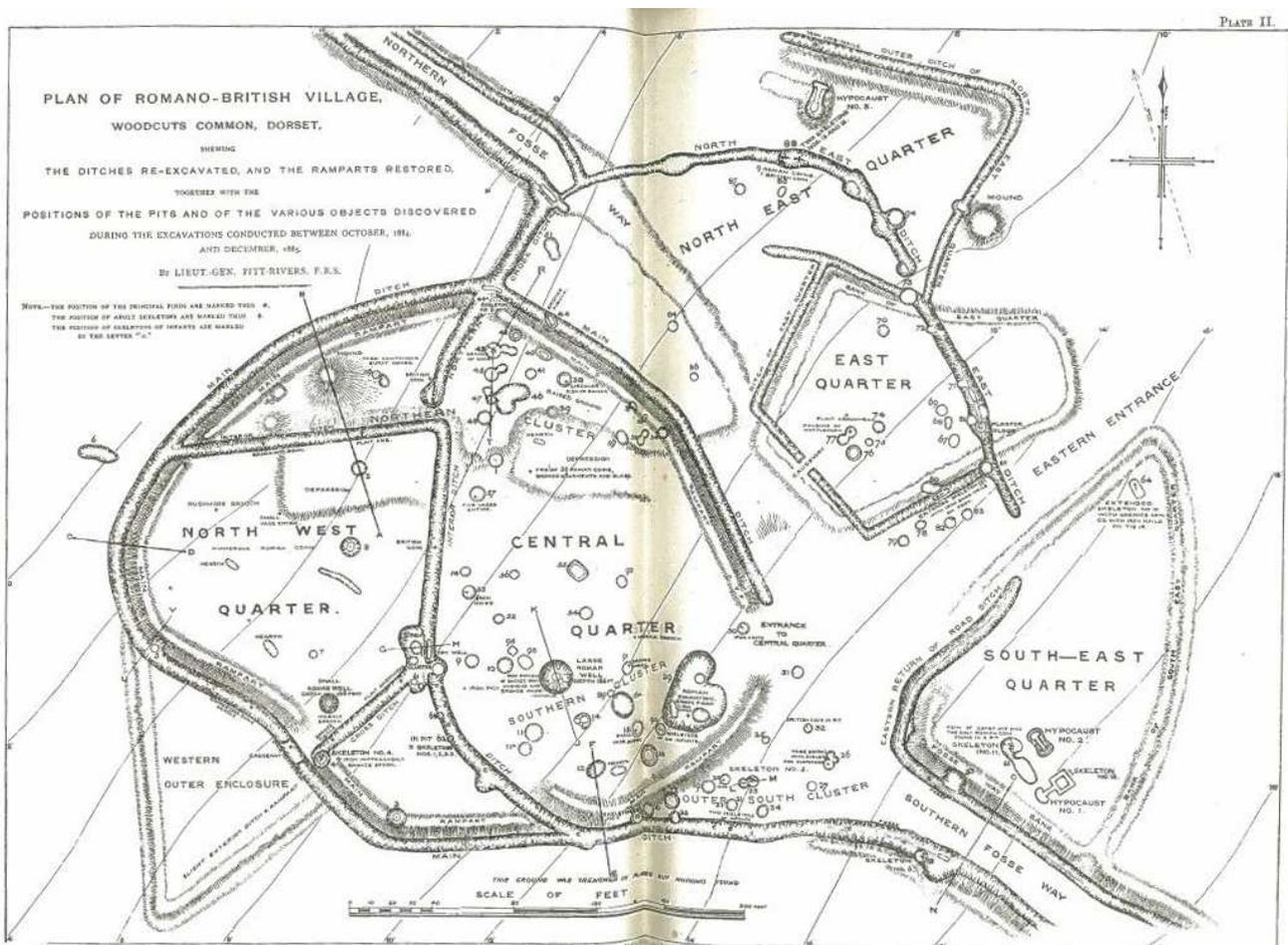




Analysis of wood charcoal remains from the Pitt Rivers Archive, The Salisbury Museum: Woodcutts Common, Dorset

Zoë Hazell and Gill Campbell

Discovery, Innovation and Science in the Historic Environment



WOODCUTTS COMMON
CRANBORNE CHASE
DORSET

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SUMMARY

During excavations in the late 1880s led by General Pitt Rivers at the Romano-British villa of Woodcutts Common, Dorset, wood charcoal was recovered; examination of the material at the time included identifications of sweet chestnut (*Castanea sativa* Mill.). As part of a wider project investigating the history of the species in the British Isles, detailed analysis and recording of the charcoal remains (held in archive at The Salisbury Museum) were undertaken. The remains originally identified as sweet chestnut have now been re-identified, resulting in no secure identifications of the species here. Given that this site (together with Rotherley, Wiltshire) has long been cited as one of the main sites providing evidence of sweet chestnut as a Roman introduction, these revised results necessitate re-evaluation of the status of sweet chestnut in Britain.

ACKNOWLEDGEMENTS

Thanks to Rob Jarman (University of Gloucestershire) for locating and sourcing the material; and thanks to Valerie Goodrich (The Salisbury Museum) and to Janet Ellis-Schön (formerly of The Salisbury Museum) for their interest and support, facilitating the research.

ARCHIVE LOCATION

The wood charcoal is part of the Pitt Rivers Collection, held at The Salisbury Museum.

DATE OF RESEARCH

2015 to 2016

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Cover image: Site plan of Woodcutts Common, from Pitt Rivers (1887).

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1 INTRODUCTION

1.1 Background to the study

Castanea sativa Mill. (sweet chestnut) is widely regarded as an archaeophyte¹ introduced into Britain by the Romans. This assertion is largely based on charcoal identifications from archaeological contexts of apparent Romano-British age, including those recovered during late 18th-early 19th century excavations. These results have been cited, for example, by Godwin (1956, 1975), and the theory of it being a Roman introduction is still held, unquestioned, by many, e.g. Rackham (1990, 4).

Work by Jarman *et al* (in press) has reviewed primary sources and relocated archive material (where available) for sites from which ‘sweet chestnut’ remains are purported to have been recovered. As part of determining the reliability of the early records, some of this archived charcoal material – namely that which has been retained in museum archives and subsequently located – has been re-examined. The results of the analysis of material from one of the sites (Woodcutts Common) are presented here in detail. For results relating to equivalent material from another site (Rotherley) see the accompanying report by Hazell and Campbell (2018).

1.2 Site details

The charcoal material discussed here came from the excavation the Romano-British villa site at Woodcutts Common², north Dorset, led by General Pitt Rivers in the 1880s (see Table 1 for details). The material was passed to the Salisbury and Wiltshire Museum in 1975 by HM Treasury as part of the Wessex Collections.

Table 1. Summary information of Woodcutts Common and its excavations.

NRHE = National Record of the Historic Environment. Also see:

https://www.pastscape.org.uk/hob.aspx?hob_id=209777

Site name	County	Monument number	NMR number	Location (from NRHE record)	Excavation dates	Excavation report
Woodcutts Common	Dorset	209777	ST 91 NE 24	ST 963 181	1884-85	Pitt-Rivers (1887)

¹ According to Preston *et al* (2004: 259) an archaeophyte is “a plant which was brought to Britain by [people], intentionally or unintentionally, and became naturalized there between the start of the Neolithic period (c. 4000 BC) and AD 1500.”

² Pitt Rivers refers to the site as Woodcuts.

1.3 Previous analyses

At the time of the original excavations, the wood charcoal remains were examined and identified by Mr Carruthers. Table 2 shows the original reporting conventions and levels, and the associations within the assemblages.

Table 2. Summary table of the wood charcoal types recorded at Woodcutts Common. sw = small well – taxa identified as present in this feature (Pitt Rivers, 1887, 194); st = surface trenching – the only wood taxon identified from the north-west quarter in surface trenching (Pitt Rivers, 1887, 191).

	Site details	
	Reference:	Pitt Rivers (1887: 177-178)
	Site name:	Woodcutts Common
Wood type (original taxonomic reporting)	Contextual information:	Surface trenching (st), and the small well (sw)
<i>Betula alba</i> (Birch)		✓
<i>Castanea vulgaris</i> Lam. (Spanish Chestnut/Chesnut)		✓ (sw) (st)
<i>Corylus avellana</i> L. (Hazel)		✓ (sw)
<i>Fraxinus excelsior</i> L. (Ash)		✓ (sw)
<i>Quercus robur</i> L. (Oak)		✓ (sw)
<i>Salix</i> sp. (Willow)		✓ (sw)

2 METHODS

2.1 Archive material

A full inventory of the archive material was undertaken; counting the total number of charcoal fragments in each wood category. A record of the storage containers and their labels was also made.

2.2 Taxonomic identifications

Wood identifications were carried out on each of the charcoal fragments, using a combination of the texts and keys by Schweingruber (1990), Hather (2000) and Gale and Cutler (2000). Reference material from Historic England's Wood and Charcoal Reference Collection (held at Fort Cumberland, Portsmouth) was also

consulted. The main wood anatomical features required for identification are as follows:

Castanea sp. (chestnut) (Fagaceae); this wood is identifiable by: a ring porous (earlywood) vessel pattern, with a flame-like pattern of the smaller, latewood vessels. Only uniseriate rays are present, and the perforation plates are simple.

Corylus sp. (hazel) (Betulaceae); characteristics of this wood, used for identifications, are a combination of: diffuse porous vessel pattern with radial chains, aggregate rays, uniseriate rays (biseriate at the aggregate rays), scalariform perforation plates (5-10 widely-spaced bars) and large vessel pits.

Fraxinus sp. (ash) (Oleaceae); this wood is identified by the combination of: ring porous vessel structure, with radially-paired vessels in the early and latewood. It has rays 2-3 cells wide, and simple perforation plates.

Quercus sp. (oak) (Fagaceae); typically this wood is characterised by: the ring porous (earlywood) vessel pattern, with a flame-like pattern of the smaller, latewood vessels³, together with the occurrence of uniseriate and wide, multiseriate rays, and simple perforation plates.

Secure identifications were only made where all the required features were clearly seen. If there was any degree of uncertainty (eg where only a 'possible' multiseriate ray could not be seen) 'cf' was used. Where it could not be determined categorically that it was *Quercus* (or cf *Quercus*) then the group *Quercus/Castanea* was used.

All the wood charcoal fragments (n = 53) were examined using an Olympus BHX high power, light-reflecting microscope, at magnifications of between x100 and x500. Usually, freshly-broken, clean planes would be examined, however, given the 'heritage' of this archival material, and its use in displays in The Salisbury Museum, the fragments were examined without breaking them⁴. As it was, it was nearly always possible to see the necessary features from the fragments' outside edges; in particular the Transverse Section (TS) and the Transverse Longitudinal Section (TLS).

2.2.1 Taxonomic inferences

According to Stace (2010), in the British Isles:

³ Evergreen oaks (none of which are native to the British Isles) have a diffuse porous vessel pattern, rather than the ring porous vessel pattern of deciduous oaks.

⁴ If the fragments had been broken then subsequently they would have had to have been stored in separate sealed sample bags (in order to keep all the fragments from the same original fragment together), making them unsuitable for display.

- *C. sativa* is introduced-naturalised⁵ (i.e. not native, but established and self-regenerating),
- the only native hazel is *C. avellana* (hazel),
- the only native ash is *F. excelsior* (ash), and
- the native oaks (both deciduous) are *Q. robur* (pedunculate oak) and *Q. petraea* (sessile oak), with the hybrid *Q. rosacea* possible where both species are present.

2.3 Other characteristics

As well as the taxonomic identifications of the wood, additional features were recorded (incorporating methods from Marguerie and Hunot, 2007):

- overall fragment size (measuring the perpendicular 3-dimensions of the fragment ie ‘width, depth and height’)
- number of growth rings
- a radial measurement across the counted growth rings (in order to calculate average ring width, if desired)
- presence/absence of: bark, pith, radial cracks, general vitrification
- recording whether the fragment was eg a complete, small diameter roundwood
- curvature of the rings
- physical character of the fragment (rounded, angular)
- any evidence of wood degradation (eg insect galleries, wood decay, fungal hyphae)
- any evidence of wood working marks

The distance measurements were recorded using Mitutoyo CD-8”CW digital callipers (mm; 2dps). Degree of light reflectance (as a proxy for degree of ‘vitrification’) was not recorded because freshly broken planes were not examined.

2.4 Imaging

Photographs of the fragments were taken using a Nikon Coolpix 4500, with the camera fixed to the microscope’s trinocular attachment, as necessary.

No images were taken using a Scanning Electron Microscope (SEM) because although it is not destructive, the method used to mount the sample (involving

⁵ Stace’s note (2010: page xix) states “...where a plant is *known* to have been introduced by [people] before 1500 (eg *Castanea*) [it is treated] as introduced” – rather than as an archaeophyte (a plant closely associated with human activities, but for which it is not known whether it is native or not).

coating with carbon) could affect subsequent radiocarbon dating of the sample itself.

3 RESULTS

3.1 Woodcutts Common archive material

A description of the samples is given in Table 3. Each taxon has been stored separately, either in a separate box (as for the ‘chesnut’) (Figure 1) or in separate compartments of an additional box (Figure 2). The storage and labels are thought to be original (Ellis-Schön pers comm).

Table 3. Details of the charcoal archival material of the Woodcutts Common excavations. Names have been emboldened here for emphasis.

The Salisbury Museum archive reference	Original box label	Box description	Contents
SBYWM:S.WCT9.4	S/WCT.9/4 “SPANISH CHESNUT [sic] WOOD FOUND ONLY IN THE N-WEST QUARTER, R.B.V. WOODCUTS COMMON. THIS WOOD WAS FOUND IN ASSOCIATION WITH A SUPERIOR CLASS OF RELICS”	Small glass-lidded cardboard box	Eight charcoal fragments each labelled: “RBV.WDTS INTERIOR N.W. QUARTER – CHESNUT [sic]”
SBYWM:S.WCT9.3	“SPECIMENS OF OAK, ASH AND HAZEL WOOD FOUND IN THE EXCAVATIONS, R.B.V. WOODCUTS COM.”	Small glass-lidded cardboard box, with compartments	Three compartments each containing charcoal fragments of a single wood type. “OAK” (16 fragments), “HAZEL” (16 fragments), and “ASH” (13 fragments) 7 of the 16 charcoal fragments are labelled OAK , and one of them is mislabelled as Ash

Figure 1. The eight “chesnut” fragments recovered from Woodcuts Common (SBYWM:S.WCT9.4). Image: Z Hazell (Historic England) reproduced with kind permission of The Salisbury Museum.



Figure 2. Additional taxa recovered from Woodcuts Common (SBYWM:S.WCT9.1, SBYWM:S.WCT9.2, SBYWM:S.WCT9.3). Image: Z Hazell (Historic England) reproduced with kind permission of The Salisbury Museum.



There appeared to be no differentiation made for ‘chestnut’ fragments recovered from different samples, features or contexts; they had all been grouped together regardless of provenance. Some of the additional fragments (oak, hazel and ash), however, had been individually labelled, including details of the feature. It is clear that some labels have been removed from a few of the fragments at some point [possibly due to the subsequent recognition of any mislabelling], but it is not known when. No *Salix* sp. or *Betula* sp. fragments have been identified/labelled as such, despite originally being reported at the site (see Table 2, above).

Details of the individual fragments within the storage boxes were also recorded (Table 4).

Table 4. Detailed description of the contents of the Woodcutts Common storage box [as it has been stored] containing: S.WCT.9.1 (hazel fragments), S.WCT.9.2 (ash fragments) S.WCT.9.3 (oak fragments). ^a = fragment mislabelled as “OAK” (but actually ash); ^b = fragment mislabelled as ‘ASH’ (but actually oak).

		Number of fragments			
		Hazel	Ash	Oak	Twig
Area [from map in Pitt Rivers (1887: Plate II)]	Feature [from sample labels]				
Ditch of E Quarter	Pit 73 WDTS	3		1	
E Quarter	Pit 70 WDTS			1 ^a	1
NW Quarter	Small well WDTS	6	6	4 ^b	
Unknown	Unlabelled fragments	7	7	9	
	Total	16	13	16	= 45

3.2 Analysis of the specimens

Each charcoal fragment was individually numbered, with the prefix WC (Woodcutts Common). Only one fragment was removed from the box at a time, and was replaced immediately after examination. This meant that it was (and still could be) possible to return to individual fragments if required. Images showing the numbering of each fragment are presented in Appendix A.

Summary results of the re-identification of the charcoal fragments, compared with their original identifications, are presented in Table 5. In total, four identifiable wood types were recorded at this site: *Corylus*, *Fraxinus*, *Quercus* and *Quercus/Castanea*, plus an Indeterminate (unidentifiable) category. All identifications to genus level were secure. Only one fragment was questionable *Quercus/Castanea*; this group was used where no multiseriate ray was observed – not even a ‘possible’ multiseriate ray.

During handling of the fragments, it was noted that some fragments had relatively fresh, cleanly broken faces, from which it was inferred that some fragmentation had occurred since they were originally sampled. It was possible to refit some of these fragments back together (see Table 5).

Table 5. Results of the re-examination and revised identifications of charcoal fragments from Woodcutts Common. Fragment numbers are those allocated during this study. Note that some of these fragments fit together; the totals in (...) account for refitting.

Original identification by Carruthers	Fragment numbers	Revised identification (this study)	Number of fragments
'Spanish Chesnut' (n = 8)	WC: 1 to 8	<i>Quercus</i>	8
'Oak' (n = 16)	WC: 9, 10, 12, 14, 17, 18, 20, 21, 22 [10=17,18=20]	<i>Quercus</i>	9 (7)
	WC: 16	<i>Quercus/Castanea</i>	1
	WC: 11, 13, 15, 19, 23 to 24	<i>Fraxinus</i>	6
'Hazel' (n = 15)	WC: 25 to 33, 35 to 40 [32=36]	<i>Corylus</i>	15 (14)
	WC: 34	Indeterminate knotwood	1
'Ash' (n = 13)	WC: 41 to 53 [43=49,44=51,47=48]	<i>Fraxinus</i>	13 (10)
TOTAL			53 (47)

3.3 Summary of identifications

3.3.1 *Castanea* or *Quercus*

On the basis of the main wood anatomical criterion for separating *Castanea* from *Quercus* (that is, the absence/presence of multiseriate rays), all of the fragments that were originally reported as 'chestnut' (n = 8) have been re-identified as *Quercus*. From the fragments originally identified as 'oak', one fragment has been identified as *Quercus/Castanea*.

3.3.2 Other taxa

In terms of the additional wood categories [oak, ash, hazel], the majority of the original identifications have been confirmed; all the fragments in the 'ash' compartment were confirmed as such, and all those in the 'hazel' compartment

– except one (Indet. knotwood) – were confirmed. Most re-identifications were for fragments within the ‘oak’ compartment, where six fragments were re-identified as ash (one of which – WC23 – had ‘oak’ written on its label), and one re-classified as oak/sweet chestnut (see Section 3.3.1). A mis-labelled fragment of oak (WC22 – labelled ‘ash’) was also found within the oak compartment; the correct compartment, in spite of its incorrect label.

3.3.3 Other features

Table 6 summarises the additional characteristics of the charcoal fragments, recorded where possible.

Table 6. Additional characteristics of the fragments from Woodcutts Common (excluding Indeterminate fragments). Absence or presence is indicated by: N = no, or Y = yes.

Wood type	<i>Quercus</i> [previously 'chesnut']	<i>Quercus</i>	<i>Quercus/ Castanea</i>	<i>Corylus</i>	<i>Fraxinus</i>
No. of fragments	8	9(7)	1	15(14)	19 (16)
No. of rings (range)	8 to 17	3 to 19	5	4 to 12	1 to 14
Average ring width (mm) (range)	1.1 to 3.7	0.6 to 2.6	0.8	0.5 to 2.4	0.8 to 7.6
Ring curvature	Strong, Indet., None, variable	Strong, Weak/none	Strong	Strong, Moderate	Indet., Strong, weak/none, weak, none
Vitrification	II, areas of III	II, I, areas of III, II	II	I, II, areas of II, III	I, II, areas of II, III
Radial cracks	Y, lots	Y, lots, along MS rays	Y (lots)	N, Y	N, Y
Tyloses present	N(sw)	N(sw), Y (occ)	N(sw)	-	N(sw), Y(hw)
Degradation	-	-	-	Holes/voids (some irregular shapes) in some fragments. Frass (x1)	-
Season of felling	After some latewood (x1)	-	-	Latewood smaller vessels and flamelike pattern present (x1)	-
Evidence of working	Possible (x1) (squared corners)	-	-	Possible (x2) (flat face/plane)	Possible (x2) (cuboid shape; flat plane)
Small diameter roundwoods	WC1, WC6	WC12, WC14	WC16	WC33	WC43=49, WC46
Notes	Generally very vitrified, with knotty/uneven growth.	Mostly sapwood.	Very deformed.		Mostly sapwood. A couple of fragments (re-identified from the oak category) looked as if they were broken off larger pieces.

Here at Woodcutts Common, seven fragments (of which two were refitted to each other) had both the pith and bark (or inner bark) present⁶. Five of the fragments (or four, taking into account the refit) were *Corylus*, and two were *Quercus* (see Table 7). Unsurprisingly, on these fragments the growth ring curvatures were strong, and no tyloses were present in the *Quercus* (as it was too young to have developed heartwood).

Table 7. Details of charcoal fragments from Woodcutts Common that were complete radial sections (ie where both pith and bark were present). * = inner bark only present.

Fragment number	Wood type	Number of growth rings	Average ring width (mm)
WC6*	<i>Quercus</i>	13	1.15
WC12		4	0.88
WC30	<i>Corylus</i>	8	0.45
WC32 = WC36		6	1.20
WC35		7	0.90
WC37		8	1.09

Of the long-lived taxa (*Quercus* and *Fraxinus*) that produce tyloses in their heartwood, it was possible to make some inferences about the maturity of the wood. The *Fraxinus* remains included wood derived from both heartwood and sapwood, whereas the *Quercus* remains consisted of sapwood – where tyloses were observed, there was no clear pattern consistent with heartwood. Fragment WC45 (*Fraxinus*) looked to contain the heartwood/sapwood boundary. Some fragments looked to have produced tyloses in response to other factors such as damage (WC47 – *Fraxinus* and WC9 – *Quercus*).

Some fragments showed evidence of strong vitrification. Of note is fragment WC4 (*Quercus*) of which was highly vitrified on one area of the fragment – with the oldest rings. This was a similar phenomenon to that observed on material by Hazell (2012: figure 5) where (oak) heartwood was more vitrified compared to sapwood.

Overall, five fragments (representing the three main taxa identified) seemed to show evidence of possible working – either with squared corners, or flat/oblique planes.

The hazel showed evidence of degradation. There were holes or voids in the charcoal, and one fragment (WC25) had charred frass within the insect galleries.

⁶ Some other fragments were recorded as ‘twig’/‘root’ ie complete small diameter roundwood cross-sections. However, those have not been included here, because no inner bark was explicitly recorded as present, even though bark had been recorded as absent.

3.4 Images of the charcoal remains

Figures 3 and 4 show images of some of the ‘chesnut’ [oak] charcoal fragments, illustrating a range of unusual growth patterns (twisted knotwood, fast and uneven growth rates within growth rings) and characteristics (radial cracks, vitrification) that were observed, and which might help explain the original (mis)identifications.

Figure 3. Low magnification images of some of the ‘chesnut’ fragments (revised to oak) from Woodcutts Common, showing: (a) Fragment WC3, showing knotwood on the TS (facing), (b) Fragment WC5 with its uneven growth within growth rings, and with wide rings (up to c 5mm (ie fast growth) in places, and (c) Fragment WC7 with multiple radial cracks – the ring porous growth rings are just visible running (vertically) across the fragment. Photos: Z. Hazell © Historic England. Produced with kind permission of The Salisbury Museum.



(a)

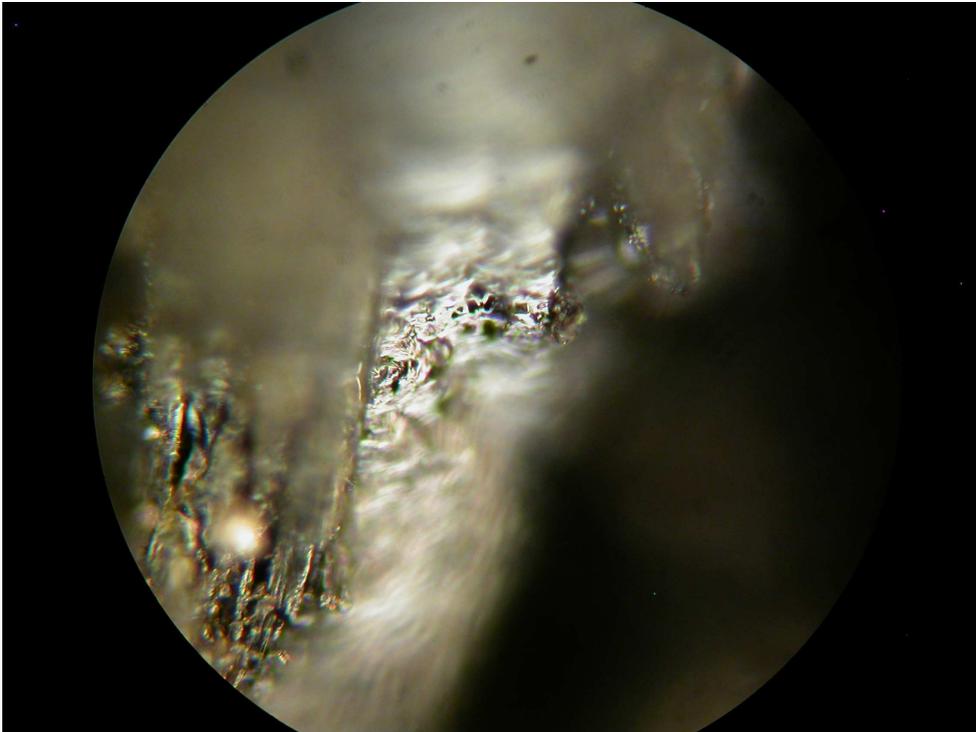


(b)



(c)

Figure 4. High magnification image of charcoal from Woodcutts Common, showing the vitrified, fused ray cells in a multiseriate ray on the TLS (Fragment WC7, field of view = 0.33mm). Photo: Z. Hazell © Historic England. Produced with kind permission of The Salisbury Museum.



4 DISCUSSION

4.1 The (re)-identifications

The archived ‘sweet chestnut’ charcoal fragments have all been re-identified as oak, based on the observation of multiseriate rays. Possible reasons for the confusion during the original investigations could be one or more of the following:

- (irregular) characteristics of the wood growth, including:
 - knotwood – resulting in unusual, twisted growth patterns (Figure 3a)
 - fast growth – forming wide growth rings, with uneven growth within rings in places (Figure 3b)
 - young wood – Schweingruber (2007, 57; citing Huber 1961) describes how, as oak wood ages, the medullary rays widen; and

Tansley (1911) outlines studies⁷ which observed how uniseriate rays in juvenile wood ‘compound’ to finally produce the multiseriate rays typical of mature oak. These fragments, therefore, could derive from juvenile wood where the multiseriate rays have not yet fully developed.

- preservation conditions /alterations of the wood
 - vitrification – distorting the alignment of the general wood structures preserved, and fusing of ray cells (Figure 4)
 - radial splitting down the multiseriate rays – obscuring/destroying the diagnostic features themselves (Figure 3c)
- past approaches to wood identifications
 - past reliance on examining the TS only – the multiseriate rays were not readily visible in the TS, meaning that it was always necessary to scan the TLS
 - inadequate microscopes/magnifications/resolutions

It is not as surprising that *Castanea* and *Quercus* were confused, given that their wood anatomical structures are very similar to each other; both are ring porous, with flame-like vessels patterns in the latewood, and with uniseriate rays present. However the additional presence of multiseriate rays in *Quercus* can reliably distinguish the two wood types. Unfortunately, no methods were reported in the original publications.

Some of the fragments had a considerable layer of sediment obscuring features, which would have been their original state. So, it is unclear how identifications could have been made at the time of the original investigations.

Given the strong similarity between sweet chestnut and oak wood at a microscopic, anatomical scale, it is not always possible to differentiate between the two. On small fragments and/or fragments of young wood, although it is possible to determine whether something is definitely oak (by the presence of multiseriate rays) it is not always possible to say whether something is definitely sweet chestnut (in the absence of multiseriate rays). Given that archaeological charcoal remains are often small in size, this is especially problematic. Secure identifications of sweet chestnut are only possible from large timbers where it is clear that the multiseriate rays are absent. It is better to report any uncertain identifications as *Castanea/Quercus* (or *Quercus/Castanea*) rather than have ‘cf’s or ‘?’s that can become mis-understood and/or omitted in citations.

The original mis-identifications of the ash and oak fragments could have resulted from: mistakes whilst originally sorting the fragments into the compartments of the display box, and/or subsequent inadvertent mixing between compartments during storage. However, there are two fragments –

⁷ On American white oaks.

WC22 (oak) and WC23 (ash) – that are clearly (mis)labelled as ash and oak, respectively.

4.2 Previous reporting

Also to be noted is the inconsistent reporting of the plant types to i) genus level for the common names, but to ii) species level in the Latin names (Table 8). For example, Carruthers refers to *Quercus robur* simply as ‘oak’, when it is specifically pedunculate oak, and *Betula alba* (since reclassified to *Betula pendula*) which is specifically silver birch. It is not thought that this level of resolution is possible from wood taxonomic features, in which case it is spurious detail of false precision. Where there is only one species native to the British Isles (eg *Fraxinus excelsior* or *Corylus avellana*) it is more understandable why the Latin binomial might have been used. The only taxon that was consistently reported with regards to its Latin and common names, was *Salix* sp. (willow); however, on the basis of its wood anatomy, it is rarely distinguished from *Populus* (poplar) as the characteristic for their distinction (ray cell morphology) is not always reliable (Gale and Cutler, 2000, 193 and 241).

Table 8. Original reporting and plant names, with their equivalent, modern conventions. From Stace (2010) and ^a = indicates from the Flora Europaea online resource (<http://rbg-web2.rbge.org.uk/FE/fe.html>). ^b = no authorities given in the original report. S = single, M = multiple

Original taxonomic reporting		Current taxonomic reporting		Number of native species
Latin name	Common name	Latin name	Common name	B Isles
<i>Betula alba</i> Linn. ^a	Birch	<i>Betula pendula</i> Roth.	Silver birch	M
<i>Castanea vulgaris</i> Lam.	Spanish Chestnut/ Chesnut	<i>Castanea sativa</i> Mill.	Sweet chestnut	-
<i>Corylus avellana</i> Linn.	Hazel	<i>Corylus avellana</i> L.	Hazel	S
<i>Fraxinus excelsior</i> Linn.	Ash	<i>Fraxinus excelsior</i> L.	Ash	S
<i>Quercus robur</i> Linn.	Oak	<i>Quercus robur</i> L.	Pedunculate oak	M
<i>Salix</i> sp. ^b	Willow			M

It is unclear why there are no charcoal remains from birch and willow, despite being listed in the taxa originally identified from the site.

5 SUMMARY AND CONCLUSIONS

This work has re-visited wood charcoal samples from the Romano-British villa at Woodcutts Common, and has re-identified what had originally been identified/labelled as ‘sweet chestnut’, as *Quercus*. The original (mis-)identifications could have been due to a combination of: unusual growth characteristics, together with alterations of the material (notably vitrification, fusing diagnostic features and/or causing splitting of fragments). Together with the corroborative results of similar analyses from the nearby Romano-British villa at Rotherley (see Hazell and Campbell, 2018), the results have significant implications for understanding the taxon’s history in the British Isles, most notably as an archaeophyte of Roman date.

In addition, the research demonstrates:

- the importance of re-examining archaeological remains in order to review the original identifications,
- the significance and value of ‘environmental archaeology’ materials (here wood charcoal) and the role they have in answering research questions of national and international importance,
- the importance of taking such samples in the first place, and keeping them stored in archives (so that they can be re-examined), clearly accessioned and in conditions to ensure for their long term preservation, and
- the relationship between archaeological investigations and museum displays; this re-identification of the ‘sweet chestnut’ material will require a re-evaluation of how the remains are exhibited from now on.

These results also call into question previous (antiquarian) identifications of other non-native taxa eg *Juglans* (walnut) and *Aesculus hippocastanum* L. (horse chestnut).

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7 APPENDIX A

Figure A1. Image showing the fragment numbers as allocated to the eight fragments within the original 'chesnut' category.



Figure A2. Image showing the fragment numbers as allocated to the fragments within the original 'hazel', 'oak' and 'ash' categories. (...) refers to an underlying fragment.





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