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TREE-RING ANALYSIS OF TIMBERS FROM THE HOUSE AND OUTBUILDINGS, ROW RIDDING FARM, WOODLAND, BROUGHTON-IN-FURNESS, CUMBRIA

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SUMMARY

Core samples were obtained from 32 different timbers of the various buildings which form Row Ridding Farm. Six of these cores were unsuitable for analysis in having too few rings for reliable dating, while a further eight samples, though measured, were undated. As expected from the brief survey undertaken prior to sampling, the 18 dated samples shows that timbers with different felling dates are to be found here.

The earliest phase of felling is represented by the two lintels to the front opening to the 'Hull', these timbers being felled at some point between 1508 at the earliest and 1533 at the latest, while two ceiling beams to the bedrooms of the house, plus one to the ceiling of the first floor hallway are slightly later, being felled between 1517 at the earliest and 1542 at the latest.

The lintel of the rear door to the Old Barn was felled between 1526–51, while the two lintels to its front door were felled 1557–82.

The next phase of felling is represented by the outer lintel of the door to the rear store to the house, this being felled between 1608 at the earliest and 1633 at the latest. Given that the timbers of the Down-house loft have a felling date of 1611–34, it is possible that all these timbers were in fact felled at about the same time.

It is just possible that the ceiling beams of the parlour were felled at the same time as each other, but this seems a little unlikely given that the west beam has a felling date of 1643–68, while the east was felled at some time between 1660–85 (there thus being only a short time overlap between them).

The latest phase of felling detected in this programme of analysis is represented by the ceiling timbers of the playroom and kitchen, these being felled at some point between 1674 at the earliest and 1799 at the latest.

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Introduction

Row Ridding Farm is situated at Woodland in the parish of Broughton West in the Furness district of Cumbria. It is about 10 miles northwest of Millom, a little way east of the A593 trunk road (SD 244 897, Figures 1a/b). The farmstead comprises a number of buildings including a farmhouse with attached outbuildings (front cover), two barns (Old Barn and Bank barn), a piggery, dairy, kennels, and other ancillary farm structures (Figure 2).

It is believed that the present two-storey, three-bay, farmhouse with heated rooms to either side of a central doorway is a later replacement to the still extant single storey with loft-space range which may have been the original dwelling. The 'new' farmhouse comprises a kitchen, dining room, parlour, and buttery to the ground floor with bedrooms to the second. The 'old' building, attached to the east end of the new house, may have included a bothy or animal shelter, now known as the 'Down-house', and the 'Hull' (Figure 3).

Sampling

Row Ridding Farm and the buildings of the surrounding district has been the subject of a programme of investigation and documentary research, on a hobbyist basis, by Mr Richard Greer, local historian. As an adjunct to this investigation a programme of dating by tree-ring of the timbers at Row Ridding Farm was requested by Mr Greer. As it now stands, the farmhouse appears primarily to be a late-seventeenth or early-eighteenth century date. The other buildings, however, utilise a number of timbers which show some possible evidence of reuse, possibly from older buildings on the site or in the locality. It was hoped that tree-ring analysis of these timbers might more reliably and accurately determine their date and the potential antiquity of some of the buildings, and establish with greater certainly how much potentially older material might still remain.

Thus, from the timbers available in several buildings of the farmstead, a total of 32 core samples was obtained (though one of these was from a beam known to have been salvaged from another building, 'Tomkins' barn). Each sample was given the code RRF-A (for Row Ridding Farm, site 'A'), and numbered 01–32. Where possible, the positions of the sampled timbers are shown on annotated photographs, these being shown here as Figures 4a–u.

Details of the samples are given in Table 1, including the timber sampled and its location, the total number of rings each sample has, and how many of these, if any, are sapwood rings. The individual date span of each dated sample is also given. In theory, there may have been other timbers which could potentially have been sampled. These, however were often too small and/or were derived from fast-grown trees, and as such were thought to have too few rings for reliable dating.

The Nottingham Tree-ring Dating Laboratory would like to take this opportunity to thank Mr Richard Greer not only for commissioning this programme of analysis and arranging access for sampling, but also for the generous funding of this project. The Laboratory would also like to thank the owners of Row Ridding Farm, Louise and Ian McArthur, for not only accommodating the sampling visits, but also for providing the sketch plans of the farmstead and house used in this report, and for their most generous and welcome hospitality.

Tree-ring dating

Tree-ring dating relies on a few simple, but quite fundamental, principles. Firstly, as is commonly known, trees (particularly oak trees, the timber most commonly used in building construction until the introduction of pine from the late eighteenth century onwards) grow by adding one, and only one, growth-ring to their circumference each, and every, year. Each new annual growth-ring is added to the outside of the previous year's growth just below the bark. The width of this annual growth-ring is largely, though not exclusively, determined by the weather conditions during the growth period (roughly March–September). In general, good conditions produce wider rings and poor conditions produce narrower rings. Thus, over the lifetime of a tree, the annual growth-rings display a climatically influenced pattern. Furthermore, and importantly, all trees growing in the same area at the same time will be influenced by the same growing conditions and the annual growth-rings of all of them will respond in a similar, though not identical, way (see Figure 5).

Secondly, because the weather over a certain number of consecutive years (the statistically reliable minimum calculated as being 54 years) is unique, so too is the growth-ring pattern of the tree. The pattern of a shorter period of growth, 20, 30**,** or even 40 consecutive years, might conceivably be repeated two or even three times in the last one thousand years, and is considered less reliable. A short pattern might also be repeated at different time periods in different parts of the country because of differences in regional micro-climates. It is less likely, however, that such problems would occur with the pattern of a longer period of growth, that is, anything in excess of 45 years or so. In essence, a short period of growth, anything less than 45 rings, is not reliable, and the longer the period of time under comparison the better.

Tree-ring dating relies on obtaining the growth pattern of trees from sample timbers of unknown date by measuring the width of the annual growth-rings. This is done to a tolerance of 1/100 of a millimeter. The growth patterns of these samples of unknown date are then compared with a series of reference patterns or chronologies, the date of each ring of which is known. When the growth-ring sequence of a sample 'cross-matches' repeatedly at the same date span against a series of different reference chronologies the sample can be said to be dated. The degree of cross-matching, that is the measure of similarity between sample and reference, is denoted by a '*t*-value'; the higher the value the greater the similarity. The greater the similarity the greater is the probability that the patterns of samples and references have been produced by growing under the same conditions *at the same time*. The statistically accepted fully reliable minimum *t*-value is 3.5.

However, rather than attempt to date each sample individually it is usual to first compare all the samples from a single building, or phase of a building, with one another, and attempt to cross-match each one with all the others from the same phase or building. When samples from the same phase do cross-match with each other they are combined at their matching positions to form what is known as a 'site chronology'. As with any set of data, this has the effect of reducing the anomalies of any one individual (brought about in the case of tree-rings by some non-climatic influence) and enhances the overall climatic signal. As stated above, it is the climate that gives the growth pattern its distinctive pattern. The greater the number of samples in a site chronology the greater is the climatic signal of the group and the weaker is the non-climatic input of any one individual.

Furthermore, combining samples in this way to make a site chronology usually has the effect of increasing the time-span that is under comparison. As also mentioned above, the longer the period of growth under consideration, the greater the certainty of the cross-match. Any site chronology with less than about 55 rings is generally too short for reliable dating.

Having obtained a date for the site chronology as a whole, the date spans of the constituent individual samples can then be found, and from this the felling date of the trees represented may be calculated. Where a sample retains complete sapwood, that is, it has the last or outermost ring produced by the tree before it was cut, the last measured ring date is the felling date of the tree.

Where the sapwood is not complete it is necessary to estimate the likely felling date of the tree. Such an estimate can be made with a high degree of reliability because oak trees generally have between 15 to 40 sapwood rings. For example, if a sample with, say, 12 sapwood rings has a last sapwood ring date of 1400 (and therefore a heartwood/sapwood boundary ring date of 1388), it is 95% certain that the tree represented was felled sometime between 1403 (1400+3 sapwood rings (12+3=15)) and 1428 (1400+28 sapwood rings (12+28=40)).

Analysis

Each of the 32 samples obtained from the various timbers of the different buildings at Row Ridding Farm were prepared by sanding and polishing. It was seen at this time that six samples had less than the minimum of 50 annual growth rings here deemed necessary for reliable dating, and they were excluded from this programme of analysis. The annual ring widths of the remaining 26 samples were, however, measured, the data of these measurements then being compared with each other as described in the notes above.

This comparative process indicated that 18 of the 26 measured samples cross-matched with each other and could be formed into one single group, the length, relative position, and overlap of the samples being shown in the bar diagram Figure 6. These 18 cross-matching samples were combined at their indicated off-set positions to form RRFASQ01, a site chronology with an overall length of 272 rings. This site chronology was then satisfactorily dated by repeated and consistent comparison with a number of relevant reference chronologies for oak as spanning the years 1389 to 1660. The evidence for this dating is given in the *t*-values of Table 2.

Site chronology RRFASQ01 was then compared with the eight remaining measured but ungrouped samples, but there was no further satisfactory cross-matching. Each of the eight remaining samples were then compared individually with the full corpus of reference material, but again there was no further cross-matching and all eight samples must, therefore, remain undated for the moment. This analysis may be summarised thus;

sampled	unmeasured	measured	undated	dated
32	6	26	8	18 (RRFASQ01 1389–1660)

Interpretation

None of the 18 dated samples in site chronology RRFASQ01 retains complete sapwood (the last ring produced by a tree before it is felled) and it is thus not possible to be absolutely certain as to precisely when any of the trees used was cut. Almost all the samples do, however, retain the heartwood/sapwood boundary (this being indicated by 'h/s' in Table 1 and the bar diagram, Figures 6 and 7). This means that although the samples are missing the outer sapwood rings (this almost certainly having been trimmed off by the original carpenters, or lost over the years through decay, exposure, and/or abrasion), it is *only* the sapwood that is lost, and it is still possible to calculate a *likely* felling date range for the timbers.

The usual way to do this is to firstly sort the samples into groups by location, 'Hull', parlour, barn, etc. Then, as indicated in the section on tree-ring dating above, the average date of the heartwood/sapwood boundary ring on each group of samples (or the individual sample if there is only one) is calculated by simply taking the date of the heartwood/sapwood boundary on each individual in a group, and dividing that by the number of samples. To this average date is added the minimum and maximum number of sapwood rings the trees are likely to have had, 15 and 40. This process is demonstrated in the bar diagram Figure 6 where the arrangement and dating of the samples tends to suggest that there is an earlier phase of felling dated to the sixteenth century, and a later phase of felling dated to the seventeenth century.

Sixteenth century timbers

Thus, as may be seen, the earliest phase of felling detected in this analysis appears to be represented by the two lintels to the front opening to the 'Hull'. The average date of the heartwood/sapwood boundary on the two samples from these timbers (RRF-A02 and A03) is 1493. By adding the minimum number of sapwood rings the trees are likely to have had, 15, and the maximum number of sapwood rings they are likely to have had, 40, we calculate that it is very likely that these timbers were felled together at some point between 1508 at the earliest and 1533 at the latest.

The two ceiling beams to the bedrooms of the house, RRF-A17 and A20, plus one to the ceiling of the first floor hallway, RRF-A21, appear to be next, the average heartwood/sapwood boundary on these three samples being dated 1502. By adding the minimum and maximum number of sapwood rings the trees are likely to have had, 15–40, we calculate that it is very likely that these timbers were felled together at some point between 1517 at the earliest and 1542 at the latest.

It would then seem that the lintel of the rear door to the Old Barn was felled between 1526–51 (sample RRF-A14 having a heartwood/sapwood boundary date of 1511), while the two lintels to its front door were felled 1557–82 (the two samples, RRF-A12 and A13, having an average heartwood/sapwood boundary date of 1542). Again, a minimum/maximum of 15–40 sapwood rings has been added to the heartwood/sapwood boundary date.

It is in fact *possible* that some of these timbers were felled at the same time as each other. Samples RRF-A02, A03, A17, A20, and A21, for example, share an overlapping felling date range between 1517 (the earliest possible felling date for RRF-A17, A20, and A21) and 1533 (the latest possible felling date for RRF-A02 and A03), and the trees could have been cut together during this common period. Another possibility is that the trees represented by samples RRF-A17, A20, and A21, and sample RRF-A14 could have been felled together. These timbers again share an overlapping date span between 1526, the earliest possible felling date for sample RRF-A14 and 1542, the latest possible for samples RRF-A17, A20, and A21.

On the other hand, the timber represented by sample RRF-A14 and those represented by samples RRF-A12 and A13 could *not* have been felled at the same time as each other because they do not share an overlapping felling date range. The latest that the tree represented by sample RRF-A14 could have been felled is 1551, while the earliest the trees represented by samples RRF-A12 and A13 could have been felled is 1557.

Seventeenth century timbers

The first of the seventeenth century timbers is represented by sample RRF-A15, from the outer lintel to door to the rear store. This has a heartwood/sapwood boundary date of 1593 which, allowing for the minimum/maximum number of missing sapwood rings, 15–40, gives a felling date range of between 1608 at the earliest and 1633 at the latest.

Given that the timbers of the Down-house loft (samples RRF-A04, A05, A06, A09, and A10) are next in date with a felling between 1611–34, it is quite possible that these, and the lintel to the rear store (RRF-A15), were in fact felled at about the same time as each other, there being a good overlap in the felling dates ranges of the two.

The penultimate phase of felling is found to the Parlour, represented by samples RRF-A24 and A25. The west beam of the Parlour (sample RRF-A24) has a felling date of 1643–68, while the east beam (RRF-A25) was felled at some time between 1660–85. It is again just possible that these two beams were felled at the same time as each other, but this seems a little unlikely given the short time overlap between their felling date ranges.

The latest phase of felling is represented by the ceiling timbers of the buttery/playroom and kitchen, samples RRF-A26 and RRF-A30. These timbers were both felled at some point between 1674 at the earliest and 1799 at the latest. Again, given the overlap in the felling date range of these two timbers, it is possible that they were felled at the same time as the east beam of the parlour (RRF-A25), where they share a common period between 1674–85.

Conclusion

Although perhaps seemingly technical and a little convoluted, the analysis undertaken here simply shows that, as perhaps expected from the initial survey of the timbers, and the fact that different, buildings (which are unlikely to all be of a single phase of construction) timbers of different dates are to be found a Row Ridding Farm. The analysis may be summarised as below;

Sample no.	Sample location	Average h/s date	Felling date range
A02, A03	'Hull'	1493	1508–33
A17, A20, A21	Bedrooms/hall	1502	1517–42
A14	Barn, rear door	1511	1526–51
A12, A13	Barn, front door	1542	1557–82
A15	Rear store	1593	1608–33
A04, A05, A06, A09, A10	Down-house	1594	1611–34
A24	Parlour	1628	1643–68
A25	Parlour	1645	1660–85
A26, A30	Buttery/kitchen	1659	1674–99

Thus, as was initially hoped, tree-ring analysis has more reliably and accurately determined the date and potential antiquity of some of the buildings, and established with greater certainly how much potentially older material still remains.

Undated samples

Eight of the 26 samples obtained from Row Ridding Farm remain ungrouped and undated. It will be seen that the majority of these undated samples have slightly low numbers of rings, though some do have what would normally be thought of as sufficient rings for reliable dating. A few of the undated samples show bands of compressed, or very narrow, rings, and some possible distortion, and it is possibly these features, which may represent interference with the climatic signal, which accounts for the lack of cross-matching and dating. The other samples show no such problems. It is not uncommon, however, in most programmes of tree-ring analysis, to find that some samples are undated, many of them for no apparent reason.

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Table 1: Details of tree-ring samples from the house and outbuildings Row Ridding Farm, Woodland, Broughton-in-Furness, Cumbria

Sample number	Sample location	Total rings	Sapwood rings*	First measured ring date (AD)	Heart/sap boundary (AD)	Last measured ring date (AD)
	'Hull'					
RRF-A01	Lintel to blocked doorway	52	h/s	------	------	------
RRF-A02	Inner lintel front opening	90	h/s	1402	1491	1491
RRF-A03	Outer lintel front opening	55	h/s	1441	1495	1495
	'Down-house' loft					
RRF-A04	North upper purlin (east bay)	55	4	1546	1596	1600
RRF-A05	North lower purlin (east bay)	57	18	1554	1592	1610
RRF-A06	South upper purlin (east bay)	53	10	1552	1594	1604
RRF-A07	South lower purlin (east bay)	59	6	------	------	------
RRF-A08	Loft door lintel east bay/west bay	49	h/s	------	------	------
RRF-A09	North upper purlin (west bay)	58	h/s	1536	1593	1593
RRF-A10	North lower purlin (west bay)	56	no h/s	1525	------	1580
RRF-A11	Door lintel (at top of steps)	52	4	------	------	------
	Old Barn					
RRF-A12	Outer lintel to front opening	111	h/s	1430	1540	1540
RRF-A13	Inner lintel to front opening	113	h/s	1431	1543	1543
RRF-A14	Inner lintel to rear opening	123	h/s	1389	1511	1511

Table 1: continued

Sample number	Sample location	Total rings	Sapwood rings*	First measured ring date (AD)	Heart/sap boundary (AD)	Last measured ring date (AD)
	Rear store to house (up steps)					
RRF-A15	Outer lintel to door	203	h/s	1391	1593	1593
RRF-A16	North purlin	nm	---	------	------	------
	House – bedroom over kitchen					
RRF-A17	North purlin	100	h/s	1401	1500	1500
RRF-A18	North fireplace bracket	nm	---	------	------	------
	House – bedroom over parlour					
RRF-A19	East ceiling beam	nm	---	------	------	------
RRF-A20	West ceiling beam	75	h/s	1429	1503	1503
	First floor hallway					
RRF-A21	Upper purlin to cat-slide over stairs	55	h/s	1448	1502	1502
RRF-A22	Inner (to house) lintel to stair doorway	nm	---	------	------	------
RRF-A23	Upper lintel to bathroom	nm	---	------	------	------
	Parlour					
RRF-A24	West ceiling beam	54	2	1577	1628	1630
RRF-A25	East ceiling beam	56	h/s	1590	1645	1645

Table 1: continued

Sample number	Sample location	Total rings	Sapwood rings*	First measured ring date (AD)	Heart/sap boundary (AD)	Last measured ring date (AD)
	Buttery/playroom					
RRF-A26	Main ceiling beam	56	h/s	1605	1660	1660
	Kitchen					
RRF-A27	Lintel to kitchen/hallway door	53	h/s	------	------	------
RRF-A28	Outer lintel to front door to kitchen	54	h/s	------	------	------
RRF-A29	'Spice cupboard' wall timber	nm	---	------	------	------
RRF-A30	Kitchen main ceiling beam	60	h/s	1598	1657	1657
	'Tack room'					
RRF-A31	Main ceiling beam	50	h/s	------	------	------
	Extra samples					
RRF-A32	Tomsteads barn beam	65	h/s	------	------	------

*h/s = the last ring on the sample is at the heartwood/sapwood boundary, ie, only the sapwood rings are missing

nm = sample not measured

Table 2: Results of the cross-matching of site chronology RRFASQ01 and the reference chronologies when the first ring date is 1389 and the last ring date is 1660		
Reference chronology	*t*-value	
Roosecote Farm, Barrow-in-Furness, Cumbria	7.9	(Arnold and Howard 2014a unpubl)
Cavendish Arms, Dalton-in-Furness, Cumbria	7.1	(Arnold and Howard 2014b unpubl)
2-4 Church Street, Leek, Staffs	6.6	(Arnold and Howard 2009 unpubl)
Sinai Park, Burton on Trent, Staffs	6.4	(Tyers 1997)
Little Morton Hall, Cheshire	6.4	(Howard 2003 unpubl)
Nether Levens Hall, Kendal, Cumbria	6.3	(Howard *et al* 1991)
Blanchland Abbey Gatehouse, Northumbs	6.2	(Arnold *et al* 2009)
Lanercost Priory, Brampton, Cumbria	6.1	(Arnold *et al* 2004)

Site chronology RRFAASQ01 is a composite of the data of the relevant cross-matching samples as seen in the bar diagram Figure 6 below. This composite data produces an 'average' tree-ring pattern, where the possible erratic variations of any one individual sample are reduced and the overall climatic signal of the group is enhanced. This 'average' site chronology is then compared with several hundred reference patterns covering every part of Britain for all time periods, cross-matching with a number of these only at the date span indicated, the table giving only a small selection of the very best matches as represented by '*t*-values' (ie, degrees of similarity). It may be noticed from this Table that the resultant *t*-values are well in excess of the *t*=3.5 value usually taken as the minimum acceptable level for satisfactory dating. These values, along with the many other slightly lower, unlisted, cross-matches, indicate a very firm and reliable date for the timbers.

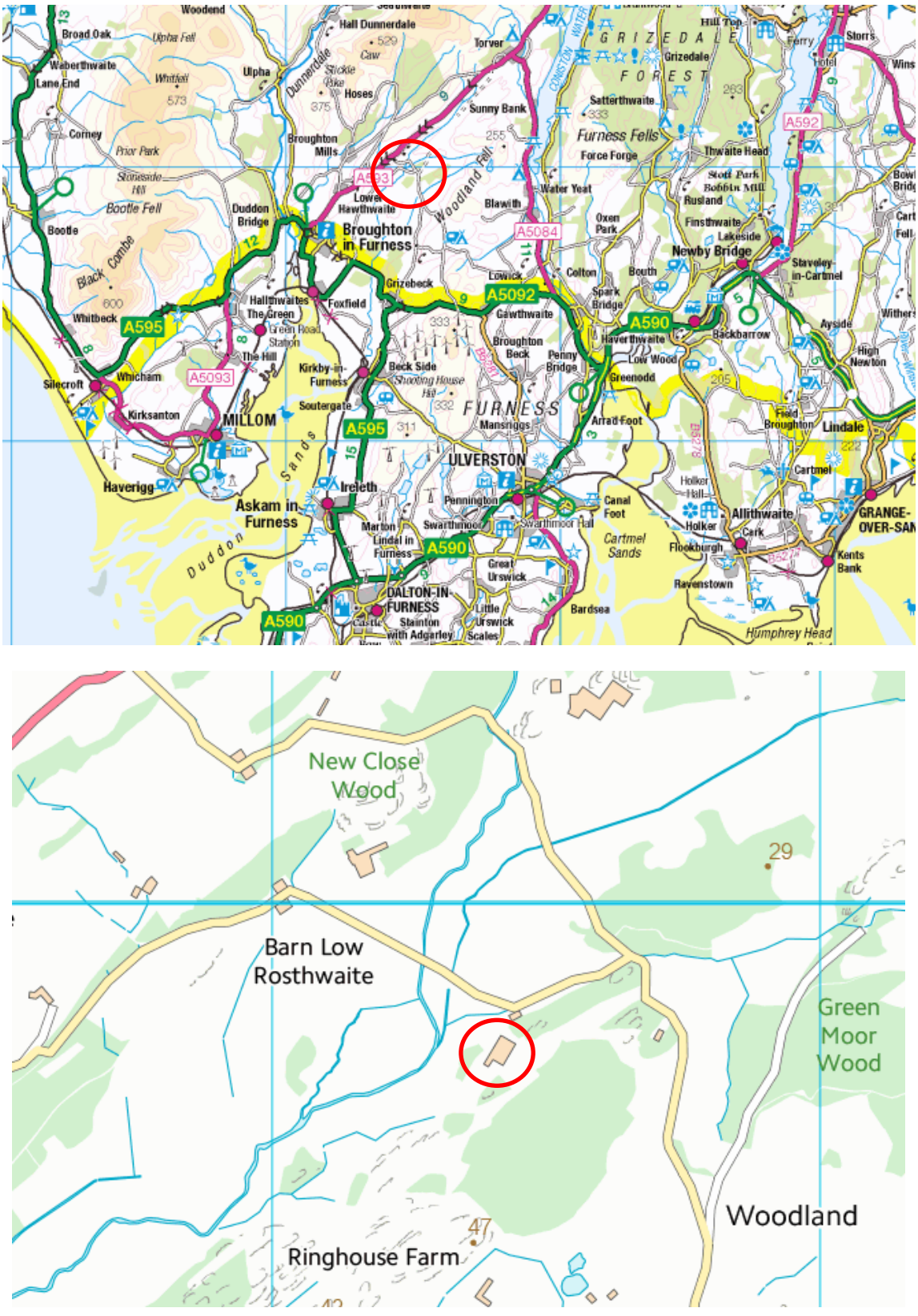


Figure 1a/b: Maps to show approximate location of Woodland (top) and Row Ridding Farm (bottom)

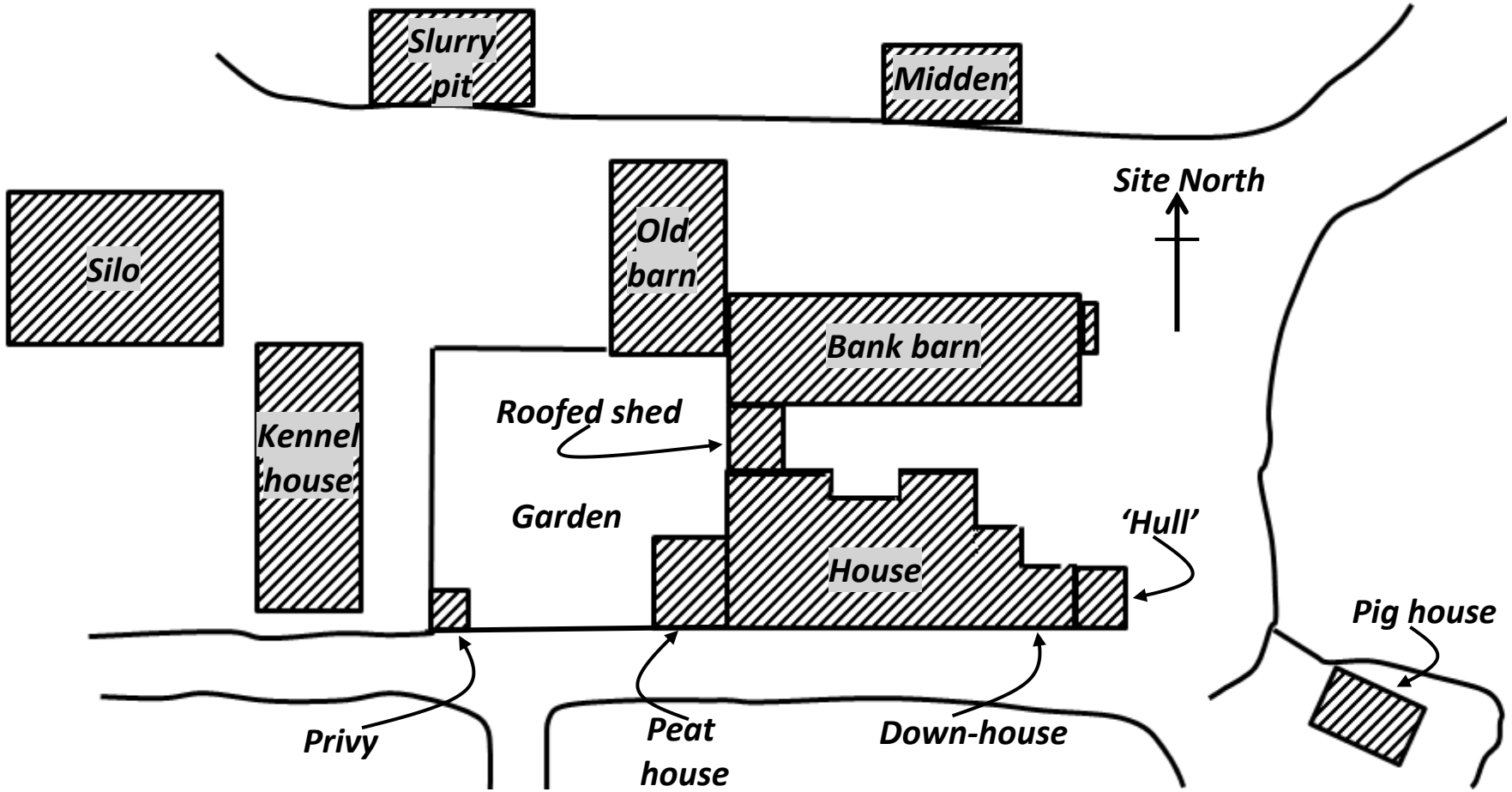


Figure 2: Plan to show layout and arrangement of the buildings at Row Ridding Farm (after Louise McArthur)

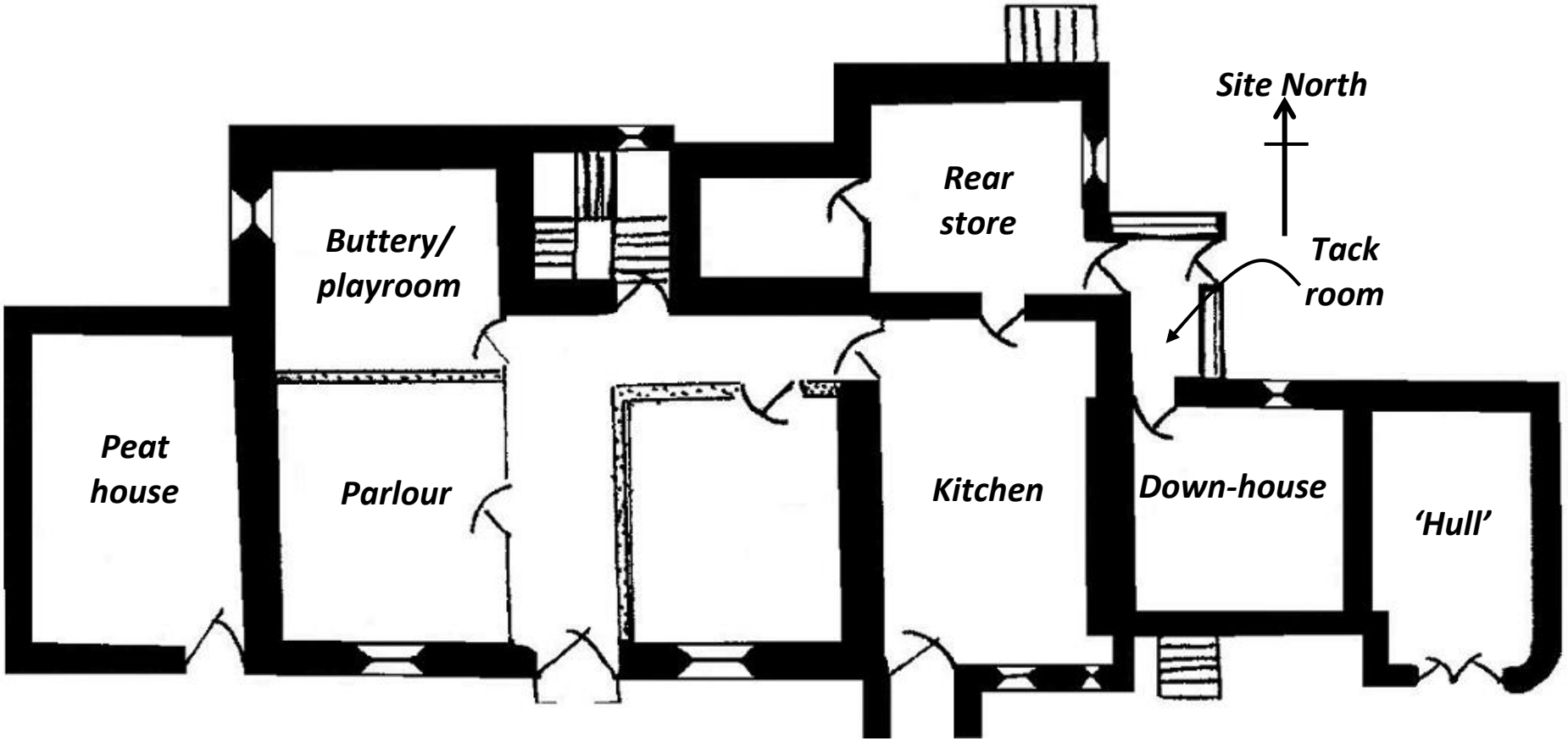


Figure 3: Plan of the Farmhouse at ground floor level to show layout and arrangement of the rooms (after Louise McArthur)

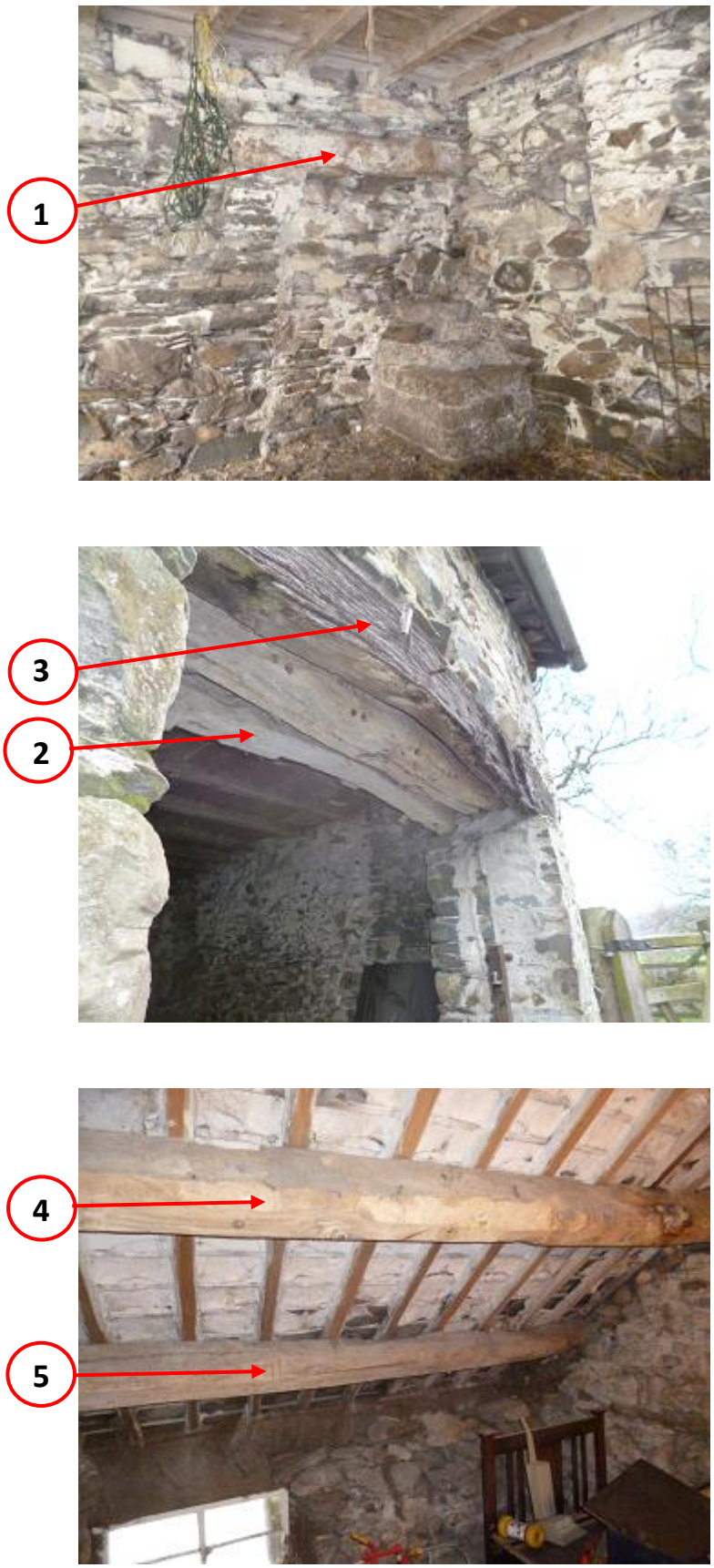


Figure 4a–c: Photographs to help identify sampled timbers

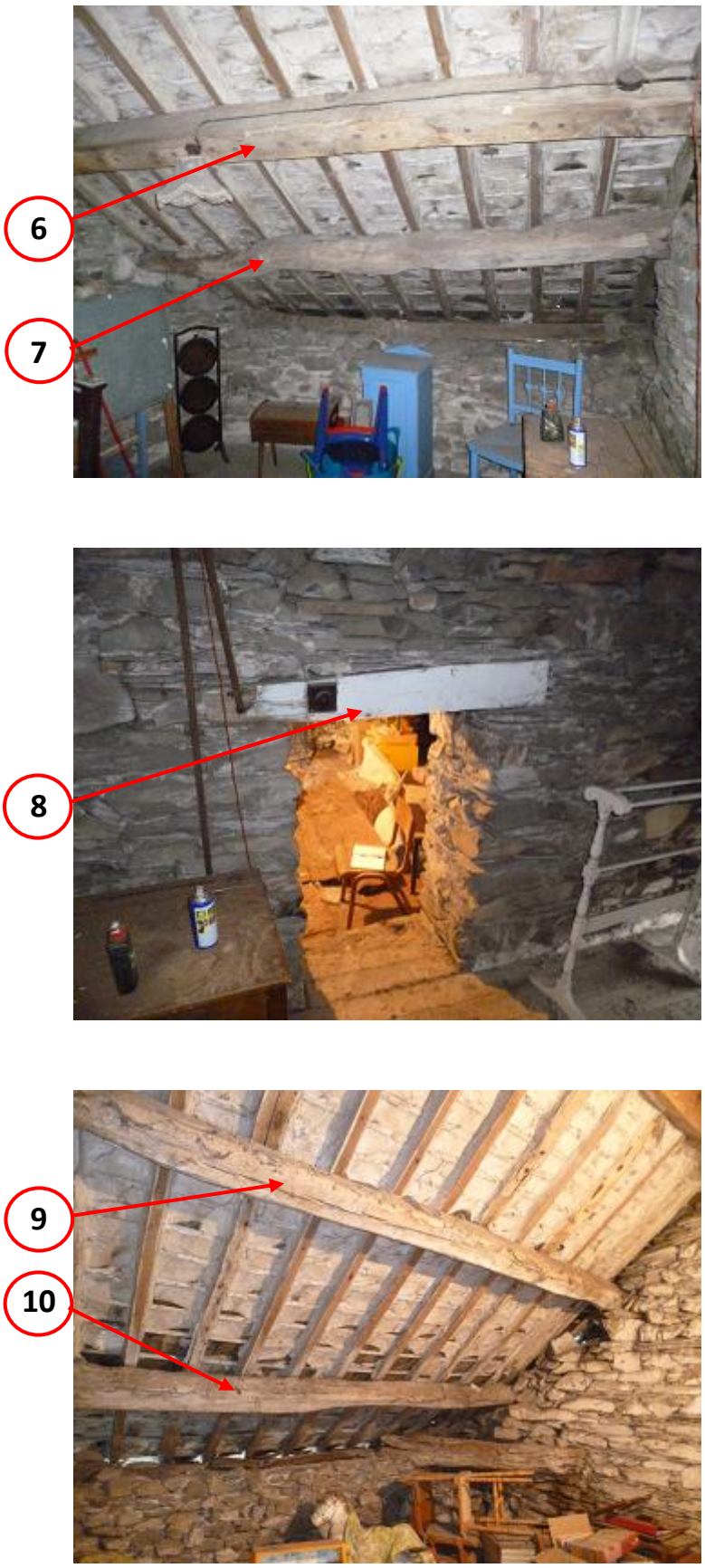


Figure 4d–f: Photographs to help identify sampled timbers

Figure 4g–i: Photographs to help identify sampled timbers

Figure 4j–l: Photographs to help identify sampled timbers

Figure 4m–o: Photographs to help identify sampled timbers

Figure 4p–r: Photographs to help identify sampled timbers

Figure 4s–u: Photographs to help identify sampled timbers

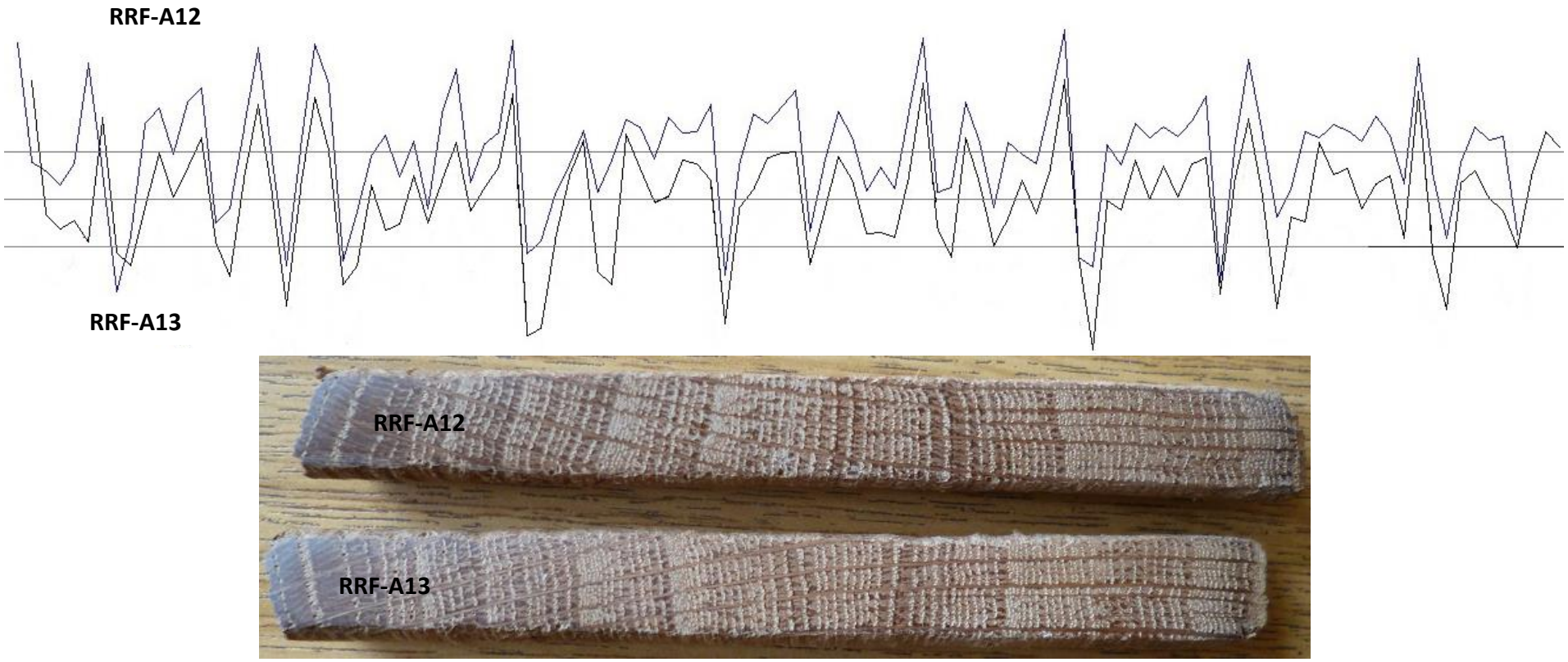
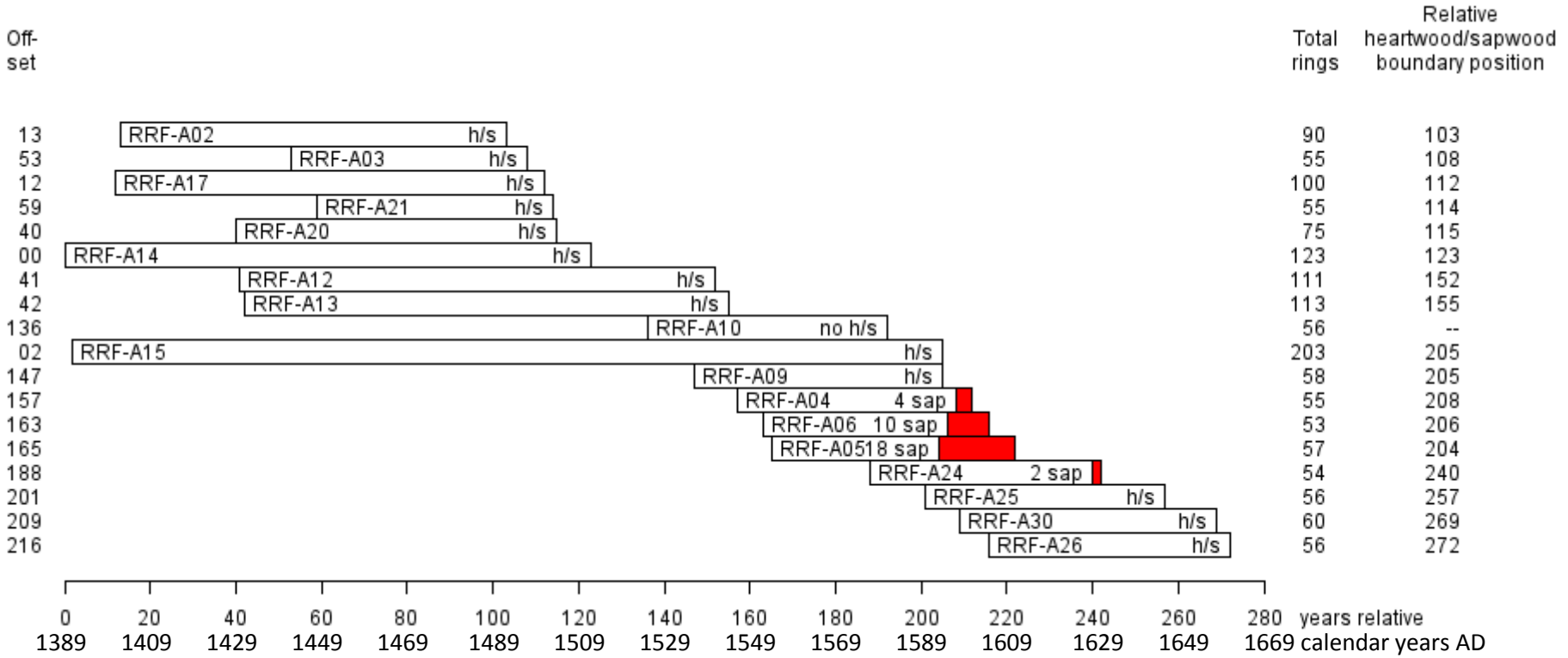


Figure 5: Graphic representation of the cross-matching of two samples, RRF-A12 and A13

When cross-matched at the correct positions, as here, the variations in the rings of these two samples (where they overlap) correspond with a high degree of similarity. As the ring widths of one sample increase (represented by peaks in the graph), or decrease (represented by troughs), so too do the annual ring widths of the second sample. This similarity in growth pattern is a result of the two trees represented having grown at the *same time* in the *same place.* The growth ring pattern of two samples from trees grown at different times would never correspond so well.



blank bars ☐ = heartwood rings, shaded bars ▬ = sapwood rings
h/s = heartwood/sapwood boundary, i.e., only the sapwood rings are missing

Figure 6: Bar diagram of the samples in site chronology RRFASQ01 at positions indicated by their grouping. In this figure the samples are shown in the form of bars, in last dated ring order, at positions where the ring variations of the samples cross-match with each other, this similarity being produced by the trees represented growing at the *same time* as each other in the *same place*. The samples are combined to form a 'site chronology', which is dated by comparison with the 'reference' chronologies (see Table 2).

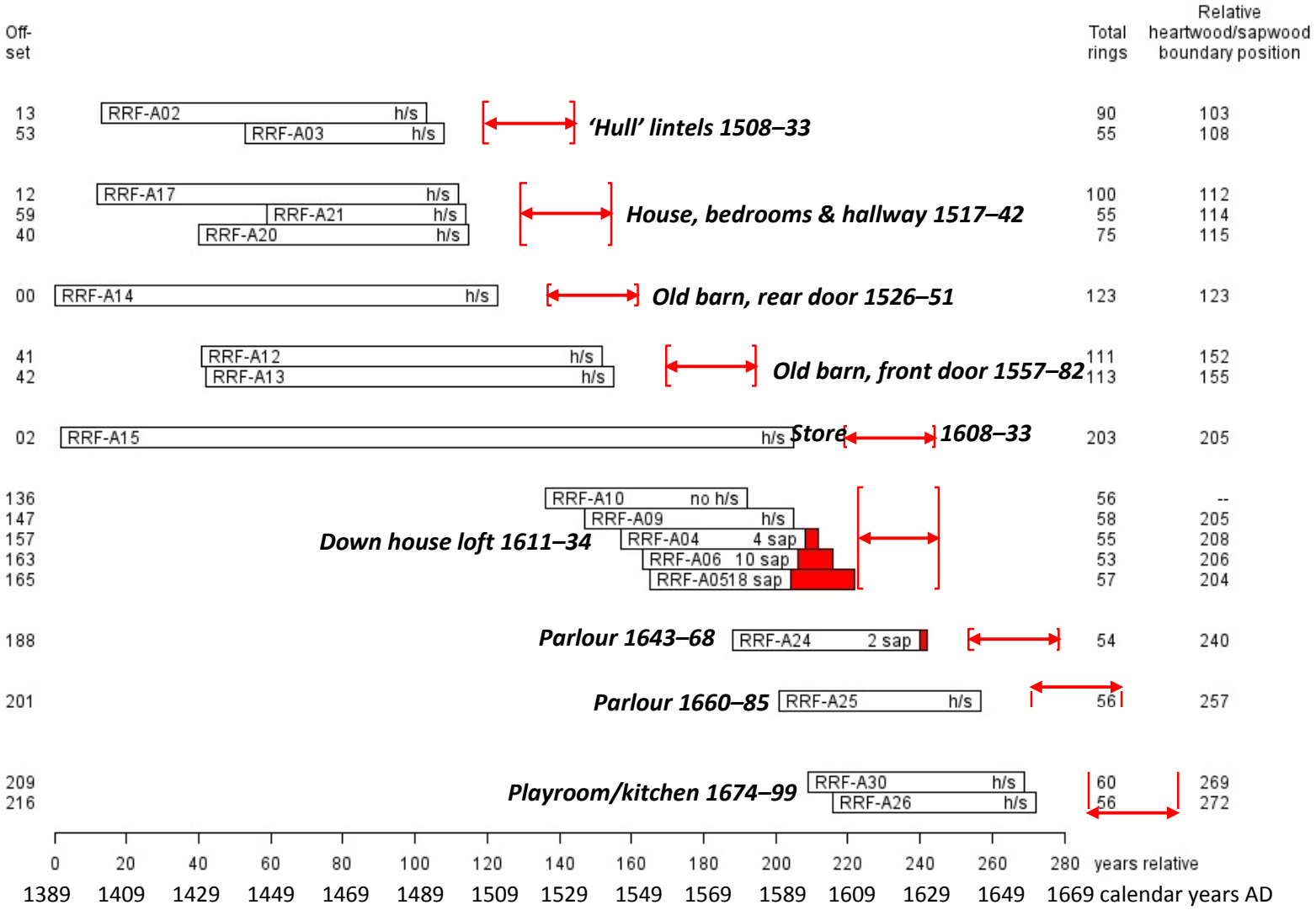

Off-set
Total rings
Relative heartwood/sapwood boundary position
13 RRF-A02 h/s 90 103
53 RRF-A03 h/s 55 108
'Hull' lintels 1508–33
12 RRF-A17 h/s 100 112
59 RRF-A21 h/s 55 114
40 RRF-A20 h/s 75 115
House, bedrooms & hallway 1517–42
00 RRF-A14 h/s 123 123
Old barn, rear door 1526–51
41 RRF-A12 h/s 111 152
42 RRF-A13 h/s 113 155
Old barn, front door 1557–82
02 RRF-A15 h/s 203 205
Store 1608–33
136 RRF-A10 no h/s 56 --
147 RRF-A09 h/s 58 205
157 RRF-A04 4 sap 55 208
163 RRF-A06 10 sap 53 206
165 RRF-A0518 sap 57 204
Down house loft 1611–34
188 RRF-A24 2 sap 54 240
Parlour 1643–68
201 RRF-A25 h/s 56 257
Parlour 1660–85
209 RRF-A30 h/s 60 269
216 RRF-A26 h/s 56 272
Playroom/kitchen 1674–99
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 years relative
1389 1409 1429 1449 1469 1489 1509 1529 1549 1569 1589 1609 1629 1649 1669 calendar years AD

Figure 7 (above): In this figure, the dated samples in site chronology RRFASQ01 are resorted into groups by sample locations, 'Hull', Old Barn, Parlour, etc (again, in last dated ring order by group and within each group). The likely felling date range of the timbers within each group is then calculated by finding its *average* heartwood/sapwood boundary date and adding the minimum and maximum numbers of sapwood rings the timbers are likely to have had, 15–40.

This shows that the earliest timbers are from the 'Hull' followed by those from the bedrooms and hallway. Because these timbers share an overlapping felling date range, between 1517–33, it is *possible* that they were in fact felled together at some point during this common period. It is also just about possible that the lintel to the rear door of the Old Barn was felled with them, but this would have had to have been after 1526 (the earliest the rear lintel could have been felled), and before 1533, the latest that the 'Hull' samples could have been felled, or before 1542 if it was felled along with the timbers from the bedrooms and hall only. The front door lintels to the Old Barn *must* have been felled at a different time because they do not share any overlap in their felling date range.

The timber to the rear store and those to the Down-house are next, possibly felled together in the earlier sixteenth century. The Timbers of the Parlour, and the buttery/playroom and kitchen are later still, probably being felled at slightly different times, although there is again some overlap in the felling dates of some samples suggesting the possibility that some were felled at the same time as each other.