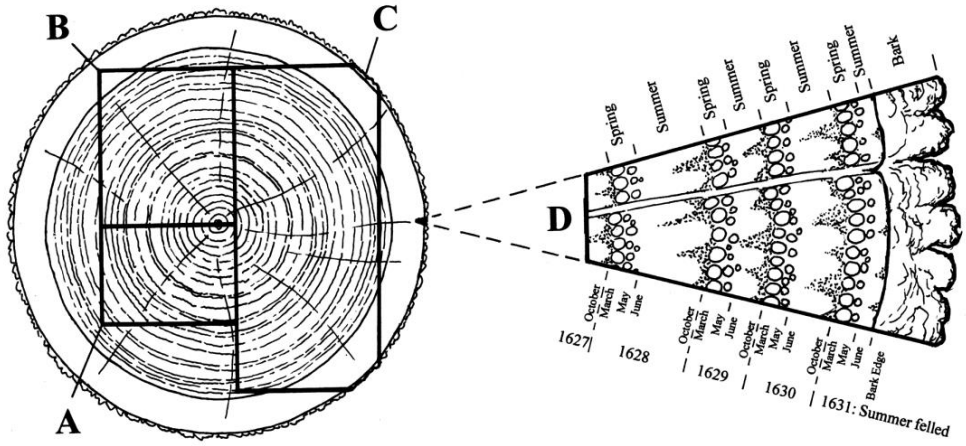
matches in the same position against a number of independent chronologies the series becomes dated with an extremely high level of confidence.

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, 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.

The full tree-ring dating report is appended below.

David Sables
Word count 4580

22/02/2007

Lampeter University

Vernacular archaeology report on Gwastadannas

This report will outline the theoretical aspects of the study of buildings Gwastadannas geographical situation some of its important architecture features the documentary evidence on its history and the results of a recent dendrochronological study carried out on the house. I will use this information to suggest possible dates and stages in the buildings development. Because the house has been unoccupied for nearly a hundred years and has been part of a large estate for centuries to concentrates of the history of its ownership rather than the tenants who occupied it. It is a history that deserves an essay of its own as the house tells a fascinating story of state power and the political rise and fall of powerful families in North Wales. The house is now empty, unused run down and has broken windows doors and slates. The house is interesting in its present state because of the mixture of artefacts it contains such as an old toilet stored in the roof cavity, the odd clog, news papers and old farm implements and would certainly puzzle any future archaeologist if it is allowed to continue to decay.

Theoretical interpretation

All houses are objects of interpretation the archaeologist see a house and see its reuse of materials or styles from other periods. The architect looks and sees methods of construction and the historian sees a period in history with its social background (Matthew 1994). Societies as a whole tend to categorise buildings. The16th century timber framed building was to the Tudors a symbol of prestige and power a building embodying cutting edge technologies and thinking, to the people of the 18th century this same style of building was viewed as outdated and backwards while in the 19th century it was promoted as a symbol of the rural idle and a lost world where honest artisans practised there trades far from the satanic smoke belching factories. Today they are jewels to be preserved and revered but tomorrow they may be seen as blights and follies symbolic of the destruction of the natural woodland and global warming. What is certain is that our interpretation takes place in the present and will therefore be different from the original statement it was meant to portray (Johnson, M, 1994). This particularly true of old cottages which are thought by many to be the home of the humble farm workers or miners cottages as shown in the John

Fords iconic movie about Wales "How green was my valley" (IMDB, 2006) but in fact most of those that survive are buildings of high status (Powell, 1996) and have survived because of their status and superior building materials. Where and the way a building is constructed also tells a story about the economic and social standing of the people who owned, worked and lived in them. Much of this can only be surmised through theoretical arguments All houses are affected by certain basic principles that are dictated by the climate and geography of the area in which they are built. Gwastadannas is typical of this looking at the building today one sees a run down farm outbuilding slowly decaying because of the hostile environment in which it is situated. A humble building which for some unknown reason has been given a grade 2 listing. Yet by examining its architecture, history and the people who lived in it becomes obvious that this cottage was once an important building both locally and within the welsh principality.

Geographical situation of the building

The national grid reference for the site is SH 65655360 on sheet 22 NE of the county series the parish is Beddgelert in Snowdonia. Gwastadannas is a small rubble built white washed cottage which has been listed as grade 2 in national importance. The cottage is situated half way down a narrow flat bottomed valley surrounded high rocky peaks which allow easy entrance only from the north on a North to South orientation. The high altitude of the North Wales mountains causes' weather conditions which consist of predominantly cloudy, low temperatures and high rainfall. The combination of these climatic factors with the dramatic relief creates a very harsh environment (Snowdonia national park authority, 2006). In reaction to this environment houses in Snowdonia tend to be built in areas taking advantage of any flat land or shelter offered by the landscape (Hughes 1908). The sheltered and secure geographical position of the site and because areas of flat land are at a premium in Snowdonia it seems likely that a dwelling of some kind has been present on the site for many centuries. However Gwastadannas the cottage which now occupies the site was tentatively dated in 1953 by the royal commission to the 16th or 17th century (Royal commission. 2006). This is born out by the historical records which contain the present name of the cottage in albeit in various different spelling variations from the early 16th century (Dunn pers 2006, comm.). The area became part of the Snowdonia National Park when it was established in 1951. The Park covers 2,132 square km (823 square miles) and stretches from Cardigan Bay in the west, to the Conwy Valley in the east and

from the River Dyfi in the south as far as Conwy in the north (Snowdonia national park authority, 2006). Today, this part of Wales is sparsely populated consisting of a few small towns, villages and a large number of farms. Settlement pattern is strongly dependent on the local geography. The dominant forms of agricultural activity in the area are sheep farming, forestry while the main employment is centred on the tourist industry (Snowdonia national park authority, 2006).

Fig 1 Hills to south of the house

Architectural features

Gwastadannas is a cottage of sub medieval design that is typical of the type made for yeoman farmers and gentry who aspired to greater social status, (these where in some terms the "yuppies" of their time who took advantage of the economic opportunities offered by the social and economic chaos caused by the reformation) a style of housing which is of higher comparable status in the Snowdonia area than it would be in other parts of Briton simply because of its geographical isolated position (Smith, 1975).

The cottage is white washed (although given its status may have been painted in a different colour at the time of its construction (Stevenson, 2006, Pers comm.) and of a rubble construction with a gabled roof. The walls are on average 711 mm in depth x 3810 mm in height. The building has 2 ground floor rooms and 1 upper room at the southern

end of the building. The internal dimensions are 11552 mm long and 5320 mm wide. The height of the southern ground floor room is 2508 mm and the upstairs room is 1216 mm to the modern roof truss. The house shows no sign of ever having been rendered on the exterior. There is a nineteenth century stable attached to the southern end of the building into which a door has been opened from the main building probably at the time of its construction. Considering that many cottages of its type had external wooden Bryers attached in this area of the house (Smith, 1975) it could be that the stone one is a replacement for wooden one that was accessed from outside the house. There are two small corrugated steel lean to buildings attached to the rear of the cottage which date to the mid 20th century.

Fig 2, Gwastadannas, 2005

The building has two entry points but would have originally have been entered by a single door in the centre of the east side of the building the other doorway is a later insertion. The original entry has a simple board wood door which has no special features. The internal layout plan is inline with the lobby entry plan with the entrance opening onto the flank of the central chimney. The house is laid out in a similar way to that described as the standard lobby entry plan by Peate (1944) in his book the welsh House and would have

looked remarkably similar in layout to Bryn-mawr the cottage he uses as an example of the style (Peate, 1945, p100). This style of house was said by Smith (1975, p457) says this was a favourite design of building in Wales during the 16th and 17th century and replaced the cross passage design.

The cottage has two down stairs rooms one heated by a single but extremely large central chimney with massive stone slabs at roof level the other unheated smith suggests that the larger southern end down stairs room had a daises partition which further subdivided the room, however this room seems of to small an are for this to be practicable at Gwastadannas. The fire place is surmounted with a substantial bressimer beam support. The bressimer beam is 415 mm x 365 mm x 1880 mm in dimensions and is simply chamfered with orgre stops. The large size of the fireplace and the bressimer beam is an indication of then status of the building at this stage in its construction i.e. the larger the fire place the more money the owner had available to pay for fuel. The building is roofed with a 19th century Canarvanshire industrial slate with an angle of around 35 degrees the roof the roof supports are of a modern a frame type but there is evidence that originally the roof was supported by raised crucks. This roof would have been of a much steeper pitch when thatched in order to enable efficient water run off (Stevenson, 2006, Pers comm.) One original crucks arm being incorporated into the new roof support system. There are the remains of two sets crucks present in the cottage and a full width cross beam support for the upper story this cross member has slots cut into it for joist, the modern joist do not fit into these slots and simply sit on the beam. This would suggest the cottage once contained a crog loft which was supported by this beam. This crog loft was later replaced by a second floor the when the roof level was modernised and the walls raised to allow more head room in the loft area. The original crucks indicate that the house may at one time have had a steeper pitch and this is indicative of a thatched roof (see plan 1) the angle of the modern supports indicates that from the 19th century it was slate. Each of the Crucks is cut in a box halving section. The south eastern cruck blade is of a width and breadth of 170 mm x 310 mm the south western cruck blade is 145mm x 340mm the north western cruck blade is 100 mm x 250 mm while the intact north eastern cruck blade is 110 mm x 262 mm and 1981mm long. There are no visible carpenter's marks on any of the internal or external woodwork. The use of this kind of roof support although found widely in cottages in Wales was once wide spread through the united Kingdome (Brunskill, 2000). The widespread use of these large timbers in an area so difficult to reach also backs up

Peate's (1945) statement that much of Snowdonia was covered with oak woodland and not the open Mooreland of today The roofing slates are thinly cut and of a regular 508 mm x 254 mm size and of a purplish grey colour. This colour and regular size indicates that they are of a type which where sourced from the quarries of Canarvanshire probably from the Penrhyn quarry at Bethesda which at its height employed 6,000 men and exported slates all over the world (Clifton-Taylor, 1962).

There are seven windows at present one in the upper part of the north gable end and three on each side of the ground floor. The windows are a mixture of wooden Georgian eight pained vertically sliding sash and 4 pained fixed. There are heavy stone lintels above each of the windows, these are of a size far beyond what is needed for structural support and may have been place there as a statement of the houses status. The windows are of hard wood with some crown glass plains and probably date to the 19th century (Brunskill, 2000) all of which are painted green although on examination they have been repainted many times over the years in various different colours. There is no sign of fixing points for shuttering this fact and the status of the occupants of the building at the time of its construction it is probable that the cottage has always been glazed. There are three glass panes set into the slate roof to allow light into the upper story, these appear to date to the 20th century. There is a blocked up window on the north western end of the ground floor room. Many of the glass pains are missing or broken several frames have begun to suffer from rot.

The ground floor flooring consist of large stone flags in both the downstairs while the upper story has 101.6 mm tunnel and grove floor boarding which has rotted and given way in several places. The flagstones are probably original to the buildings and the floor boarding appears to be recent probably dating to the second half of the 19th century. The floor boards have been opened to allow a simple lean to stair to be inserted; this stair is made of a similar wood to the floor boarding which appears to be pine although neglect and rot makes it to positively identify timber used in the construction. The upper floor has been sectioned of at the eves with low plaster board stud wall. These stud walls are around 914 mm high, the eastern wall has a door way cut into it which allowed it to be used in the past as a storage area.

The architecture suggests that the house was originally a single story cottage laid out to the sub medieval lobby entry plan (see plan 2) with a loft at one end which was probably accessed by means of a simple ladder (see plan 3). The large lintel stones over the door and window suggest that a considerable amount of effort was put into its erection; this is borne out by the large chimney and its massive bressimer beam. The style and the expensive features suggest that the house was originally constructed in the 16th or 17th century.

History of the House

The history of the house and the land it stands on is recorded as far back as 1216 AD. It is a history intermitly linked with the politics of power in Wales. The first record of the ownership of the land concerns Llewellyn the Great took who advantage of the civil war in England between John and his barons to make himself the de facto ruler of all Wales outside the lands of the Marcher Lords in a parliamentary assembly held at Aberdyfi in 1216. it was at this time that the other Welsh rulers formally paid homage and swore allegiance to Llewellyn. This was recognised formally by the English crown in 1218 by the Treaty of Worcester (BBC History, 2006).

It was usually in that period that kings granted tracts of land to the church in return for prayer for their soul after they died following this custom In 1198 Llewellyn granted the township of Nantgwynant to the Cistercian Abbey of Aberconwy, naming the lands, including the area of the house then called Gwastad Onnos (Gresham, 1939). Llewellyn died in 1240 at Aberconwy Abbey. Over the centuries the lands owned by the Abbey where leased to small farmers rather than worked directly by the monks. It is not recorded where or what form theses early farmstead took. However I would expect one to be on or near the site of the present house because of the proximity to water flat land and shelter from the climatic conditions.

The first mention of the site of the cottage by name was is in conjunction with Maredudd Robert and his oldest son John Wyn Maredudd who in 1506 were appointed stewards for life of the Nanwhynan lands including the area now called Gwastadannas and the other Caernarvonshire lands of the Abbey of Aberconwy by the Abbot Dafydd Owain (Gresham, 1939). In 1508 Maredudd Robert widened there control of these holdings by obtaining from Abbot Dafydd the leases of many of the Cistercian holdings including the property

Gwastadannas. Maredudd Robert's will has not survived, but it appears from later documents that at his death in 1525 the monastic lease of Gwastadannas and much of Nantgwynant, passed to his eldest son, John Wyn Maredudd. In the 1536 Ministers' Accounts preceding the dissolution of the Monasteries, the property is name is spelt as Iwasdainas & was leased by John Wyn Maredudd (Dunn, 2006, pers comm.). John Wyn Maredudd died in 1559 and left the lease of Gwastadannas (which now belonged to the crown) to his eldest son, Morus Wynn. Later in 1569 rental details names Gwastadannas and its stock (Dunn, 2006 pers comm.). At Morus Wynn's death in 1580, the property is next mentioned as part of a vast estate called Gwydir owned by Sir Richard Wynn. The Wynn family of Gwydir claimed descent from Owain Glyndwr the Welsh hero through his second marriage. His farther was the first of the family to use the name Wynn. After he was created a baronet in 1611, Sir John was a member of the Council of Wales and the Marches, deputy lieutenant of Caernarvonshire and twice sheriff of the same county (National Library of Wales, 2006). On Sir Richard's death 1674 this estate was broken up the Nantgwynant portion of the Gwydir estate was purchased by John Rowlands of Nant, Betws Garmon, through marriage this portion, including Gwastadannas, passed into the hands of the Williams-Bulkeley family of Baron Hill of Anglesey. The Bulkeley family where and are very prominent in the political higher achy of the are with Sir Richard Bulkeley (1862-1942), 12th Baronet, Lord Lieutenant of Anglesey and a commander in the Royal Anglesey Militia (National Library of Wales, B, 2006). The family still own Gwastadannas today and from at least the time it came into the families possession been rented out as part of a small holding (Margaret Dunn, pers comm. 2006. In 1920 a new farmhouse was erected uphill of the old building and the house was used as a store (Royal Commission for Wales, 2006).

Fig 4 rubbing from tomb of Sir Richard Wynn.

Fig 5 Bulkeley family coat of arms.

The Written documentation pertaining to the land suggests that it was being farmed from 1198 when it was specifically named in deeds. Documentation also indicate that a house (probably the one we see today) was standing on the site in 1536 when a property is said to be leased to John Wyn Maredudd in the Ministers Accounts preceding the dissolution of the Monasteries. This suggest that the house was well established so would have been present for some years. The history of the house suggests that the cottage was occupied by the powerful Maredudd family until it passed into the hands of Sir Richard Wynn at which time it became a minor part of a vast estate. It then passed into the Baron Hill estate at from which time it was rented to tenant farmers.

Fig 6, The new house.

David Sables
Word count 4580

22/02/2007

Dendrochronological Survey

During the summer of 2005 a dendrochronology survey of Gwastadannas and other houses in Beddgelert was undertaken by Nigel Nayling of the University of Wales Lampeter. The American astronomer A. Douglass developed dendrochronology in the early 20th century, Douglass realised that the each year trees put on annual growth rings which are influenced by climatic conditions. He also realised that trees of the same species, growing in the same area would show a similar growth pattern. Douglass also realised that by matching up patterns of growth from successively older timbers, a chronology could be established. From the 1960's scientists developed a sequence of chronologies which has enabled the dating of a wide range of timbers from several geographical areas (Renfrew and Bahn 2001). This form of dating has proved very successful especially in dating buildings and as a control measure for the calibration of carbon dating and given the right circumstances such, as the presence of a ring sequence from heartwood to bark an extremely precise date of the felling of a piece of timber can be achieved sometimes to the to the year and season. Another advantage of dendrochronology is because it is expressed in calendar years, it makes it a useful tool when used in conjunction with historical documentation. However in that if the timber has been trimmed, or worked such as in furniture and exposed building timbers, the felling date will be less precise (Baillie, 1995).

It was necessary to take samples from several pieces of timber from Gwastad Anas in order to date the building reliably. The timbers to be sampled were chosen with care on the likely hood that they were contemporary to the buildings construction. The timbers chosen where from the bressimer beam in the chimney which is integral with the main part of the building and the cruck stubs which are built into the walls and although the crucks beams themselves where being used in buildings well into the 19th century and are impossible to date stylistically do provide good sampling points with buildings. Samples 5 cm thick where taken from the widest part of the bressimer beam, sections of the partially removed crucks where sawn off at a place which gave the best amount of rings. The cores and sections were marked for radial alignment. The samples were then marked as to where they came from in the house before being numbered and sealed in clear polythene bags ready to be taken to the laboratory for cleaning and preparation.

On initial examination in the laboratory, all the cores and sections were found to be cracked and distorted, due to the process of drilling or simply natural ageing. The cores and sections were cleaned with an orbital sander, using progressively finer grained sand paper until the ring structures were clear. The samples were examined for any growth anomalies and any breaks or fractures within the wood, which would have made the counting of the growth rings difficult (Nayling, 2005, pers comms.).

The ring widths of the samples were measured using a low powered binocular microscope, connected to a travelling stage linked to a microcomputer using the computer programme developed by Sheffield University called 'Windows for Dendro'. Each ring was measured to an accuracy of 0.01 mm with all samples being processed at least twice to ensure the accuracy of the results. A note was made of any difficult areas such as very narrow rings or rings that could represent more than one ring in case the samples gave only weak matches to other chronologies (Nayling, 2005, pers comm.). This was a time consuming and at times frustrating task especially when examining cracked distorted and damaged areas of sapwood.

The samples where then tested against other samples taken from buildings in the local region. Later all the data from the samples was combined with data from samples taken during the same week from Hafod Lwyfog. This was combined sequence of samples was used to produce a master chronology for the local area. This successfully matched with several known regional and national chronologies (Nayling 2005 pers comm.). These results where then put into a graph form for easier understanding. All results from the test where expressed in terms of t values the higher the t value the better the match.

Table 1: *t-value matrix for cross-matched samples from Gwastad Anas and Hafod Lwfog used in construction of area chronology = overlap < 15 years, - = t-values less than 3.00,* = empty square*

Samples	HL05	HL04	GA01	GA02	GA04
HL01	3.32	-	3.94	3.40	-
HL05	*	7.03	-	3.20	-
HL04	*	*	-	3.27	3.36
GA01	*	*	*	8.48	4.41
GA02	*	*	*	*	5.52

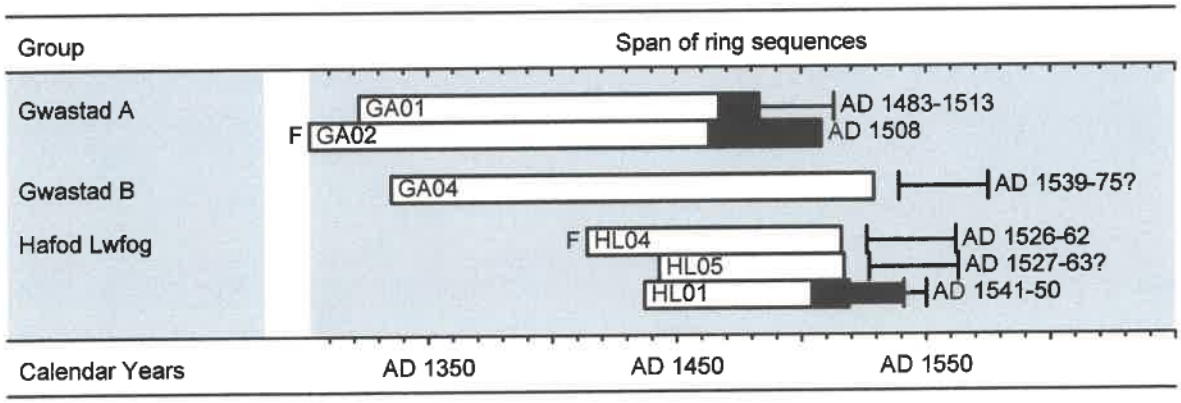
Table 2: *List of samples taken from Gwastad Anas*

Sample	Origin of core	Cross-section (mm)	Total rings	Sapwood rings	ARW mm/year	Date of sequence	Felling period
01	Truncated eastern cruck blade. Slice sample. Sapwood poorly preserved	310 x 170	162	16	0.89	AD 1322-AD 1483	AD 1483-1513
02	Truncated western cruck blade. Slice sample	340 x 145	207	45+B	0.72	AD 1302-AD 1508	AD 1508
03	Collar from truss over bressumer beam. Badly fragmented and few rings. Unmeasured	250 x 100	-	-	-	Unmeasured	Undated
04	Bressumer beam	415 x 365	195	+HS?	1.19	AD 1335-AD 1529	AD 1539-75?

Table 3: *master chronologies against which the Gwastad Anas sequence matched inclusive: t- values with independent reference chronologies*

Reference chronology	*t*-values
Bronyffynnon, 24 Bridge Street, Denbigh (Nayling 2001)	5.01
Llangelynin Church, Gwynedd (Nayling 2003)	6.35
Llyn Peris Boat, Gwynedd (Nayling 1999)	5.47
Penrhyn Fish Weir, Bangor (Nayling 2000a)	6.68
Belfast (Baillie 1977)	6.36
Bedstone Manor Farm, Salop (Miles *et al* 1995)	6.27
Apethorn Fold Farmhouse, Greater Manchester (Tyers 1999)	5.28
Stayley Hall, Stalybridge, Greater Manchester (Nayling 2000b)	5.36

Diagram 1. *Bar diagram showing the chronological positions of the dated timbers. The estimated felling periods are also shown*



As with any scientific method, it cannot be guaranteed that the analysis will result in the production of a date, however when successful this dating method is still the most accurate dating method available. Although dendrochronology cannot be taken as a positive date for the erection of a building it can provide a definitive date for the felling of timbers in certain cases down to the season of a particular year. This can be very useful when examining documentary evidence for particular events such as the buying of timber for using on a particular estate or property. The choosing of timbers that are integral to the structure can also be used as a guide to that part of the structures age. This being the

case the positive dating of the truncated eastern cruck blade and truncated western cruck blade both of which where felled around AD 1508 make this the probable date of the earliest phase of construction of the present building. The later date of the felling of the timber used in the bressimer beam suggests that the house underwent a modernisation at this time.

Conclusion

The architecture suggests that the house was originally a single-story cottage laid out to the sub-medieval lobby-entry plan with a loft at one end. The large lintel stones over the door and window suggest a building of high status with a considerable amount of effort being put into its erection; this is borne out by the large chimney and its massive bressimer beam. The style and the expensive features suggest that the house was originally constructed in the 16th or 17th century. The written documentation pertaining to the house suggests it was standing in AD 1536; this ties in well with the dendrochronological dating of the cruck blades which where felled around AD 1508 and the bressimer beam which dates to around AD 1539. This suggests that the building underwent three major stages of construction. The first in AD 1508 when the building was first constructed, then in AD 1539 when a major internal rebuild was undertaken and the chimney inserted and finally. The last phase of construction took place in the mid to late 19th century when the house was re-roofed and the present windows and upper floor where inserted.

Whilst the house is now in an empty run-down condition with broken windows, doors and slates, it is still interesting because of the mixture of artefacts and architectural features it contains. However, if the house remains unused, the roof will continue to deteriate and the building will then be subject to the full force of the horrendous Snowdonia climate and quickly fall into ruin and be lost.

Bibliography

Baillie, M., 1995, *A Slice through time, dendrochronology and precision dating,* London: Batsford.

Brunskill, R, 2000, *Vernacular Architecture an illustrated handbook.* London: faber and Faber.

Clifton-Taylor, 1962, *The Patern of English Building*, London: Batsford.

Dunn, M., 2005, *Personnel communication,* Bryn Bedd, Nant Gwynant Gwynedd.

Gresham, A, 1939, The Aberconwy Charter In, *Archaeologia Cambrensis* Cardiff : The association. pp 150-157.

Hughes, H and North, H., 1908, *The Old Cottages of Snowdonia,* Bangor: Jarvis and Foster publishers.

Johnson, M, 1994 Ordering Houses Creating Narratives, In: *Architecture and order, approaches to social space* (ed) Parker Pearson, M, and Richards, C, London, Routledge. Pp 170-175.

Peate, I., 1945, The Welsh House, Liverpool: The Brython Press.

Powell, C., 1996, *Discovering cottage Architecture*, Haverfordwest: Shire Publications.

Naylining, N., 2005, *Personnel communication,* University of Wales Lampeter.

National Library of Wales, 2006, *Wynn family of Gwydir, papers* 14,04,06.

National Library of Wales, B, 2006, *Baron Hill papers*, 14.04, 06.

Renfrew, C., Bahn, P., 2001, Archaeology: theories methods and practice. London: Thames & Hudson.

Royal Commission for Wales, 2006, *Gwastadannas*, National Monuments Record: Aberystwyth 14,04,06

Smith, P., 1975, *Houses of the welsh countryside,* London: Her Majesty's Stationery Office.

Stevenson, G., 2006, *Personnel communication,* University of Wales Lampeter.

Internet Bibliography

BBC History, 2006, Internet, *Welsh Timeline*
http://www.bbc.co.uk/history/timelines/wales/llywelyn.shtm. 10,04,06

IMDB, 2006, Internet, *How green was my valley*, WWW.imdb.com/title/tt0033729/, 10,04,2006.

Snowdonia national park authority. 2006, internet, *Snowdonia national park authority,* www.countryside,wales.gov.uk 12,04,2006.

Figure 1 Bar diagram showing the chronological positions of the dated timbers. The estimated felling periods are also shown. The dated tree-ring series are grouped as crucks from Gwastad Annas (Gwastad A), the bressumer beam over the presumed inserted fireplace (Gwasta B), and dated roof timbers from Hafod Lwyfog

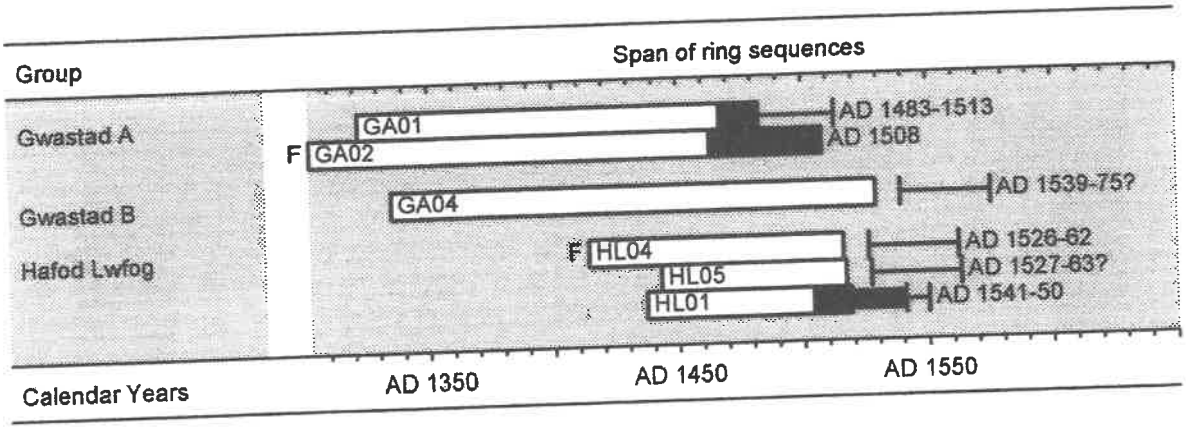


Figure 2 Plan of Gwastad Annas indicating location of samples. After RCAHMW 1960, Fig 28. NGR SH 6565 5360

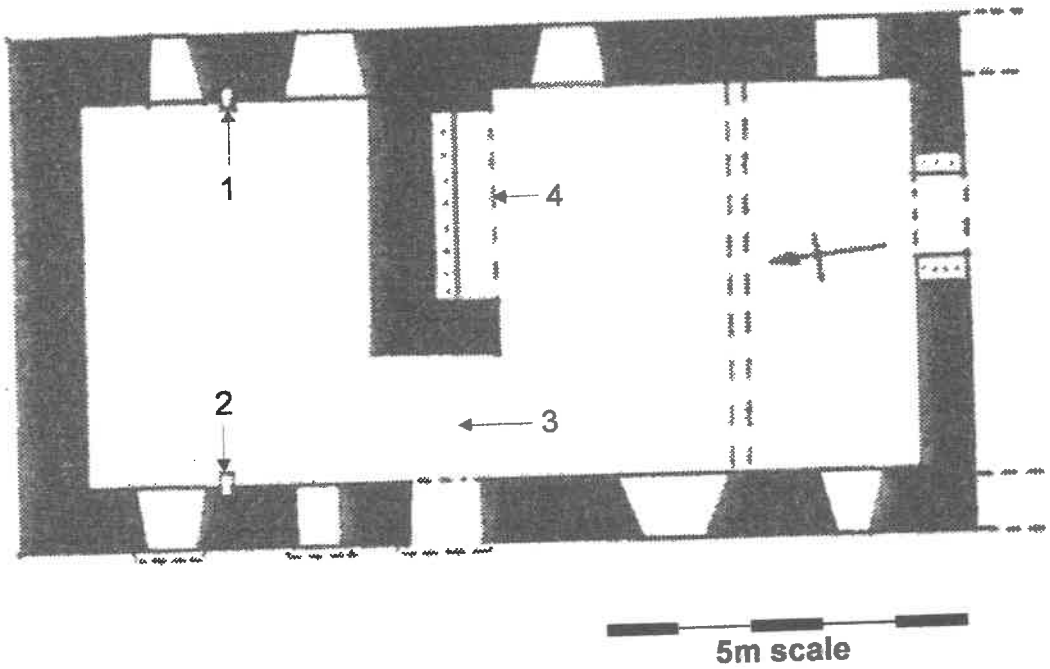


Table 1 List of samples

Gwastad Annas

Sample	Origin of core	Cross-section (mm)	Total rings	Sapwood rings	ARW mm/year	Date of sequence	Felling period
01	Truncated eastern cruck blade. Slice sample. Sapwood poorly preserved	310 x 170	162	16	0.89	AD 1322-AD 1483	AD 1483-1513
02	Truncated western cruck blade. Slice sample	340 x 145	207	45+B	0.72	AD 1302-AD 1508	AD 1508
03	Collar from truss over bressumer beam. Badly fragmented and few rings. Unmeasured	250 x 100	-	-	-	Unmeasured	Undated
04	Bressumer beam	415 x 365	195	+HS?	1.19	AD 1335-AD 1529	AD 1539-75?