Wessex Archaeology

Dowd's Farm
Hedge End, Hampshire

Supplement to Publication
Charcoal

by Ruth Pelling

Ref: 62354

October 2012

Dowd's Farm, Hedge End, Hampshire (62354)

Charcoal

Ruth Pelling

Introduction

A number of samples produced large quantities of generally well preserved charcoal. Twenty-three samples were selected for analysis: 18 came from later prehistoric to early Roman contexts, one was from a late Saxon/early medieval hearth, three from medieval features (two pits and a ditch) and one from an undated hearth (feature 3101). The prehistoric/Roman samples were taken from a range of features including ditches, pits, hearths and tree-throw holes.

Methodology

Charcoal fragments retained in the 4mm and 2mm sieves were extracted from the flots. Large samples were fractioned by up to 1/16.. Charcoal fragments from each sample (or sample fraction) were fractured to expose a fresh transverse section (ts) and sorted into groups based on anatomical features under a binocular microscope at magnifications of up to x40. Representative fragments were selected for detailed examination. These were fractured to expose a tangential (tls) and radial longitudinal sections (rls) and mounted on to a slide using modelling clay (methods follow Leney and Casteel 1975 and Gale and Cutler 2000). Slides were examined using an incident-light microscope at magnifications of up to x400. Identification was made according to anatomical characteristics described by Schweingruber (1990) and Hather (2000). Identification was to the highest taxonomic level possible, usually that of genus, while nomenclature follows Stace (1997). Where several species are possible the genus is given. When anatomical differences between related genera are too slight to enable positive identification to genus level a group name is given, for example with members of the Pomoidae group (*Crataegus*, *Malus*, *Pyrus* and *Sorbus*) and aspen/willow (*Populus* and *Salix*) which are indistinguishable. Where a genus is represented by a single species in the native British flora this is named.

All fragments retained in the 4mm sieve were identified. Fragments were identified in the 2mm sieve until a fully representative range of taxa in each sample had been identified (generally in the region of 100 fragments). The total number of fragments or volume in the fraction is given with the total number or volume identified for each sample.

Results

The samples selected all produced large flots dominated by charcoal. The detailed results are given in Table 1. Much of the charcoal consists of mature heart or trunk wood, particularly of oak, while smaller quantities of narrow roundwood (generally <10mm) were present in several samples, dominating a small number of deposits. While preservation was generally good a number of samples produced charcoal with mineral deposit or occasionally showing signs of probable high temperatures resulting in vitrified, glassy appearance (McParland et al 2010).

Despite the dominance of oak in the majority of samples there are some deposits which stand out. These are discussed in more detail. Some general comments about the nature of the woodland and specific activities relating to exploitation of that woodland are also given.

Late Prehistoric
Area A: Four samples were examined: two from hearth type features (features 12023 and 12102), one from a posthole forming part of a four-poster group (feature 10878), and one from a pit (feature 10861). Radiocarbon dates on charcoal from three of the four samples suggest them to be Middle to Late Iron Age in date. The posthole and the pit sample were dominated by oak charcoal (*Quercus* sp.), with four fragments of alder (*Alnus glutinosa*) identified in the pit feature (feature 10861). Fragments of roundwood were present in the pits, while the posthole appears to have produced mature oak wood only (the charcoal in this sample was not examined in detail), which would be consistent with the charcoal deriving from the burnt post.

The two hearth samples produced charcoal assemblages which were slightly more mixed. Hearth 12023 produced charcoal from four taxa: elm (*Ulmus* sp.), oak (*Quercus* sp.), hazel (*Corylus avellana*) and ash (*Fraxinus excelsior*), this last species dominating the sample. This is the only sample in which elm was recovered and the only one in which ash dominated. Hearth 12102 produced an assemblage dominated by oak but with small quantities of alder (*Alnus glutinosa*), aspen/willow (*Populus/Salix* sp.) and Pomoideae (apple/pear/hawthorn/whitebeam). A small quantity of the alder wood was of narrow roundwood, although the majority of charcoal in both hearth deposits was from mature wood.

Area B: One sample was examined from a Late Bronze Age tree-throw hole (feature 10182). The charcoal was scanned only and appears to be entirely derived from oak (*Quercus* sp.).

Area C: The largest group of samples examined came from Area C. Charcoal from a second Late Bronze Age tree-throw hole (feature 13323) was dominated by oak (*Quercus* sp.) with a single fragment of alder or hazel (*Alnus/Corylus*) roundwood. Pit 13219 produced only oak charcoal. A second pit (14129) produced a mixed assemblage which was dominated by alder, but included small quantities of oak, aspen/willow (*Populus/ Salix* sp.), possible ivy (*Hedera helix*), holly (*Ilex aquifolium*) and ash. Three hearth samples were dominated by oak but with smaller quantities of alder, poplar/willow, Pomoideae type and holly present. Finally, five samples from ditches were examined from the enclosure complexes (two from small enclosure 14317, two from large enclosure 13593 and one from field boundary group 13264). Two samples (one from the large enclosure 13593 and one from the field boundary ditch 132264) produced oak charcoal only. The charcoal from the large enclosure was heavily encrusted with mineral deposits suggesting some fluctuation of the water table in the ditch terminal (context 13507). The remaining three ditch deposits produced some oak, but were dominated by alder including roundwood, with occasional fragments of hazel and Pomoideae type. The roundwood appears to show growth rings suggesting an age of three to eight years and includes sap wood.

Area E: Two samples of Late Iron Age to Early Romano-British date were examined; one came from a tree-throw hole (12936) and one from a pit/hearth (12888). Both samples produced large quantities of oak charcoal with three fragments of poplar/willow charcoal in the pit deposit.

Late Saxon/medieval
Four samples were examined from late Saxon or medieval contexts, two from Area C (hearth 13445 and ditch 10028) and two from pit 12710 in Area G. All four samples were dominated by oak charcoal. The pit in Area G also contained fragments of alder, hazel, possible poplar/willow and blackthorn (*Prunus spinosa*), Pomoideae and possible ash. The hearth in Area C similarly contained fragments of hazel and

Pomoideae, while the ditch deposit produced oak only. The hazel in the hearth and the pit included roundwood ranging from two to six or seven years growth.

Undated
An undated hearth in Area G (feature 3101) produced only oak charcoal.

Discussion

The Wooded Environment
A fairly wide range of tree taxa had been exploited at Dowd's Farm during both the prehistoric and medieval periods of activity at the site. The underlying solid geology of the area comprises Eocene Bracklesham Beds, Bagshot Sands and London Clay locally overlain with clay-with-flints (Geological Survey of Great Britain 1973). Wet conditions prevail in the lower areas to the east of the site. Pockets of remnants of mixed deciduous woodland remain in the vicinity. The range of tree species represented by the charcoal would all occur naturally in this environment. The importance of trees and shrubs in the local environment through the prehistoric and medieval periods is attested by the pollen (Grant, Pollen report). The charcoal is therefore presumed to be largely locally derived and the species presence generally reflects that indicated by the pollen.

Oak is likely to have formed the dominant large tree cover in the local woodland and the dominance of oak in particular in the charcoal assemblage is likely to be largely a reflection of availability. Localised areas of oak-ash woodland may also have existed, although the pollen evidence of ash is limited (Grant, Pollen report). Members of the Pomoideae group (apple/pear/ hawthorn/whitebeam), elm, hazel and holly are typical of a variety of environments including open woodland, woodland edge and scrub. Elm will also produce large standard trees in more open areas. Alder and aspen/willow prefer damp or marshy ground and will have been growing on the lower parts of the site and surrounds, particularly on the clay. Alder also performs well on nutrient poor soil having root nodules which contain nitrogen-fixing bacteria (Milner 1992). Aspen (and poplar) are anatomically indistinguishable from willow but also tends to favour damp or seasonally wet meadows. The ivy present in small quantities is likely to have entered the deposits with larger host tree species through which it was growing. Similar vegetation is suggested by charcoal from the northern fringe of present day Southampton where mixed oak/ash woodland is suggested for the Late Neolithic/Early Bronze Age with scrubby vegetation including hazel, *Prunus* (probably blackthorn), Pomoideae group, and poplar or willow were indicated by the charcoal (Gale 1995), although this assumes wood collection was unbiased to particular species and was representative of local availability. A similar pattern is suggested for the medieval period although with the addition of birch and maple.

Sample Composition and Fuel Use
The dominance of oak in the charcoal assemblage makes it difficult to establish the significance of variation between features, feature types or areas of the site. Some comments can be made concerning particular features or assemblages however as well as the selection of particular taxa for fuel. The dominance of oak in the samples is likely to be due to its availability and burning qualities. Oak and ash wood provide good fuel of high thermal capacity. Additionally oak has a long tradition of being the timber of choice in construction. Its dominance is therefore to be expected and is generally noted in archaeological contexts, in many cases representing re-use of structural timbers or use of off-cuts as fuel as well as deliberately targeted fuel wood.

The three tree-throw holes have all produced samples consisting almost entirely of oak, with one fragment of alder/hazel roundwood from a tree-throw hole in Area C (feature 13323). It is possible that in these examples the oak derives from the tree associated with the tree-throw hole, rather than representing fuel wood, although the feature may have been used for a secondary function or shelter. The presence of alder does indicate that some additional wood was incorporated. A post-hole from the four-post structure (group 10081) in Area A also produced only oak, and in this instance it is feasible that the wood derives from the post itself.

A deposit from a hearth in Area A (feature 10878) was unusual for the site in that it was dominated by ash rather than oak. This was the only feature to produce elm, and also produced hazel. It is possible that the wood was selected for its burning properties but may simply reflect availability of trees at that particular time or used building material or off-cuts. Like oak, ash makes a very good fuel wood, although unlike oak it also burns well when still green (Edlin 1949), a property which may have been significant in its selection in this instance.

A group of deposits from enclosure ditches and a pit in Area C (ditch groups 14317 and 13593 and pit 14129) are of interest in that they are dominated by alder including a high proportion of narrow roundwood. Oak tends to be poorly represented in these samples. Feature 10021 from group 13593 also produced more aspen/willow wood than the other deposits, possibly derived from the same process or source as the alder. The dominance of alder in a limited number of deposits suggests that it has been deliberately selected for some specific purpose. Alder is generally considered to be a poor fuel, although does make good charcoal (Gale and Cutler 2000, 34). Charcoal production is difficult to recognise as distinct to general burning, although the good preservation and limited number of fragments which were vitrified are perhaps consistent with relatively controlled burning. Given the apparent availability of oak it is unlikely the alder was selected in the absence of alternative fuel types, which further supports the possibility that it was deliberately selected for charcoal production, or that alder charcoal was brought into this part of the site for burning. The use of alder charcoal has been suggested elsewhere in the county, for example for Romano-British period Houghton Down, Danebury Environs, where it is associated with metal working (Campbell 2008, 71).

The bulk of the charcoal at Dowds Farm appears to be from mature heartwood, while some narrow roundwood from a range of species was also present. Taxa represented by roundwood include the alder already discussed, but also hazel, possible aspen/willow. In addition wood of smaller trees such as holly, the Pomoideae group and the *Prunus* species also appears to have been burnt. The different wood types and differently sized material burn in diverse ways. Large logs or off-cuts of trunk wood, particularly of oak heartwood, which is denser than oak sapwood, provide a longer-lasting heat than the narrow roundwood. Conversely the narrow roundwood produces an intense short-lived heat due to the higher ratio of atmospheric oxygen to wood surface. As such, bundles of roundwood or brushwood would provide rapid high heat to establish a fire. It is likely then that the selection of the various woods is in part related to their burning properties as well as availability.

Woodland Management

It has been suggested on the basis of the pollen record that coppiced woodland may be represented in the vicinity of the site, with hazel dominant (Grant, Pollen report). Some management, even if conducted on an *ad hoc* basis is certainly feasible and potentially necessary in order to maintain a steady fuel supply. It is very difficult to infer coppicing from charcoal, and evidence for it in the prehistoric period remains largely a matter of conjecture. Clues to coppicing or pollarding cycles may be gained from examining patterns of similarity in ages of trees and patterns in growth ring widths (Morgan 1988). In practice however it is difficult to make meaningful interpretation of archaeological data given the range of potential sources of wood and survival of material. Woodland management has been argued for Danebury Hillfort (Poole 1984, 482) where the hazel charcoal consistently ranges in age from three to nine years, while hazel wattle and daub impressions have also been recovered. Gale has argued for oak coppice at both Runnymede, Middlesex (Gale 1991a, 233) and Wytch Farm (East of Corfe), Dorset (Gale 1991b). At Runnymede oak wood was generally from young trees (up to 35 years) and oak stems of seven years would conform to the long established custom of harvesting rods on a seven year cycle.

At Dowd's Farm the majority of charcoal was from mature wood, or from material that was too fragmentary to establish the age or size of tree. However, roundwood was present in a number of features, particularly of alder, while roundwood of hazel and possible aspen/willow was also present. The age of roundwood indicated by growth rings ranged from 3 to 9 years. One sample (context 10021 from enclosure ditch 13593) produced a deposit with a number of roundwood fragments still retaining sap wood. The age range and diameter of the fragments ranges from four to nine rings and 3 to 7.5mm (wood can reduce by up to 40% on conversion to charcoal (Gale 2006, 58) which is consistent with coppice cycles. It is also worth considering that to improve coppice, some over-storey clearance will be required to encourage the understorey. Some of the oak represented in the charcoal could be derived from this process.

Conclusions

Large quantities of charcoal were recovered by flotation from features at Dowd's Farm, the majority being from the late prehistoric or early Romano-British phase of occupation with some medieval material also recovered. Oak dominates the assemblages as a whole and is dominant in most contexts, although there are some more interesting patterns visible in the data. The quantity of charcoal and evidence for possible woodland management from the pollen record (Grant, Pollen report) raise the potential for charcoal production at the site. The bulk of the charcoal was well preserved and very little had vitrified, potentially linked to controlled burning conditions. In addition a number of samples produced alder roundwood, a species which makes poor fuel as wood but makes good charcoal (Gale and Cutler 2000). While the presence of coppiced woodland and charcoal production cannot be demonstrated from the charcoal alone, the range of taxa supports the pollen data for relatively open mixed woodland, with an understorey of shrubby species, while some selection of alder roundwood appears to have taken place.

References

Campbell, G. 2008 Plant utilization in the countryside around Danebury: a Roman perspective in B. Cunliffe, *The Danebury Environs Roman Programme, A Wessex Landscape During the Roman Era*, English Heritage and Oxford University School of Archaeology, Monograph No. 70, 53-74

Edlin, H. L. 1949 *Woodland Crafts in Britain*, London: B.T. Batsford

Gale, R. 1991a The identification of wood remains, in S. Needham (ed) *Excavation and salvage at Runnymede Bridge, 1978: Late Bronze Age waterfront site*, London: British Museum Press, 226-30

Gale, R. 1991b charcoal identification, in P.W. Cox and C. M. Hearne (eds) *Redeemed from the Heath: The Archaeology of the Wytch Farm Oilfield (1987-90)*, Dorset Natural History and Archaeological Society Monograph, 9. 201-3, microfiche E4-7

Gale, R. 1995 Charcoal, pages 46-47 in A. Crockett, Excavations at Montefiore New Halls of Residence, Swaythling, Southampton, 1992, *Proceedings of the Hampshire Field Club Archaeological Society*, 51, 5-57

Gale, R. and D. Cutler, 2000 *Plants in Archaeology*, Westbury and Royal Botanic Gardens, Kew

Gale, R. 2006 Charred plant remains, pages 58-61 in A. Chapman An Iron Age Enclosure at Site A, Kennel Farm, Basingstoke, Hampshire, *Proceedings of the Hampshire Field Club Archaeological Society*, 61, 2006, 16-62

Hather, J. G. 2000 *The Identification of the Northern European Woods, A guide for archaeologists and conservators*, London: Archetype Publications

Leney, L. and Casteel, R.W. (1975) Simplified Procedure for Examining Charcoal Specimens for Identification. *Journal of Archaeological Science* 2,153-159

McParland, L.C., Collinson, M.E., Scott, A.C., Camobell, G. and Veal, R. 2010 Is vitrification in charcoal a result of high temperature burning of wood? *Journal of Archaeological Science*, 37 (2010), 2679-2687

Milner, J.E. 1992 *The Tree Book,* London: Collins and Brown

Morgan, R.A. 1988 The case for wattling – what tree rings could reveal in P. Murphy and C. French (eds) *The exploitation of the wetlands*, BAR British Series 186, Oxford, 77-91

Poole, C. 1984 The woodlands and their use, in B. Cunliffe (ed) *Danebury: an Iron Age Hillfort in Hampshire. Volume 2, The excavations 1969-1978: The finds*, Council for British Archaeology Research Report 52. London: Council for British Archaeology, 481-3, micro fiche1-6

Schweingruber, F.H. (1990) *Microscopic Wood Anatomy* (3rd ed). Birmensdorf: Swiss Federal Institute for Forest, Snow and Landscape Research

Stace, C., 1997. *New flora of the British Isles* (2nd ed). Cambridge: Cambridge University Press

WESSEX ARCHAEOLOGY LIMITED.
Registered Head Office: Portway House, Old Sarum Park, Salisbury, Wiltshire SP4 6EB.
Tel: 01722 326867 Fax: 01722 337562 info@wessexarch.co.uk
Regional offices in **Edinburgh**, **Rochester** and **Sheffield**
For more information visit **www.wessexarch.co.uk**