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An Assessment of the Impact of Trees upon Archaeology Within a Relict Wetland

Margaret Cox

School of Conservation Sciences, Bournemouth University, Talbot Campus, Poole BH12 5BB, U.K.

Caroline Earwood

Ferney Cottage, Pentre Llifior, Berriew, Powys SY21 8QJ, U.K.

E. B. Gareth Jones

Department of Biology and Chemistry, City University of Hong Kong, 83 Chee Avenue, Kowloon, Hong Kong Special Administrative Region, People's Republic of China

Julie Jones and Vanessa Straker

School of Geographical Sciences, University of Bristol, University Road, Bristol, BS8 1SS, U.K.

Mark Robinson

University Museum, Parks Road, Oxford, OX1 3PW, U.K.

Mark Tibbett

School of Conservation Sciences, Bournemouth University, Talbot Campus, Poole BH12 5BB, U.K.

Steven West

6 Atlantic View Court, Highbury Road, Weston-super-Mare, North Somerset, BS23 2DJ, U.K.

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An evaluation of a surviving stretch of the Abbot's Way, in the Somerset Levels and Moors, was undertaken to assess the consequences of the previous management regime and inform future management of the site. The scheduled site appeared to have been dewatered and desiccated as a consequence of tree planting and the effects of a deep, adjacent drainage ditch during the previous decade. The evaluation considered the condition of the Neolithic timbers and associated palaeoenvironmental record from three trenches and, where possible, compared the results with those obtained from the 1974 excavation (Girling, 1976). The results of this analysis suggest that the hydrological consequences of tree planting and colonization had a detrimental effect on both the condition of the timbers and insect remains. However, pollen and plant macro-fossils survived well although there was modern contamination. A trench opened outside the scheduled area, where the ground was waterlogged and supported a wet acid grassland flora, revealed similar problems of survival and condition. This almost certainly reflects a period of peat extraction and an associated seasonally fluctuating water table in the 1950s and 1960s; in fact pollen survived better in the scheduled dewatered area. These results are compared with those recovered from the Sweet Track which was evaluated in 1996. Both sites have been subject to recent tree growth but the Sweet Track has been positively managed in terms of hydrology. The most notable difference between the two sites is that insects and wood survived better at the Sweet Track site than at the Abbot's Way. Insects seem to be a more sensitive indicator of site desiccation than plant

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remains. It is recommended that any programme of management of wetland for archaeology should avoid deliberate tree planting and natural scrub and woodland generation. It should also take into account past as well as present land use.

Keywords: WETLAND MANAGEMENT, ABBOT'S WAY, NEOLITHIC, PALAEOECOLOGY, TREES, SWEET TRACK.

Introduction

This evaluation, undertaken in 1992, was specifically designed to establish the condition of part of the Neolithic Abbot's Way trackway (ST 41944256), and its associated palaeoenvironmental record both in and adjacent to the scheduled site (SM 27990). The scheduled area had suffered desiccation and erosion due largely to the presence of trees on the site and subsequent dewatering. It was anticipated that little would remain of the ancient timbers and that the palaeoenvironmental potential of the site would be seriously compromised. The data presented here, combined with that obtained nearby in 1974, is the base line from which to monitor subsequent change arising from any future management plan. The archaeological results of this assessment are not presented here but are lodged with the site archive.*

Background

The Abbot's Way was constructed across a lowland raised mire in what is currently known as Westhay Level, in the Somerset Levels and Moors *c.* 2000 BC. There is a vast literature on the archaeological and palaeoenvironmental history of this area and the reader is referred to Coles & Coles (1986) and Caseldine (1988).

The last decade has seen a growth of interest in methods of scientifically analysing and quantifying the condition of archaeological wood. Van Bergen *et al.* (2000) employed pyrolysis gas chromatography and mass spectrometry to gain an insight into lignin degradation. Robertson & Packer (1999) used nuclear magnetic resonance profiles to image the penetration of D20 into wood, while light and electron microscopy were used to determine major forms of decay by Bjordal, Nilsson & Daniel (1999). Kim & Singh (1994, 1999) used transmission electron microscopy and confocal laser scanning microscopy to examine bacterial tunnelling. Passialis (1997) examined water solubility and ash content, Kohdzuma, Minato & Katayama (1996) using both mechanical and physical indicators while Nelson *et al.* (1995) examined penetration by soft rot fungi. Few, however, have attempted to evaluate the condition of specific *in situ* structures using a range of analyses that include the palaeoenvironmental record inherent in buried peats. Parker Pearson (1997) and French & Taylor (1985) only examined wood in any detail. Van de Noort *et al.* (1995) examined pollen and wood survival but without base line data. An exception to this is Brunning *et al.* (2000) who applied a suite of methods to the nearby Sweet Track which has been under a unique system of active site management since 1983.

The Abbot's Way. The trackway was first excavated in 1864 then again in 1873 (Dymond, 1880). It subsequently received the attentions of Bulleid (1933) and Godwin (1960) prior to the excavations carried out by the Somerset Levels and Moors Project in 1974 and 1979 (Beckett & Hibbert, 1976; Coles, 1980; Coles & Hibbert, 1968; Coles & Orme, 1976; Girling, 1976; Morgan, 1976 and Morgan, 1980). As a consequence of destruction and loss due to peat extraction, and subsequent excavation, by the 1980s, only this stretch of approximately 50 m of the trackway was known to survive *in situ*, while a further stretch (SM 27992) centred on ST 41804278 might survive nearby.

For an understanding of this trackway and its environs the reader is referred to those papers cited above. In brief, it was 2560 m in length running between two islands across a raised mire. The course of the trackway was undulating reflecting the surface topography of the contemporary raised mire hummock and pool surface. The upper (walking) surface of the track mainly comprised split *Alnus glutinosa* (alder) planks and logs, with occasional round-wood, laid transversely to form a corduroy trackway of about 1 m wide. Other timbers included *Corylus alvellana* (hazel), *Fraxinus excelsior* (ash) and *Quercus* sp. (oak). These split planks were frequently laid flat side down upon the mire surface. They were largely held in place by *Corylus* pegs, but occasionally by *Alnus* and *Fraxinus*. A substantial structure, it was subject to repair during its lifetime, and was eventually overwhelmed by *Eriophorum* sp. (cotton grass).

The Evaluation Site

The length subject to evaluation is situated immediately north of a peat factory complex. In 1983, the landowner donated a parcel of land containing about 25 m of the Abbot's Way (Figure 1) to the Somerset Levels Project.† The Project fenced off this area (approximately 22 × 18 m) from the remainder of the field and planted a few *Betula* (birch) trees around the perimeter of the site. At this time the site supported wet acid grassland flora. This land forms part of a

*The site archive is lodged with the Somerset County Museum Service, The Castle, Taunton, Somerset.

†Run by John and Bryony Coles from 1973–1992.

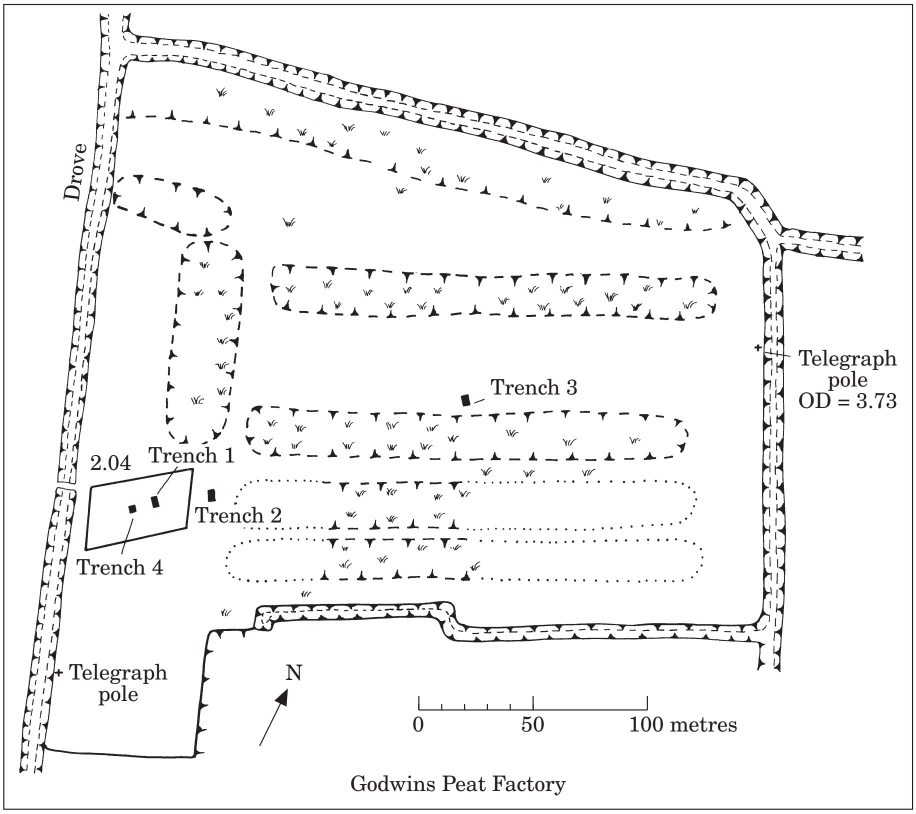

Figure 1. Site plan.

scheduled monument and was conveyed to Somerset County Council for permanent protection in 1991.

In 1992, assessment was made to inform future management of the site. There were 30 *Betula* trees on the site with further trees and scrub outside of the fenced area; the site was also becoming overgrown with *Rubus fruticosus* (blackberry). The ground surface was dry and desiccated and the site was traversed by several desiccation cracks of up to 1·3 m in depth. One of these crossed the projected course of the Abbot's Way which was believed to be *c.* 0·4 m below the ground surface (J. Coles pers. comm.). Desiccation cracks had first appeared across the site in the late 1980s. An adjacent rhyne, which runs north-east to south-west along the north-west edge of the site, is approximately 1·5 m deep and generally devoid of groundwater all year round. It is isolated from the main drainage system in the area but, nevertheless, acts as a sump drawing water out of adjacent land. There were no species of wet acid grassland flora on the area with tree cover. With the exception of the area immediately bordering the edge of the rhyne, which clearly demonstrated the impact of draw down, the adjacent field still supported wet acid grassland species.

Three assessment trenches* were opened across the trackway to determine the condition of the timbers, and the palaeoenvironmental record within the adjacent peats (Figure 1). It was not intended to lift the timbers, but to expose them briefly in order to record them and taken samples. Wood was assessed for evidence of working, species, cellular condition, % moisture content, % density and microbial activity. Peat samples were taken from each of the three trenches in order to assess the condition of plant and insect remains. These were compared to data from the 1974 excavation in order to assess any differences in levels of survival and condition, as well as levels of modern contamination. This part of the Abbot's Way had never been exposed previously.

The first trench to be examined was within the fenced, desiccated area. The second was outside the fenced and wooded area but within the scheduled area and the third was further east in the field, with generally a much wetter soil profile presently supporting wet acid grassland flora (described below). The latter area was part of a field subject to peat extraction by hand-cutting in the 1950s. During this time the site of the trench would have been affected by drainage of the adjacent area, with its seasonally fluctuating water table.

Data from the Sweet Track evaluation will be included here for comparative purposes. The Sweet Track site was also subject to tree and scrub regeneration adjacent to the line of the track (but not over it),

*Trench 4 was not subject to palaeoenvironmental analysis and is not discussed in this paper.

Figure 2. Trench 1 showing *Betula* roots.

although a 20 m wide strip was clear felled in the early 1990s. Crucial differences between the two sites are that the Sweet Track (3807/6 BC) is deeper within the peat substrate (0·46–0·94 m), it is below the water table and subject to a reducing or highly reducing environment (Brunning *et al.*, 2000).

The Evaluation

Standard wetland excavation methods were employed and exposed areas were protected from drying. Ambient temperatures were between 5° and 10°C with no night frosts. All trenches were 1 × 2 m and were placed length-wise across the track, which was located using an auger. Trenches were all back-filled immediately after sampling and recording.

Trench 1

Sited within the wooded area, the desiccated surface peat (*Calluna-Eriophorum*) (heather-cottongrass) topsoil was gently removed working around numerous and often, substantial *Betula* roots and some shallow Gramineae (grass) roots. These continued through a compacted layer of dark grey-brown peat which contained *Eriophorum* macrofossils. This peat was dry and almost leather-like in consistency and effectively pealed off the underlying Abbot's Way timbers and continued below the trackway. The trackway was located between 0·27 m and 0·34 m below the ground surface.

The trackway comprised split-wood planks and round-wood placed alongside each other in a north-south direction. The planks were closely butted together and the remains of one peg were present. Split-wood was between approximately 0·70 m and 1·3 m in length.

The track was covered with a network of *Betula* roots (Figure 2) some of which were between 0·01 m and 0·02 m in diameter. The roots caused distortion of the timber in one area and several had penetrated the timbers.

Trench 2

Trench 2 was situated just outside the fenced area but within the scheduled area (Figure 1). This area was not affected by trees and was covered with mixed vegetation (described below). The topsoil removed from the trench was dry and moderately compacted. It comprised black humified peat to a depth of approximately 0·2 m. As in Trench 1, this lay above heavily compacted, leather-like peat comprising largely *Eriophorum* and *Calluna* macrofossils. Unlike Trench 1, this context was extremely damp, the water table being only about 0·3 m below ground level. The Abbot's Way timbers were within this layer at a depth of between 0·33 m and 0·41 m below ground surface.

The timbers comprised four substantial split planks, two of which were bark side up, plus three round-wood pegs. The planks averaged approximately 0·98 m in length and 0·2 m in width. They were laid in the same manner as in Trench 1. There were no roots or rhizomes evident at the level of the track. Gramineae roots only reached down to between approximately 0·10 to 0·15 m

Trench 3

Trench 3 lay outside the scheduled area (Figure 1) to the east of a section of the trackway excavated by the Somerset Levels Project in 1974, and to the west of a section removed during the 1973 excavations. The uppermost context was below a varied wet acid grassland flora (described below). This was a damp, moderately compacted, disturbed, grey-brown and pale brown mixed peat. This deposit was of varied thickness ranging from 0·22 m to 0·26 m in depth; it contained *Sphagnum* (moss) and *Eriophorum* macrofossils.

As in Trenches 1 and 2, the trackway was within a context of compacted and leathery, dark grey-brown peat comprising *Eriophorum-Calluna* macrofossils. Evidence of spade marks in overlying peat suggests that the timbers here came close to being destroyed during the 1950s when hand cutting last took place in this field. At a depth of between 0·32 m and 0·40 m below the ground surface, the trackway comprised up to five broken planks, measuring between 1·3 m to 1·5 m in length and between 0·06 m and 0·21 m in width. These were lying in a north–south direction running east–west. A round-wood pole was lying obliquely in the north-east corner of the trench. One broken peg survived *in situ*. In this area, the trackway appeared to have been disturbed before being overwhelmed by the raised mire. The timbers here generally appeared macroscopically to be more degraded than elsewhere, with the round-wood pole and the peg appearing to be best preserved.

Figure 3. Trench 3 with the roots of *Salix* and *Chamaenerion angustifolium*.

Thin reddish-brown (maximum 3 mm) sinuous roots derived from *Chamaenerion angustifolium* (rosebay willowherb) and thicker roots from self-seeded *Salix* (willow) saplings were prolific in the contexts above the trackway (Figure 3). Both types of root had penetrated down through the peat to the timbers and some had grown into or through them. *Salix* roots were observed to pass directly through the wood while the *Chamaenerion angustifolium* roots grew into the wood following the direction of the grain.

The Wood

Trench 1

The condition of the wood was extremely poor with a high degree of desiccation and decay. The surfaces were very crumbly and dry; consequently no tool-marks or other evidence for woodworking survived. The wood in the western side of the trench was more severely affected than that on the east.

A number of transverse timbers were identified as *Alnus* sp. (alder glutinose), the majority of which were made from half-split trunks or large branches. These are listed in Table 1. Further analysis was impossible owing to the degraded nature of the wood. A small number of transversely laid pieces of round-wood were identified as *Fraxinus excelsior* as was a single peg at the end of one transverse timber. Fragments of split-wood found lying on the trackway were sampled. Where these could be identified they were *Alnus* sp. They probably represented broken pieces of transverse planks. Seven of 11 planks could not be identified to species while all round-wood could.

Table 1. Timbers observed in Trench 1

1.1	Transverse plank	Unidentifiable
1.2	Transverse plank	Unidentifiable
1.3	Transverse plank	Unidentifiable
1.4	Transverse round-wood	*Fraxinus excelsior*
1.5	Transverse plank	*Alnus glutinosa*
1.6	Transverse plank	Unidentifiable
1.7	Transverse plank	*Alnus glutinosa*
1.8	Transverse round-wood	*Fraxinus excelsior*
1.9	Transverse plank	*Alnus glutinosa*
1.10	Transverse plank	Unidentifiable
1.11	Transverse round-wood	*Fraxinus excelsior*
1.12	Split-wood fragment	Unidentifiable
1.13	Split-wood fragment	*Alnus glutinosa*
1.14	Round-wood	*Fraxinus excelsior*
1.15	Split-wood fragment	Unidentifiable
1.16	Round-wood	*Fraxinus excelsior*
1.17	Round-wood peg	*Fraxinus excelsior*
1.18	Transverse plank	*Alnus glutinosa*

Trench 2

The general condition of the timbers was better than in Trench 1 although all the surfaces were badly decayed and any tool-marks had been obliterated. Four transverse planks (*Alnus* sp), some with bark on their upper surfaces, were exposed. These had been produced in a similar way to those in Trench 1 although again the condition made detailed analysis of the woodworking methods impossible. As the trackway was not lifted, and the condition of the planks was poor, it was difficult to measure their exact thickness. As far as could be established these ranged from 40 to 120 mm with planks from 200 mm to 360 mm.

Two round-wood pegs were uncovered at the ends of the transverse timber. The length of these pegs remains unknown as they were not fully exposed. The wood species of only one was identifiable, the other was in too poor a condition. Two small pieces of round-wood, both of which were identified as *Corylus avellana* (hazel) were found lying over one of the transverse timbers. The diameter of the round-wood ranged between 65 and 120 mm. The timbers are listed in Table 2. A small number of wood fragments were removed during the evaluation, three of these were bark while the fourth was modern and from a disturbed context immediately below the modern ground surface.

Trench 3

Timber in this trench was also in very poor condition, some of it being impossible to identify (Table 3). The track at this point was rather jumbled consisting of five split-wood planks some with bark *in-situ*, made in the same way as those in Trenches 1 and 2. Additionally a

Table 2. Timbers observed in Trench 2

2.1	Transverse plank	*Alnus glutinosa*
2.2	Round-wood peg at end of 2.1	Unidentifiable
2.3	Transverse plank	*Alnus glutinosa*
2.4	Transverse plank	*Alnus glutinosa*
2.5	Transverse plank	*Alnus glutinosa*
2.6	Round-wood peg against 2.5	*Alnus glutinosa*
2.7	Round-wood transverse	*Corylus avellana*
2.8	Round-wood transverse	*Corylus avellana*

Table 3. Timbers observed in Trench 3

3.1	Transverse round-wood	*Fraxinus excelsior*
3.2	Transverse plank	*Alnus glutinosa*
3.3	Transverse plank	*Alnus glutinosa*
3.4	Transverse plank	*Alnus glutinosa*
3.5	Transverse plank	*Alnus glutinosa*
3.6	Peg near end of 3.3	*Ulmus* sp.
3.7	Transverse plank	*Alnus glutinosa*
3.8	Split-wood fragment, partly in west section	Unidentifiable
3.9	Split-wood fragment under 3.8	Unidentifiable
3.10	Round-wood length at right angles to transverse timbers	*Fraxinus excelsior*
3.11	Half-round-wood length over 3.12	*Alnus glutinosa*
3.12	Split-wood fragment under 3.11	Unidentifiable
3.13	Split-wood fragment	*Alnus glutinosa*
3.14	Round-wood lying to south of track	*Fraxinus excelsior*
3.15	Round-wood fragment over 3.2	*Fraxinus excelsior*

number of broken and fragmentary pieces of split-wood were arranged in the same orientation as the transverse timbers as were a small number of round-wood lengths. Where these could be identified they were either *Fraxinus excelsior* or *Alnus glutinosa.* Unlike in Trench 1, all planks could be identified to species. A single piece of *Fraxinus excelsior* round-wood (43 mm diameter) lay outside the trackway and crossed the corner of the excavation. A single peg of *Ulmus* sp. (elm) was found in an upright position near the end of 3.3. Only split-wood fragments could not be identified in this trench.

General observations

In all trenches the wood was highly crumbly and decayed making cutting of samples for identification difficult. Virtually all the *Alnus* transverse timbers were in this state although a few appeared firmer when sampled. These were not, however, in better microscopic condition. Most of the *Alnus* samples showed extensive evidence of the collapse of the cell walls and in some cases evidence of attack by fungi or parasites.

The round-wood samples were often in better condition and easier to cut than the transverse timbers. This may in part be because many of them were *Fraxinus excelsior* that appeared to withstand decay and desiccation better than the *Alnus* as there was less evidence of collapse of cell walls. This is also true of the single *Ulmus* peg. All of the wood, but particularly that in Trenches 1 and 3, had been damaged by root penetration. In Trench 1 this had caused the wood to dry out and crumble. In some cases the roots penetrated the entire length of pieces of round-wood.

Because of the extent of drying and decay no tool-marks survived on any of the wood and examination of the tree ring patterns was impossible.

Moisture content and density of timber specimens

The results of analysis of moisture content and density of eight specimens from the first three trenches are described in Table 4. Three specimens were averaged to obtain the result for each sample. These results suggest that samples 3, 4, 5, 7 and 8, representing timbers from each of the three trenches, were well decayed. Fungal spores and mycelium were present on the wood indicating active decay in progress. Whether this was superficial or deeper decay was impossible to say without further analysis. Corresponding data from the Sweet Track Brunning *et al.* (2000) revealed negative counts of cellulolytic bacteria (anaerobes) and all evidence of fungal activity was considered not to be modern.

Table 4. Moisture content and density so specimens

Sample number	Wood type	% moisture content	% density	Trench number	Timber number
1	*Fraxinus excelsior*	316·8	0·26	1	1·8
2	Unknown	381·7	0·22	1	1·2
3	*Fraxinus excelsior*	798·5	0·11	1	1·4
4	Unknown	836·2	0·11	2	2·2
5	*Fraxinus excelsior*	774·8	0·11	3	3·10
6	*Alnus glutinosa*	388·9	0·22	2	2·1
7	*Alnus glutinosa*	872·0	0·10	3	3·7
8	*Alnus glutinosa*	752·0	0·12	2	2·4

Plant Macrofossil Assessment

From each of the three trenches, four samples were taken at points above, level with, and below the track. It was hoped that by examining the material preserved in the peat, it would be possible to judge the effects of drying and consequent cracking of the peat surface and the possible downward movement of modern plant material.

A brief vegetation survey was conducted in 1992 in the vicinity of the three trenches, to aid the interpretation of the samples and clarify the extent of modern contamination. The samples were weighed and the volume taken, and all the samples were paraffin floated using standard techniques, for the extraction of plant and insect remains. In view of the high proportion of the sample which floated (in Trench 2 between 0·48–0·50 m, the whole sample floated), only 100 ml was sorted and a note was made of the abundance of plant remains on the following scale: <20—occasional; 20–100—common; >100—abundant. The results are shown in Table 5. Botanical nomenclature throughout this paper is based on Clapham *et al.* (1989).

Trench 1

Trench 1 was the closest trench to the *Betula* trees. Contemporary vegetation was indicative of a dry, disturbed habitat. It included the following species: *Urtica dioica* (stinging nettle), *Stellaria media* (chickweed), *Senecio vulgaris* (groundsel), *Galium aparine* (cleavers), *Chamaenerion angustifolium*, *Polygonum* *lapathifolium* (pale persicaria), *Rubus fruticosus*, *Stachys arvensis* (field woundwort), *Salix* sp., *Atriplex/Chenopodium* (orache/goosefoot), *Cirsium/Cardus* sp. (thistle), *Rumex* (dock) and Gramineae (grasses).

The top two samples from this trench, i.e. above the track, were dominated by modern *Betula* seeds and modern plant roots. Many of the other seeds, also determined as modern intrusions, reflect the present-day cover as indicated above, in particular *Polygonum lapathifolium/nodosum*. Some fossil material was also present, represented by *Sphagnum* (bog moss), Gramineae, *Hydrocotyle vulgaris* (marsh pennywort) and *Cladium mariscus* (great fen-sedge). These were more generally indicative of material contained in the peat from the level of the trackway at 0·26–0·28 m and below. This peat was dominated by *Sphagnum* moss, in the form of leaves and capsules, *Phragmites* (common reed) stem fragments and *Calluna* (heather) seeds, leaves, flowers and woody stem fragments. The distinctive sclerenchymatous spindles from the leaf bases of *Eriophorum* (cotton grass) were also noted at 0·48 m. Preservation of all this material was excellent. Modern roots had penetrated to 0·28 m (i.e. the level of the track) and a few modern *Betula* seeds were found to the level below the track.

Trenches 2 and 3

Both Trenches 2 and 3 were located further away from the area of the *Betula*. The present-day vegetation of both trenches was similar, dominated by *Potentilla erecta* (tormentil), *Hypochaeris radicata* (common cat's ear), *Stellaria graminea/palustris* (lesser/marsh stitchwort), *Chamaenerion angustifolium*, *Aegopodium podograria* (ground elder), small clumps of *Rubus* and *Salix*, Gramineae and *Juncus* sp. (rush). An adjacent damper area included *Phragmites*, *Iris pseudacorus* (yellow iris) and *Lotus pedunculatus* (greater bird's-foot-trefoil). A few *Betula* seedlings were present.

Trench 2

The top level of Trench 2 was composed largely of modern roots and a few modern seeds of *Urtica*, *Stellaria* and *Betula*, but on the whole the seeds had the appearance of fossil material, although they were of similar species to the modern vegetation. Abundance was very low, with only a few seeds of each species. *Sphagnum* and *Phragmites* were also present, with *Phragmites* more abundant at the level of the trackway (0·32–0·34 m). The sclerenchymatous spindles of *Eriophorum* were again noted at 0·32–0·34 m and at 0·485 m. Also present were the woody stem fragments of *Calluna* in excellent condition together with leaves, flowers and seeds. While *Sphagnum* was still present, it was not dominant as in the lower level of Trench 1. Interestingly, a few of the *Calluna* leaves and other small stem fragments were carbonized, again indicating the good level of preservation.

Trench 3

Modern seeds and roots were again dominant in the upper layers, reflecting the present day vegetation and *Salix* and *Chamaenerion angustifolium* roots penetrated to the level of the trackway. Trench 3 differed slightly in that the layer above the trackway (0·18–0·20 m) showed more similarity with the levels of, and below the trackway than the other trenches. *Phragmites* dominates, with *Calluna* and *Sphagnum* present. Modern seeds were few and mostly relate to single occurrences. At the level of the trackway (0·32–0·34 m) and below, the peat consisted almost totally of *Sphagnum* leaves, with some *Phragmites* and *Calluna*. A few carbonized *Calluna* leaves and other fragments were also noted. Preservation, especially of the *Sphagnum* was excellent.

General comments

During initial analysis of the deposits it was noted how dry the peat was throughout the sequence in all the trenches. The top two layers were very dry and crumbly, and whilst the bottom two layers at and below the level of the trackway, were more compacted they were still very dry, and needed soaking before laboratory analysis could proceed. However, despite the condition of the peat, preservation of the plant remains contained within it proved to be good. The presence of small fragments such as the disc-shaped lids from *Sphagnum* capsules and examples of single *Calluna* leaves show the quality of preservation.

The three trenches showed a great similarity in observed features. The top levels were consistently dominated by modern roots. Many of the seeds, which appeared to be sub-fossil, were the same species as the modern ones, indicating that a similar disturbed-type environment existed in the more recent past, as today. However, elements of the wetland environment were also present, with *Sphagnum* and *Phragmites* even in the uppermost levels, together with other species such as *Typha* (reedmace), *Hydrocotyle vulgaris* (marsh pennywort), *Potamogeton* (pondweed), *Cladium* and *Ranunculus flammula* (lesser spearwort). It may be possible that a fluctuating water table allowed for the existence of these two habitat types side-by-side, as seen in the vicinity of Trenches 2 and 3 today.

The trench closest to the *Betula* trees was different in the prevalence of *Betula* seeds, which in small numbers had penetrated to depths below the level of the trackway. The present day ground surface over all of this area appeared dry and cracked, and has allowed downward movement of modern material in all three trench areas, but not to such a great depth as in the immediate vicinity of the *Betula* trees. Assessment of the Sweet

Table 5. Abbot's Way, plant macrofossils

Depths below surface (cms)		Trench 1				Trench 2				Trench 3				
		0–4	12–14	26–28	48–50	6–8	18–20	32–34	48–50	8–10	18–20	32–34	48–50	
Sample volume (litres)		0·5	0·8	0·5	0·8	1·0	1·0	1·4	1·0	1·0	1·5	1·0	0·9	Habitat
Sphagnum sp (leaves)	Bog moss	a:f	c:f	a:f	a:f	a:f	a:f	c:f	a:f	c:f	c:f	a:f	a:f	Bogs
RANUNCULACEAE														
Ranunculus acris/repens/bulbosus	Buttercup									o:m	o:m			Damp G,W
Ranunculus flammula L.	Lesser Spearwort									o:f				M
CARYOPHYLLACEAE														
Cerastium sp	Chickweed	o:f	o:f											Da,G
Stellaria graminea L.	Lesser Stitchwort		o:f			c:mf	c:f			o:f				G,W
Stellaria media agg (L) Vill	Chickweed	o:f	c:f				o:f							Da
CHENOPODIACEAE														
Atriplex spp	Orache	o:f	o:f			o:f								Da
Chenopodium album L.	Fat-hen	o:m	a:mf	o:m		c:f	o:f	o:f						Da
Chenopodium ficifolium Sm	Fig-leaved Goosefoot					o:f								Da
Chenopodium polyspermum L.	All-seed			o:m		o:f								Da
Chenopodium rubrum/glaucum	Red/Glaucous Goosefoot		o:m											Da
ROSACEAE														
Potentilla erecta L. Rausch	Common Tormentil	o:f				o:f	c:f			o:mf	o:m			G, bog/fen
Potentilla sp	Cinquefoil		o:f			o:f	o:f							
Rosaceae indet (thorns)		o:f			o:f	o:f								
Rubus fruticosus agg	Blackberry	o:m								o:m				W,S,D
UMBELLIFERAE														
Conium maculatum L.	Hemlock									o:m				B,W,damp
Hydrocotyle vulgaris L.	Marsh Pennywort	o:mf				o:m	o:f							Bogs/fens
POLYGONACEAE														
Polygonum aviculare agg L.	Knotgrass					o:f	o:f				o:f			Da
Polygonum lapathifolium/nodosum L.	Pale persicaria	c:mf	c:mf			o:f	o:f			o:f				Da,ponds
Polygonum hydropiper L.	Water-pepper		o:f			o:f	o:mf							B, shallow water
Polygonum persicaria L.	Redshank		o:f			c:f	c:f			o:mf				D,B
Rumex acetosella agg L.	Sheep's Sorrel					o:f	o:f			c:mf	o:f			G
Rumex spp	Dock	o:m	o:f			o:f				o:mf	o:m			
URTICACEAE														
Urtica dioica L.	Stinging Nettle	o:m				o:m				o:f				DWSB, nitrogen/phosphate
BETULACEAE														
Betula sp	Birch	a:m	c:m	o:m	o:m	o:m				o:mf	o:m			W

Table 5. Continued

		Trench 1				Trench 2				Trench 3				
Depths below surface (cms)		0–4	12–14	26–28	48–50	6–8	18–20	32–34	48–50	8–10	18–20	32–34	48–50	
Sample volume (litres)		0·5	0·8	0·5	0·8	1·0	1·0	1·4	1·0	1·0	1·5	1·0	0·9	Habitat
SALICACEAE														
Salix sp	Willow	o:m												M,B, fens
ERICACEAE														
Calluna vulgaris (L.) Hull (leaves)	Heather			a:f	c:f		o:f	a:f	a:f	o:f	a:f	a:f	c:f	Heaths, bogs
Calluna vulgaris (flowers)				c:f	o:f			c:f	o:f		c:f	c:f	o:f	
Calluna vulgaris (seeds)				c:f				c:f	c:f		c:f	c:f	o:f	
SOLANACEAE														
Solanum nigrum L.	Black Nightshade	o:f												Da
LABIATAE														
Ajuga reptans L.	Bugle		o:f			o:f	o:f			c:m	o:f			Meadows, damp W
Galeopsis tetrahit L.	Common Hemp-nettle	o:f	o:f			o:f								H,W, fens
COMPOSITAE														
Chrysanthemum leucanthemum L.	Ox-eye Daisy					o:f								G
Cirsium/*Carduus* spp	Thistle	o:f												Da, M,G,S
Hypochaeris spp	Cat's Ear	o:mf								o:f				Meadows/pasture
POTAMOGETONACEAE														
Potamogeton spp	Pondweed					o:f								A
JUNCACEAE														
Juncus spp	Rush	o:f	c:f			o:f	c:f			o:f				M, damp places
TYPHACEAE														
Typha spp	Bulrush	o:f				o:f								Reed-swamps
CYPERACEAE														
Carex spp	Sedge	o:m	o:f			o:f	c:mf			c:f	o:f			M, damp places
Cladium mariscus (L.) Pohl	Great Sedge		o:f											Reed-swamp, fen
GRAMINEAE														
Gramineae indet	Grass	o:f	c:f			o:f	c:mf		o:f	o:mf	o:mf			G
Phragmites australis (Cav) Trin ex Steudel (stem frags)	Common Reed			c:f	a:f		c:f	a:f	a:f		a:f	c:f	o:f	Swamps/shallow water

HABITATS: A: aquatic; B: bankside; Da: disturbed ground including arable; G: grassland; H: hedgerow; M: marsh; S: scrub; W: woodland; o: occasional; c: common; a: abundant; m: modern; f: fossil.

Track similarly showed downward penetration of modern vegetation (i.e. seeds) but this was limited to 0·29 m. Preservation of plant macros was fragmentary in the upper drier levels but at all levels they were identifiable (Brunning *et al.*, 2000).

Assessment of pollen and spores

Samples of 1 cm^3 were prepared using standard procedures, excluding the use of hydrofluoric acid but including the addition of an exotic marker to determine pollen and spore concentration (Moore, Webb & Collinson, 1991). Ten traverses or 100 grains of land pollen were counted for each sample and the results presented in Figures 4–6. Percentages are given as total land pollen and spores (TLPS). Pollen nomenclature follows Moore, Webb & Collinson (1991). The condition of the grains and spores is described using the following terminology (after Delcourt & Delcourt, 1980). Corrosion: usually caused by microbial decay in the presence of aeration (oxidation). The exine may have complete perforations or may be scarred, etched or pitted. Degradation: caused by exposure of the grain to air, which in peat could include periodic drying. Thinning of the exine (as compared with local perforation noted above) can occur. Crumpled (mechanical damage): caused by exposure to physical stress during the course of the depositional history. The exine becomes bent, crumpled or ruptured. Obscured grains: grains obscured by detritus on the slides resulting from material remaining that was resistant to the preparation techniques. A full description of the pollen assemblage is available in the archive.

In Trench 1 the profile sampled was 0·44 m deep, in Trench 2 to 0·48 m and Trench 3 to 0·5 cm, in all cases reflecting the level of the trackway. The most noticeable difference between Trench 3 and the two others was the dramatic increase in *Betula* pollen to 25–30% at between 0·1 and 0·15 m in depth. *Betula* only accounted for *c.* 5% TLPS in the other trenches, despite the fact that they were much nearer to the *Betula* trees planted in the last 15–20 years. However, some of this could have been contributed by regeneration in the more recent past, as saplings were observed close to Trench 3, but a similar influence was not observed in the plant macrofossil assemblage.

Concentration, condition and contamination

Trench 1. The levels above the track contained a number of pollen types that may be modern contaminants. These grains would have washed down desiccation cracks in rainwater or been transported by earthworms. Some pollen grains are much better preserved than the others, resembling that in a modern type collection rather than an archaeological peat deposit. Much of this is of taxa that are growing on the modern ground surface. Possible contaminants include *Polygonum aviculare* (knotgrass), *Betula*,

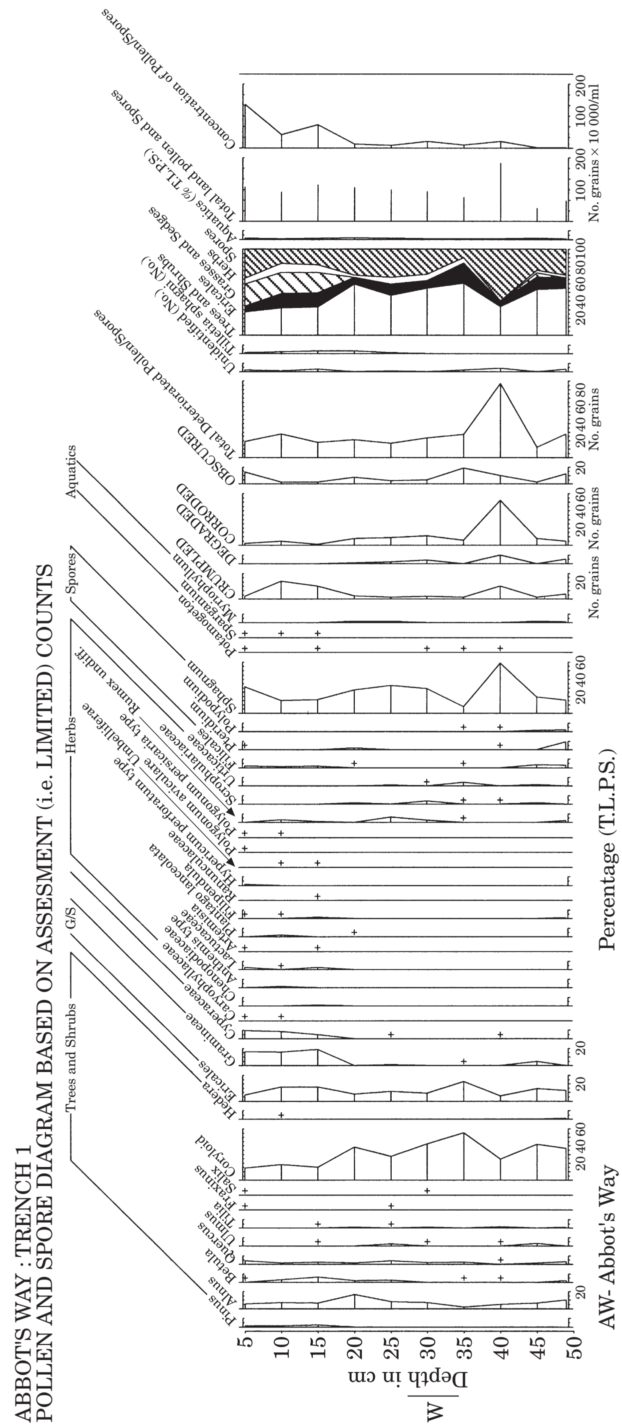

Figure 4. Trench 1: assessment of pollen and spores.

Gramineae, *Plantago lanceolata* (ribwort plantain), Caryophyllaceae (chickweed family) and *Rumex* (sorrel dock), many of which were identified as components of the 1990s flora. Contamination does not appear to extend below the track. Despite the proximity of the mature *Betula* trees, *Betula* pollen did not rise above 5% TLPS and some of this may be subfossil rather than

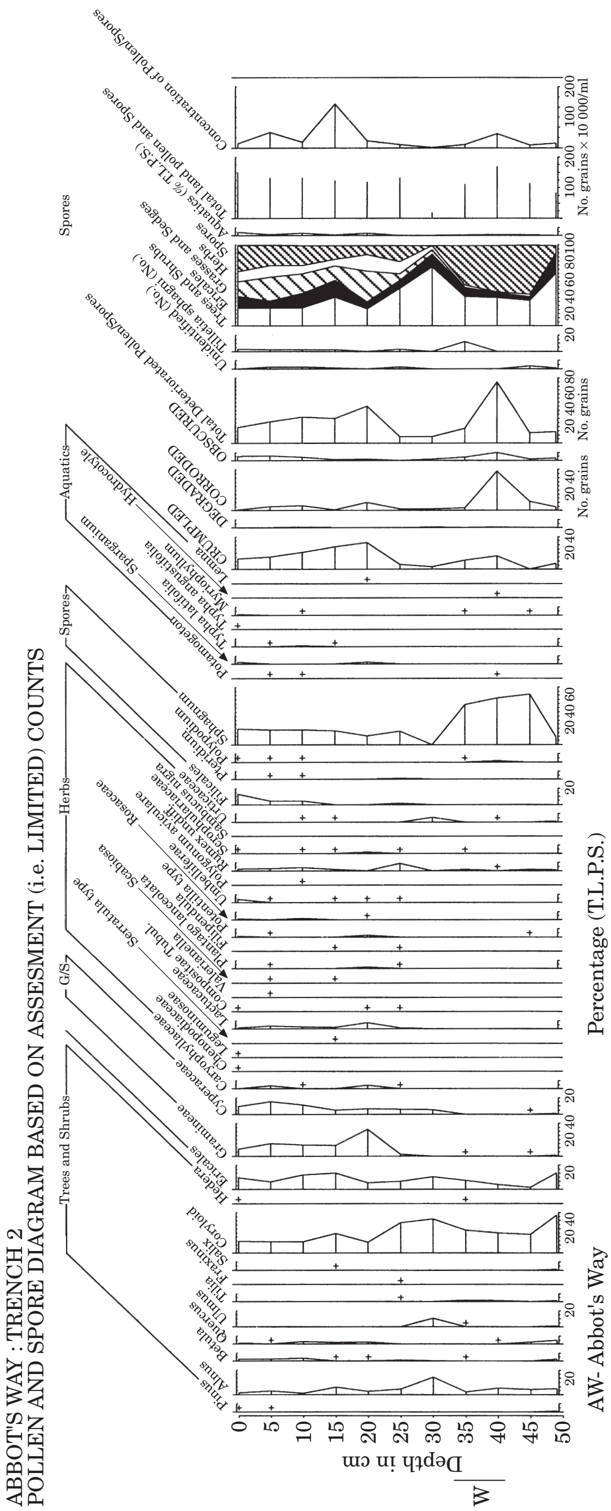

Figure 5. Trench 2: assessment of pollen and spores.

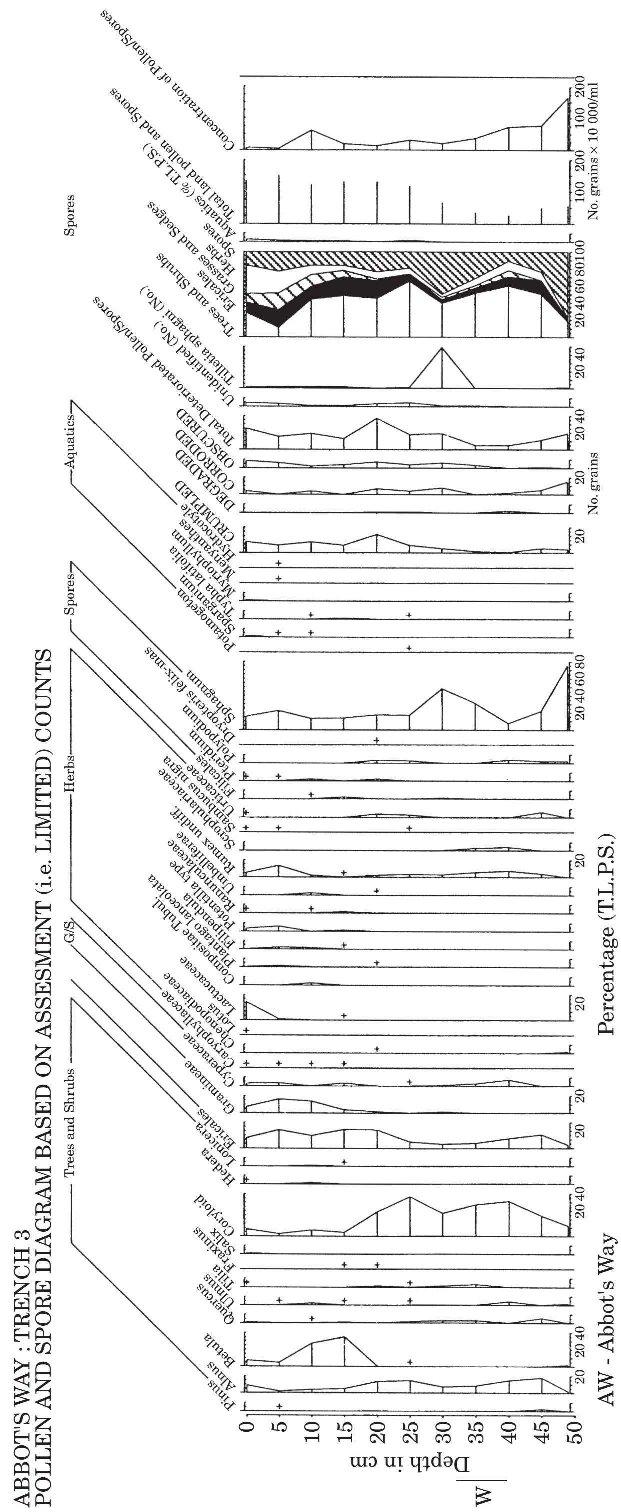

Figure 6. Trench 3: assessment of pollen and spores.

modern. Beckett & Hibbert (1976) found some *Betula* pollen in the upper levels of their sampled profile about 100 m away.

The presence of corroded *Sphagnum* spores at about 0·40 m is of interest and may relate to the temporary drying of the bog surface. Deterioration of pollen and spores did not increase above the level of the track, apart from a slight rise in the number of crumpled grains.

Table 6. Coleoptra and other insect remains from the 1992 evaluation

	Trench 1			Trench 2				Trench 3		
Depths in cm below surface	0→4	12→14	48→50	6→18	18→20	32→34	48→50	8→10	18→20	32→34
ARTHROPODA										
Millepedes	1	—	—	—	—	—	—	—	—	—
Spiders	—	—	1	—	—	—	—	—	—	—
INSECTA										
Hemiptera	1	—	—	—	—	—	—	1	—	—
Coleoptera										
Bembidion obtusum Serv	1	—	—	—	—	—	—	—	—	—
Pterostichus diligens (Sturm)	—	—	1	—	—	1	—	—	—	—
P. strenuus (Pz)	1	—	—	—	—	—	—	—	—	—
Pterostichus sp.										
Hydroporus sp.	—	1	1	—	—	—	—	—	1	1
Megasternum obscurum (Marsh)	—	—	—	—	—	—	—	1	—	—
Enochrus sp.	—	—	—	—	—	—	—	1	—	—
Octhebius sp.	—	—	—	—	—	—	—	1	—	—
Acidota crenata (F)	—	—	—	—	—	—	—	1	—	—
Stenus sp.	—	—	—	—	—	—	—	—	—	1
Rugilus sp.	—	—	—	—	—	—	—	1	—	—
Lathrobium sp.	—	—	—	—	—	—	—	1	—	—
Xantholinus linearis (O1) or *longiventris Heer*	—	—	1	—	—	—	—	1	—	—
Philonthus sp.	—	1	—	1	—	—	—	1	—	—
Tachinus sp.	—	1	—	—	—	—	—	—	—	—
Aleocharinae indet	—	—	—	—	—	—	—	2	—	—
Onthophagus sp.	—	—	—	—	—	—	—	1	—	—
Scirtidae indet	—	—	—	—	—	1	—	—	—	1
Actenicerus sjaelandicus (Müll)	—	—	—	—	—	—	—	1	—	—
Agriotes sp.	1	1	—	1	—	—	—	—	—	—
Plateumaris discolor (Pz) or *sericea* (L)	—	—	—	—	1	—	1	—	—	1
Donacia or *Plateumaris* sp.	—	—	—	—	—	—	—	1	1	—
Longitarsus sp.	—	1	—	—	—	—	—	—	—	—
Chalcoides sp.	—	—	—	—	—	—	—	1	—	—
Chaetocnema concinna (Marsh)	1	—	—	—	—	—	—	—	—	—
Chaetocnema sp. (not *concinna*)	—	—	—	—	—	—	—	1	—	—
Psylliodes sp.	—	—	—	—	—	—	—	—	1	—
Apion sp.	—	—	—	—	—	—	—	3	—	—
Notaris acridulus (L)	—	—	—	—	—	—	—	1	—	—
Ceuthorhynchinae indet	1	—	—	1	—	—	—	3	—	—
Total Coleoptera	5	5	3	3	1	2	1	22	4	4
Hymenoptera										
Formicidae	—	—	—	—	—	—	—	—	1	—
Hymenoptera parasitica	—	—	—	—	—	—	1	—	—	—
Diptera—puparia	—	4	—	1	—	—	—	2	—	—

Trench 2. As with Trench 1, the upper levels also include a number of possible contaminants such as *Scabiosa*, Caryophyllaceae, Umbelliferae, *Plantago lanceolata* and *Potentilla*. Some grains of these types were better preserved than subfossil material. Plants that could have produced this pollen were observed growing on the site. Contamination was only evident in the top five samples (0–0·25 m). An increase in corrosion, particularly of *Sphagnum* spores was evident just below the base of the track, as seen in Trench 1. The top 0·25 m showed a marked increase in crumpled grains.

Trench 3. The upper levels showed evidence of contamination with inclusion of the herbaceous taxa noted in the other trenches, as well as a lot of well preserved, probably modern, *Betula* pollen. A peak of corroded grains below the base of the track was not observed.

The pollen and spore concentration was not particularly low in Trenches 1 and 2, but increases in the top 0·15–0·20 m of these trenches. This may confirm the suggested input of modern pollen in the upper layers. The present ground surface was not the original peat surface owing to peat cutting and shrinkage due to dessication. In contrast, Trench 3 has a lower pollen and spore concentration than the other two, which suggests that preservation is poorer in this trench as it is unlikely that the original pollen input was lower.

General observations

The growth of the mature *Betula*, proximity of the rhyne and obvious drying out of the peat, did not appear to have drastically affected pollen preservation in Trench 1, compared with the other two trenches.

Some contamination from modern pollen was evident in the upper levels of all the trenches. The worst preservation was observed in Trench 2 and drainage associated with hand peat cutting in the 1950s had clearly affected preservation in Trench 3. In addition the growth of roots down to the level of the track may have had a greater effect than previously suspected.

Unfortunately, there is no data on the pollen and spores from the same sampling areas 20 years ago, so direct comparisons cannot be made. It is only possible to use the pollen diagram by Beckett & Hibbert (1976) in a very general way, and they do not give figures on pollen concentration and deterioration that could be used for comparative purposes. As far as the pollen and spores are concerned, the peat retains sufficient potential to place the track in its environmental context and provide information on local and regional vegetation, as long as the possible contamination by modern pollen in the upper 0·25 m is taken into account. Despite site management differences, pollen recovered from the Sweet Track showed a similar pattern of survival and condition. It differed in that there was no modern contamination but condition of the pollen was also good enough to allow palaeoenvironmental reconstruction (Brunning *et al.*, 2000).

The Survival of Coleoptera

Four samples were taken from each trench, two from above the track, one from the track and one from below the track. Insects had been analysed from the 1974 excavation (Girling, 1976) but the samples proved difficult to process. The paraffin flots often contained large quantities of plant debris and the concentration of remains was low. Even so, it was possible to use the results to give a detailed environmental sequence for the Levels.

The 1974 excavation revealed a greater thickness of peat over the trackway than in the 1992 trenches, suggesting that peat wastage had occurred. Allowing for this, the bottom of the series of samples in each 1992 trench, at a depth of 0·5 m, was possibly equivalent to a depth of about1·0 m in the Girling column. Similar difficulty was experienced in processing the samples and on average, each 100 ml flot had been derived from a sub-sample of about 250 g unprocessed weight.

It was decided that insect analysis would be limited to these 100 ml sub-samples. Each sub-sample was sorted in water under a binocular microscope and arthropod fragments, including Coleoptera and other insects were identified with reference to the Hope Collections of the University Museum, Oxford. The results are given in Table 5, which lists the minimum number of individuals represented by the fragments from each sample. Nomenclature follows that used by Girling (1976). Remains were entirely absent from Trench 1 at 0·26–0·28 m and Trench 3 at 0·48–0·50 m so they have been omitted from the table. Earthworm cocoons were present in the top two samples in each trench and some of the insect remains in these samples were obviously modern.

General observations

The top sample from Trench 3 gave a much higher concentration of insect remains than the other samples, but the reason for this is unclear. Otherwise the results from the three trenches are similar, so will be discussed together. The concentration of identifiable beetles per kg in the 1992 samples averages 16·1 per kg whereas in the Girling samples the concentration was 15·0 per kg. This similarity, however, is misleading. The majority of insects from the 1992 excavation were from the top two samples in each trench. These samples were of biologically active materials, including live soil invertebrates, and the insects appear to represent modern death assemblages in various stages of decay.

The habitat suggested by the Coleoptera from these samples, fen meadow with disturbed weedy habitats, was not indicated by the upper samples in the Girling sequence. The most numerous phytophagous beetles from the top samples of the Girling sequence were *Plateumaris discolor*, which feeds on *Eriophorum* sp., *Altica* sp. which feeds on various plants including heathland species and *Micrelus ericae*, which feeds on *Erica* sp. and *Calluna vulgaris*. Although there were some less readily identifiable fragments of *Plateumaris* from the upper 1992 samples, the other two species were absent. Instead there were species of *Psylliodes* and Ceuthorhynchinae likely to have fed on cruciferous weeds and *Apion* sp. which mostly feed on Leguminosae, especially vetches and clovers. There was no evidence from the insects for the birch trees, although there was a specimen of *Chalcoides* sp. which feeds on *Salix* spp., another tree now growing on the site, as well as *Populus* spp. (poplar). Evidence for the drying out of the peat comes from the presence of three specimens of the beetle *Agriotes* in the 1992 samples. Its larvae feed on the roots of grassland herbs. The Girling samples instead just contained the closely related *Actenicerus sjaelandicus*, which feeds on roots in wetter habitats.

If only the 1992 samples from the track and below are considered, the concentration of Coleoptera falls to 6·2 individuals/kg. Allowing for possible peat wastage, which would have had the effect of concentrating insect remains if they too were not lost, what could have been the equivalent of 1 kg of peat in 1974 now perhaps only contains a quarter of the number of identifiable individuals. Girling (1976) reported that insects from the track and just below were well preserved but remains from the equivalent 1992 samples were poorly preserved and very fragmentary. There was no evidence that these deposits had experienced contamination and similar species to those noted by Girling were identified. However, the assemblages were so sparse, that by themselves little more could be interpreted from them other than that they came from wet habitats.

Biological reworking and decay in the peat above the track, the equivalent of at least the top 0·5 m of the Girling column, had rendered the insect remains from it worthless for palaeoecological studies by 1992. Degradation of insect remains from the trackway and below it, the equivalent of perhaps 0·5 m to 1·0 m in the Girling columns has greatly reduced the palaeoecological value of this material. Indeed, had it been presented for assessment, the author would have recommended that, given the extraction difficulties, the low concentration of remains and their fragmentary nature, detailed analysis could not be justified. This contrasts with comparable depths of peat examined by Girling (1976) in 1974. Interestingly, the insect remains from the Sweet Track survived in good condition that was similar to that seen in earlier studies (Brunning *et al.*, 2000).

Discussion and Conclusion

The results presented above show that treating the scheduled part of the Abbot's Way differently from the rest of the field within which it lay, had a detrimental effect on both the condition of the Neolithic timbers, and some aspects of its associated palaeoenvironmental data. The depth of peat above the track was reduced largely by desiccation of the peat caused by tree-planting. This reflected dewatering, lack of subsequent management, the consequent spread of trees, and the presence of a (largely empty) 1·5 m deep rhyne adjacent to the site. Drainage by the latter may have exacerbated the impact of the trees.

Timbers in all trenches, but 1 and 3 particularly, were affected by root damage. Trench 1 was extensively affected by substantial *Betula* roots that both distorted and perforated the timbers. Timbers in Trench 3, outside the area directly affected by the *Betula*, were damaged by the finer but no less damaging roots of *Chamaenerion angustifolium* and *Salix* seedlings, both penetrating the wood. Tool marks did not survive. The wood was generally crumbly and decayed, showing evidence of the collapse of cell walls and modern attack by fungi and bacteria. *Fraxinus excelsior* and *Ulmus* survived better than the *Alnus* in that they had less collapse of cell walls, but both *Fraxinus* and *Alnus* could have very high percentage moisture content and low percentage density, which suggest a less clear relationship between species and condition.

The condition of the wood in Trench 1 was extremely poor with a high degree of desiccation, and only 61% could be identified to species. That in Trench 2 was better, but still poor with 87·5% identified to species. Timbers in Trench 3 were also in very poor condition (comparable to Trench 1) but species could be identified in 80%. Wood survived very poorly in all three trenches despite their presently different states of vegetation, wetness and management regimes. It is possible that the fluctuations in drainage and aeration that would have occurred in proximity to Trench 3, were more damaging than the gradual drying out affecting Trench 1.

Assessment of the Sweet Track showed conversely that the wood had a greater potential than that from the Abbot's Way for assessment of species, tool-mark analysis, dendrochronology and woodland management studies (Brunning *et al.*, 2000). Both past and more recent dewatering of wetland soil would allow the invasion of aerobic fungi and bacteria. Such fungi in particular, are likely to be detrimental to archaeologically significant remains as they often carry with them a suite of enzymes that can degrade wood (lignin) (e.g. peroxidases) and the exoskeletons of insects (chitases). The degradation of lignin, the most complex and recalcitrant of plant polymers, is complicated and requires specialized white rot fungi such as *Phanerochaete* spp. Lignin degradation has also been shown by mycorrhizal fungi that associate with the plant roots of tree such as *Betula* and *Salix* (Hasselwandter, Bobleter & Read, 1990). Invasion of the wood by either of these types of fungi may account for some of the observed degeneration in some wood samples from the Abbot's Way. That said, it must also be considered that the species represented by the two sites are markedly different and each structure is separated by almost 2000 years in terms of longevity. Either or both may also be an important consideration in the response of the timbers to dewatering and to any other microbiological or physico–chemical variables of the burial environment imposed by tree root systems. Similarly, while something is known of the modern environment of each monument and of that contemporaneous to its construction and engulfment within the developing raised mire, little is known of the not inconsiderable intervening period and associated variables.

Surprisingly, plant macrofossils survived well at all levels within all trenches, regardless of the condition of the peat. Modern material was present down to the level of the trackway but was distinguishable by the presence of white starchy tissue. Modern pollen grains were also located down to 0·24 m, but less so than with the plant macrofossils. Surprisingly, *Betula* pollen levels were higher away from the trees than close to them; a variety of factors may have caused this. Similarly, the presence of the trees and proximity of the rhyne to Trench 1 do not appear to have drastically affected pollen preservation compared with that in Trenches 2 and 3 where pollen survival is less good. It is possible that the fluctuating water levels inherent with earlier peat extraction in this area may have affected the pollen survival more than a slow and gradual drying out which has affected Trench 1.

The most noticeable difference between the plant macrofossil and pollen analyses concerns the representation of *Betula*. The plant macrofossils showed clear evidence of contamination by modern seeds in Trench 1, to the level of the track and below it, whereas the pollen evidence suggests only slight contamination. In contrast, *Betula* pollen, some of it probably recent, was more common in Trench 3. This may be due in part to recent growth of small saplings, but high levels of modern seeds were not represented. This could reflect the lack of deep cracks in the peat for them to penetrate. It is possible that Trench 3 was closer to another source of birch pollen when the peat was developing, than Trenches 1 and 2.

Compared with palaeoentomological data from 1974 (Girling, 1976), it appears that biological reworking and decay above the track has destroyed the potential of the site for detailed insect analysis in all three trenches. This suggests that they are susceptible to damage by dewatering in any form, whether it occurs slowly or as a consequence of seasonal activity. Chitin is a widespread nitrogenous substrate in soil and chitinolytic ability is common among fungi (Cooke & Whips, 1993). Chitin is usually the main constituent of insect cuticles (Wigglesworth, 1972), which therefore provides a substrate for soil fungi. The loss of identifiable insect remains is likely to be due to the action of such fungal exo-enzymes where suitable aerobic soil conditions are allowed to prevail. The results from the Abbot's Way, when compared to those from the deeper and wetter Sweet Track suggests that the survival and condition of insect remains are more vulnerable to inappropriate management than plant remains and pollen. If this finding is representative of other peat-based sites, it suggests that when assessing or monitoring the condition of the palaeoenvironmental record in relict wet-sites, entomological analysis might prove the more sensitive indicator of detrimental change to the palaeoenvironmental record and should be targeted.

As would be anticipated, both middle and later 20th century changes to the burial environment have impacted upon the condition of the Abbot's Way timbers. However, they have survived the present and recent dry regimes, albeit with a reduced archaeological potential for analysis. It appears that pollen and plant macrofossils retain their potential for environmental reconstruction, despite the degradation of the burial environment, while insect remains do not.

It is important that as much data as possible about previous land-use is gathered when assessing the condition of any monument. The present-day wetness and flora of the area of Trench 3 would suggest that the present environment is good for the preservation of waterlogged archaeology. It may be, but that cannot redress the damage done during an earlier period of deleterious land-use. It is all too easy to assume that in a presently flourishing area of wetland, any archaeology therein will survive in good condition, however, the current status of a site can mask decades, centuries and millennia of natural and anthropogenic alteration, all of which will have taken its toll.

Since this assessment, the Abbot's Way has not been subject to any form of active management. Trees have once more colonized the site, desiccation cracks are evident and the hydrological status of the site may have further deteriorated. However, a new and potentially beneficial management plan has been proposed that includes tree felling, crack infilling and grazing (Brunning pers. comm.). This may lead to a gradual rise in the water level but will introduce nutrient enrichment into the equation. The data presented here could act as a benchmark for the future assessment of recent and future management regimes though how the impact of the two variables will be differentiated is unclear.

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