Drigg
The wood charcoal
Denise Druce

The assessment of 12 bulk samples taken during the excavations at Drigg (OA North 2010, 2011) demonstrated the presence of well-preserved and abundant charcoal in the burnt stone layer, ***15*** (samples 1008 and 1010), and in the layer ***16*** (samples 1012 and 1014), immediately below. These four samples were selected for charcoal analysis. Few burnt mounds have been excavated in Cumbria (Heawood and Huckerby 2002, OA North 2011) and this, coupled with a the lack of detailed charcoal work from previously excavated burnt mounds in Cumbria sites (eg Sparrowmire and Aldingham) (Heawood and Huckerby 2002, Elsworth 2006, Huntley 2010), meant that recommendations were made for full charcoal analyses. It was hoped that the information, along with the pollen data, would provide details of local woodland communities and environments alongside any evidence for species selection of the wood fuels used. Given that the material came from stratified contexts it was envisaged that any changes in the type of taxa available and utilised over time may also be evident.

Quantification
Four bulk samples were selected for charcoal analysis and these included two (1008 and 1010) taken from the burnt stone layer, ***15***, and two (1012 and 1014) from the underlying layer ***16***. The four bulk samples ranged in size from five to 14 litres.

Methodology
The samples were processed by hand, where flots were retained in a 0.25mm mesh sieve, and the residue on a 0.5mm mesh. Both the flots and residue were air-dried. Analysis of the four samples followed standard procedure described in Druce (?) where 100-150 fragments (or the entire if less than this) >4mm in size were extracted and identified. The percentage of >4mm sized charcoal fragments analysed was noted. The charcoal was initially sorted into groups based on the features visible in transverse section using a Leica MZ6 binocular microscope at up to x40 magnification. Representative fragments of each group were then fractured to reveal both radial and tangential sections, which were examined under a Meiji incident-light microscope at up to X400 magnification. Identifications were made with reference to Schweingruber (1990), Hather (2000), and modern reference material.

Results
The Wood Taxa
The charcoal results of the 4 samples are shown by fragment count in Table *. Eleven taxa were positively identified, including six to species. The taxonomic level of identification varied according to the observed genera/family and/or the state of preservation. In some cases the level of identification was limited due to the similarities of species within a family or sub-group, These categories are *Salix/Populus* sp (willow/poplar), *Prunus* sp (blackthorn-type) *Prunus avium* (wild

cherry), *P. Spinosa* (sloe/blackthorn), and *P. padus* (bird cherry) and Maloideae (hawthorn, whitebeam, apple and pear) e.g. *Salix/Populus* sp (willow/poplar), which cannot be separated anatomically. *Prunus avium* (wild cherry), *P. Spinosa* (sloe/blackthorn), and *P. padus* (bird cherry) are also very similar and referred to as *Prunus* sp (blackthorn-type) in the text. Similarly, the wood of Maloideae, which includes hawthorn, whitebeam, apple and pear, cannot be distinguished anatomically, and is referred to as hawthorn-type in the text. In general preservation was fair. The fragments categorised as indeterminate from either distorted/knotty wood or highly clinkered.

The charcoal content of all four samples was fairly similar and dominated by *Quercus* sp (oak) including oak heartwood. *Alnus glutinosa* (alder) and *Salix/Populus* sp charcoal was also fairly well represented. Plus fragments of *Corylus avellana* (hazel), *Ulmus glabra* (elm), and *Fraxinus excelsior* (ash) (including mature ash) were also recorded in all four samples. Single fragments of cf *Euonymus europaeus* (spindle tree) were identified in both the stone layer (***15***) and the underlying layer (***16***). A single *Betula* sp (birch) fragment was recorded in ***16***, plus rare fragments of *Tilia cordata* (lime), Maloideae, and *Prunus* sp were recorded in the stone layer ***15***.

Discussion

The charcoal evidence from Drigg indicates that a range of wood taxa was available and utilised for fuel, although, a preference for oak is evident. The pollen evidence from Drigg (Core 2) (Rutherford this volume) indicates a local landscape dominated by alder and birch prior to and during the initial phases of burnt mound activity. Moderate amounts of oak and hazel pollen were also recorded (Rutherford ibid this volume), which, given the wet nature of the site, was likely to have come from drier areas nearby or further afield. Although alder was fairly well represented in the charcoal assemblage from Drigg, birch, surprisingly, was more-or-less absent. According to Edlin (1949), birch wood burns quickly, which may have made it unsuitable for the burnt mound activity. Conversely, birch may have been utilised but as it burns quickly may not survive. The heating of stones, however, was likely to have required a long and sustained heat, which oak wood (or charcoal) would certainly have provided.

A bulk sample taken during the excavation of a from the burnt mound at Sparrowmire Farm, Kendal, also produced charcoal from oak and diffuse porous taxa (alder, birch and hazel) (Heawood and Huckerby 2002). The relative abundance of each taxa, however, was not explored. Charcoal studies from burnt mound sites in eastern England indicate the exploitation of local fen-edge woodland. Unlike Drigg, the assemblages were dominated by what was likely to be the immediate woodland, namely alder with lesser amounts of hazel, blackthorn/hawthorn-type, oak, ash, elder and field maple were also utilised (Murphy 2001). Like birch, alder makes a poor fuelwood unless it is converted into charcoal prior to use (Edlin 1949). Evidence from three of the fen-edge sites suggests that lesser amounts of other taxa, such as hazel,

blackthorn/hawthorn-type, oak, ash, elder and field maple were also utilised (Murphy 2001).

Although vegetation changes are apparent in the pollen curve from Drigg, no discernible differences are evident in the charcoal assemblages from the stone layer (***15***) and the layer below (***16***) except, perhaps, for the addition of hawthorn/blackthorn type and lime charcoal in ***15***. It is possible that the charcoal from the two layers originates from broadly the same period of use. Baysian modelled radiocarbon dates of peat from the underlying layer ***16*** (sample 1011) and charcoal from the stone layer, ***15*** (samples 1008 and 1010), certainly concord with this, and show more-or-less consistent age ranges of 2490-2345 cal BC and 2460/2470-2225/2285 cal BC respectively (Marshall *et al* this volume).

It is clear from the pollen evidence that activity at the site was of a magnitude to affect its immediate environment, causing a rise in herbaceous taxa, including the disturbance indicator ribwort plantain, and a rise in bracken spores (Rutherford ibid this volume). Significant changes in the arboreal pollen, however, is limited to the relative abundance of alder, birch, and willow, which is just as likely to reflect changes in local groundwater conditions, or the regeneration of birch following previous clearance (Rutherford this volume). All things considered, it would appear that the burnt mound activity was not detrimental to the local oak woodland. The presence of a diverse range of woodland taxa, including small roundwood, may indicate that other, perhaps more sustainable, sources of fuel wood was also utilised, such as dead/branch wood from woodland floors. The presence of ash and spindle tree, plus hawthorn/blackthorn-type in the stone layer (***15***), suggests that some of the exploited woodland was fairly open.

Conclusion

The charcoal evidence from Drigg suggests that oak, including mature oak, was the preferred wood fuel for the burnt mound activities. That oak was specifically selected for its burning properties is attested by the pollen evidence, which indicates an immediate environment of alder and birch just prior to and during the burnt mound activity. A number of other taxa were also recorded in the assemblages, which may include material collected from woodland floors.

Acknowledgments

Sandra Bonsall processed the remainder of the bulk samples required for analysis. Thanks also to Dana Challinor who assisted with some of the identifications.

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