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Excavations at West Amesbury Farm: The charred plant remains from a Middle Neolithic pit group

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SUMMARY
Excavation at West Amesbury Farm, south of the A303, in the south eastern corner of the Stonehenge and Avebury World Heritage Site (WHS), revealed a Middle Neolithic pit group, as well as linear features, post holes and tree throws. Charred plant remains were recovered from a range of features, most notably the Middle Neolithic pits, and add to the growing body of data from Middle Neolithic pits in the Amesbury area. Hazelnut (*Corylus avellana*) shell fragments were the most numerous plant material type recovered, in common with contemporary pit groups elsewhere, and contribute to our understanding of the seemingly formulaic depositional fill process of such pits. Cultivated remains were demonstrated to be intrusive.

CONTRIBUTORS
Ruth Pelling

ACKNOWLEDGEMENTS
Excavations at West Amesbury Farm were directed by David Roberts. The stratigraphic narrative was produced by David Roberts and Andrew Vallez-Tullet. David Roberts and Gill Campbell provided comments on this text. The coordination of radiocarbon dating, and calibration and modelling of dates was conducted by Peter Marshall. Data is stored within *ArboDat 2016 English Version* (copyright held by the Licensor, Landesamt für Denkmalpflege Hessen/hessenARCHÄOLOGIE; project number HE7238-621). Front cover image of *Corylus avellana* (hazel) nutshell fragments taken on a Keyence VHX7000 3-D digital microscope (AHRC Award AH/V011758/1) at x20 magnification.

ARCHIVE LOCATION
The report archive is held at Historic England, Fort Cumberland

DATE OF RESEARCH
The excavation was undertaken during the winter of 2015-16. The assessment and analysis were conducted during 2016-17

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CONTENTS

INTRODUCTION

Following a geophysical survey (Linford *et al* 2015), five trenches were excavated by Historic England at West Amesbury Farm, Wiltshire, during the winter of 2015-16 (Figure 1). Trenches were sited to investigate likely linear features, some of which were subsequently interpreted as Middle Bronze Age field boundaries (Roberts *et al* 2017), a square enclosure previously investigated by Wessex Archaeology (Darvill 1995; Valdez-Tullett and Roberts 2017), and a series of geophysical anomalies in the south eastern area of the field. The geophysical anomalies were subsequently demonstrated to consist of a Middle Neolithic Peterborough Ware pit group, post holes, linear features, tree throws and an area of badger burrows (Roberts *et al* 2020). A grave, [93240], was physically and stratigraphically located between two Middle Neolithic pits (Mays *et al* 2018). The pits contained large assemblages of finds including lithics, Peterborough Ware pottery, faunal remains, worked stone and shale.

An intensive sampling strategy was adopted to recover charred plant remains as well as faunal remains and other finds at West Amesbury Farm. A total of 198 flotation samples of 5 to 50 litres (but mostly 40 litres) were taken from the site from the full range of feature types. Features sampled were mostly of broadly Neolithic and Bronze Age date, or lacking dating evidence, with a small number of samples also taken from the badger barrows. The Middle Neolithic pits were completely excavated and sampled in detail, with flotation samples taken from each fill in each section excavated (i.e. two samples per context). Coarse sieved samples (sieved over a 5mm mesh) were also taken from the pit deposits. Flotation samples were processed by excavation staff using a flotation tank with a mesh of 250 microns for the flot and 500 microns for the residue.

Following assessment of all flots (Roberts *et al* 2016), only samples from the Middle Neolithic pits and a notable assemblage of post medieval charred grain were taken to full analysis. Samples from all other features produced only background scatters of eroded and abraded charred grain or pulses, all of which are likely to have been considerably reworked and of relatively recent origin. The remains are referred to in a series of interpretative reports (Roberts *et al* 2017; Valdez-Tullett and Roberts 2017) but are not discussed in any detail here. The post medieval charred grain was recovered from a group of features including a linear ditch, pit and tree throw, which while potentially prehistoric in origin (a small quantity of prehistoric finds was recovered from the tree throws), produced only scant prehistoric or likely prehistoric plant remains (undated hazelnut shell fragments and directly dated Mesolithic *Pinus* charcoal). This assemblage is discussed in a separate report (Pelling 2019). The plant remains from the Neolithic pit group are discussed here.

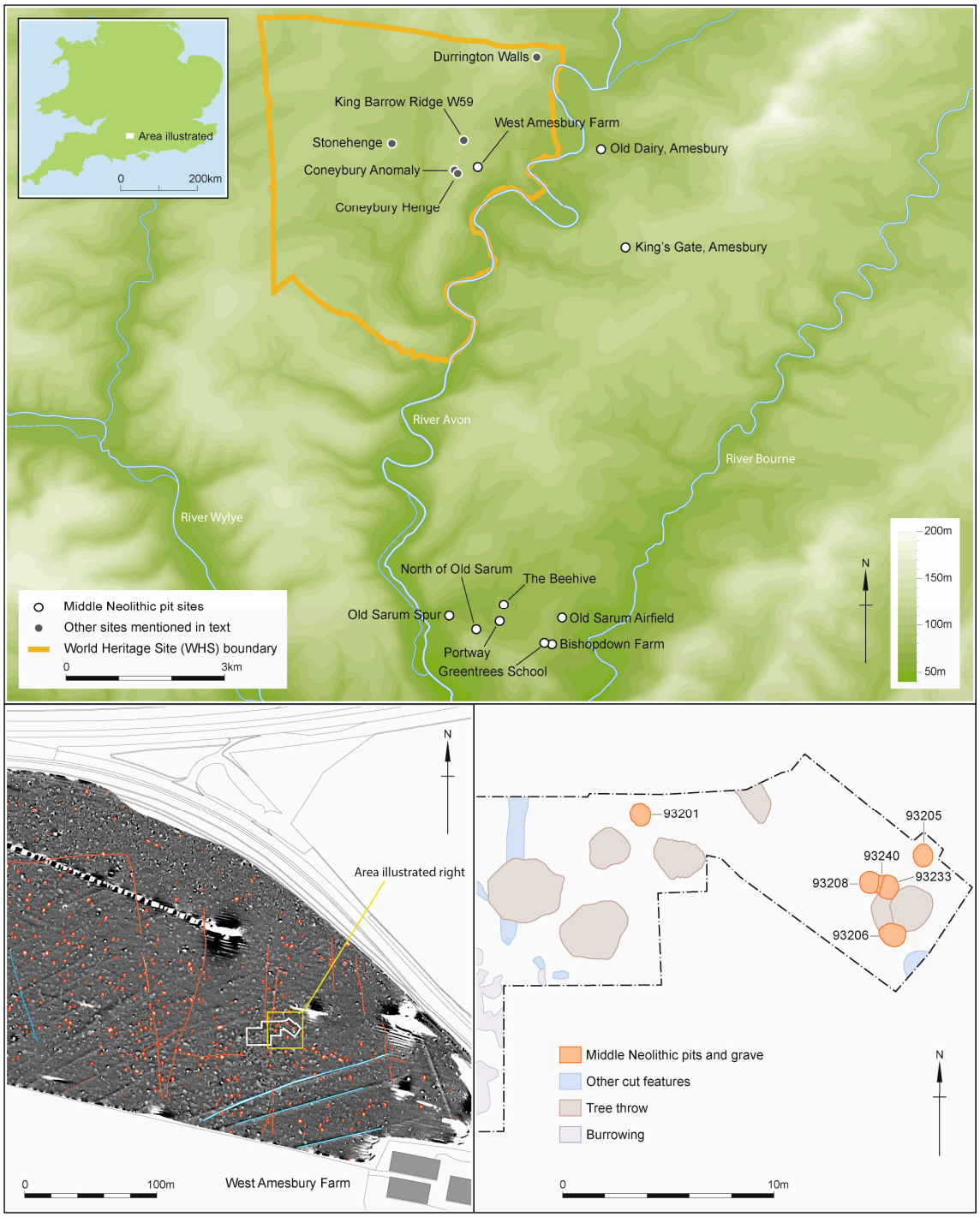

Figure 1: Location of West Amesbury Farm pit group within the WHS

The field where the excavations took place, which was under pasture at the time of excavation, slopes southwards from the A303 across the King Barrow Ridge. Stonehenge is situated 1.5km to the west and is visible from the crest of the hill towards the top of the field, although out of sight from the Middle Neolithic pit group which is situated on an east facing slope looking towards Amesbury. The Coneybury Anomaly, which has produced the earliest (although not directly

dated) cereal assemblage in the Stonehenge landscape (Carruthers 1990), is situated 0.5km to the south west of the pit group. The excavation results add to the growing understanding of the nature of Middle Neolithic pits, a number of which have now been recorded in the Amesbury Area including three groups from the immediate vicinity of the site: King Barrow Ridge pits (W59; Richards 1990), King's Gate (Wessex Archaeology 2014) and Old Dairy, Amesbury (Harding and Stoodley 2017).

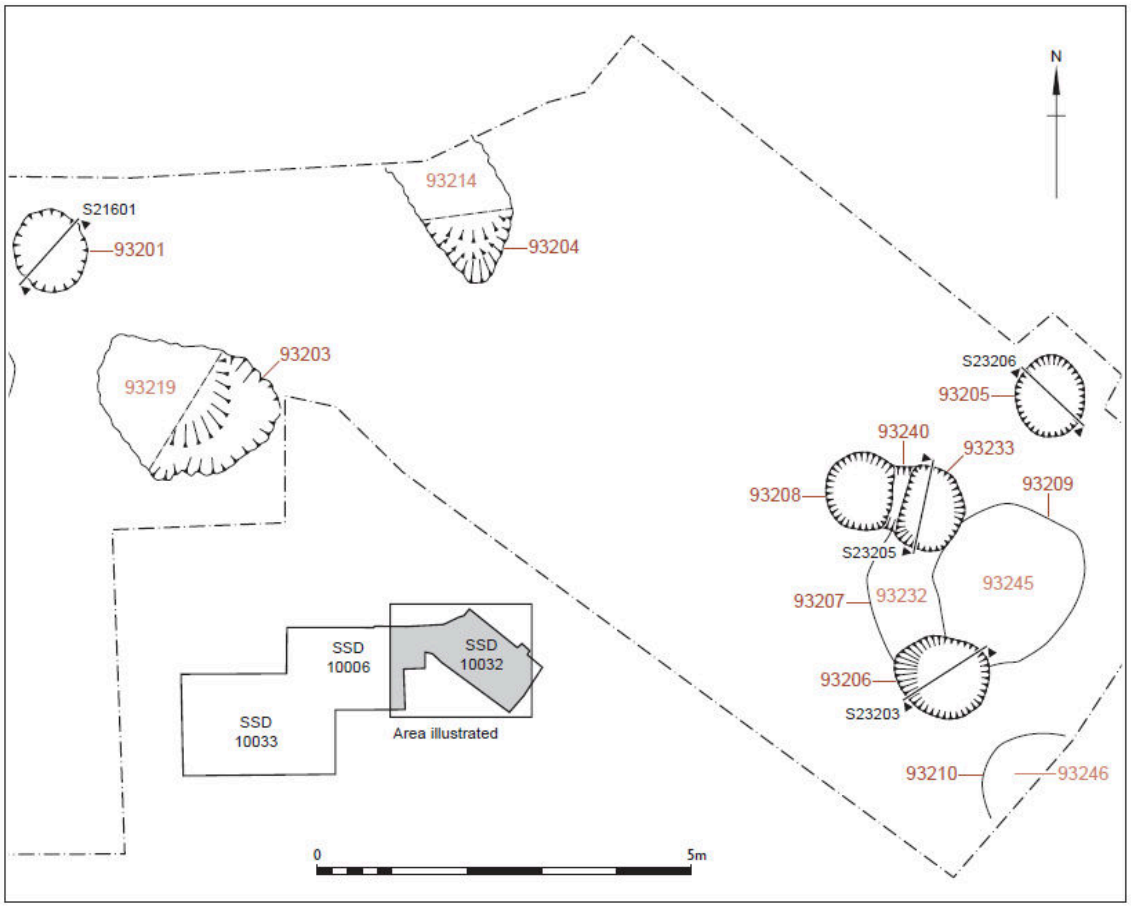

Figure 2: Plan of West Amesbury Farm pits

METHODOLOGY

Flotation samples of between 7 and 80 litres, but generally in the region of 40 litres, were taken from each context from each excavated section (i.e. two samples from each context), of the five Middle Neolithic pits, producing a total of 44 flotation samples (1453 litres). Two samples (28 litres in total) were taken from the grave deposit. All flots were sorted in their entirety using a binocular microscope at magnifications of x10 to x40. All identifiable and quantifiable seeds, chaff and other plant parts were extracted. Plant material extracted from

the residues by excavation staff was also examined (material was extracted from 100% of the >4mm residue and 25% of the 2-4 mm residue). Identification was made on the basis of morphological criteria and by comparison with modern reference material held in the Historic England reference collection at Fort Cumberland. Nomenclature and taxonomic order follows Stace (1997) for plants other than cereals and Zohary and Hopf (2000; tables 3, page 24 and 5, page 58) for cereals. Grain was quantified on the basis of embryo ends, and chaff on the basis of part identified (rachis, glume base, culm node). All results were entered into ArboDat 2016 English Version© (Kreuz and Schäfer 2002). In the tables flots and residue counts have been combined and the figures shown include a multiplier for fractioned samples, so that counts from the 25% of the 2 to 4mm residue have been multiplied by 4. Mesh size was not always recorded for material picked-out from residues; where it was not clear if material was from a 2mm or a 4mm mesh, it was not multiplied, so that all figures given should be regarded as minimums.

A number of cereal grains, charcoal and hazelnut shell fragments were radiocarbon dated, alongside faunal and human skeletal remains, as part of a comprehensive dating programme undertaken to establish the date of the deposits as well as the degree of intrusive cereal remains and pulses. The results of the dating programme are presented in Roberts *et al* (2020) and López-Dóriga *et al* (2019). Dates obtained plant remains are summarised in Table 1.

RESULTS

Cultivated plants and the problem of intrusive material

A summary of all charred plant remains by pit is given in Table 2. Small numbers of cereal remains (grain and a single rachis) were recovered from all pits including the primary anthropogenic fills (hereafter referred to as primary fills). The cereal grains and pulses were degraded and highly eroded, suggesting they had suffered significant post-depositional reworking and damage. Taxa identified were wheat (*Triticum* sp.) including free-threshing type grain, rye (*Secale cereale*) and barley (*Hordeum vulgare*). Poorly preserved cultivated legumes were present in three pits.

Table 1: Radiocarbon dates on plant material from the Middle Neolithic pits. All dates calibrated by Peter Marshall (Roberts *et al* 2020). *Beyond calibration

Date	Fill	Taxa	$\delta^{13}C$ (‰	Radiocarbon Age (BP)	Calibrated Date (2σ)
Pit 93208					
UBA-31616	93230 (primary fill)	*Hordeum vulgare*, grain	−25.0±0.22	825±39	cal AD 1150–1280
OxA-35988	93230	*Triticum* sp free-threshing, grain	-22.9±0.2	824±24	cal AD 1150-1280
SUERC-66778	93230	*Corylus avellana* nutshell frag	−24.0±0.2	4499±30	3360–3030 cal BC
Pit 93206					
SUERC-74012	93227/4 (primary fill)	*Triticum* sp free-threshing, grain	-25 (assumed)	401±30	cal AD 1430-1620
UBA-34945	93227/4	*Hordeum vulgare*, grain	Failed - insufficient carbon		
UBA-31617	93231 (erosion layer)	*Hordeum vulgare*, grain	-24.9±0.22	184±60	cal AD 1530-1955
UBA-31617	93231	*Hordeum vulgare*, grain	−24.9±0.22	184±60	cal AD 1530–1955*
UBA-31614	93227 (primary fill)	*Corylus avellana* nutshell frag	−22.7±0.22	4462±27	3340–3020 cal BC
SUERC-66777	93227	Pomoideae charcoal	−24.5±0.2	4492±30	3360–3020 cal BC
Pit 93205					
UBA-31619	93247 (primary fill)	Pomoideae charcoal frag	−25.1±0.22	4509±30	3360–3090 cal BC
SUERC-66779	93247	*Corylus avellana* nutshell frag	−26.8±0.2	4502±30	3360–3090 cal BC
OxA-35148	93242 (secondary fill)	*Corylus avellana* nutshell frag	−23.4±0.2	4493±31	3330–3105 cal BC

Intrusive cereal grain and pulses are known to occur in many early prehistoric features, even in seemingly well sealed contexts (Pelling *et al* 2015). The presence of free-threshing wheat and rye, both rare prior to the Saxon period and thereafter common (van der Veen *et al* 2013), and pulses, not reliably recorded prior to the Middle Bronze Age in Britain (Treasure and Church 2017) raised the possibility of likely intrusive contamination. Two grains of free-threshing wheat and four grains of barley were therefore submitted for radiocarbon dating. Also submitted for dating were 4 fragments of hazelnut shell and two fragments of Pomoideae charcoal which were assumed to be contemporary with the pit fills. One grain sample failed to produce a date, while the remaining grains produced calibrated dates ranging from the medieval to post medieval period (Table 1). A cultivated legume from another trench on the site (Trench 10002) produced a medieval date, despite cereal grains from the same feature producing post medieval dates (Pelling 2019). It is likely that the other undated cereal remains and pulses were also intrusive given these results, the similarity in condition and the consistent return of intrusive dates on cereal grain and legumes from Middle and Late Neolithic pits elsewhere southern Britain (Stevens and Fuller 2012; Pelling and Campbell 2013; Pelling *et al* 2015). In contrast, all hazelnut shell fragments and charcoal produced Middle Neolithic dates which were statistically consistent with dates on animal bone from the same features (López-Dóriga *et al* 2019), all falling within a date range of 3360 to 3020 cal BC.

Table 2: Summary of charred plant remains from the Middle Neolithic Pits and Grave 93240. Charcoal was only identified if submitted for radiocarbon dating or if identifiable in transverse section (*Quercus* sp.).

Total Sample Volume (l)		300	420	260	175	290	28
Number of Samples		8	14	6	7	8	2
Feature		93208	93206	93233	93205	93201/ 91613	93240
Crops (intrusive)							
Hordeum vulgare L.	Barley grain	4	3	1	1	3	-
cf. *Hordeum vulgare* L.	Barley grain	-	1	-	-	-	-
Secale cereale L.	Rye grain	-	-	-	1	-	-
Triticum aestivum /turgidum	Free-threshing Wheat grain	3	2	2	5	3	1
Triticum aestivum /turgidum	Free-threshing Wheat rachis	-	-	-	-	1	-
Triticum sp.	Wheat grain	1	10	4	-	4	-
cf. *Triticum* sp.	Wheat grain	-	1	-	-	-	-
Cerealia indet.	Cereal grain	19	22	-	2	6	-
Fabaceae (cultivated)	Pulses	-	1	2	-	1	-
Fruits and nuts							
Corylus avellana L.*	Hazelnut shell fragments	163	554	274	635	37	11
Corylus avellana L.*	Fragments per litre	0.54	1.32	1.05	3.62	0.128	0.39
Other							
Poaceae	Grasses, rhizome	-	-	1	-	-	-
Indet	Seed	1	4	-	1	1	-
Indet	bone fragment	-	-	-	-	-	2
Charcoal frags (estimated)							
Betulaceae	Alder/Hazel/Birch	-	-	-	1	-	-
Quercus sp.	Oak	-	-	-	-	5	1
Pomoideae	Apple/Pear/Hawthorn	-	1	-	1	-	-
Indet/Other (not identified)		20	80	20	90	5	10

* adjusted figure including residue finds >2mm

Gathered food plants

Charred hazelnut shell fragments were recovered from all five pits, with a total of 1661 fragments (adjusted minimum figure) recorded. The hazelnut shell was not evenly distributed between or within pits; number of nut shell fragments per litre deposit per pit (Table 2) Table 3ranged from 0.128 [Pit 93201/91613] to 3.62 pit [93205]. Counts of hazelnut shell fragments per context are shown in Table 3.

Within four of the pits the hazelnut shell is concentrated within the lowest primary fill, with concentrations ranging from 0.39 fragments per litre in the primary fill of pit [93201/91613], to 29.4 fragments in the equivalent fill of pit

[93205]. Conversely, in pit [93208] the greatest concentration (1.4 fragments per litre) was within the secondary fill, context (93228), although the numbers involved are modest. The paucity of hazelnut shell in the primary fill is at odds with the distribution of animal bone in this pit (Worley 2017). The concentration of nutshell in the basal erosion deposits was predictably low in each pit.

Table 3: Distribution of hazelnut shell fragments in pit fills (flotation samples only, including adjusted figures for residue finds).

				Corylus avellana **nutshell frags**	
Vol (l)	**Context**	**Description**	**Samples**	**Count**	**Frags/litre**
Pit 93206					
80	93220	3rd fill	53225/08	22	0.275
80	93222	2nd fill	53210/29	68	0.85
40	93223	Erosion	53214/34	1	0.025
80	93225	Erosion	53215/31	80	1
100	93227/4	1st fill	53213/20/31/39	365	3.65
40	93231	Erosion	53222/32	18	0.45
Pit 93205					
80	93237	3rd fill	53245/55	8	0.1
73	93242	2nd fill	53252/58	185	2.53
15	93247	1st fill	53259	441	29.4
7	93241	Erosion	53251	-	-
8	93244	post pipe	53254	1	0.124
Pit 93233					
80	93234	3rd fill	53240	26	0.33
60	93235	2nd fill	53237/42	22	0.37
80	93236	1st fill	53244/46	213	2.66
40	93238	Erosion	53248/53	13	0.33
Pit 93208					
70	93226	Erosion	53217/23	2	0.03
75	93228	2nd fill	53218/24	105	1.4
80	93230	1st fill	53221/28	35	0.44
75	93229	Erosion	53219/27	21	0.28
Pit 93201/91613					
80	91614=93202	4th fill	51601	-	-
40	93212	3rd fill	53206	1	0.025
80	93211=91639	2nd fll	53207/51603	1	0.013
90	93213=91640	1st fill	53211/ 51606/07/08	35	0.39
Grave cut 93240					
28	93239		53249/50	11	0.39

A small quantity of hazelnut shell (11 fragments) was also recovered from the fill of grave feature [93240] which cut the top of pit [93208] and was subsequently cut by pit [93233] (Roberts *et al* 2020). A single free-threshing *Triticum* (bread or rivet wheat) grain from the same context was assumed to be intrusive. It is likely that the hazelnut shell within the grave fill is re-deposited from the pit fills rather than forming part of a deliberate grave deposit.

The only other plant remains recovered from the pits and grave were a rhizome fragment of a grass (from pit [93233]), a number of small indeterminate seeds, and a modest assemblage of charcoal (Table 2). Given the number of charcoal fragments were generally very low no attempt was made to analyse the material beyond assessment level and identification prior to radiocarbon dating. Taxa identified included oak (*Quercus* sp.), Pomoideae type (hawthorn (*Crataegus monogyna*), apple (*Malus* sp.), pear (*Pyrus* sp.), rowan and white beam (*Sorbus* sp.)), and Betulaceae (alder/hazel/birch (*Alnus/Corylus/Betula* sp.)). While it is not possible to attach any significance to taxa present in terms of deliberate selection, it is reasonable to assume the taxa represent available vegetation in the landscape. The presence of Betulaceae, which included hazel, is expected given the number of hazelnut shells, while the presence of Pomoideae group charcoal would indicate possible fruit producing tree or shrubs in the landscape. It is notable that only small quantities of charcoal were present in the pit deposits despite of the presence of burnt bone and burnt hazelnut shell.

DISCUSSION

Cereal cultivation is recorded in the British Isles from the beginning of the Early Neolithic (shortly after 4000 BC), attested by directly dated grain (Brown 2007, Stevens and Fuller 2012, on-line supplementary material). Once intrusive cereal grain finds are taken into account (Pelling *et al* 2015), however, there is growing evidence for a dramatic reduction in cereal assemblages which can be confidently dated to the subsequent Middle and Late Neolithic (Moffett *et al* 1989; Robinson 2000; Stevens and Fuller 2012; Stevens and Fuller 2015), which has also been associated with a recurrence of woodland re-establishment in the pollen record between 5300 and 4400 cal BP (Woodbridge *et al* 2014). This apparent decline of cereal cultivation is accompanied by a decline in cereal impressions found on pottery, a decrease in recorded ard marks, and fewer finds of quern stones (Stevens and Fuller 2012; Barclay and Bradley 2017), suggesting a real change in plant food production and consumption, rather than a change in depositional practices. The decline in cereal records fits the model of a shift towards a more pastoral farming system during the 'Secondary Neolithic' first proposed by Piggott (1954, 365-6). The archaeobotanical record for the Middle and Late Neolithic in southern Britain is characterised by a much greater proportion of charred wild plant remains compared to cultivated taxa.

Assuming all the cereal grains in the West Amesbury Farm pits are intrusive, as indicated by the radiocarbon dates obtained on those dated, the plant assemblage can be regarded as almost exclusively composed of hazelnut shell fragments. Within Wiltshire a number of sites have produced cereal remains from reportedly Middle or Late Neolithic contexts, but most can similarly be discounted by either direct dating, as for Conebury Henge (Carruthers 1990; Pelling *et al* 2015) and Durrington Walls (Craig *et al* 2015; Pelling *et al* 2015), or questioned on the basis of the presence of taxa known to be later introductions, as well as other evidence for contamination (Pelling *et al* 2015). A single exception is a barley grain from a Late Neolithic Grooved Ware pit from Bulford South (pit 5228; Wessex Archaeology 2015), which unexpectedly returned a Middle Neolithic date of 3370–3020 cal BC (UBA-34499, 4505±41 BP) (Worley *et al*. 2019). Interestingly, no cereals appear to be associated with the Bronze Age activity at West Amesbury Farm either (Roberts *et al* 2017), despite the evidence for a resurgence in cereal growing elsewhere in the region (Pelling and Campbell 2013).

The West Amesbury Farm deposits appear to be more indicative of smaller scale disposal practices rather than larger scale consumption or processing activities. While it is not possible to establish if the deposition of burnt hazelnut shell, or indeed the act of burning nutshell, are symbolic acts in themselves, it is apparent that it forms a regular and deliberate part of the Peterborough Ware pit filling activity. The quantities of burnt nutshell within other Middle Neolithic pits in Wiltshire are variable, although it does form a consistent component of Peterborough Ware pit fills (see Worley *et al* 2019). A nearby pit at Old Dairy Farm, Amesbury, produced 3046 fragments from 110 litres of sediment (Wyles 2017). One of a number of Peterborough Ware pits from the Portway Site, Old Sarum, just north of Salisbury, contained a seemingly deliberately placed layer of more than 10,000 hazelnut shell and kernel fragments, as part of a carefully curated fill sequence which included a number of flints, and a placed young male cattle horn core (Powell *et al* 2005, 258). The subsequent fill contained further hazelnut shell, a wild apple pip (*Malus* cf *sylvestris*) and further finds including pig bones. The careful placing of the hazelnut shell was clearly deliberate and either significant within itself or provides evidence for the use of hazelnut processing by-product as a suitable surface on which to place the other objects.

In terms of plant diet, it is unlikely that the Middle Neolithic population of Wiltshire consumed only hazelnuts, and a far more diverse range of plant foods were probably consumed than is indicated. The presence of crab apple at The Portway site (Powell *et al* 2005) and sloe stones (*Prunus spinosa*) from a pit at King Barrow Ridge on the other site of the A303 from West Amesbury Farm (Carruthers 1990) hint to at least some exploitation of wild fruits, even if they are not immediately readily edible. The presence of Pomoideae charcoal at West Amesbury Farm, which includes apple, pear, hawthorn and rowan, indicates the

likely availability of fruits locally. Archaeologically less visible plants or plant parts such as leaves or roots, and fungi could have formed a significant component of the diet.

CONCLUSIONS

The Middle Neolithic pit group from West Amesbury Farm has produced an archaeobotanical assemblage which is broadly in keeping with those recovered from other Peterborough Ware pits locally. Cereal and pulse remains are likely to be entirely intrusive, as all the cereal grains dated returned medieval or later dates. Hazelnut shell was recovered from all five pits in variable quantities. The material is likely to have been deliberately included in the pit filling sequence. Charcoal was scarce in relation to hazelnut shell fragments which would support the interpretation of careful selection of burnt material for deposition rather than wholesale inclusion of fire debris. The charcoal taxa identified is indicative of the range of likely tree and shrub species growing within the vicinity of the site which includes fruit trees. The character of the plant based diet and depositional practices of the Middle Neolithic population in Wiltshire, drawing on evidence from these contemporary pit deposits, is discussed in more detail in Worley, *et al* (2019).

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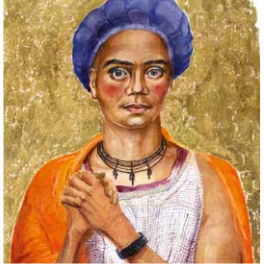



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