The Archaeology of the A30 Bodmin to Indian Queens Road Scheme
Specialist Report Archive

The Charcoal

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Introduction

Twenty-nine samples were selected for analysis on the basis of the assessment carried out by Thompson, Francis and Summers (May 2007). Assemblages worthy of full analysis were identified from pits, postholes and ditches from Sites, A, C, D and E. The aims of the charcoal analysis were to characterise the wood utilised for fuel for each period represented and to examine any changes in the exploitation of woodland resources. The results from samples assessed by Thompson *et al.* are also included in this report where relevant.

Methodology

The majority of the samples were analysed in full, following standard procedures. Large assemblages were divided using a riffle box, so that an optimum number of 100 fragments were identified from each sample (the percentage of the flot identified is given in the tables). The charcoal was fractured and sorted into groups based on the anatomical features observed in transverse section at X7 to X45 magnification. Representative fragments from each group were then selected for further examination using a Meiji incident-light microscope at up to X400 magnification. Identifications were made with reference to Schweingruber (1990), Hather (2000) and modern reference material. Where a number of samples analysed from a single site had produced similar assemblages or there were more than one sample from a single feature, 20 fragments were selected from the remaining samples to confirm the taxonomic composition. The maturity of the wood was noted where possible. Classification and nomenclature follow Stace (1997).

Results

The results by fragment count are given in Tables 1-4 which are presented with the discussion below. The preservation of the charcoal was generally poor, being very friable and infused with sediment, with the exception of a few very large and well preserved samples. There were a large number of small diameter roundwood fragments in the assemblages, but the majority was too fragmented to provide useful growth ring analysis. The full results are included in the archive.

Eight taxa were positively identified, with the taxonomic level varying according to the biogeography and anatomy of the taxa: *Quercus* sp. (oak), *Alnus glutinosa* (alder), *Corylus avellana* (hazel), *Populus/Salix* (poplar/willow), *Calluna vulgaris* (heather), *Prunus spinosa* (blackthorn), Maloideae (hawthorn, service, apple etc) and *Cytisus/Ulex*(broom/gorse). All are native and there were no exotics. The *Cytisus/Ulex*, Maloideae and the *Populus/Salix* could not be differentiated to any greater level, since the anatomical structures of the species are difficult to distinguish, but it appeared that a single species was represented in each case. The identification of the cf. *Cytisus/Ulex* could not be confirmed with certainty as the preservation was too poor to allow the examination of key diagnostic characteristics, but it is very likely that one of these genera was represented.

Neolithic/ early Bronze Age

Royalton Hengiform (Site E)

Samples from both the outer pit ring 1112 and the inner posthole circle 1111 of the hengiform monument were analysed. With the exceptions of 1128 and 1095, the charcoal was not well preserved and relatively sparse. Oak dominated all but one of the assemblages; roundwood and trunkwood was represented. The assessment report also noted that oak was present in many of the thirty-six other samples from this site which produced low quantities of charcoal. The quantity of probable broom/gorse in pit 1154 is notable as it represents nearly 50% of the identifiable charcoal, and this samples also produced two fragments of Maloideae (hawthorn, pear, service etc).

Feature type		Pit				Post hole	Post pipe
Feature		**1086**	**1128**	**1154**	**1179**	**1095**	**1123**
Context number		1085	1131	1173	1178	1094	1120
Sample number		1016	1050	1022	1042	1028	1055
% flot identified		100	3.125	100	100	12.5	-
Quercus sp.	oak	58rh	97hs	38r	24h	108h	20hs
Corylus avellana L.	hazel		6				
Alnus/Corylus	alder/hazel		11				
Maloideae	hawthorn etc			2			
Cytisus/Ulex	broom/gorse	5					
cf. *Cytisus/Ulex*	broom/gorse			30r	1r		
Indeterminate		7	3	15		2	
Total		**70**	**117**	**85**	**25**	**110**	**20**

r=roundwood; h=heartwood; s=sapwood

Table 1: Charcoal analysis from Site E

The analysis of the charcoal from the hengiform monument shows no significant spatial pattern, nor context-related variation. Whether the oak represents the burnt remains of structural wood or fuel wood or both is unclear, but the broom/gorse is likely to be from fuel use. Broom/gorse were commonly bound into brooms (Gale & Cutler 2000), and may have entered the archaeological record as defunct artefacts thrown onto the fire, but the evidence of broom/gorse from several samples, and from other sites along the A30, indicates the exploitation of heathland resources. Interestingly, the pollen results from Site E also indicated an element of heathland through the presence of heather (Allen & Brown 2007), which is reflected in a possible heather charcoal fragment from pit 1128 (Thompson *et al.* 2007). The pollen also shows a strong component of hazel, and small stands or isolated pockets of oak woodland in the vicinity. The picture from the charcoal would suggest more plentiful oak supplies than this, or at least that the isolated woodland areas were being exploited for some use at Site E.

Lane End Pit Circles (Site D)

The two adjacent pit circles at Site D were dated to the Early Bronze Age, and samples were selected from both to provide a spatial analysis. It was immediately apparent that the eastern pit circle (4234) was richer in charcoal than the western

(4022) and that there was a concentration of charcoal in the eastern-side pits of 4022. The western-side pits of 4022 produced little charcoal. This may indicate that the charcoal in 4022 came from a burning event that occurred in 4234, and/or that the charcoal had a similar provenance. All nine of the pits, from both 4234 and 4022, were almost entirely composed of oak, with a notable quantity of heartwood present. Pit 4249 produced 20% hazel (of which only 2 fragments were roundwood) and a single fragment of Maloideae was recovered from 4272. The significance of the hazel is negligible given the total quantity of oak from the other samples.

Feature type		Western pit circle				Eastern pit circle				
Feature		**4238**	**4240**	**4249**	**4252**	**4236**	**4256**	**4272**	**4276**	**4309**
Context number		4239	4241	4247	4250	4237	4260	4270	4274	4315
Sample number		4034	4040	4038	4042	4045	4066	4053	4067	4054
% flot identified		25	-	25	-	12.5	50	25	-	6.25
Quercus sp.	oak	104h	20h	69hs	20h	100h	118hs	132hs	20hs	120h
Corylus avellana L.	hazel			18r						
Maloideae	hawthorn, pear, apple							1		
Indeterminate		3		4						
Total		**107**	**20**	**91**	**20**	**100**	**118**	**133**	**20**	**120**

r=roundwood; h=heartwood; s=sapwood

Table 2: Charcoal analysis from Site D

The environmental picture for Site D does not differ significantly from Site E. At least, the charcoal indicates a similar plentiful supply of oak. The assemblages from Site D are unusual in that, with the exception of cremation samples, it is rare to have such complete dominance of oak from so many pits (no further species were indicated in the assessment results either). It suggests that a single activity may be denoted; one that merited or necessitated the exclusive use of oak, and/or that structural remains are represented. Although no direct evidence for tin-mining was discovered on the A30, it is perhaps worth noting that oak would have made an excellent charcoal fuel for smelting, and is commonly found in large quantities on later iron-smelting sites (e.g. Challinor, forthcoming).

Middle Bronze Age

Belowda Pit and Hearth Group (Site C)

As noted in the assessment, Site C produced the most abundant charcoal, and samples were analysed from five of the seven pits, the hearth and both ditch termini. The preservation was variable with friable fragments and numerous small twigs which could be difficult to identify. Most of the pits had several samples from different contexts – while a single sample was analysed in full, the other samples were scanned to provide a tentative characterisation of the assemblage. The results were recorded in the archive, but did not produce any significant variations in the pit compositions, and are not presented here. Oak is still well represented, particularly in hearth 4451, but there is a greater quantity of other species. Hazel is present in most samples, particularly frequent in the pits, which indicates oak-hazel woodland in the area. There is also a component of hedgerow-type species (blackthorn, Maloideae) and

heathland types (heather and broom/gorse). This is supported by the pollen from site C (Allen and Brown 2007), which indicates a similar environmental picture.

Of particular note is the large quantities of roundwood in these samples; 57% of the oak in ditch 4439, for example, was roundwood. This denotes a significant difference in the charcoal assemblages from Site C compared with Sites D and E. This could be due to environmental changes by the Middle Bronze Age; i.e. increased clearance requiring increased exploitation of hedgerow/heathland resources and the gathering of small woodland branches. However, while this may be an element, the pollen results do not suggest significant change from the Late Neolithic/Early Bronze Age sequence, making it more probable that the differences are associated with context-related variation. If the earlier samples may have resulted from industrial activities, it seems more likely that these samples have a domestic provenance.

Feature type		Pit					Ditch terminus		Hearth
Feature		**4136**	**4172**	**4414**	**4421**	**4428**	**4439**	**4446**	**4451**
Context number		4140	4173	4415	4425	4433	4443	4448	4453
Sample number		4019	4020	4112	4110	4106	4114	4126	4130
% flot identified		25	12.5	-	-	3.13	3.125	100	1.56
Quercus sp.	oak	94rhs	35rh	18rh	11rh	64rhs	88rhs	78rs	99rs
Corylus avellana L.	hazel	14	55r	1	5r	33r	17	2	
Calluna vulgaris L.	heather								1r
Prunus spinosa L.	blackthorn		1						
Maloideae	hawthorn, pear, apple		13r	1	4r	17r	18r	6r	
Cytisus/Ulex	broom/gorse							16r	6r
cf. *Cytisus/Ulex*	broom/gorse						1		
Indeterminate		3	2			3	2	6	10
Total		**111**	**106**	**20**	**20**	**117**	**126**	**108**	**116**

r=roundwood; h=heartwood; s=sapwood

Table 3: Charcoal analysis from Site C

Late Iron Age/Romano-British

Lower Trenoweth Roundhouse (Site A)

The charcoal from this site was generally sparse and small in size, with large quantities of roots and other contaminants in the flots. Only three samples merited full analysis; from one of the postholes at the entrance to the roundhouse (3457) and two ditch termini (3269) and (3439) in the outer ring ditch. The posthole was entirely dominated by oak, with heartwood and a couple of small roundwood fragments. The assemblage may well have come from structural wood remains, particularly since many of the other samples produced more mixed assemblages. Indeed, it was noted in the assessment that this site produced the most taxonomically diverse assemblages and the majority contained a notable component of diffuse porous species, albeit in small quantities, as demonstrated by 3443. This is a clear contrast to the earlier samples from sites C, D and E. It is interesting, therefore, that the ditch samples at Site A are so contrasting; 3439 is dominated by oak, while ditch 3269 was composed of small roundwood fragments from a range of species, with a large quantity of alder.

The presence of alder, and willow/poplar, indicates the exploitation of wetland resources, as these species prefer damp ground. In addition to the heathland component (gorse/broom and heather), this may suggest a lessening supply of oak in the near vicinity. Certainly, neither alder nor willow are the best choice for fuelwood (Edlin 1949).

Possible Roman ditch at Chainage 4000

This picture would appear to be confirmed by the assemblages from the possible Roman ditch 3355 at Chainage 4000. In these samples, oak was in a notable minority, but a range of other species, including willow/poplar, hazel and broom/gorse, were well represented. Assuming that the ditch is later in date than the Late Iron Age/Romano-British roundhouse, this supports the indication of environmental change reflected in fuelwood selection. The fact that these samples, and the ones from Site A, also contained cereal remains and weed seeds may be relevant. It implies that the charcoal comes from domestic cooking or crop processing debris and these assemblages are consistent with the general domestic-type of fuelwood gathering practiced in Romano-British settlements (e.g. Gale 1999).

Site		A				Nr Ch 4000	
Feature type		Ditch	Ditch	Posthole	Layer	Ditch	Ditch
Feature		**3269**	**3439**	**3457**	**3443**	**3355**	**3355**
Context number		3270	3440	3457	3443	3360	3361
Sample number		3010	3028	3031	3030	3018	3019
% flot identified		12.5	25	50	-	12.5	-
Quercus sp.	oak	33rhs	96h	123rh	4	9r	9r
Alnus glutinosa Gaertn.	alder	38r					
Corylus avellana L.	hazel					19r	1r
Alnus/Corylus	alder/hazel		1r		4		
Populus/Salix	poplar/willow	8r				44r	3r
Calluna vulgaris L.	heather	4r					
cf. *Calluna vulgaris* L.	heather				4r		
Maloideae	hawthorn, pear, apple etc				5r	1r	
Cytisus/Ulex	broom/gorse	20r				31r	7r
Indeterminate		7r			3	2	
Total		**110**	**97**	**123**	**20**	**106**	**20**

r=roundwood; h=heartwood; s=sapwood

Table 4: Charcoal analysis from Site A and Chainage 4000

Conclusions

The charcoal from the A30 presents a fairly consistent picture of woodland resources, which indicates oak-hazel woodland was most commonly utilised for fuelwood. Hedgerow and heathland areas were also being exploited, as were wetland areas in the later Romano-British period. This is consistent with the general palynological picture in Cornwall which shows oak-hazel woodland dominated, with alder woodland on lower-lying areas, throughout the Neolithic period (Wilkinson & Straker ??). Moreover, the general taxonomic list from the A30 is similar to that at Davidstow (see Smith 2002 for references).

The pollen evidence from the A30 itself shows a more cleared and grassland environment in the Early Bronze Age onwards. The charcoal does not entirely support this as there is a vast quantity of oak in the Late Neolithic/Early Bronze Age samples, but there is a slow decrease in the amount of oak used in later samples (Figure 1), which may indicate changes in the environment and a lessening of woodland resources.

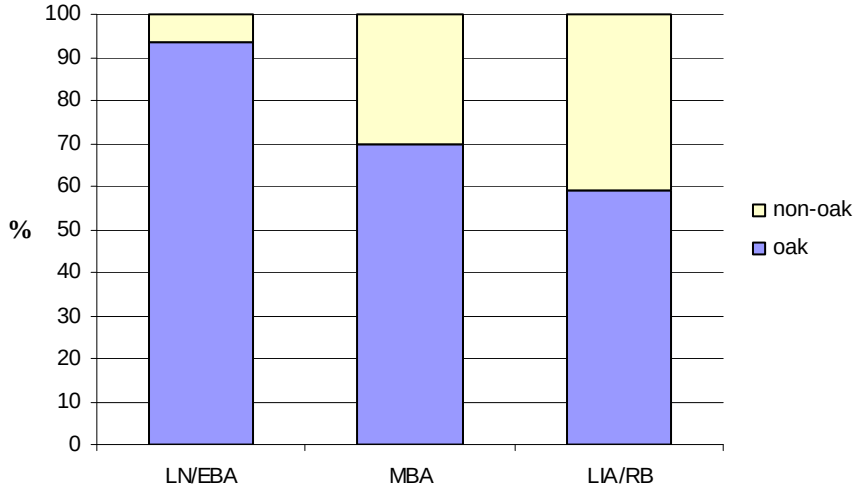

Figure 1: Graph showing percentage of oak to non-oak taxa by period

The almost exclusive presence of oak in the hengiform monument at site E, and the pit circles at site D, may relate to the activities which produced the charcoal, rather than environmental availability. The assemblages are more akin to ritual or industrial samples, than to domestic debris. This is supported by the lack of food or other artefactual remains that might be expected in domestic contexts. It is worth noting that industrial activities such as metal smelting are commonly carried out using oak charcoal and these assemblages could have resulted from such activities.

References

Allen, P & Brown, A, 2007. Pollen assessment, in A30 Bodmin to Indian Queens: Post Excavation Assessment, Oxford Archaeology.

Challinor, D, forthcoming. The Wood Charcoal, in Excavations at West Hawk Farm, Kent, South East Archaeology Monograph 1

Edlin, H L, 1949. *Woodland crafts in Britain: an account of the traditional uses of trees and timbers in the British countryside*, London, Batsford

Gale, R & Cutler, D, 2000. *Plants in Archaeology: Identification manual of vegetative plant materials used in Europe and the southern Mediterranean to c. 1500,* Westbury and Kew.

Gale, R, 1999. Charcoal [from Pomeroy Wood], in A P Fitzpatrick, C A Butterworth & J Grove (eds) *Prehistoric and Roman Sites in East Devon: The A30 Honiton to Exeter Improvement DBFO, 1996-0. Volume 2: Romano-British Sites,* 372-382, Salisbury, Trust for Wessex Archaeology

Hather, J G, 2000. *The Identification of Northern European Woods; A Guide for Archaeologists and Conservators*, London, Archetype Publications

Smith, W, 2002. *A Review of Archaeological Wood Analyses in Southern England*, Centre for Archaeology Report, English Heritage

Schweingruber, F H, 1990. *Microscopic wood anatomy*, 3rd Edition, Swiss Federal Institute for Forest, Snow and Landscape Research

Stace, C, 1997. *New Flora of the British Isles*, Second Edition, Cambridge, Cambridge University Press

Thompson, G B, Francis, R, & Summers, J. 2007 Charred plant remains and wood charcoal assessment, in A30 Bodmin to Indian Queens: Post Excavation Assessment, Oxford Archaeology.

Wilkinson, K & Straker, V ?? Neolithic and Early Bronze Age environments in south-west England