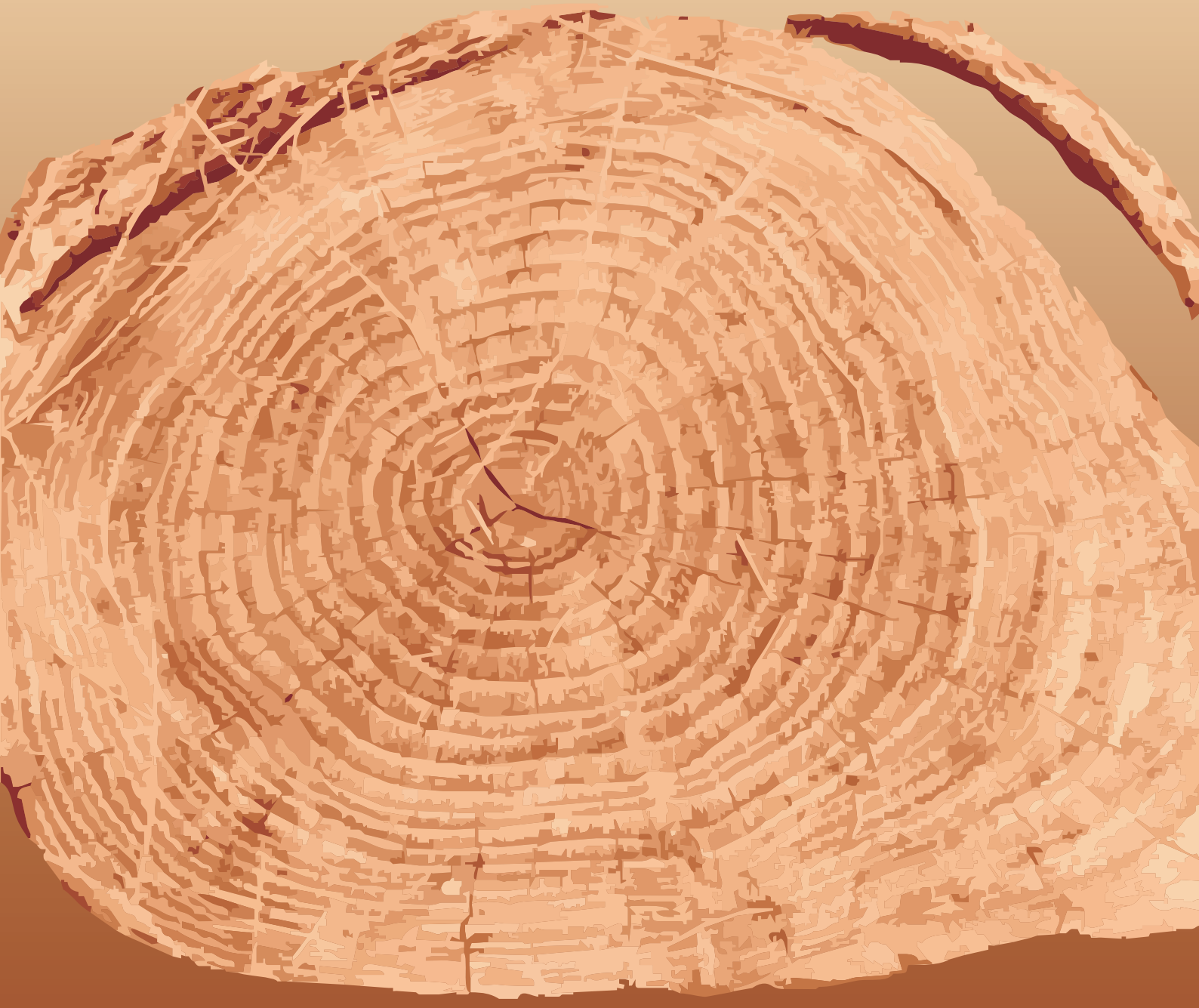
A Romano-British rural site at Eaton Socon, Cambridgeshire

Specialist Report

Waterlogged Wood and Charcoal



by Rowena Gale

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Introduction

This report includes the analysis of charcoal and waterlogged wood recovered from Romano-British pits, ditches and a watering hole. Apart from *in situ* burning recorded in hearth 96, there was no evidence of hearths or furnaces and it is probable that most of the charcoal represents fuel debris from domestic hearths or small local fires. The pastoral aspect of the site was emphasised by the numerous ditches, enclosures and large droveway. Waterlogged wood included the remains of worked timbers and roundwood (probably mostly from natural accumulation of fallen tree debris). Six samples of charcoal and eight of waterlogged wood were selected for examination to indicate the character of the local woodland, the economic use of woodland resources and for evidence of woodland management.

Materials and methods

Waterlogged wood

Samples 24, 42/42A, 45, 46/46A, 53A and 54A consisted of numerous pieces of very degraded twigs or narrow roundwood and wood fragments. Samples 10 and 11 related to a pit (15 – initially thought to be a possible grave); the associated wood fragments were small and desiccated. Thin sections of waterlogged wood were prepared for examination using standard methods (Gale and Cutler 2000). These were mounted on microscope slides and examined using a Nikon Labophot-2 microscope at magnifications up to x400. A 50% subsample was examined from the large quantity of waterlogged wood in sample 46A. The desiccated wood was examined using similar methods to those for charcoal.

Charcoal

Bulk soil samples were processed by Chris Stevens (at The MacDonald Institute) by flotation and sieving. The resulting flots and residues were scanned under low magnification and the charcoal separated from plant macrofossils. Charcoal fragments measuring >2mm in cross-section were considered for species identification from samples 7, 16, 20, 25, 33 and 45. A 25% subsample was examined from sample 25.

The condition of the charcoal varied from well preserved and firm to friable, degraded and partially vitrified, and some fragments, particularly those in sample 33, included reddish deposits which had permeated throughout the wood structure. Samples 7 and 20 included intact radial segments of roundwood.

Samples were prepared for examination using standard methods (Gale and Cutler 2000). The fragments were supported in washed sand and examined using a Nikon Labophot-2 microscope at magnifications up to x400. The anatomical structures were matched to prepared reference slides.

When possible, the maturity of the wood was assessed (i.e. heartwood/sapwood), and stem diameters and the number of growth rings recorded. It should be noted that measurements from charred material may be up to 40% less than the living wood.

Results

The results are summarised in Tables 1 (waterlogged wood) and 2 (charcoal). 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*). Where a genus is represented by a single species in the British flora this 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). Classification follows that of *Flora Europaea* (Tutin, Heywood *et al* 1964-80).

The anatomical structure of the charcoal was consistent with the following taxa or groups of taxa:

Betulaceae. ?*Alnus glutinosa* (L.) Gaertner, European alder; *Betula* spp., birch

Caprifoliaceae. *Sambucus nigra* L, elder; *Viburnum* spp., wayfaring tree or guelder rose

Corylaceae. *Corylus avellana* L., hazel

Fagaceae. *Quercus* spp., oak

Oleaceae. *Fraxinus excelsior* L., ash

Rosaceae. Subfamilies:

Pomoideae which includes *Crataegus* spp., 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 which includes *P. avium* (L.) L., cherry*; P. padus* L., bird cherry, and *P. spinosa* L., blackthorn. Most fragments included the broad heterocellular rays characteristic of P*. spinosa* but a few were less typical and may have represented either *P. avium* or *P. padus.*

Salicaceae. *Salix* spp., willow, and *Populus* spp., poplar. In most respects these taxa are anatomically similar. The ray type sometimes allows the taxon to be named, however this feature is not always a reliable indicator, particularly for juvenile wood, and has not been used in this instance.

Ulmaceae. *Ulmus* spp., elm.

Waterlogged wood

Samples 10 and 11A were obtained from pit 15. The wood was in poor condition, desiccated and structurally collapsed. Sample 10 included several pieces of narrow Salicaceous (willow, *Salix*, or poplar, *Populus*) roundwood (probably about 10mm in diameter). The morphology and anatomical growth patterns suggested that these may have derived from a single stem. Sample 11 was composed of compressed fragments of organic material, soil and a single piece of extremely degraded wood. the latter was provisionally identified as either Salicaceae, alder (*Alnus glutinosa*) or hazel (*Corylus avellana*); an unidentified charred herbaceous stem (2mm in diameter) was also present.

Sample 45 consisted of organic material and small pieces of roundwood from the base of ditch 76, context 891. The wood was identified as ash (*Fraxinus excelsior*) and elder (*Sambucus* sp.) but was too degraded to record the growth rates.

Watering hole 81, initially interpreted as a possible tanning pit, included a compressed layer of very degraded wood in the basal fill (sample 46/46A), which included roundwood from oak (*Quercus* sp.) and willow (*Salix* sp.) or poplar (*Populus* sp.) and larger wood fragments of irregular shape. Bark was also frequent either loose or still adhering to wood fragments. The abundance of bark, particularly oak, would be consistent with tanning. A further sample (54A) from this pit consisted of small Salicaceous sticks and twigs, mixed with a conglomerate of compressed leaf material. Sample 53A included willow (*Salix* sp.)/poplar (*Populus* sp.) and hazel (*Corylus avellana*)/alder (*Alnus glutinosa*) roundwood (up to 10mm in diameter). The growth structure of the hazel/alder stems was characteristic of coppice rods; in addition, a fragment of oak (*Quercus* sp.) and a willow or poplar wood chip were recorded - the latter possibly bearing tool-marks.

A waterlogged deposit of degraded roundwood (sample 24) was recovered from the top level of the fill of watering hole 99 (on the eastern edge of the site). The roundwood, some of which retained bark, ranged from 0.5-22mm in diameter and was identified as elder (*Sambucus* sp.) and *cf.* Salicaceae stems. A similar but much larger deposit of wood (sample 42/42A) from the base of the watering hole consisted mostly of elder (*Sambucus* sp.) and *cf.* willow (*Salix* sp.) or poplar (*Populus* sp.) but also included ash (*Fraxinus excelsior*) and blackthorn (*Prunus spinosa*) or the hawthorn/*Sorbus* group (Pomoideae). None of the wood in these samples derived from coppiced rods and it is probable that they accumulated from twigs shed from trees and shrubs growing in the vicinity of the watering hole. The remains of oyster shells, animal bone and pottery testify to the use of the (?defunct) watering hole as a dump.

Charcoal

Sample 45 was recovered from the large enclosure ditch 76 and included both charcoal and waterlogged wood (see above). Charcoal was sparse but included oak (*Quercus* sp.), hawthorn/*Sorbus* group (Pomoideae) and willow (*Salix* sp.) or poplar (*Populus* sp.), whereas the waterlogged wood consisted of ash and elder roundwood. Roman pottery in the same context suggested the dumping of waste material and it seems likely that the charcoal originated from fuel debris – perhaps from either a domestic hearth or a small local bonfire.

Charcoal (sample 20) from the fill of ditch 29 (ditch terminal 477) included a relatively large amount of roundwood from oak (*Quercus* sp.), ash (*Fraxinus excelsior*), elm

(*Ulmus* sp.), hazel (*Corylus avellana*), blackthorn (*Prunus spinosa*), elder (*Sambucus* sp.) and *Viburnum*. Intact cross-sections of blackthorn and *Viburnum* stems measured 8mm and the remaining charcoal appeared to be from either narrow roundwood or juvenile wood. Since other remains in the context included domestic type rubbish (pottery and bones) an origin from domestic fuel seems likely for the charcoal.

Domestic waste was also recovered from the fill of ditch 9 (segment 377), parallel to ditch 29, in which pottery was recorded as abundant. Charcoal (sample 7) consisted mainly of fragments of narrow roundwood (up to 8mm in diameter) from willow (*Salix* sp.) or poplar (*Populus* sp.), ash (*Fraxinus excelsior*), oak (*Quercus* sp.), blackthorn (*Prunus spinosa*) and *Prunus* sp. – the latter was either atypical blackthorn or cherry. Although more restricted in species, the character of the charcoal from the adjacent ditches 9 and 29 was similar enough to suggest a common origin or use.

Ring gully 80, approximately 7m in diameter, marked the site of a roundhouse close to small fields and enclosures. Small fragments of charcoal (sample 16) including oak (*Quercus* sp.), birch (*Betula* sp.) and possibly alder (*Alnus glutinosa*) were recovered from cut 447, together with burnt bone and a tiny fragment of coal. The deposit almost certainly derived from hearth debris and, by association, from activities within the structure.

Hearth 96, sited on the southern edge of the central region, included burnt stone, burnt bone and charcoal. *C*harcoal (sample 25) was abundant and predominantly composed of large chunks (up to 25 x 20 x 20mm) of blackthorn from fairly wide roundwood. Several other species were also identified including willow (*Salix* sp.) or poplar (*Populus* sp.), elder (*Sambucus* sp.), ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and oak (*Quercus* sp.).

Pit 201 was located at the northern edge of the site cutting the large enclosure ditch 60, and was interpreted as a possible latrine or rubbish pit. The charcoal (sample 33) was poorly preserved and contaminated with red iron-like deposits. Blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*) and willow (*Salix* sp.) or poplar (*Populus* sp.) were identified.

Discussion

During the Romano-British period the site appeared to have been largely agricultural with little evidence of domestic settlement, although the region as a whole was densely populated with farmsteads (Spoerry 2000). Numerous ditches indicated field systems and a main droveway (ditches 60 and 76). A circular gully (80) attested to a roundhouse in the corner of a large square enclosure. Charcoal and waterlogged wood were recovered from pits 15 and 201, hearth 96, ditches 9, 29 and 76, ring gully 80 and watering holes 81 and 99.

Waterlogged wood

The waterlogged wood mostly consisted on narrow roundwood up to about 22mm in diameter, and was usually poorly preserved and compressed. Willow (*Salix* sp.) and/or poplar (*Populus* sp.) were most frequent but elder (*Sambucus* sp.), ash (*Fraxinus excelsior*), oak (*Quercus* sp.), hazel (*Corylus avellana*) or alder (*Alnus glutinosa*) and blackthorn (*Prunus spinosa*) or hawthorn/*Sorbus* group (Pomoideae) were also

identified. Evidence of coppicing was rare and only recorded as a possibility for the alder or hazel fragments in pit 901 – a willow/poplar wood chip in the same context suggested that some of the wood from this pit may have derived from wood-working waste.

On excavation, watering hole 906 was interpreted as a possible tanning pit. Wood fragments were abundant and included roundwood and some larger irregular-shaped pieces of oak and willow/poplar roundwood. Given the ready supply of local hides and skins, a tanning industry would have been appropriate here. Oak bark has formed the mainstay of the tanning industry in Britain (Edlin 1949), and although oak bark was frequent in the pit it was difficult to substantiate its use for tanning from the wood remains.

Roundwood from ditch 76 and the watering hole 81 is likely to have derived from hedgerow prunings, brash, trimmings from the conversion of timber or from small branches or twigs detached through natural causes (e.g. high winds or storms).

It is debatable whether the wood in these features was dumped or accumulated over a period of time from fallen tree debris. The latter seems a feasible explanation for open features such as watering holes 81 and 99 and ditch 76 where locally damp soils probably supported shrubby willows, elder and probably other scrubby growth. The predominance of pastoral type features (field systems, ditches and droveway) emphasises the importance of stockbreeding – with the associated necessity of hedges and/or fencing. Spiny hedges of hawthorn and blackthorn would have made effective stock-proof barriers, whereas fencing may have incorporated either post and rail (or similar type) or wattle hurdles. Poles or coppice from species such as willow, hazel, alder and oak would have been more appropriate for fencing. Hedge prunings and narrow roundwood would have provided ideal kindling or firewood, and it could be argued that such resources would have been too valuable to have been dumped, unless either there was a surplus of wood (unlikely in this intensively farmed community) or the requisite transport was unavailable, in which case on-site burning might have been preferred to clear the debris.

Charcoal

Hearth 96 was the only hearth, furnace or fire site recorded on the site, and charcoal in the remaining features (ditches 9, 29 and 76, pit 201 and gully 80) appeared to have been dumped with other domestic rubbish and almost certainly represented fuel debris from domestic use or small local bonfires. Where ditches bordered arable fields some charcoal may have accrued from burnt material used to improve the soil. Similar species to those named in the waterlogged wood were present in the charcoal samples with the addition of birch (*Betula* sp.), elm (*Ulmus* sp.) and *Viburnum.* Positive identifications were also obtained for hazel, alder, blackthorn and the hawthorn/*Sorbus* group. The greatest diversity in species was recorded in samples that were charcoal-rich. The charcoal was mostly rather comminuted but in samples from the parallel ditches 9 and 29 it was evident that the bulk of the fuel was gathered from narrow roundwood (see Table 2), and was similar in character to the waterlogged wood. There was no evidence of the use heartwood or wide roundwood except in hearth 96, where fairly wide blackthorn stems had been burnt.

Most fuel appeared to have consisted of narrow stems, hedgerow prunings or brushwood but not coppiced stems. The remains of leaf fodder could also have

produced a source of defoliated twiggy branches well-suited for firewood. The use of coal was indicated from remains in the ring gully 80.

Environmental evidence

The site was established in the river valley on the third gravel terrace close to the Great Ouse River, approximately 18m aOD. Extensive field systems and ditches lay either side of a major droveway and the absence of domestic features suggested that the site was mainly agricultural.

In prehistoric times the Ouse valley suffered frequent inundation and, often devastating, alluviation (Dawson 2000). Although alluvial deposition eased somewhat in the early Roman period, alluviation had returned by the end of the occupation. Low-lying land on the floodplain at Eaton Socon probably underwent seasonal inundation and the high water table would have ensured damp or waterlogged soils throughout much of the year. The frequency of willow and/or poplar in the wood and charcoal deposits suggested that wet or waterlogged conditions persisted in the environment. Many of the taxa identified, e.g. elm, ash, oak, hazel and birch, would have thrived in damp, but not waterlogged, conditions and probably colonised areas less prone to flooding. Shrubby species included elder, blackthorn, member(s) of the hawthorn group, and *Viburnum.*

Romano-British settlements were also established on the western side of the Ouse River at Little Paxton and to the east at Eynesbury, St Neots, and Great Paxton (Jones 2000; Spoerry 2000). In common with Eaton Socon, the focus was on intensive agriculture – the nearby road system presumably provided an efficient means of marketing produce. Given this intensity of land-use, woodland was probably very sparse in the immediate vicinity of the site. The archaeology at Eaton Socon verified the importance of stockbreeding in the local economy and, by implication, it seems likely that hedgerows would have been common, especially where defining what may have been fairly permanent or well established features such as the droveway (ditches 60 and 76).

Evidence of coppiced (managed) woodland was supplied by waterlogged wood (either hazel or alder) in pit 901 but was insufficient to assess crop rotations. Maiden trees or poles from the same woodlands may have supplied timber for structural work (large worked timbers are reported elsewhere in this volume), or, alternatively large wood or timber may have been obtained from unenclosed wood pasture or hedgerow trees.

Conclusion

The site was located close to the Great Ouse River in a region of intensively cultivated settlements. During the Romano-British period agricultural activities at Eaton Socon were orientated towards pastoralism. The analysis of charcoal and waterlogged wood recovered from Romano-British features in a complex of agricultural field systems and drove-ways, identified a wide range of taxa including alder (*Alnus glutinosa*), birch (*Betula* sp.), ash (*Fraxinus excelsior*), the hawthorn/*Sorbus* group (Pomoideae), blackthorn (*Prunus spinosa*), oak (*Quercus* sp.), willow (*Salix* sp.) and/or poplar (*Populus* sp.), elder (*Sambucus* sp.), elm (*Ulmus* sp.) and *Viburnum.*

The origin of the charcoal was mostly attributed to domestic fuel debris; while the waterlogged wood was more likely to have represented fallen debris (twigs and thin branches) from trees and shrubs, although the occasional wood chip and single

fragment of ?coppice rod also suggested wood-working activities. Fuel deposits consisted of narrow stems or branches with no evidence for the use of coppiced stems.

Despite the diversity of trees and shrubs discussed here, the narrow dimensions of the roundwood suggested that firewood was obtained from juvenile stems or hedge prunings but not coppiced stems. Evidence of managed woodland was slight (possibly alder or hazel). The landscape appears to have been mainly open although small stands of mature or managed woodland (providing coppice rods, poles and larger timber) probably survived somewhere in the vicinity.

References

Dawson, M., 2000, The Ouse Valley in the Iron Age and Roman periods: a landscape in transition, in M. Dawson, *Prehistoric, Roman, and Post-Roman landscapes of the Great Ouse Valley*, CBA Res. Rep. **119**, 107-30

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

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

Godwin, H., 1956, *The History of the British Flora*, Cambridge, Cambridge University Press

Jones, A., 2000, A river valley landscape: Excavations at Little Paxton Quarry, Cambridgeshire 1992-6 – an interim summary, in M. Dawson, *Prehistoric, Roman, and Post-Roman landscapes of the Great Ouse Valley*, CBA Res. Rep. **119**, 131-44

Mitchell, A., 1974, *A Field Guide to the Trees of Britain and Northern Europe,* London, Collins

Spoerry, P., 2000, Estate, village, town? Roman, Saxon and medieval settlement in the St Neots area, in M. Dawson, *Prehistoric, Roman, and Post-Roman Landscapes of the Great Ouse Valley,* CBA Res. Rep. **119**, 145-60

Tutin, T.G., Heywood, V.H. *et al*., 1964-80, *Flora Europaea, Volumes 1-5*, Cambridge, Cambridge University Press

Table 1: Waterlogged wood from Romano-British contexts

Feature	Cut	Context	Sample	*Alnus/ Corylus*	*Fraxinus*	*Prunus/* Pomoideae	*Quercus*	Salicaceae	*Sambucus*	Comments
Pit 15	394	395	10	-	-	-	-	5 r/w	-	Small fragments of desiccated wood probably all from same piece of r/w, diameter <10mm
			11A	?1	-	-	-	?1	-	Desiccated wood, too degraded to identify, more closely than Salic./alder/ hazel; also 1 unidentified herbaceous stem, diameter 2mm
Ditch 76	889	890	45	-	2 r/w	-	-	-	3 r/w	Small fragments from very degraded r/w
Watering hole 81	906	868	53A	3 r/w ?coppice	-	-	1	3 r/w 1 chip	-	Very degraded; r/w, diameter <10mm. Salic. wood chip with tool marks
		909	46/46A	-	-	-	5 r/w	22 r/w	-	50% subsampled; very degraded r/w and larger wood fragments
			54A	-	-	-	-	*cf.* 5 r/w	-	Very degraded and compressed r/w, diameter 10mm; also conglomerates of compressed leaf material
Watering hole 99	877	882	24	-	-	-	-	*cf.* 1 r/w	7 r/w	Roundwood, diameter from 0.5-20mm, very degraded
	883	888	42+42A	-	1	1 r/w	-	*cf.* 7r/w	2r/w	25% subsampled; twigs and r/w, diameters from 0.5-15mm; very degraded and collapsed.

Key. r/w = roundwood; the number of fragments identified is indicated

Table 2: Charcoal from Romano-British features

Feature	Cut	Context	Sample	Alnus	*Betula*	*Corylus*	*Fraxinus*	Pomoideae	*Prunus spinosa*	*Prunus*	Quercus	Salicaceae	*Sambucus*	*Ulmus*	*Viburnum*
Ditch 9	377	376	7	-	-	-	10r	-	2r	5	2r	20r	-	-	-
Ditch 29	477	478	20	-	-	6r	8r	2r	21r	-	2r	-	1r	1r	6r
Ditch 76	889	890	45	-	-	-	-	1	-	-	1	2	-	-	-
Hearth 96	616	617	25	-	-	2	5	-	57	-	8	4	2	-	-
Pit 201	784	786	33	-	-	2	-	10	-	-	-	6	-	-	-
Ring gully 80	447	448	16	*cf.*1	1	-	-	-	-	-	2	-	-	-	-

Key. r = roundwood (diameter <10mm); the number of fragments identified is indicated.

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