CHAPTER 35

Charcoal

by Rowena Gale

35 Charcoal

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The excavations at Stansted produced over 400 samples of charcoal, mostly from the LTCP, MTCP and M11 sites. About 220 were considered suitable for analysis and, from these, 67 samples were selected for full analysis, representing 42 contexts from the following periods:

Middle Bronze Age – 7 contexts
Late Bronze Age – 6 contexts
Early Iron Age – 3 contexts
Middle Iron Age – 1 context
Late Iron Age – 2 contexts
Late Iron Age/early Romano-British – 8 contexts
Early Romano-British – 2 contexts
Romano-British 2nd – 3rd century AD - 2 contexts
Late Romano-British – 5 contexts
Post-medieval – 2 contexts
Unphased – 5 contexts

Charcoal was examined from a range of context types including Bronze Age ditch, pit and posthole fills and a burnt mound; Iron Age fills of pits, ditches and a hearth; Late Iron Age/early Romano-British cremations, postholes and pits; Romano-British fills of ditches, pits, hearth and kiln; and post-medieval pit and ditch fills. In addition, charcoal was examined from four unphased hearth contexts to provide *in situ* evidence of fuel selection/ preference.

The overall analysis was undertaken to:

1. Provide environmental evidence, particularly for the prehistoric period for which few comparable data are currently available for this region of Essex
2. Determine the use woodland resources and managed woodland
3. Evaluate the type and character of the fuel used for pyre construction in the Late Iron Age/early Romano-British periods.
4. Assess the character of the charcoal associated with the Late Bronze Age burnt mound and ritual pit 423143
5. To indicate the selection and use of wood species to fuel domestic and industrial hearths

Methodology

Bulk soil samples were processed by flotation and sieving. The resulting flots and residues were scanned under low magnification and the charcoal separated from plant macrofossils. Most fragments were relatively small in size although some measured up to10 mm or more in cross-section. A few samples contained intact segments of narrow roundwood. Charcoal fragments measuring >2 mm in radial cross-section were considered for species identification. The charcoal-rich sample 2408 was 50% sub-sampled prior to identification.

The condition of the charcoal varied from firm and well-preserved to poor and friable and, sometimes, vitrified (a condition brought about by exposure to temperatures in excess of 800^{o}C, Prior and Alvin 1983). The samples were prepared using standard methods (Gale and Cutler 2000). The anatomical structures were examined using incident light on a Nikon Labophot-2 compound microscope at magnifications up to x400 and matched to prepared reference slides of modern wood. When possible, the maturity of the wood was assessed (ie heartwood/sapwood) and stem diameters recorded (it should be noted that charred stems may be reduced in volume by up to 40%).

Results

A summary of the results is presented in Table 35.1. Classification follows that of *Flora Europaea* (Tutin *et al.* 1964-80). Group names are given when anatomical differences between related genera are too slight to allow secure identification to genus level. These include members of the Pomoideae (*Crataegus, Malus, Pyrus* and *Sorbus*) and Salicaceae (*Salix* and *Populus*). When a genus is represented by a single species in the British flora, it is named as the most likely origin of the wood, given the provenance and period, but it should be noted that it is rarely possible to name individual species from wood features and exotic species of trees and shrubs were introduced to Britain from an early period (Godwin 1956; Mitchell 1974). The anatomical structure of the charcoal was consistent with the following taxa or groups of taxa:

Aceraceae. *Acer campestre* L., field maple
Betulaceae. *Alnus glutinosa* (L.) Gaertner, European alder; *Carpinus betulus* L., hornbeam
Corylaceae. *Corylus avellana* L., hazel
Fagaceae. *Quercus* sp., oak
Oleaceae. *Fraxinus excelsior* L., ash
Rhamnaceae. *Rhamnus cathartica* L., purging buckthorn
Rosaceae. Subfamilies:
Pomoideae, which includes *Crataegus* sp., hawthorn; *Malus* sp., apple;
Pyrus sp., pear; *Sorbus* spp., rowan, service tree and whitebeam. These taxa are anatomically similar; one or more taxa may be represented in the charcoal.
Prunoideae. *Prunus spinosa* L., blackthorn.
Salicaceae. *Salix* sp., willow, and *Populus* sp., poplar. In most respects these taxa are anatomically similar.
Ulmaceae. *Ulmus* sp., elm

Middle Bronze Age

A substantial settlement of post-built roundhouses was founded above Pincey Brook on the MTCP site. A large barrow monument and ring ditch 324078 were sited north-east of the settlement. Cremated bone was present in the silty infill of the ring ditch but since cremation pyres did not appear to have been burnt within the monument, it is probable that the bone was redeposited here. Charcoal samples 2642 and 2647 from the infill on the north-eastern aspect of the ring ditch 320111 contained degraded charcoal, including some partially vitrified fragments. The taxa identified included hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and probably oak

(*Quercus* sp.) (Table 35.1). Although the charcoal may represent pyre fuel, alternative origins can not be ruled out.

The waterlogged remains of worked wood from carpentry and structural use, were also recovered from the basal and secondary fills of the ring ditch 324078 and were identified as elm (*Ulmus* sp.), field maple (*Acer campestre*), alder (*Alnus glutinosa*) and oak (*Quercus* sp.) (Allen 2005). These included wood chips, off-cuts and stakes.

Pit 470040, located in the LTCP site, was sealed by the Late Bronze Age burnt mound. Charcoal in samples 911, 912 and 913, from fills 470042, 470044 and 470046, was identified as hazel (*Corylus avellana*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), oak (*Quercus* sp.) and ash (*Fraxinus excelsior*) and alder (*Alnus glutinosa*) (Table 35.1). Charcoal 856 from the fill of posthole 470001, from the same area, consisted mainly of the hawthorn/ *Sorbus* group (Pomoideae), but also oak (*Quercus* sp.), elm (*Ulmus* sp.) and ash (*Fraxinus excelsior*). Sample 851 from the upper fill of pit 470033 included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and elm (*Ulmus* sp.). The origin of the charcoal is unknown.

Late Bronze Age

Settlement appears to have been more dispersed during the Late Bronze Age, although numerous pits at the M11 site and the LTCP site attest to local activity. A complex of pits recorded on the northwest of the M11 site included pits 423143 and 436060. The former contained flint and a placed pottery vessel; associated charcoal 6160 included oak (*Quercus* sp.), the hawthorn/*Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*). The second pit appeared to have been back-filled in one episode; here the charcoal 6172 was more abundant and included a wider range of taxa: field maple (*Acer campestre*), hazel (*Corylus avellana*), ash (*Fraxinus excelsior*), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and oak (*Quercus* sp.). The origin of the charcoal in these pits is unknown, although pit 423143 clearly had ritual connotations.

Pits were also a feature of the LTCP site. Charcoal samples 824 and 825 were examined from the primary and secondary fills of pit 467002. Although there was no evidence of *in situ* burning the pit was sited within the footprint of the roundhouse in an appropriate position for a hearth; the charcoal may, therefore, relate to domestic fuel debris. The taxa identified included oak (*Quercus* sp.), blackthorn (*Prunus spinosa*), the hawthorn/ *Sorbus* group (Pomoideae), purging buckthorn (*Rhamnus cathartica*) and hazel (*Corylus avellana*).

At the southern edge of the LTCP site a burnt mound was located alongside the northern bank of the stream. This overlay and sealed the Middle Bronze Age pit 470040. At least one area of *in situ* burning was recorded. The mound had accumulated over a period of time and was composed of charcoally silt and fire-cracked stones. Charcoal from layers (464008) and (464010), within the burnt mound, consisted predominantly of the hawthorn/ *Sorbus* group (Pomoideae) and oak (*Quercus* sp.) but also included blackthorn (*Prunus spinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.), elm (*Ulmus* sp.) and *cf.* hazel (*Corylus avellana*).

Early Iron Age

Traces of permanent settlement were sparse although a number of pits attested to continuing occupation of the area. Pits were recorded on the north-west edge of the M11 site, in an area in which pit construction was already established. Some of these contained charcoal. Sample 6211 from the upper fill of pit 436091, in which pottery and struck flint were abundant, included predominantly field maple (*Acer campestre*) and oak (*Quercus* sp.) but also the hawthorn/*Sorbus* group (Pomoideae), hazel (*Corylus avellana*) and elm (*Ulmus* sp.). Sample 6163 from the lower fill of pit 423108 included oak (*Quercus* sp.). hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and *cf.* hazel (*Corylus avellana*). Similar species, with the addition of field maple (*Acer campestre*) and purging buckthorn (*Rhamnus cathartica*), were identified from sample 6212 from the upper fill of pit 436099. The origin of the charcoal is unknown but could relate to either domestic or agricultural activities.

Middle/Late Iron Age
The remains of dwelling houses at the M11 and LTCP sites attested to permanent occupation. At the M11 site, a single post-built roundhouse was recorded adjacent to an earlier boundary ditch. A possible hearth feature 430042 with *in situ* burning was located within the ring ditch, close to the northwest side of the structure. Associated charcoal 6180) may thus represent domestic fuel residues; small slivers of charcoal were identified as the hawthorn/*Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*).

Late Iron Age

This period saw radical changes in land use to accommodate increased levels of stock management (eg, the creation of droveways and land clearance) and the further development of settlements with associated mortuary sites located upslope. Burials within the cemeteries were mostly cremation deposits, while inhumations were comparatively rare. There was no evidence to suggest that cremation pyres were sited within the cemetery.

Sample 6131 (context 439014) was recovered from the fill of ditch 439013. The sample was composed predominantly of narrow roundwood from blackthorn (*Prunus spinosa*) but also included oak (*Quercus* sp.) and ash (*Fraxinus excelsior*). The abundance of blackthorn could be indicate of hedgerow debris.

Charcoal in sample 6210 obtained from the fill of ditch 424035 consisted of small fragments from the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*), willow (*Salix* sp.) or poplar (*Populus* sp.) and purging buckthorn (*Rhamnus cathartica*).

Late Iron Age/early Romano-British period

The transition of the Late Iron Age into the early Romano-British period was not clear-cut and thus some features are loosely attributed to this period. Charcoal was examined from cremation burials on the LTCP and MTCP sites. Although this material almost certainly represents pyre fuel, some may have originated from funerary furniture (eg, the bier) or grave goods placed on the pyre

In the LTCP site, cremation burial 113072 contained human bone from an adult of unknown sex, charcoal and the remains of an urn. The cremation was excavated in 5 spits. Associated charcoal (samples 377-379 and 382-383) suggests that the pyre was built principally from oak (*Quercus* sp.) but also incorporated ash (*Fraxinus excelsior*) and shrubbier species such as hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.). Similar species were present in sample 384 from the backfill of the feature, context 113074.

Cremation burial 143075 was sited some distance north-west of feature 113072. The burial included two urns, one inside the other, and human bone from a female aged between 25 and 45. The burial was excavated in east and west sectors with three spits in each. Charcoal fragments (samples 529-534) were small but consistently indicated the exclusive use oak, probably mostly fairly narrow roundwood.

Charcoal was examined from two further features from this site. Firstly the steep-sided pit 135039, which did not appear to be related to any other feature and was of uncertain function. The primary fill included a large dump of charcoal in the northern (deepest) sector, context 135040. Sample 417 consisted almost entirely of oak (*Quercus* sp.), mostly juvenile wood, although blackthorn (*Prunus spinosa*) was also present. Secondly, posthole 108089, which was cut into an earlier ditch feature. Since this was initially thought to be a cremation burial, the feature was excavated in spits. Samples 352, 353 and 354 consisted predominantly of oak (*Quercus* sp.) and ash (*Fraxinus excelsior*), although blackthorn (*Prunus spinosa*) was minimally present in sample 353 (see Table 35.1). This wood was mostly fairly juvenile and included a high proportion of narrow roundwood. The origin of the charcoal is unknown.

In the MTCP site, charcoal was recovered from adjacent cremation burials 330020 and 332009, situated slightly southwest of the Bronze Age barrow monument. The first, an unurned cremation burial of a female aged about 35, was excavated in three spits. Associated charcoal in sample 2323 was sparse and degraded but indicated that the pyre was constructed from oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*). Cremation 332009 contained the remains of a male aged 40+, abraded decorated pottery sherds, ash and charcoal. The feature was excavated in nine spits and although the charcoal was relatively frequent it was very fragmented. Oak (*Quercus* sp.) and field maple (*Acer campestre*) proved to be the dominant taxa, with sporadic occurrences of ash (*Fraxinus excelsior*), hazel (*Corylus avellana*), the hawthorn/ *Sorbus* group (Pomoideae) and possibly willow (*Salix* sp.) or poplar (*Populus* sp.).

Sample 6117 (context 430019) was recovered from the fill of ring gully 430016 on the M11 site. The charcoal, probably domestic hearth debris, consisted mainly of narrow roundwood from ash (*Fraxinus excelsior*) but also included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*).

Early Romano-British period

During the Romano-British period the area became the focus of extensive settlement and intensive land-use for agricultural purposes, although some areas may have been industrial.

A small sample of charcoal 255 from the secondary fill of ditch 110073, sited in the south-east corner of the LTCP site included oak (*Quercus* sp.), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*) and field maple (*Acer campestre*).

Hearth feature 150028, on the same site, cut into early Romano-British ditch 150024; the function of the hearth is unknown but was tentatively assigned as industrial or agricultural. The charcoal consisted of oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and ash (*Fraxinus excelsior*). If from a non-domestic context, there was no indication of species selection related to function.

Romano-British 2nd – 3rd century

A ditch fill (context 121078) in the linear feature 109196 in the LTCP site produced Romano-British pottery and an unusually well preserved assemblage of charcoal (372). The latter included a high proportion of narrow roundwood from shrubby hawthorn/ *Sorbus* group (Pomoideae) and blackthorn (*Prunus spinosa*). Small amounts of oak (*Quercus* sp.), field maple (*Acer campestre*) and willow (*Salix* sp.) or poplar (*Populus* sp.) were also present. The inclusion of pottery suggests a domestic origin for the charcoal.

Context 138027, the fill of a linear feature 138024, located on the east side of the LTCP site, included numerous pot sherds and a quantity of well preserved charcoal (sample 399) composed mainly of narrow roundwood. The taxa identified included oak (*Quercus* sp.), field maple (*Acer campestre*), the hawthorn/ *Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*) and willow (*Salix* sp.) or poplar (*Populus* sp.).

Late Romano-British period

The MTCP site appears to have supported industrial/ agricultural activities throughout the Romano-British period, including domestic iron-working. A small quantity of charcoal was recovered from kiln 338009, which was interpreted as a corn-drier. Fuel debris in samples 2423 and 2324 from the final firing of the kiln included oak (*Quercus* sp.), the hawthorn/ *Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.). Oak (*Quercus* sp.) largewood and a small amount of willow (*Salix* sp.)/poplar (*Populus* sp.) were also recorded from a large sample of rather comminuted but well-preserved fuel debris from the basal fill of a charcoal-rich pit 334013, adjacent to, and probably associated with the use of the kiln. From the same area, a deposit of daub and burnt clay, possibly from a hearth base, was dumped in a neighbouring pit (context 319139); associated charcoal (sample 2434) was identified as oak (*Quercus* sp.) and hazel (*Corylus avellana*).

A large pit 347041, probably a waterhole, was sited close to the smithy. Sample 2520, mostly consisted of narrow roundwood ranging from 10-15 mm in (charred) diameter, although oak (*Quercus* sp.) largewood was also present. The taxa identified included hazel (*Corylus avellana*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*). Some of the roundwood appeared to be from fast-grown stems.

Post-medieval period

A hunting lodge was constructed within a rectangular enclosure in the LTCP site. A second structure was erected close by and cobbled areas provided hard standing. Samples 831 and 839, from the fill of enclosure ditch 466020, were similar in character and contained a wide range of taxa: oak (*Quercus* sp.), hornbeam (*Carpinus* sp.) (mostly narrow roundwood), field maple (*Acer campestre*) (including roundwood), ash (*Fraxinus excelsior*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), willow (*Salix* sp.) or poplar (*Populus* sp.) and *cf.* hazel (*Corylus avellana*). The origin of the charcoal is unknown although dumped fuel debris from activities associated with the hunting lodge seems likely.

Unphased

Several hearths were located in an open area on the LTCP site. The charcoal-rich sample 409, from hearth feature 110129, consisted entirely of oak (*Quercus* sp.) largewood. Similar evidence was obtained from samples 426, 429 and 437, from hearth contexts 152022 and 150041, and from samples 515 and 520, from hearth deposit 106088. The consistent and exclusive use of oak in these hearths may reflect the requirement of a particular property offered by this type of fuel.

Discussion

This report includes the analysis of charcoal recovered from pits, ditches, mounds, cremation burials, hearths and kilns dating from the Middle Bronze Age to the post-medieval period, from the M11, the MTCP and the LTCP sites.

The second and first millennium BC

Environmental evidence

The site was located on a relatively flat plateau some 92-108 m aOD in an area of heavy clay, with watercourses/ streams running close to some of the excavated sites, eg, Pincey Brook at the base of the LTCP site. Waterlogging appears to have occurred regularly. An initial assessment of the pollen suggested that during the Early Bronze Age the area was well-wooded, particularly with alder, hazel, lime (*Tilia* sp.), willow, oak, elm and pine (*Pinus* sp.). The difficulty of cultivating the unyielding soils on the plateau almost certainly resulted in the persistence of woodland in this area, possibly until the medieval period.

Evidence of domestic settlement dates from the Middle Bronze Age, when agricultural clearance, predominantly for pastoral farming, significantly reduced woodland cover. The fuel requirements of the settlement would have been obtained from local stands of woodland or scrub, hedgerow trees and hedgerows. Fuel provision would have been influenced by:

1. The practical aspects of fuel-gathering, eg, accessibility
2. The quality and burning properties of the wood
3. The allocation of certain timber trees or coppice to fulfil construction, hurdle-making and other requirements

Thus, although a rough indication of woodland composition can be assessed from deposits of fuel debris, the interpretation of such must take into account the bias towards economic uses and supply. For a number of reasons (eg differential preservation and fragmentation rates of charcoal) the accurate assessment of species dominance in a charcoal assemblage is notoriously difficult. For the purposes of this report, the overall dominance of species is based on the frequency of charcoal fragments per species in each sample and the overall occurrence of species in the total number of samples examined. On this basis, oak, the hawthorn group and blackthorn probably had a wider distribution in the landscape than, for example, ash, elm, maple, alder, willow or poplar and hazel (Table 35.1). Evidence from the remains of worked wood (chippings, off-cuts and timbers), obtained from Middle Bronze Age contexts in the barrow monument 324078, was indicative of on-site wood-working, using elm (*Ulmus* sp.), field maple (*Acer campestre*), alder (*Alnus glutinosa*) and oak (*Quercus* sp.) (Allen 2005). It is interesting to compare the different application of wood resources when supplying fuel as opposed to carpentry or wood-working needs and, although these results do not necessarily negate the earlier suggestion that oak, blackthorn and the hawthorn group were dominant in the locality, they do underline the dangers of environmental reconstruction using a restricted set of data.

The species named from the charcoal analysis mostly comply with those identified from the pollen assessment and the final pollen analysis (Wiltshire 2002; Huckerby *et al.* CD Chapter 31), although, interestingly, neither lime, birch (*Betula* sp.) nor pine (all of which were represented by pollen) occurred in the charcoal. In view of the importance of lime in the prehistoric period as a source of bast fibre and leafy fodder (Edlin 1949), and consequently the by-product of narrow roundwood for firewood, the absence of lime in the fuel deposits is rather surprising. By the Middle Bronze Age, however, lime was probably relatively rare at the site and Wiltshire (2002) suggests that, on the Stansted Plateau, the trees were confined to woodland on damp soil close to Pincey Brook – perhaps outside the catchment area for fuel collection. Birch provides high-energy, if fast-burning, fuel and its absence in the charcoal may be indicative of its general paucity at the site. Pine pollen is produced in great abundance and, being wind-dispersed, it can travel long distances. Thus, despite the frequency of small amounts of pine pollen at the site, it is possible that pine was not growing in the immediate vicinity. The absence of pine in the charcoal samples, however, may be more to do with the tendency of the resinous wood to spit when burning than its distribution in the neighbourhood. Bracken (*Pteridium aquilinum*) appears to have grown fairly freely in the open grassland (Wiltshire 2002) and although, when dried, it provides a hot fast-burning fuel, there was no evidence of its use in the fuel debris examined.

The pollen record suggests that both alder and hazel underwent a marked decline during the Middle Bronze Age (Wiltshire 2005; Huckerby *et al*., CD Chapter 31). The reason for this is not clear, although regular coppicing (perhaps to supply young stems for hurdle-making or basketry) would have reduced pollen production. In the Late Bronze Age, an area adjacent to the brook on the LTCP site (potentially an ideal habitat for alder) was used extensively for activities which resulted in the formation of a burnt mound. The paucity of both alder and hazel in fuel deposits associated with the burnt mound supports the suggestion that these species failed to recover from deforestation during the Middle Bronze Age.

It is possible that some cleared areas reverted to thorn scrub, as suggested by the high ratio of charcoal from the hawthorn group and blackthorn, although a good deal of this material may relate to the cutting/ pruning of hedges used to define livestock enclosures. Hedges seem especially relevant in the landscape during this period, in which there was little evidence of ditched enclosures. It has also been suggested, that thorny scrub may have colonised the trampled soils around abandoned waterholes (Robinson, pers. comm.).

The low density of settlement and the focus on pastoral farming at Stansted in the Bronze Age and Early-Middle Iron Age undoubtedly contributed to the survival and diversity of the arboreal taxa associated with the prehistoric period. A fairly comparable range of species was recorded from prehistoric and Romano-British contexts at Thorley, sited about 3 miles southwest of Stansted, where, despite the paucity of charcoal available, the taxa identified included maple, ash, the hawthorn group, oak, purging buckthorn, blackthorn, elder (*Sambucus nigra*) and gorse (*Ulex* sp.)/broom (*Cytisus scoparius*) (Gale, in prep). It is interesting, therefore, to compare these landscapes with that at Grange Lane, a Middle Bronze Age – Late Iron Age site on the A120 Roadscheme, just south-east of Stansted, where the emphasis was on cereal production (Challinor, per. com). The pollen record for Grange Lane indicates that the landscape was predominantly open grassland during this period, with the sparse woodland supporting only a narrow range of taxa: oak, pine, hazel and alder.

Cremations, burnt mounds and placed deposits

Bronze Age

A Middle Bronze Age barrow monument, sited north-east of the settlement in the MTCP area, provided early evidence of funerary ritual. Finds at the monument were sparse and charcoal recovered from the ring ditch 320111 could not be securely attributed as pyre fuel. The sample consisted of shrubby species including hazel, the hawthorn group and probably oak. Although we have no comparable material from the same period, this type of fuel is similar to that identified from later non-ritual contexts, suggesting that no special importance attached to the species in the ring ditch.

A number of pits and postholes sited close to Pincey Brook (LTCP site) were sealed by a Late Bronze Age burnt mound. The origin of charcoal in these features, 470023, 470040 and 470041, is uncertain and could relate to either the general dumping of fuel debris or from the overlying burnt mound. The taxa identified were comparable to deposits in the burnt mound and included mostly oak, the hawthorn group and blackthorn but also alder, hazel, ash and elm (Table 35.1).

The Late Bronze Age burnt mound marked the site of intensive activity. The area appeared to have been in use over a considerable period of time and the refuse from this activity overlay local pits and postholes, and possibly seeped into the underlying features. Fuel debris from the burnt mound indicated the frequent use of oak, the hawthorn group and blackthorn, and somewhat less use of ash, elm, hazel and alder.

A group of paired pits located in the northwest part of the M11 site contained structured/ placed deposits. Pottery vessels were placed in one of each pair of pits; the second pit contained only sherds. Carbonised bone, charcoal and fired clay were associated with both pits in the pair. Charcoal 6160 was examined from pit 423143,

which contained a placed vessel, and also from pit 436060 (sample 6172) sited some distance away. Pit 436060, which was probably for ritual use but did not contain any significant artefacts, appeared to have been back-filled in a single episode. Only small amounts of charcoal were available from these pits: oak, the hawthorn group and blackthorn were common to both pits. In addition, pit 436060 contained ash, hazel and maple. The function/ origin of the charcoal is unknown but the use of multiple species in these features suggests that no special/ ritual selection applied to the fuel.

Iron Age

Following a period of more dispersed occupation in the Early Iron Age, groups of settlement were established during the Late Iron Age, often associated with cemeteries.

Pyre fuels

Cremation appears to have been preferred to inhumation, and the cremated remains, often including a certain amount of burnt pyre fuel (charcoal), were interred either in urns or as loose deposits. The pyre sites appear to have been located elsewhere.

Charcoal was examined from two Late Iron Age/ Romano-British urned cremation burials (113072 and 143075) in the cemetery uphill of the settlement at the LTCP site. 143075 appeared to have been constructed almost entirely of oak, employing mostly juvenile wood and narrow roundwood. Charcoal from cremation 113072 was too fragmented to assess the maturity of the wood but, here again, oak formed the dominant component but was mixed with ash, willow/poplar, hazel and the hawthorn group. Both burials were of adults; 143075 was female aged, between 25 and 45. The (apparently) exclusive use of oak in burial 113072 may be significant.

The cremation burials on the MTCP site were also assigned a Late Iron Age/early Romano-British date. Charcoal from this site was examined from unurned cremation burials 330020 (35 year old female) and 332009 (40+ year old male). Here the pyre fuel was less well preserved and it was more difficult to detect the presence of narrow roundwood. The pyres for each had been constructed using wood from multiple species, predominantly oak, field maple and ash but also hazel, the hawthorn group and willow/ poplar. The only apparent difference between the pyre woods from these burials and those from the LTCP site being the common use of maple at the MTCP site, perhaps reflecting a wider distribution of maple in this area.

Experimental research on pyre structures has demonstrated that approximately one tonne of wood is required to consume an adult human body (McKinley 1994). Traditional methods of construction employed the use of substantial billets/ poles of wood to form a rectangular platform. Thus the frequency of narrow roundwood, especially of oak and ash, associated with the pyres from the LTCP site at Stansted is unusual, since clearly stout poles/ branches would afford far greater support to the body and produce a longer-lasting fire. This use could imply a lack of suitable largewood and a greater dependency on coppiced stems from managed woodland.

The dominant use of oak and ash at Stansted correlates with evidence from a group of Romano-British burials at Strood Hall, a nearby site included in the A120 (Challinor 2007), but here the frequency of oak heartwood suggested a more widespread use of largewood.

Domestic fuel

The function of the Bronze Age pit 467002 sited within the footprint of a roundhouse at the LTCP site was undetermined but was provisionally interpreted as a hearth feature. If correct, the charcoal therein would represent domestic fuel debris; if incorrect, dumped domestic hearth debris is still possible. Samples 824 and 825 indicated the use of oak, the hawthorn group, blackthorn, hazel and purging buckthorn.

A group of Early Iron Age pits was recorded at the north-western edge of M11 site. Charcoal was examined from the fills of pits 433108, 436091 and 436099. There was no evidence of associated industry or domestic occupation but since the pits also contained pottery sherds and flint, it is possible that the charcoal derived from some type of domestic activity. The fuel included numerous species: oak, maple, ash, elm, the hawthorn group, blackthorn, purging buckthorn and hazel. From the same area, more convincing evidence of domestic fuel was obtained from a hearth feature 430042, sited within a Middle/Late Iron Age roundhouse; the small sample obtained indicated the use of shrubby species: the hawthorn group and blackthorn.

Fuel debris from undetermined sources

The use of multiple species was also recorded from deposits in a Late Iron Age ditch 424035 on the M11 site.

Summary

In general, the taxa identified from the charcoal correlate with the pollen record. Charcoal deposits suggest that, from the Middle Bronze Age, oak formed the dominant woodland. Other taxa named included ash, elm, field maple, alder and shrubby species including the hawthorn group, blackthorn, willow and purging buckthorn. There was little evidence to implicate the use of coppiced woodland at this time. The high ratio of the hawthorn group and blackthorn throughout the samples could suggest that hedges were commonplace in the landscape, although burning scrub wood in the hearth would result in charcoal of similar character. The longevity of this type of woodland is attributed to the difficulty of cultivating the heavy clay soils and contemporary agricultural practices, eg the low density of arable land.

Charcoal was examined from ritual (burnt mounds, placed deposits and pyre fuel) and domestic contexts (a hearth and pits). The similarity of species from these contexts suggests that little or no differential selection related to the gathering of firewood for these activities. Although there appears to have been some overall species preference (eg oak occurred most frequently), fuel collection was probably based on availability and access.

Although it was not possible to verify the use of coppiced wood from the charcoal available, it is worth noting that narrow roundwood from a range of species, including timber trees such as oak and ash, was increasingly common in contexts post-dating the Early Iron Age. This more or less coincided with radical changes in land use and increasing emphasis on arable production dating from the Late Iron Age/early

Romano-British period, and could imply a corresponding reduction in woodland and a greater dependence on woodland management.

Romano-British period

Environmental evidence

This period saw the major re-organisation of land boundaries and, by the late second or third centuries, domestic settlement was concentrated on the MTCP site. Mixed agriculture intensified and, although speculative, circumstantial evidence suggests that most, if not all, woodland was managed. The range of woodland species available for fuel, however, seems little changed from the prehistoric period (Wiltshire 2002; Huckerby *et al*. CD Chapter 31). The absence of elm, alder and purging buckthorn in charcoal deposits from the Late Iron Age onwards may not be significant, since these were only sparsely represented in earlier contexts.

Industrial fuel

Although its function is unknown, the early Romano-British hearth 150028, located in the LTCP site, was probably associated with industrial use. Charcoal residues collected from this feature indicated the predominant use of oak and ash.

By the Romano-British period, part of the MTCP area was dedicated to industrial activities, which included metal-working (probably on a domestic scale). The late Romano-British pit 347041, possibly a waterhole sited next to, and used by, the smithy, contained hammerscale, iron-working waste, and charcoal. The charcoal, almost certainly industrial fuel debris, consisted predominantly of narrow roundwood (<15mm in diameter) from hazel, ash, oak and field maple. The inclusion of coppiced material verified that the charcoal-making industry operated in managed woodland (charcoal fuel was an essential requisite of iron-working).

The function of the late Romano-British kiln 338009, also in the MTCP site, was provisionally attributed to corn-drying. Associated fuel debris from the kiln and flue channel (contexts 338010 and 338011) was sparse but indicated the use of oak, the hawthorn group and willow or poplar. A much larger sample, obtained from the basal fill of an adjacent pit 334013**,** consisted almost entirely of fragments of oak largewood. Charcoal from pits 319140 and 334013 may also be related to industrial activities. Both pits were sited close to the kiln, 319140 also contained dumped daub and burnt clay, possibly from a hearth base. The charcoal was identified as oak, hazel and willow/ poplar (Table 35.1).

Fuel debris from undetermined sources

A bulk sample from ditch 109196 on the LTCP site dates from the 2nd-3rd centuries. It yielded a high ratio of charred narrow roundwood, mostly from blackthorn and the hawthorn group but also oak, field maple and willow or poplar. The similarity of this deposit to that from context 138027, sited slightly further east in the same ditch, suggests common origins for this material, perhaps dumped waste from domestic hearths.

Medieval and post-medieval periods

Environmental evidence

Palynological evidence for the medieval period was sparse but indicative of an open landscape on acidic soils; tree/ shrub species included alder, birch, hazel, holly (*Ilex aquifolium*), pine, oak, willow and heather (Ericaceae) (Wiltshire 2002). Evidence from the charcoal added the following species: ash (possibly coppiced), blackthorn and the hawthorn group.

During the post-medieval period the site was used for gaming and hunting and it is probable that the acreage of local woodland was increased. The pollen record indicates the development of a species-rich woodland including field maple, alder, birch, hazel, ash, pine, oak, beech (*Fagus* sp.), hornbeam (*Carpinus* sp.), elm, willow and yew (*Taxus* sp.). Beech, hornbeam and (evergreen) yew form substantial trees, none of which were recorded from earlier periods. It is feasible that they were introduced at this time to enhance the character of the woodland for the purposes of hunting and also to provide a more diverse range of timber and wood. Woodland management would have been central to the maintenance and stocking of a working estate such as this; the arboreal element probably included coppice, pollards and standard trees.

Fuel debris from domestic sources

Deposits of charcoal in the fill of the post-medieval enclosure ditch 466020 (LTCP site) can almost certainly be attributed to fuel debris from activities associated with the hunting lodge. The taxa identified included field maple, hornbeam, ash, oak, willow, the hawthorn group and *cf.* hazel. The frequency of hornbeam roundwood implies the presence of coppiced or pollarded trees.

Samples from unphased deposits

Charcoal was examined from several hearth contexts and, although undated at present, the provenance of the samples, ie from *in situ* contexts, were potentially of value since these could be verified as containing fuel debris from a single source or event. The hearths were located in the LTCP site. The charcoal-rich sample 409, from hearth feature 110129, consisted entirely of oak largewood. Similar evidence was obtained from samples 426, 429> and 437, from hearth contexts 152022 and 150041, and from samples 515 and 520 from hearth 106088. In the absence of artefactual material the function of the hearths remains unknown but the selection of a single species fuel may be significant and stands in contrast to the multiple species present in samples examined from pits, ditches and other features at this site.

Conclusion

This report includes the identification of charcoal from a range of features, dating from the Middle Bronze Age to the post-medieval period. Although the origin of the charcoal is not always known, the species identified indicates access to a diverse range of trees and shrubs that must have grown in close proximity to the site throughout this period. It is suggested that oak formed the dominant component of woodland and that thorn hedges and/or scrub were probably common in the

landscape. In the post-medieval period, land was afforested to allow hunting. Although coppicing was probably practiced from an early period, there was scant evidence of such in charcoal examined prior to the Late Iron Age/early Romano-British period.

Charcoal debris associated with placed deposits (eg, Late Bronze Age pits) more or less conformed to that from non-ritual contexts, ie, Bronze Age ditch and pit fills and the burnt mound, thereby negating ritual aspects of species selection. Similarly, pyre debris from three Late Iron Age/early Romano-British cremations also included multiple species, although predominantly oak, ash and maple (probably related to structural requirements rather than ritual funerary customs). Cremation 143075 (that of an adult female), however, was probably fired exclusively with oak.

Industrial deposits, provisionally attributed to a Romano-British corn-dryer, indicated a preference for oak largewood, whereas narrow roundwood recovered from deposits of contemporary iron-working and smithing waste in pit F347041 demonstrated the use of narrow roundwood from multiple species. Industrial origins are suggested for the abundant deposits of oak from a group of unphased hearth contexts in the LTCP site.

Table 35.1: Charcoal from the M11, LTCP and MTCP sites
Key. h = heartwood; r = roundwood (diameter <20 mm); s = sapwood (diameter unknown); u = undetermined maturity (*Quercus* only)
The number of fragments identified is indicated

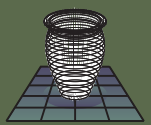
Sample	Context	Description	*Acer*	*Alnus*	*Carpinus*	*Corylus*	*Fraxinus*	Pomoideae	*Prunus*	*Quercus*	*Rhamnus*	*Populus/ Salix*	*Ulmus*
Middle Bronze Age													
BAAMP 00													
2642	320120	Secondary fill of ring ditch F320111	-	-	-	-	-	-	-	c*f.* 3	-	-	-
2647	320117	Fill of ring ditch F320111	-	-	-	11	-	1	-	-	-	-	-
BAACP 01													
851	470034	Upper fill of pit F470033	-	-	-	-	-	15	1	3h, 6s	-	-	1
856	470002	Fill of posthole F470001	-	-	-	-	1	77	-	3h	-	-	1
911	470042	Fills of pit	-	2	-	-	-	2	11	2u	-	-	-
912	470044	F470040	-	*cf.* 1	-	*cf.* 1	1	-	-	*cf.* 2	-	-	-
913	470046		-	-	-	3	-	5	2	5h, 1s	-	-	-
Late Bronze Age													
BAACP 00													
824	467003	Fill of pit	-	-	-	3	-	8	3	2s	2	-	-
825	467004	F467002	-	-	-	-	-	45	4	3u	-	-	-
BAACP 01													
832	464010	Burnt mound	-	-	-	-	-	10	1	1r, 8s	-	-	-
834		layer	-	-	-	-	-	27	-	2h, 10s	-	1	-
837			-	-	-	*cf.* 1	-	15	2	2h, 1s	-	-	1
838	464008	Burnt mound	-	-	-	-	-	21	-	3h, 5s	-	-	-
835		layer	-	-	-	-	-	11	5	1h, 1s	-	-	-
836			-	-	-	*cf.* 1	4	4	2	2s	-	-	-
BAALR 00													
6160	423142	Fill of pit F423143	-	-	-	-	-	10	2	3s	-	-	-
6172	436061	Fill of pit F436060	2	-	-	1	2	12	2	3s	-	-	-

Early Iron Age													
BAALR 00													
6163	423159	Lower fill of pit F423108	-	-	-	*cf.* 2	-	3	5	2s	-	-	-
6211	436092	Fill of pit F436091	27	-	-	8	2	16	-	26h, 8s	-	-	1
6212	436100	Upper fill of pit F436099	10	-	-	*3*	-	8	2	3h	3	-	-
Middle ?Late Iron Age													
BAALR 00													
6180	430041	Hearth F430042	-	-	-	-	-	7	4	-	-	-	-
Late Iron Age													
BAALR 00													
6131	439014	Fill of ditch F439013	-	-	-	-	1	-	23r	1r	-	-	-
6210	431028	Ditch fill F424035	-	-	-	-	1	11	4	1h	2	1	-
Late Iron Age/ Early Romano-British													
BAACP 00													
352	108091	Posthole, spit 1	-	-	-	-	41r	-	-	2s	-	-	-
353		Posthole, spit 2	-	-	-	-	10	-	1	15s	-	-	-
354		Posthole, spit 3	-	-	-	-	9	-	-	10s	-	-	-
377	113073	Crem. burial F113072 spit 1	-	-	-	-	-	-	-	11h, 29s	-	1	-
378		Crem. burial F113072 Spit 2	-	-	-	-	28r	-	-	7h, 19s	-	-	-
379		Crem. burial F113072 Spit 3	-	-	-	2	1	-	-	35s, 7u	-	-	-
382		Crem. burial F113072	-	-	-	-	-	1	-	4h, 31s	-	3	-

		Spit 4												
383		Crem. burial F113072	-	-	-	*cf.* 1	-	-	-	1h, 27s	-	2	-	
		Spit 5												
384	113074	Crem. burial F113072	-	-	-	5	3	-	-	25s, 5u	-	1	-	
		Backfill												
417	135040	Fill of pit F135039	-	-	-	-	-	-	1r	8h, 25s, 3r	-	-	-	
529	143077	Crem. burial F143075	-	-	-	-	-	-	-	79s	-	-	-	
		Spit 1 east												
530		Crem. burial F143075	-	-	-	-	-	-	-	27s	-	-	-	
		Spit 2 east												
531		Crem. burial F143075	-	-	-	-	-	-	-	2s	-	-	-	
		Spit 3 east												
532		Crem. burial F143075	-	-	-	-	-	-	-	6s	-	-	-	
		Spit 1 west												
533		Crem. burial F143075	-	-	-	-	-	-	-	14h, 8s	-	-	-	
		Spit 2 west												
534		Crem. burial F143075	-	-	-	-	-	-	-	27s	-	-	-	
		Spit 3 west												
BAALR 00														
6117	430019	Fill of ring gully F430016												
BAAMP 00														
2323	330021	Crem. burial F330020	-	-	-	-	-	-	-	*cf.* 2	-	-	-	
		Spit 2												
		Crem. burial F330020	1	-	-	-	2	-	-	-	-	-	-	

		Spit 3												
		Crem. burial F330020	-	-	-	-	5	-	-	4	-	-	-	
		Spit 4												
2828	332010	Crem. Burial F332009	2	-	-	-	1	1	-	1s	-	-	-	
		Spit 1												
2829		Crem. Burial F332009	2	-	-	-	3	-	-	14h, 4s	-	*cf.* 1	-	
		Spit 2												
2830		Crem. Burial F332009	7	-	-	1	6	-	-	2s, 7u	-	-	-	
		Spit 3												
2831		Crem. Burial F332009	16	-	-	-	-	2	-	3s, 14u	-	-	-	
		Spit 4												
2832		Crem. Burial F332009	11	-	-	-	1	1	-	8h, 6u	-	-	-	
		Spit 5												
2833		Crem. Burial F332009	12	-	-	-	-	-	-	5s	-	-	-	
		Spit 6												
2834		Crem. Burial F332009	1	-	-	-	-	-	-	25s, 3u	-	-	-	
		Spit 7												
2835		Crem. Burial F332009	-	-	-	-	-	-	-	2s, 1u	-	-	-	
		Spit 8												
2836		Crem. Burial F332009	1	-	-	-	-	-	-	4s	-	-	-	
		Spit 9												
Early Romano-British														
BAACP 00														
255	110075	Secondary fill of ditch F110073	1	-	-	2	-	-	4	5s, 7u	-	-	-	
387	150026	Fill of hearth	-	-	-	-	2	29	-	19h, 1s	-	-	-	

		F150028											
Roman 2nd – 3rd Century AD													
BAACP 00													
372	121078	Fill of ditch F109196	2	-	-	-	-	64r	21	5s, 1r	-	2	-
399	138027	Fill of ditch F138024	8r	-	-	-	-	11r	6r	3h,3s,6r	-	2	-
Late Romano-British													
BAAMP 00													
2408	334014	Basal fill of pit F34013	-	-	-	-	-	-	-	46h, 21s	-	3	-
2423	338010	Kiln deposit F338009	-	-	-	-	-	1	-	6h, 11s	-	2	-
2424	338011	Flue channel of kiln F338009	-	-	-	-	-	-	-	1s	-	-	-
2434	319139	Fill of pit F319140	-	-	-	21	-	-	-	18h, 32s	-	-	-
2520	347046	Fill of pit F347041	1r	-	-	15r	9r	-	-	3h,1s,5r	-	-	-
Post- medieval													
BAACP 01													
831	472007	Fill of ditch	3	-	21r	*cf.* 3	2	4	1	1r, 2u	-	-	-
839	466023	F466020	8	-	14	*cf.* 9	12h + s	9	1	5h	-	1	-
Unphased													
BAACP 00													
409	110130	Hearth deposit F110129	-	-	-	-	-	-	-	114h	-	-	-
426	152022	Hearth deposit	-	-	-	-	-	-	-	4u	-	-	-
429		F152021	-	-	-	-	-	-	-	23h, 3s	-	-	-
437	150041	Hearth deposit F138058	-	-	-	-	-	-	-	7h	-	-	-
515	106069	Hearth deposit	-	-	-	-	-	-	-	59h, 2s	-	-	-
520	106086	F106088	-	-	-	-	-	-	-	58h	-	-	-



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