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EXCAVATION OF A BURNT MOUND AT FELTWELL ANCHOR, NORFOLK, 1992

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SUMMARY

A low mound of fragmented heat-affected flint and charcoal dating to the Bronze Age at Feltwell Anchor, Norfolk, was fully excavated. Beneath it lay several small pits, some containing larger pieces of burnt flint. To one side of the mound lay a large pit whose waterlogged fills contained a preserved timber trough. The pit also contained quantities of organic material which were sampled for plant macrofossils, pollen, insects and molluscs. The palynological analysis, in particular, produced useful environmental indicators. A grave cut centrally into the top of the mound contained an inhumation which had been buried in a timber coffin or mortuary structure. Charcoal from the mound and bone samples from the skeleton submitted for radiocarbon measurement dated the site to the Early Bronze Age.

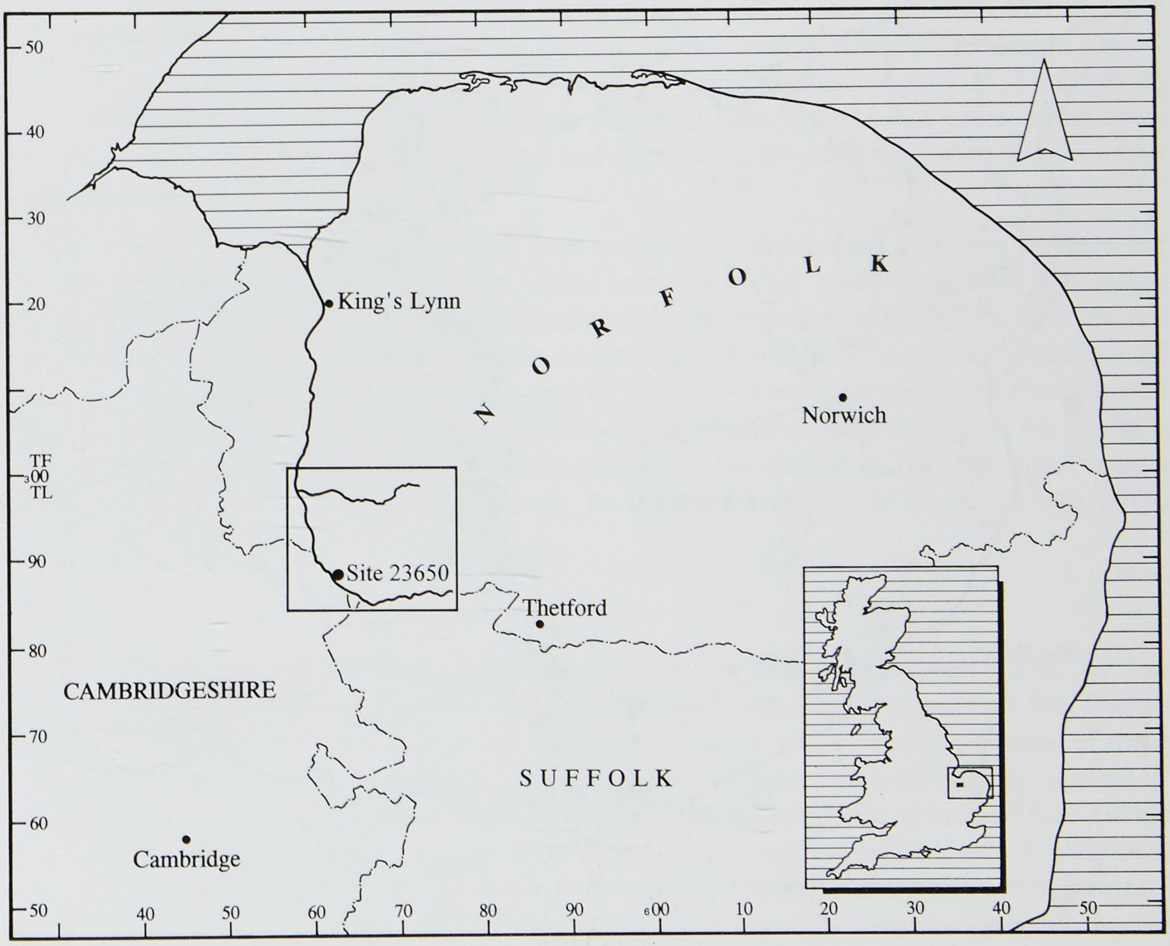

Fig. 1 Location of site and area of Fig. 2

Introduction

General background

The Fenland Project was initiated in 1981, its primary aim being to survey a large part of the Wash Fenlands through systematic field survey and to provide information upon which to base policies for the preservation or detailed investigation of selected sites. A major campaign of fieldwalking, as part of the Fenland Survey Project, started in the 'Wissey Embayment', the area of former peat fens in the extreme south-west of Norfolk, in the autumn of 1983 (Figs 1 and 2). The aims, methods and initial results of the Fenland Project, as well a general introduction to the archaeology of the Wash Fenlands, are summarised in Hall and Coles 1994. A detailed survey of evidence from the Wissey Embayment has been published (Silvester 1991), along with a survey of the evidence for prehistoric settlement accumulated prior to the Fenland Survey (Healy 1996).

The Fens were formed by a series of marine incursions, silt and peat deposits being laid down during salt-water and freshwater episodes (Hall and Coles 1994, 13–15). As environmental conditions in the embayment changed, so too did the areas and resources available for

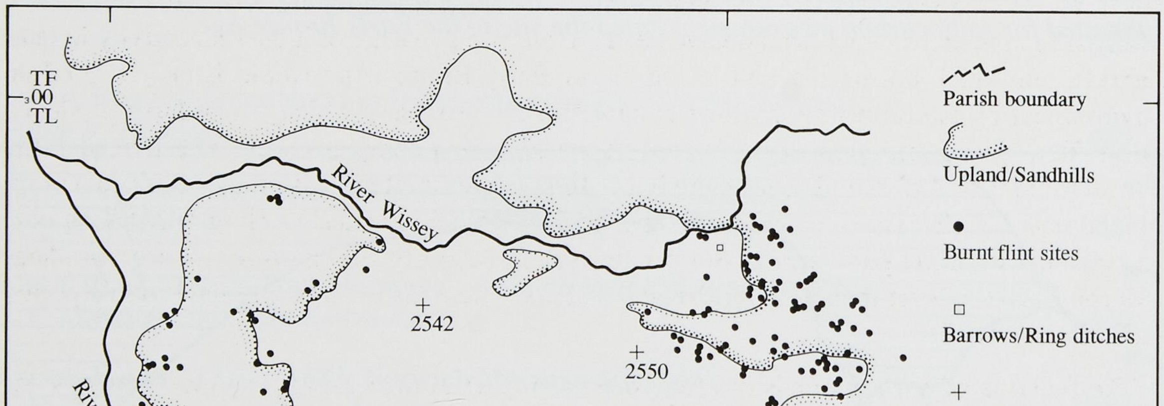

Fig. 2 The Wissey Embayment (after Silvester 1991)

exploitation by the prehistoric communities living there. During the later Neolithic period the sea encroached into the Wissey Embayment itself leading to the deposition of clastic sediments or 'fen clay' on top of the deposits of 'basal peat' which existed in river channels and damp hollows in the area. In the Early Bronze Age there was a fall in relative sea level and it retreated from the Embayment leaving creeks and saltmarshes. Deposits of 'upper peat' formed and engulfed the earlier prehistoric sites (Silvester 1991, 11). Radiocarbon determinations from samples of the basal and upper peat at Feltwell Common have given dates of 4135±70 BP, Q-2548 (2875–2595 Cal BC) and 3815±70 BP, Q-2551 (2420–2140 Cal BC) respectively (Waller 1994a, 137; Silvester 1991, 33).

The Fenland Survey identified more than 300 'potboiler' or burnt flint sites in the Wissey Embayment (Fig. 2). Many of the concentrations of burnt flint were fairly small (63% were less than 0.06 ha in area) and only eight of the sites could be classified as 'mounds'. The burnt flint itself consists of 'calcined' fragments, grey or white in colour, resulting from the flint having been heated and then put into water, producing hot water and steam: the sudden temperature change would have caused the flint to craze and shatter.

Dating evidence for the burnt flint spreads and mounds in the Wissey Embayment is scarce but it has been argued that most belong to the 2nd or late 3rd millennia BC (Silvester 1991). Many are in locations which would have been too wet for domestic or industrial activity in later periods, but which during the Late Neolithic or Early Bronze Age would have provided an environment of natural watery hollows suitable for the processes which would have produced burnt flint. The distribution of burnt flint in the area also compares well with that of lithic concentrations of that period. Elsewhere in Norfolk, Beaker pottery was recovered from a burnt mound near Dereham at Hoe, and from other probable 'cooking sites' (Apling 1931). Charcoal associated with burnt flint sites in Suffolk has produced Early Bronze Age radiocarbon dates (Murphy 1988). Burnt mounds from Ireland and elsewhere also commonly date to this period (O'Drisceoil 1988).

The function of burnt mounds has long been a subject of discussion. The most obvious use for the hot water produced at the sites would seem to be for cooking or food processing (Wiltshire 1995) but a lack of animal and plant remains at some sites suggests that this was not always their main purpose. Other activities requiring hot water — including a number of industrial process and bathing, either in water or steam — have been suggested (Hodder and Barfield 1991). Containers for water, usually in the form of pits or troughs dug near the mounds, have often been found. These may be simple pits where the natural soil is clayey and retains water (Pasmore and Pallister 1967) or may be lined with timber or stone (Gowen 1988, O'Drisceoil 1988).

The site

Feltwell Parish runs east to west across the centre of the Wissey Embayment (Fig. 2). The modern village lies on the edge of the chalk uplands which slope down to meet the fen. During the Fenland Survey 110 'potboiler' sites were identified in the parish. Seventy percent of these were between 0.01–0.06 ha in area. While many of the sites were isolated spreads, several of them were closely grouped together. The excavated burnt mound (FWL 171, SMR Site 23650: Fig. 2) was the most prominent and substantial of the eight mounds identified in the Embayment during the Fenland Survey. It was situated at TL 6320 8850 on the north slope of a formerly peat-buried sandhill, just beyond the extent of the marine incursion which deposited the fen clay. Farming and resultant peat wastage had exposed much of the mound: although the low rise of the site was clearly visible from a distance, the density of burnt flint seen in the ploughsoil showed that the mound had been heavily eroded by ploughing.

In 1989-90, during the Fenland Evaluation Project, the site was again fieldwalked and an auger survey demonstrated the survival of intact burnt flint deposits beneath the ploughsoil. The wastage of the peat and erosion of the mound was clearly ongoing, and it was decided to excavate the site as part of the ensuing Fenland Management Project (FMP). Excavations by the Norfolk Archaeological Unit, directed by Mark Leah, took place over eight weeks during November and December 1992. This was the first controlled excavation of a burnt mound in the Fens.

Structure of the report

All contributing specialists' reports, with the exception of those dealing with the worked flint and pottery, have been integrated with the stratigraphic data. Detailed descriptions of the methodologies and nomenclature used, and full analytical and interpretive reports by individual specialists, are held in the site archive which is curated by the Norfolk Museums Service.

Only data from the mammal bone, plant macro-remains, and palynological reports have been tabulated and presented graphically (Tables 1 and 2; Figs 7 and 8). Zonation of the pollen diagrams was carried out subjectively, and three zones were recognised; these were designated FWA/1-FWA/3 for convenience. Only FWA/1 and FWA/2 warrant full status as local pollen assemblage zones since FWA/3 contained very few palynomorphs. The latter is included merely to indicate the relative concentrations of microscopic charcoal, organic content, and the presence of algal spores. Palynological diagrams were drawn from percentage data (Calcote 1998).

Radiocarbon date ranges were calibrated to two sigma using the intercept method of Stuiver and Reimer (1986) and are quoted, as recommended by Mook (1986), with end points rounded outwards to ten years.

Excavation Results

Introduction

Contour surveying and fieldwalking helped to define accurately the extent of the burnt mound and of a probable former water channel running south-west to north-east immediately to its north-west. Systematic sub-sampling and sieving of ploughsoil and mound material was carried out over a 30 x 30m area. The rest of the peaty ploughsoil was removed by machine to expose the mound and underlying pre-Flandrian glacial sands. Beneath these sands was a blue-grey clay or till which included reworked Mesozoic clays. Excavation of the mound and associated and underlying archaeological features and deposits was entirely by hand. The extent of the mound and the locations of excavated features are shown in Fig 3.

The pre-mound surface

A patchy layer of grey sand, 20–50 mm thick and continuous across much of the site, was thought to represent a weathered subsoil discoloured by organic material and microscopic charcoal from the overlying mound. Assessment of the layer suggested that the soil profile had been truncated, but the presence of palynomorphs and animal bone indicated that at least some of the original soil sequence was preserved. The animal bone (Table 1) included that of cattle

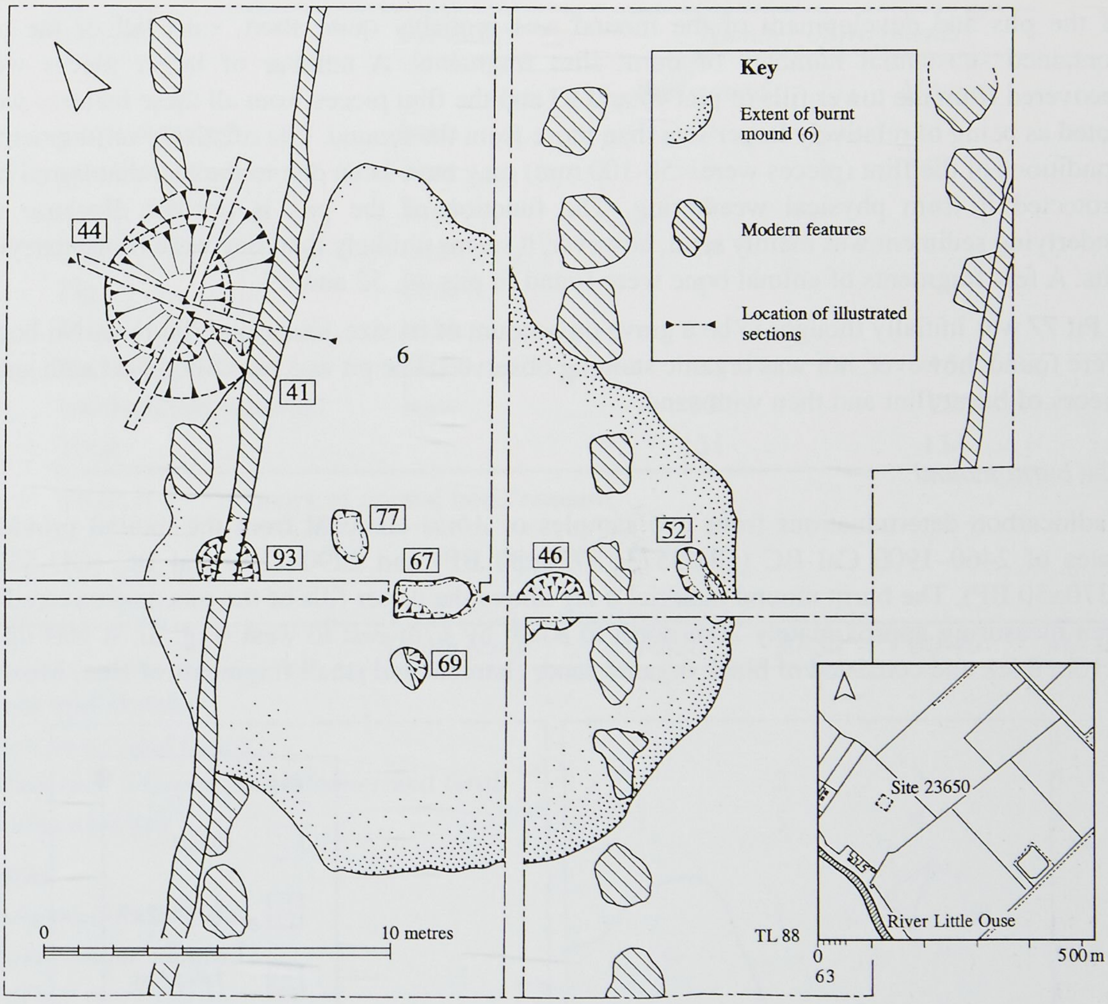

Fig. 3 Plan of excavated features; inset shows location of trench

(both meat and non-meat bearing), some bearing butchery marks. A pig radius also showed evidence of butchery, with knife cuts at the proximal anterior end indicating dismemberment.

The loss of the surface of the palaeosol might have been caused by windblow of a sandy ploughsoil that had developed subsequent to Neolithic clearance of the woodland. The low numbers of pollen and plant spores in the soil may suggest that the profile had lost its upper horizons. The assemblage indicates, however, that at some time before the mound was made the site had supported grassy areas, with cereals being grown or processed in the vicinity. There was also mixed deciduous woodland with *Alnus* (alder), *Tilia* (lime) and *Corylus*-type (probably hazel) in the catchment. Spores of the common soil fungus *Sordaria* were identified. Species within this genus are often associated with dung (Domsch and Gams 1972). Copious spores are produced when the fungus is subjected to heat shock, however (Ingold 1965), and their presence might be a reflection of the heating of soils by processes associated with the mound.

Pre-mound pits

Five features interpreted as deliberately-dug pits (Fig. 3) were seen cutting the pre-mound surface. They ranged in size from 0.76–2.50m across and in depth from 80mm–0.34m, and were confined to a small area beneath the central part of the mound. They appear to have been left open and subsequently became filled with mound material. The time lapse between the digging of the pits and development of the mound was probably quite short, since all of the pits contained substantial numbers of burnt flint fragments. A number of larger pieces were recovered from the lower fills of pits *46* and *93* and the flint pieces from all these features were noted as being of relatively larger size than those from the mound. The relatively unfragmented conditions of the flint (pieces were <50-100 mm) may have been due to the fact that burial had protected it from physical weathering. The function of the pits is unclear. Because the underlying sediment was mainly sand, however, it seems unlikely that they were flint-quarrying pits. A few fragments of animal bone were found in pits *46, 52* and *69*.

Pit *77* was initially thought to be a grave on account of its size, shape and flat base. No bones were found, however, nor was organic staining observed. The pit was backfilled first with small pieces of burnt flint and then with sand.

The burnt mound

Radiocarbon determinations from two samples of *Alnus* charcoal from the mound provided dates of 2460–1900 Cal BC (GU-5573: 3720±80 BP) and 2290–2130 Cal BC (GU-5574: 3370±50 BP). The burnt mound material *6* lay above the upper fills of the pits, and covered an area measuring approximately 20m north to south by 17m east to west (Fig. 3). It was up to 0.10m thick and consisted of black organic sand, charcoal and small fragments of flint. Most of

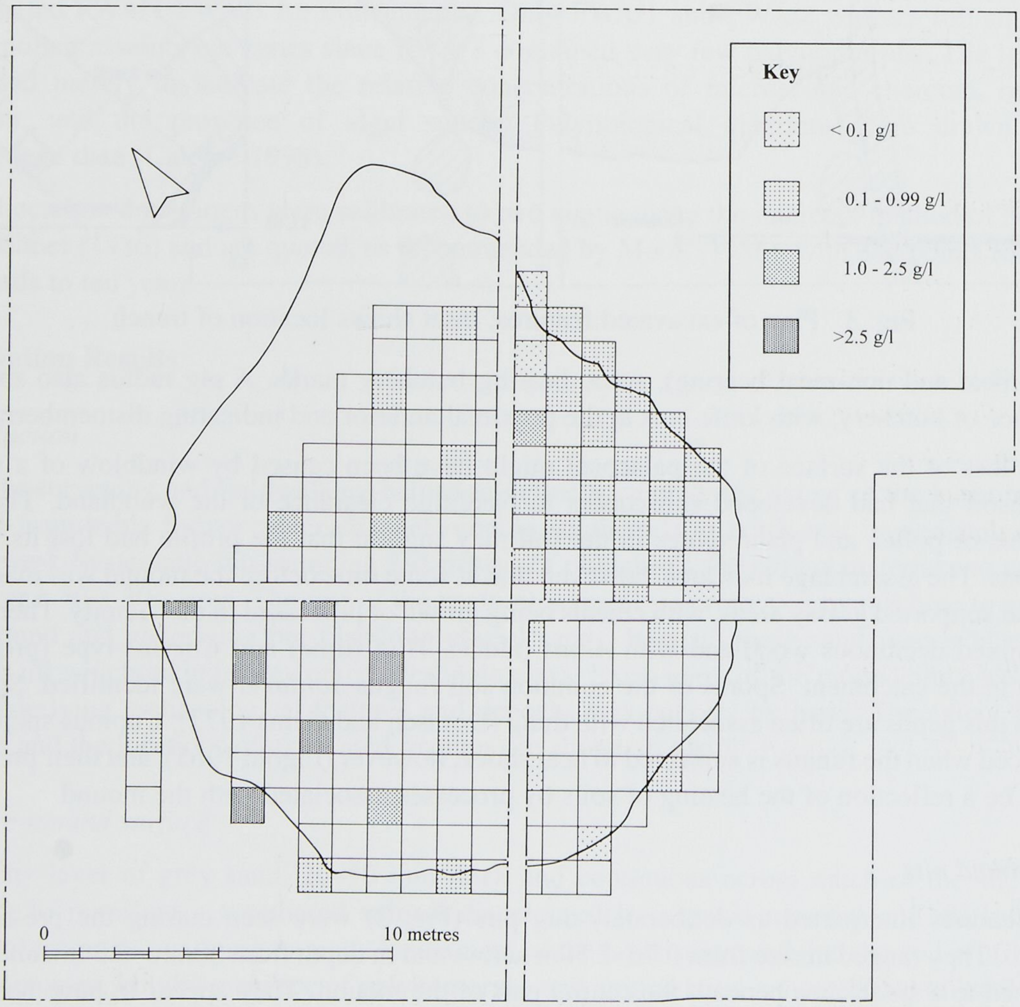

Fig. 4 Distribution of charcoal fragments >6mm across the area of the mound

Animal	*Remains*	*Number of fragments*	
		Pre-mound	*Mound*
Large mammal	bone	40	37
Small mammal	bone	18	25
Cattle	bone	37	47
Cattle	teeth	5	-
Pig	bone	1	-
Dog	tooth	-	1
Red deer	antler	-	15
Unidentified mammal	bone	30	29
Total		131	154

TABLE 1. Summary of animal bone remains

Depth (cm)	*10-20*	*20-30*	*30-40*	*40-50*
Trees and shrubs				
Quercus sp (leaf frags)				+
Rubus sect. *Glandulosus Wimmer* and *Grab*		2	2	5
Sambucus nigra L.	1	5	4	2
Herbs				
Chenopodiaceae indet.		1		
Chenopodium album L.				1
Cladium mariscus L.				1
Juncus sp(p)				+
Mentha arvensis/aquatica		1		7
Menyanthes trifoliata L.		1		
Polygonaceae indet.				1
Rumex acetosella L.				1
Urtica dioica L.		2		9
Aquatics				
Lemna sp(p)	1	10	8	58
Oenanthe aquatica L. Poiret				5
Ranunculus sceleratus L.				1
Ranunculus subg. *Batrachium* DC A.Gray				7
Others				
Buds				+
Charcoal	+	+	+	+
Fungal sclerotia		+	++	+
Wood		+	+	+++
Sample weight (kg)	0.5	0.7	0.5	0.6

TABLE 2. Seeds and vegetative remains from pit *44*

these were only 20-30 mm in size, suggesting high levels of surface weathering. The very low level of the mound and the large amounts of burnt flint in the ploughsoil indicated the heavy truncation and dispersal of material.

The mound material was initially bulk-sampled, in the north-east quadrant, on an alternate 1m grid, but a coarser sampling interval was adopted for the rest of the mound (Fig. 4). The relative richness of charcoal in the south-west quadrant of the mound suggested a focus of burning in that area. The distribution of charcoal types identified from woody species was more or less consistent in all samples. Of the nine samples analysed, all were dominated by *Alnus* (alder), with lesser amounts of *Quercus* (oak). The remaining taxa occurred sporadically and in relatively small quantities. They included *Prunus* (probably blackthorn), *Crataegus* type (hawthorn group), *Fraxinus* (ash), *Sambucus* (elder) and *Acer* (field maple). This assemblage suggests mixed woodland with shrubs in the marginal or more open areas, and abundant *Alnus*, probably on wetter ground.

With the exception of those of *Quercus*, the fragments appear to be from young stems. Their age range was difficult to assess; charcoal of *Prunus* was probably from fairly narrow stems (2-3 years in age), but *Alnus* and *Fraxinus* were probably from thicker stems (ie. >3 growth rings). The *Quercus* charcoal ranged from very narrow stem/twig to heartwood.

No palynomorphs were found, and plant macrofossils other than wood charcoal (Fig. 7) were sparse. A few cereal fragments, including an indeterminate *Triticum* (wheat) grain, were identified along with a few *Corylus avellana* (hazel) nutshell fragments. Charred remains of plant foodstuffs (cereals and nutshell) were too infrequent to suggest that plant food processing was important at the site. Fragments of animal bone were recovered from the mound material, however (Table 1), and knife and chop marks could be seen on two of the cattle bones. Uncharred fragments of *Cladium mariscus* (great fen sedge) nutlets, and other uncharred fruits and seeds were found (Table 2) together with some shells of fresh-water and land molluscs, but these post-dated the mound. Either they were related to wetter conditions after the abandonment of the site, or they were recent contaminants.

The results from the burnt mound suggest that *Alnus* trees or saplings were plentiful and were utilised as the main fuel source, supplemented by small quantities of wood from other trees and shrubs. *Alnus* burns slowly and generally makes a poor fuel although its potential improves when it is made into charcoal (Edlin 1949). While the *Cladium* nutlets were not charred, it is worth noting that sedges were traditionally used in the Fens as kindling (Edlin 1951), and for fuelling ovens (W. Stearn, *pers. comm.*).

The waterlogged pit

(Figs 5–8)

Sub-circular feature *44* lay immediately to the north-west of the mound. It was approximately 6m x 5m in extent. The pit was considerably deeper than all other features excavated at the site. It was excavated to a depth of 1.00m and augered a further 0.50m to a level of –1.33m OD. Its bottom was not reached. The feature was filled with peat and a mixture of inwashed sand, burnt flint, and wood. While the fills of the pit were all stratigraphically later than the pre-mound layer *5*, the edge of the feature did not appear to cut it; instead layer *5* ran down into the east side of the feature (where it was truncated by a modern land drain: Fig. 5). It seems likely that the pit began life as a hollow, probably of natural origin. It then appears to have been enlarged to form a deeper pit which possibly fulfilled some function related to the burnt mound, but this

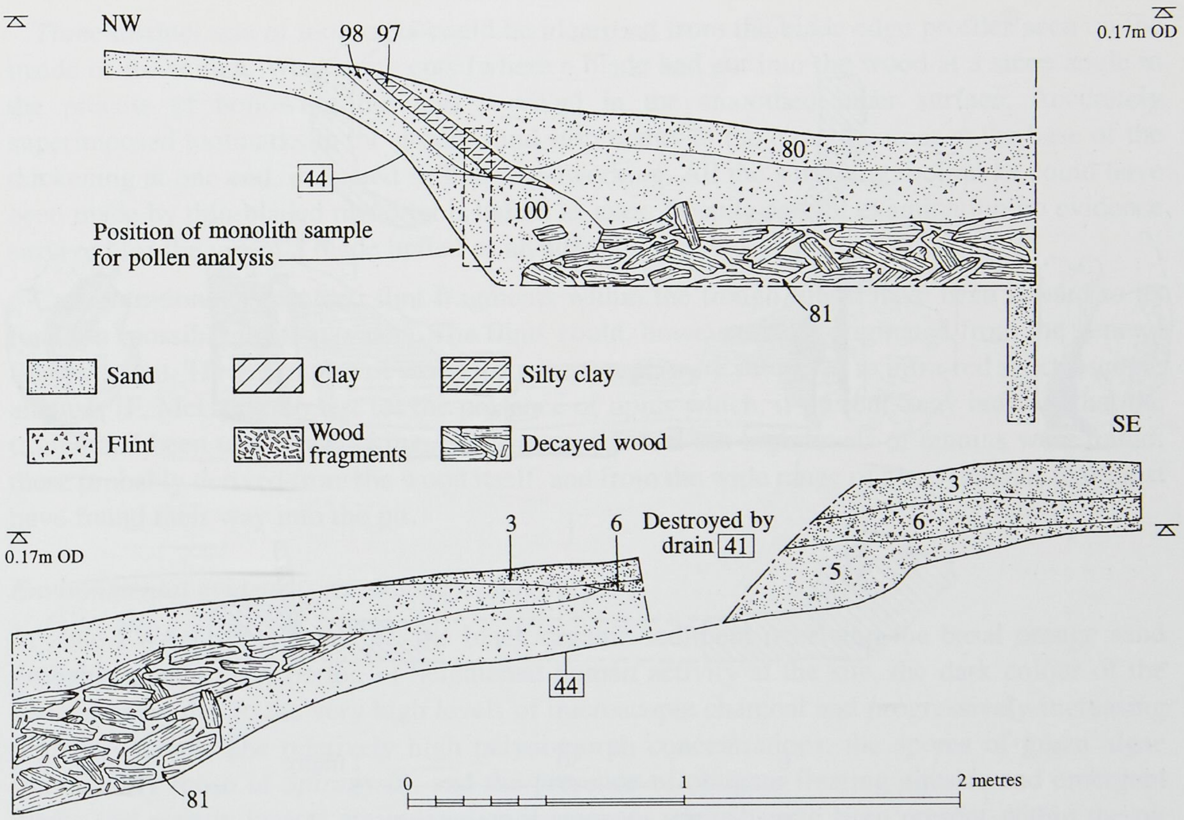

Fig. 5 Section across pit *44*

relationship is unclear. The many fragments of burnt flint found within the pit (including some from its primary fill) showed either that the two were related, or that the pit post-dated the flint-burning activity on the site. The mound itself had encroached over the upper fills of the pit: this may have occurred as the mound became spread after disuse of the site and as the material in the pit decayed and became consolidated.

A well-preserved timber trough was found in the pit and samples from the fills of the pit were analysed for plant macrofossils, insects and pollen evidence. Although pollen was not abundant in the sediments, palynological analysis has provided important environmental information.

The trough

The timber trough was 1.75m long (Fig. 6; Plate 1). It lay with one end within the lower pit fill *81* as if it had fallen or been discarded into the already partly-filled feature. Pollen analysis of scrapings from the exterior and interior of the trough supported this interpretation (Wiltshire 1993). The evidence indicated that after the pit was abandoned, sediment accumulating within the feature had gradually engulfed the wooden structure.

The trough was made from a hollowed section of *Alnus* trunk. The wood was fragile and part of it had been damaged by the digging of a modern marl pit. Despite this, however, it was possible to lift and reassemble it. Both ends of the trunk had been left slightly thicker, and here tangential planks had been set into grooves to form the ends of the trough. Yellow clay present in cracks in the inner surface of the timber at the thicker ends may have acted as a sealant, although none survived within the better-preserved groove itself. No bark remained, and no toolmarks were observed on the underside of the trough.

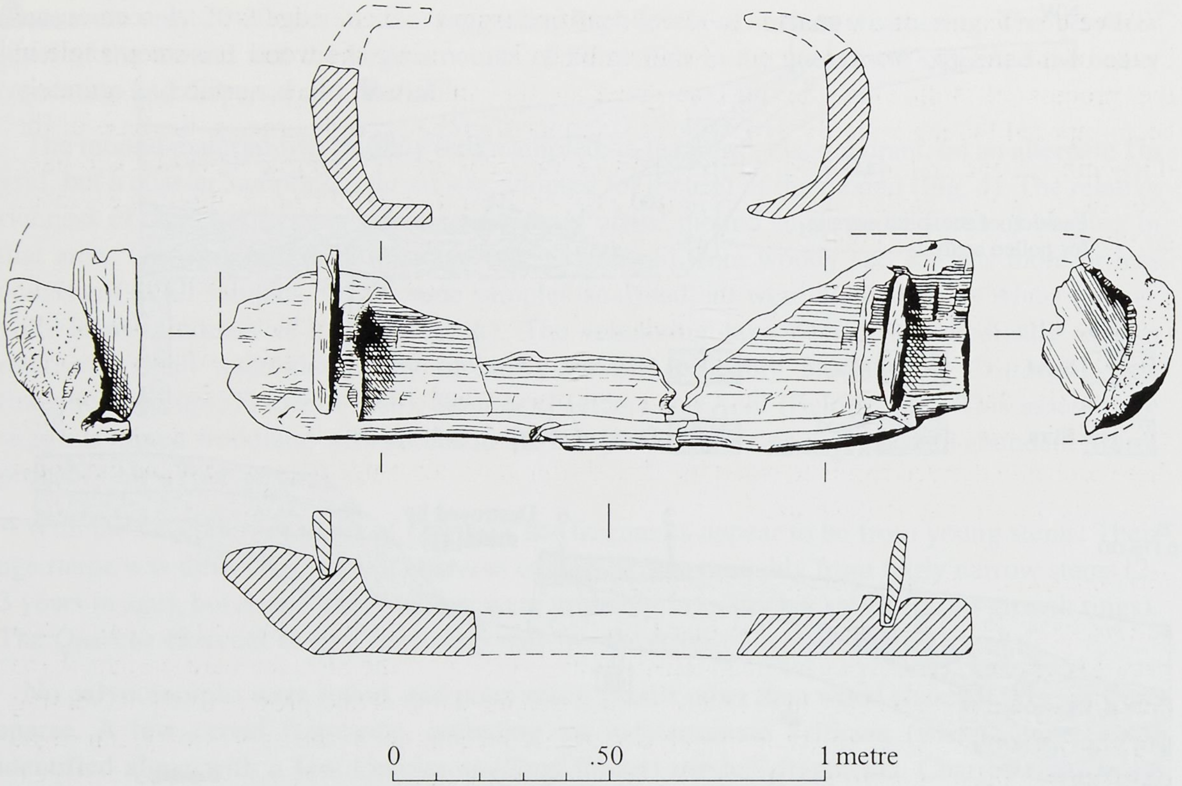

Fig. 6 Timber trough from pit *44*

Plate 1 The timber trough from pit *44*. Scale = 2m. (23650 FWL 107 by Martin Smith)

Three distinct sets of toolmarks could be identified from the blade edge profiles seen on the inside of the trough. Weakening cuts (where a blade had cut into the wood at a steep angle in the process of hollowing the log) survived in the smoothed inner surface. Accurately superimposed toolmarks in the groove, and stop marks in the curved corner at the base of the thickening at one end, indicated skilled woodworking. All the surviving toolmarks could have been made by thin-bladed metal tools hafted as axes. Despite careful examination no evidence survived for the use of a blade hafted as an adze.

Concentrations of calcined flint fragments within the trough might have been related to its function (possibly heating water). The flints could, however, have originated from the general fills of the pit. Three samples of wood from the trough were subjected to infra-red spectroscopic analysis (F. McLaren) to test for the presence of lipids which, if present, may indicate that the trough had been used for cooking. None were detected but high levels of tannins were found; these probably derived from the wood itself, and from the wide range of plant remains that must have found their way into the pit.

Environmental evidence: conditions within the pit

In zone FWA/1 (Figs 7 and 8), the black organic sediment overlying the basal orange sand probably represents a period of heightened human activity at the site, the dark colour of the deposit being due to the very high levels of microscopic charcoal and progressively-increasing organic content. The relatively high palynomorph concentrations, the spores of green algae (particularly those of *Spirogyra*), and the presence of obligate floating aquatic and emergent plants and aquatic insects are indicative of stagnant water having been present within the pit during accumulation of its basal fills (Table 2).

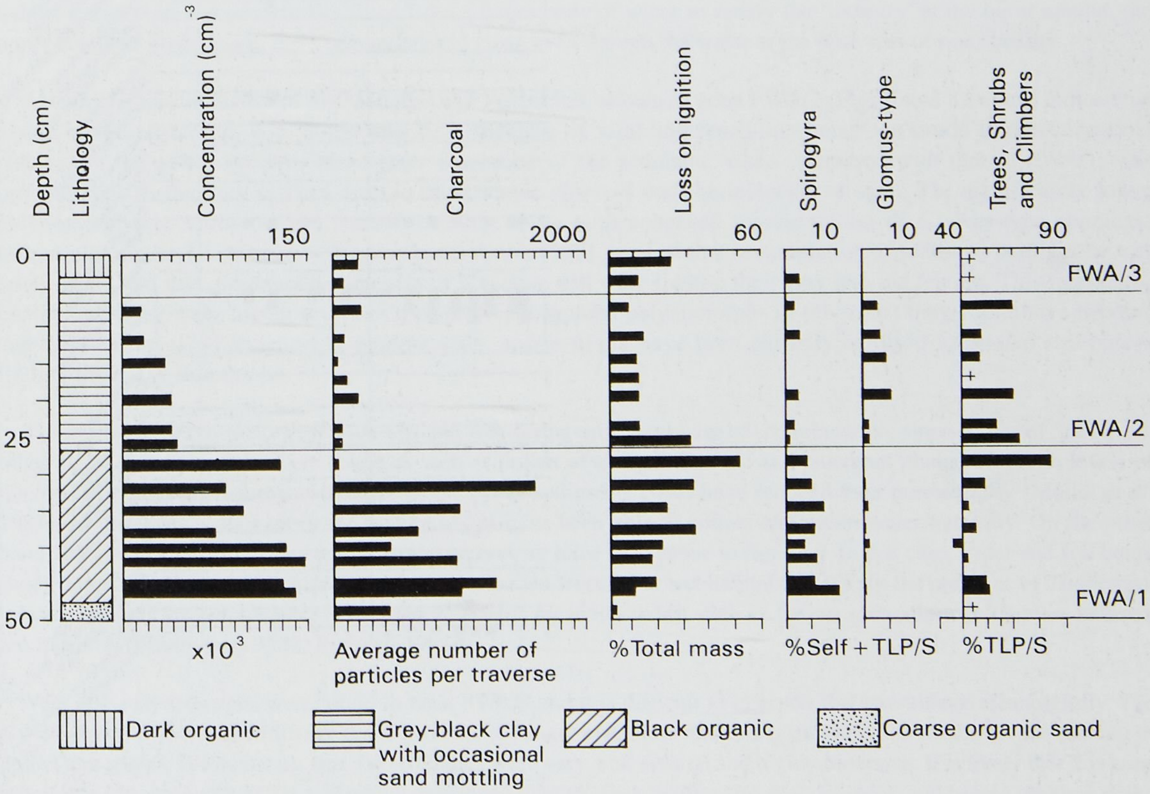

Fig. 7 Palynomorph concentrations, charcoal estimations, loss on ignition data and selected taxa from pit *44*

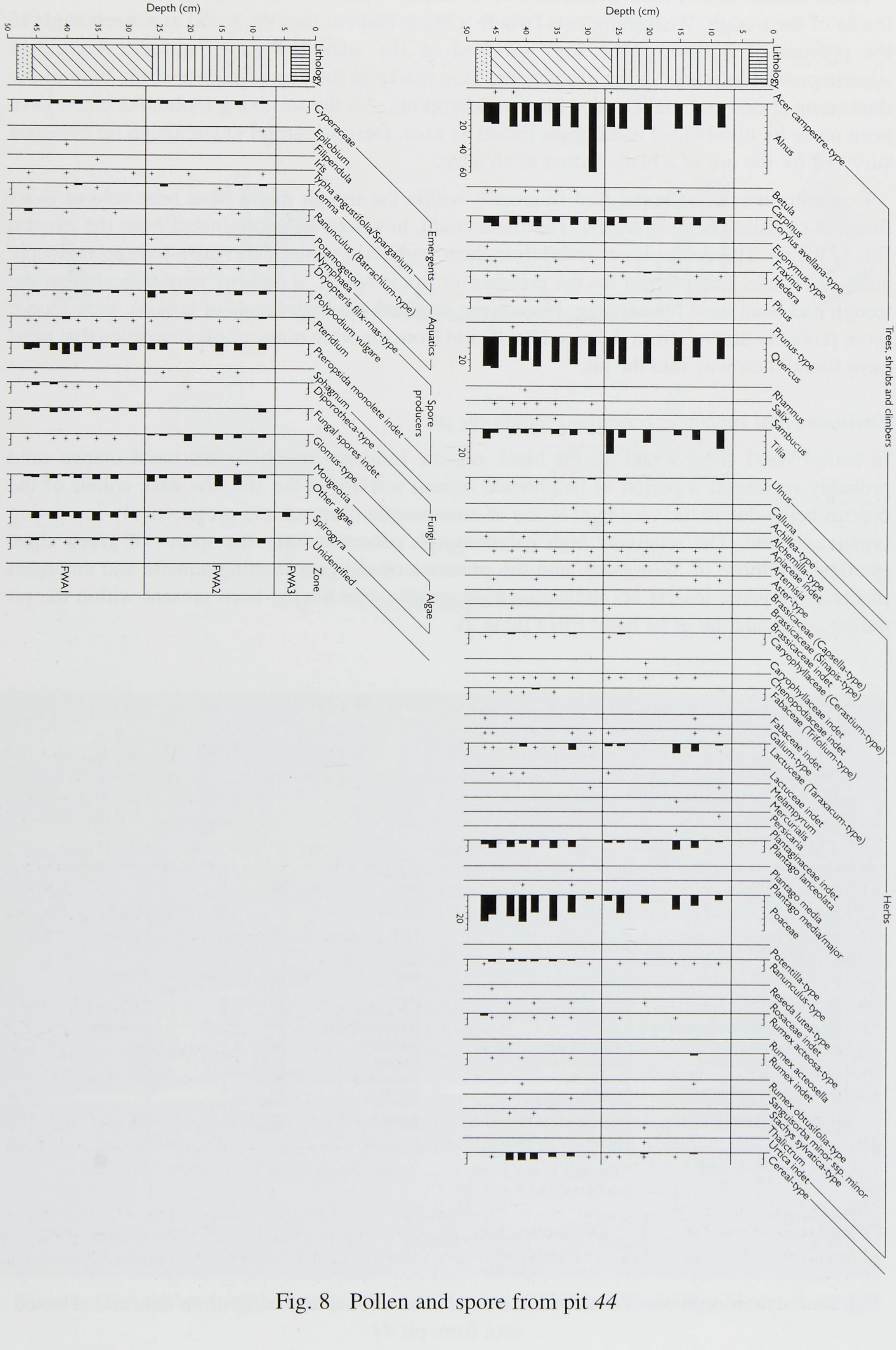

Fig. 8 Pollen and spore from pit *44*

Water beetles *Agabus bipustulatus* and *Hydrobius fuscipes*, and the larval case of a caddis fly, were found. *Lemna* (duckweed) was particularly abundant and present throughout the sequence of deposits. Other obligate aquatic plants represented included *Ranunculus* subg. *Batrachium* (water crowfoot), *Ranunculus sceleratus* (celery-leaved buttercup), and *Oenanthe aquatica* (fine-leaved water dropwort); the presence of emergent vegetation and marsh plants is indicated not only by the remains of wetland plants such as *Juncus* (rush), *Mentha arvensis/aquatica* (water mint), *Menyanthes trifoliata* (bogbean), and *Cladium mariscus* (great fen-sedge), but also by the weevil, *Notaris acridulus*.

The presence of *Oenanthe aquatica* and the relative abundance of *Spirogyra* suggest that the feature was prone to seasonal drying. Both flourish where there is extreme fluctuation in water levels and the sporulation of the alga is stimulated by desiccation (Round 1981; Stace 1991). The consistent presence of fungal spores might also add weight to the suggestion of periodic drier episodes since aerobic conditions would allow fungal growth and sporulation. However, they could equally have been derived from phylloplane fungi (those which *normally* grow on leaves). This might be borne out by the relative abundance of fungal sclerotia in the more basal sediments. It is possible that the site was subject to periodic flooding so that plant and animal remains from elsewhere were carried into the pit. It is also feasible that the pit was used as a reservoir, and pollen, seeds, and insects were brought from elsewhere in transported water. If this were the case, the biomorph assemblage would then represent the vegetation and fauna from the site of water collection as well as, or rather than, from the pit itself. But the increasing organic content of the sediment indicates that it was derived at least partly from accumulating *in situ* plant debris.

Water holes of similar size have been reported at other burnt mound sites (Wiltshire 1997), and their function is enigmatic. It is also difficult to know whether the quality of water was important to the activity associated with the mound, but at Feltwell the high concentrations of both microscopic charcoal and palynomorphs throughout the sediments suggest that the feature was not cleaned regularly. The shallow water left at the bottom of the pit after an episode of activity might have supported a rich assemblage of algae, micro-organisms and arthropods. The abundance of algal spores certainly suggests that the water was periodically green and slimy, probably in spring (Round 1981). Urine and dung from stock animals might have raised nitrogen and phosphate levels and encouraged algal growth. Any nutrient enrichment, and accumulation of decomposing organic debris in the waterlogged basal sediment, would also have promoted anaerobic microbial activities such as fermentation, sulphate reduction, and methanogenesis, and a wide range of noxious metabolites might have formed at the sediment/water interface. Such fouling might have been offensive only when water levels were low, however, and when use of the feature was less intensive. If the pit were indeed a reservoir, and periodically filled from a larger body of water to satisfy the ‘industry’ at the burnt mound, the upper levels of water might have been relatively clean even though the water at the base was of poor quality.

Abrupt changes in nature of the sediment and vegetation, shown in zone FWA/2 (Figs 7 and 8), could indicate an hiatus in sedimentation, but might also be a function of sampling resolution being too crude to detect gradual changes in the pollen spectra. The lighter coloration of the sediment, when compared with that in FWA/1, was probably due to the very marked drop in microscopic charcoal and the inclusion of sand. The significantly lower palynomorph concentration and organic content, along with enhanced representation of *Glomus*-type sporangia (arbuscular mycorrhizal fungi — Bagyaraj and Varma 1995), suggest that accumulation of sediment in this zone was fairly rapid, and that considerable amounts of bioactive soil were finding their way into the feature. This might also explain the marginally higher levels of unidentified, corroded palynomorphs in this zone; they could have become damaged during rapid transport in eroding soils, and/or might have been partially oxidised in aerated soil before finding their way into the pit.

There are indications that the feature was still wet during this later phase of sedimentation, since spores of *Spirogyra*, other algae, and *Sphagnum* were found as well as pollen of obligate aquatic and emergent plants. The high levels of microscopic charcoal and organic matter in the lower sediments could have reduced their permeability (Mallik *et al.* 1984), so that later in its history the feature might have been able to collect and retain water naturally. On the other hand, the pit could have remained in use as a reservoir or have been prone to flooding. In this case, water and soil being washed into the pit would have contained residual pollen from other wet habitats. Certainly the presence of *Thalictrum* (meadow rue) is interesting since it is found in wet fen meadows today, such as *Juncus subnodulosus–Cirsium palustre* fen meadow (Community M22: Rodwell 1991b).

Very few palynomorphs were found in zone FWA/3 and it is difficult to interpret the assemblage meaningfully. The sediment was permeated with very dense growths of fungal mycelium and this is probably the reason for the paucity of pollen and spores. It also means that the sediments were very well aerated and highly bioactive. It is likely that this zone represents a biologically-active soil which developed over the feature after site abandonment, and before regional rising water table led to the deposition of highly organic peat deposits over the site.

Environmental evidence: the wider environment

The coarse orange basal sand representing the period before use of the pit contained few palynomorphs. Results are not shown on Figs 7 and 8, but there were sufficient to provide some picture of the vegetation at and around the site before the feature became functional. *Alnus* (alder), *Betula* (birch), *Corylus avellana*-type (hazel), *Quercus* (oak), and monolete Pteropsida (undifferentiated ferns) were recorded, indicating that mixed deciduous woodland was present; but open habitat herbs such as *Poaceae* (grasses), *Cyperaceae* (sedges), and *Plantago lanceolata* (ribwort plantain) were represented as well as cereal-type pollen. Microscopic charcoal was moderately abundant but the amount of organic matter (represented by loss-on-ignition) within the sand was low. The results suggest that the site was situated in an open area within woodland and that farming was taking place in the area.

If the concentrations of microscopic charcoal are taken as indicators, the role of the pit in relation to the burnt mound is represented by zone FWA/1. The curve for trees, shrubs, and climbers in Figure 7 may be regarded as a 'woodland cover' curve (*sensu* Heim 1962). This is based on the (rather over-simplified) contention that a value of 50% arboreal pollen is indicative of 50% woodland cover. Whilst the limitations of this concept are accepted, it remains a useful indicator of woodland change. *Alnus, Quercus, Tilia*, and *Corylus avellana*-type appear to have been the most abundant trees, but *Ulmus* (elm), *Pinus* (pine), and *Fraxinus* (ash) were also present in the mixed woodland. The 'woodland cover' curve suggests that the burnt mound was set in a fairly large woodland clearing, or that about half the catchment supported woodland. Fig. 7 shows that shrub growth was promoted by the higher light intensities offered by the opened canopy. Most are relatively low-growing and uncompetitive in dense woodland, and are usually found at the woodland edge and in glades. The relative open-ness of the site is also reflected in the wide assemblage of ferns, ruderals and grassland herbs, dominant amongst them being Poaceae (grasses) and *Plantago lanceolata* (ribwort plantain). The wide herbaceous flora is indicative of weedy grassland and disturbed soils and it is likely that woodland pasture was well established.

The pollen spectra in Fig. 7 are indicative of a variety of woodland communities exploiting the wide range of physico-chemical conditions offered by soils in the catchment, probably grading along ecological gradients from the drier to wetter, and mesotrophic to oligotrophic soils. There seems little doubt that much of the local woodland had been cleared by the Early Bronze Age and that clearings were being exploited for both agriculture and activities associated with the burnt mound.

Impact of people and their domestic stock on the catchment's soils would, inevitably, result in both large and small-scale variation in soil pH and hydrology. The complexity of the pollen spectra indicate that woodland clearances had promoted pedogenic changes, with advanced soil acidification in some areas; soil heterogeneity is reflected by pollen from plants with diverse ecological requirements being found together in the sediments. Microenvironments were probably created which could support sub-communities within both local woodland and the cleared areas themselves (Rodwell 1991a). Wet soils would have supported *Alnus, Salix, Rhamnus catharticus, Cyperaceae*, and *Filipendula*. Even much of the grass pollen could have been derived from *Phragmites* (reed) growing in the nearby fen, along with *Sphagnum* moss (Daniels and Eddy 1985). Drier soils supported mixed deciduous woodland dominated by *Quercus, Corylus avellana*-type, *Ulmus*, and *Tilia* (lime), as well as areas supporting *Calluna* (heather), *Pteridium aquilinum*, and *Rumex acetosella* (sheep's sorrel), plants which are characteristic of heathland, acid grassland, and open, sandy places today. Some soils near the pit seem to have been nutrient-enriched and sufficiently circumneutral to allow *Sambucus* (elder), *Euonymus* (spindle), *Prunus*-type (eg. sloe), and *Sanguisorba minor* (salad burnet), while disturbed and trampled soils in open areas supported ruderals such as *Rumex* spp. (docks), *Artemisia* (mugwort), *Chenopodiaceae* (goosefoot), and *Plantago* spp. *Melampyrum* (cow-wheat) is thought to indicate burning and disturbance of woodland, and many of the herbs shown in Fig. 8 could have been growing as woodland edge or glade plants. The relative contribution of fen grasses and dry-land grasses to the Poaceae pollen curve is difficult to ascertain, but the consistent representation of herbs, characteristic today of grazed and trampled grassland, suggests that there were areas of pasture close to the feature.

The resolution of palynomorph identification does not allow the precise characterisation of major communities in the catchment, and any comparison with communities in modern habitats must be approximate. However, the assemblage of trees, shrubs, and climbers would suggest that woodland associations similar to those given below, and described in detail in the National Vegetation Classification (Rodwell 1991a and b), were present in the catchment:

Community W5	*Alnus glutinosa/Carex paniculata* woodland (wet/mesotrophic soil)
Community W21	*Crataegus monogyna/Hedera helix* scrub (dry/mesotrophic soil)
Community W10	*Quercus robur/Pteridium aquilinum/Rubus fruticosus* woodland (dry/oligo-mesotrophic soil)

The greatest impact on trees occurred at 38cm, and just before this significant amounts of cereal-type pollen were present; there was a continuous record of cereals to the end of the zone. Crops might have been grown within clearings in the woodland (Coles 1976; Edwards 1993; Wiltshire and Edwards 1993) and processing waste used to supplement other fuel. This means that residual pollen could have become scattered over the site and reached the pit. It could also have been incorporated into the sediments via dung of domesticates fed on the by-products of crop cultivation. After the reduction of arboreal pollen at 38cm, there was recovery to previous levels, and a massive increase (to 85%) at the end of the zone, where organic content of the sediment reached its highest level, and charcoal its lowest. It must be stressed that most of the variation in the arboreal pollen curve seems to have been due to the reduction and recovery of *Alnus*, although other trees were affected to some extent. There is little evidence to indicate the length of time represented by zone FWA/1, although the variation in the tree pollen curve implies a period long enough to witness the reduction and recovery of (predominantly) *Alnus*, ie. a number of years.

At the end of zone FWA/1 the increase in *Alnus*, the decline in charcoal and rise in organic content might suggest abandonment of the feature with a moving of the focus of activity elsewhere. Reduced activity would have resulted in low levels of microcharcoal, and plant debris would have been able to accumulate in the pit. The depressed values for dominant herbaceous taxa at the end of the zone might be a statistical artefact caused by the large increase in *Alnus*.

The terrestrial element of the beetle assemblage was too small to provide detailed information on the surrounding landscape. Both woodland and grassland taxa were present, however, including the weevil *Dryophthorus corticalis*. Today this insect is known only from Windsor Great Park, where it lives in the damp wood of old, rotten *Quercus* trunks in association with the ant *Lasius brunneus* (Donisthorpe 1939). This weevil was formerly more widely distributed, however, and has been recorded from several Bronze Age and earlier assemblages of old-woodland character. Table 2 shows that *Quercus* leaves were certainly found in the macrofossil assemblage, along with the seeds of *Rubus* sect. *Glandulosus* (bramble) and *Sambucus nigra* (elder). Another tree-dependent weevil was also found; *Phyllodecta vulgatissima* feeds on *Salix* (willow) leaves, so the shrub was probably growing locally, as indicated in the pollen record (Fig. 7). The presence of grazed grassland is also confirmed by the record of two beetles (*Phyllopertha horticola* and *Agrypnus murinus*), both of which feed on the roots of grassland plants. The scarabaeoid beetles *Geotrupes* sp. and *Aphodius* sp. also indicate grazing animals since they feed on the droppings of large herbivores. The plant macrofossil assemblage reinforces the evidence for weedy grassland, and areas of disturbed ground with ruderal weeds such as *Urtica dioica* (nettle), *Chenopodiaceae* (goosefoot), and *Rumex acetosella* (sheep's sorrel).

Zone FWA/2 seems to represent the period when the burnt mound lost its importance. There was a significant rise in *Tilia* very close to the site, although trees and shrubs were less affected. However there were also small increases in *Ulmus*, *Quercus*, and *Pinus*, along with a more significant increase in *Polypodium* (polypody fern) and an overall decrease in Poaceae. *Tilia* pollen and *Polypodium* spores are considered to be moderately resistant to decomposition so that where levels of biodeterioration are high, these taxa can become over-represented. However, there was very little difference in the levels of monolete fern spores between FWA/1 and FWA/2, and these are considered to be even more resistant to decay (Havinga 1971; Tipping and Carter 1994). It is likely, therefore, that the observed increases are real. *Polypodium* might have expanded in local woodlands generally and may not be directly related to the recovery of *Tilia*.

Tilia has sticky leaves and is insect-pollinated. It produces very small quantities of poorly-dispersed pollen, while most of the other trees (Fig. 8) produce relatively large amounts of readily-dispersed pollen. Its high pollen percentage suggest that *Tilia* had grown close to the burnt mound for a very long period, and that it had been pollarded during the peak of activity at the site. With abandonment of the area the tree was able to re-grow and flower, although the observed effects may have been due to the recovery of one or two trees rather than larger areas of woodland. *Tilia* representation can certainly vary considerably over short distances (Keatinge 1982) so that it is difficult to ascertain its population size. This tree must have been very valuable as a source of nutritious, palatable animal fodder and sugar sap in spring, and the seed may be converted to an oily substance resembling chocolate (Brimble 1948). In historical times, bast fibre (from the inner bark) has been used for making baskets, soles of shoes, fishing nets, and even a coarse kind of woven cloth. The wood is light, and seasons, works, and turns well, and it is excellent for carving (Hyde and Harrison 1977). The tree also casts heavy shade; it is highly likely, therefore, that it was cut to create glades as well as being heavily exploited when the site was in action.

The marked expansion of *Tilia* (up to 25% TLP/S) is particularly interesting since elsewhere in the Fens *Tilia* was a prominent component only of the pre-Elm Decline *(ie.* late Mesolithic/early Neolithic) woodland. At Feltwell Common, for example, the tree was remarkably abundant before 5000 years ago (Waller 1988, 1994a) but, with some exceptions (Bradshaw 1981; Greig 1982), it appears to have declined suddenly and permanently in the southern Fens in the Early to Middle Bronze Age. This makes the situation at Feltwell Anchor enigmatic. High *Tilia* values in palaeosols may indicate differential decomposition, but this is an unlikely explanation for these results since there were so few other marked changes in the pollen record in zone FWA/2. Explanations for the demise of *Tilia* vary from the hydrological (Waller 1994b) to the anthropological (Turner 1962). It can survive a fluctuating water table but cannot tolerate permanently water-logged soils, and Waller (1994b) has suggested that its decline in both the fens and elsewhere could have been due to progressive paludification of soils. In terms of felling, severe coppicing, and pollarding, *Tilia* has been shown to be exceedingly resilient, and it is rarely killed by cutting and mutilation (Pigott 1991).

It is likely that occupation of the burnt mound site resulted in severe cutting of local (possibly only a few) *Tilia* trees to the extent that flowering was much reduced. Increased pollen percentages after abandonment of the site could have been a result of flower production on stump suckers. It is also possible that the difference between the fate of *Tilia* at Feltwell Anchor and Feltwell Common (and elsewhere) was apparent rather than real; the pit at Feltwell Anchor probably recorded local and short-term changes in vegetation and it might not be possible to record such small-scale variation in sites with wider catchments (Jacobson and Bradshaw 1981).

Assessment of the peat deposits overlying the pit (Wiltshire 1993) showed that both *Tilia* and *Ulmus* disappeared from the record very soon after peat initiation. This would support Waller's contention (1994b) of paludification being the main force in the demise of hydrologically-sensitive taxa during, or after, the early Bronze Age. The earlier disappearance of *Tilia* from Feltwell Common emphasises the time-transgressive nature of the *Tilia* decline and its relationship to rising water table; the development and spread of peat may have reached Feltwell Common before Feltwell Anchor.

In conclusion, during its active life the pit appears to have been set in one of a number of woodland glades, or within open, mixed woodland in which both pastoral and arable agriculture were practised and had continued since before activity at the mound had started. The openings and glades would have been productive with berry-producing shrubs, and herb-rich grassy areas. Fen carr vegetation dominated by *Alnus* was important in the wetter areas, while soils near the pit must have been drier and relatively nutrient-rich. This is indicated by the number of hydrologically-sensitive, nutrient-demanding taxa growing very close to the feature; the fact that so many of these plants were insect-pollinated attests to their presence very nearby. Dry, acidic soils had also developed in the catchment and these supported plants characteristic of acid grassland and open, sandy soils. Many of the ruderals and other herbs could also have been growing on the broken, arable soils. The amounts of cereal-type pollen found in the pit might suggest that crop processing waste was used to supplement fuel for the mound, and some organised settlement must have existed in the vicinity in order to produce the crops. However, the duration of occupation and activity at the mound cannot be ascertained by palynological study alone.

The quality of the water in the water hole appears to have been periodically variable, and this may reflect a seasonal use of the feature. The pollen spectra also suggest that the pit supported prolific growths of floating aquatics and stands of emergents, but it is also possible that the pollen of these taxa found their way into the sediments through active filling from other bodies of water and/or flooding of the site. The pollen spectra in the upper sediments suggest that previously-exploited *Tilia* trees were able to recover after the site fell into disuse, and that the subsequent rise in ground water and resulting peat initiation occurred later at Feltwell Anchor than at Feltwell Common.

The grave

Grave *67* was a sub-rectangular feature, orientated east to west and cut into the approximate centre of the mound (Fig. 3). It contained a crouched inhumation, *71* (Fig. 9; Plate 2), which had been laid within a wooden coffin or mortuary structure. Radiocarbon determinations from samples of the left femur, tibia and fibula gave a date of 2140–1880 Cal. BC (Fig. 10: 3605±42 BP, weighted mean of GU-5571, 3540±60 BP, and GU-5572, 3670±60 BP; Ward and Wilson 1978). A flint scraper was found in the west end of the 'coffin' approximately 0.40m from the skull.

During excavation the mound material *6* was thought to have sealed the fill of the grave (Fig. 11). However, due to the similarity of the grave fill to the mound (*ie.* with mound material forming the main fill of the grave) and because only a shallow section through the mound existed, it is likely that any grave cut through the mound would have been very difficult to identify. The large amounts of burnt flint recovered from the grave indicated that it was present on the site before the grave was backfilled. Therefore, it is suggested that the mound actually *pre*-dated the burial. The radiocarbon determinations from the mound material and the skeleton also suggest (86% confidence) that the burial post-dates the mound.

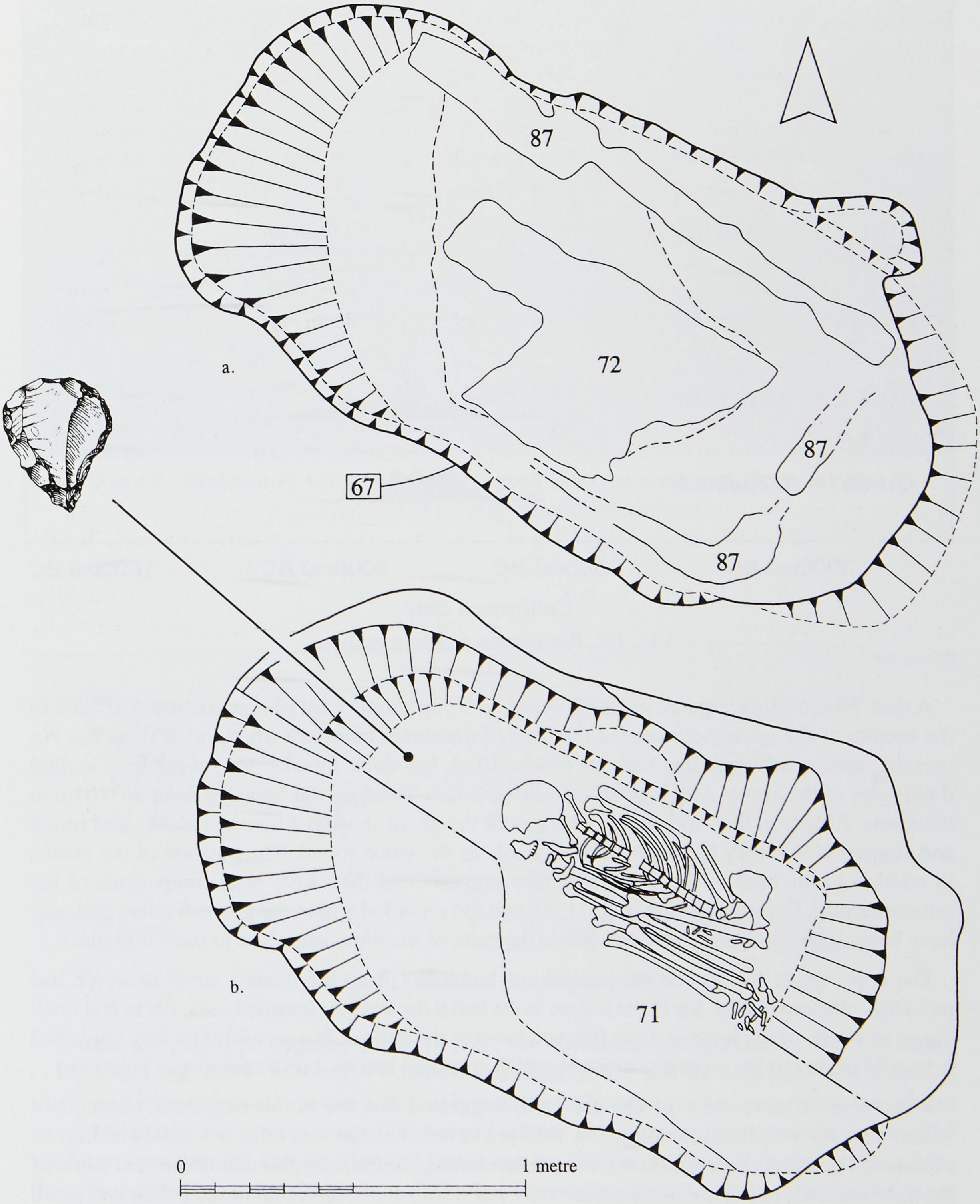

Fig. 9 Plan of grave *67* (a: coffin *72*; b: skeleton *71*)

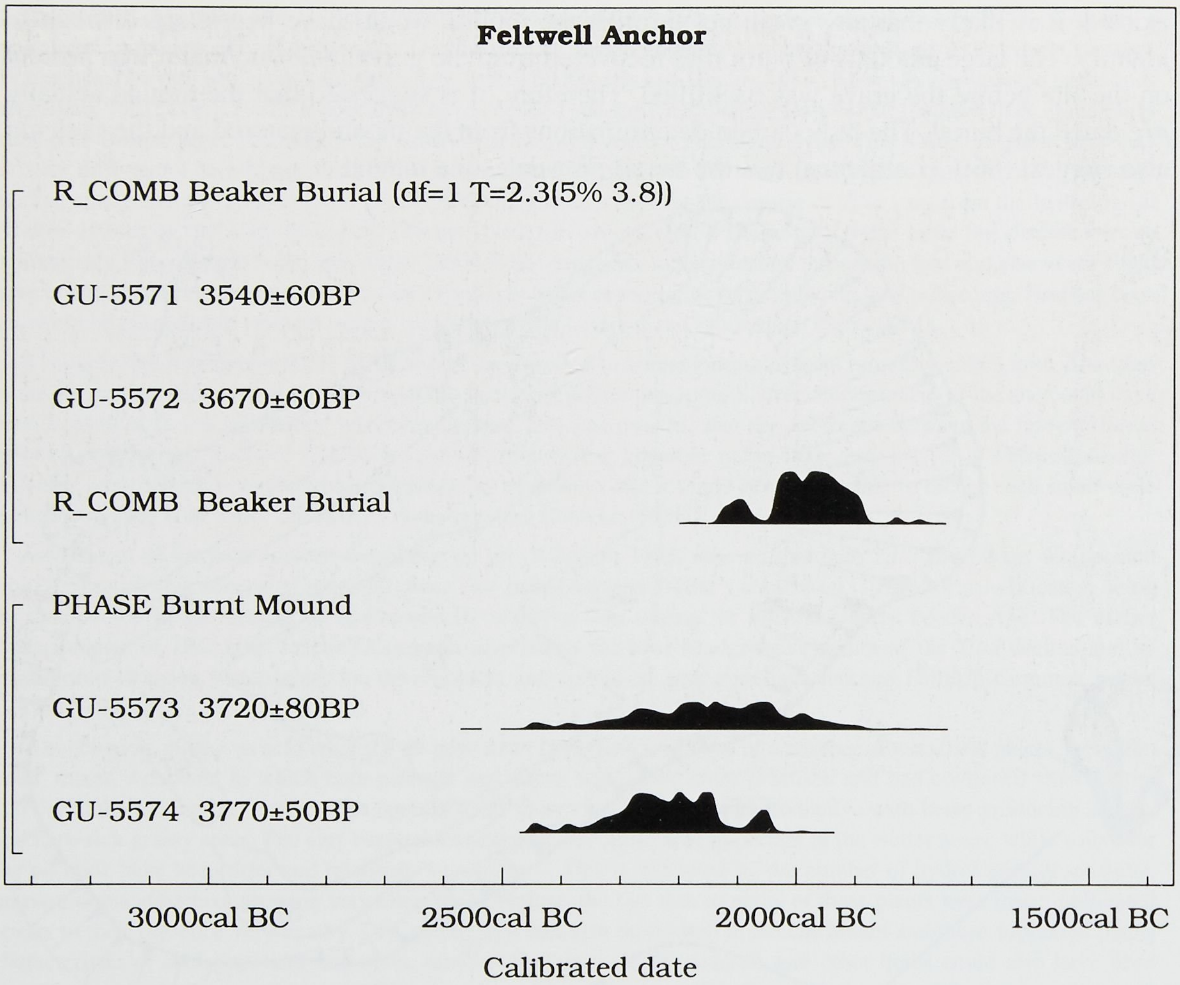

Fig. 10 Radiocarbon determinations

A dark brown-black organic material, lying on a thin primary fill of charcoal-flecked sand in the bottom of the grave, represented the base of a wooden mortuary structure *72* (Fig. 9a). No upright sides attached to this base were identified, but thick 'planks' (*87*) were seen around three sides of the grave. Although no cellular structure remained the 'wood' was up to 0.04m in thickness. Ridges in the sand along the edges of the grave showed where the planks had rested and suggested that they had collapsed outwards as the wood rotted. The position of the planks in relation to the base of the wood structure suggests that they were both components of the same structure. Deposits of clay (Fig. 11: *88* and *89*) recorded within the grave at either end may have been deliberately rammed up against the ends of the wood structure to pack it in place.

The upper grave fill *66* consisted mainly of burnt flint from the mound, some of which had probably collapsed into the top of the feature as the burial decayed. It contained some flecks and small lumps of wood, which became more frequent towards the bottom. It is possible that they originated from a lid or roof to the mortuary structure which collapsed into the burial chamber as it decayed.

Palynological assessment of the grave fill suggested that the burial may have taken place within a grassy woodland clearing. The well-preserved skeleton was fully articulated and lay in a crouched position (Fig. 9b). There was recent damage to the scapulae and tibiae, and some of the hand and foot bones and the patellae were not retrieved. Assessment of the pelvis and skull, and measurements of the femur and humerus showed the individual to be female. Examination

Plate 2 Skeleton *71* within grave *67*, viewed from the north-east. Scale = 1.5m. (23650 FWL 78 by Martin Smith)

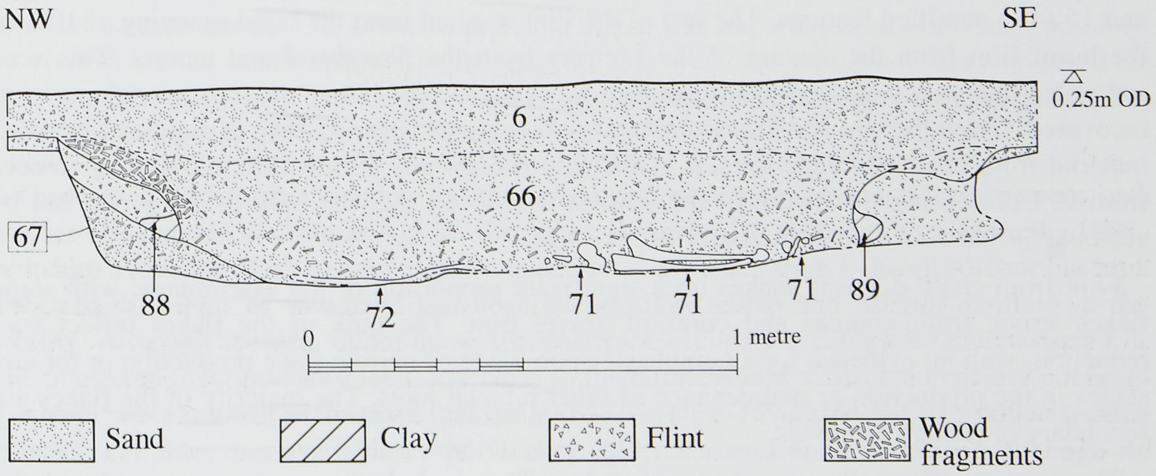

Fig. 11 Section across grave 67

of the pubic symphysis (Suchey-Brooks 1986), the costochondral junction of the ribs (Iscan *et al.* 1985), the teeth (Moorrees, Fanning and Hunt 1963) and the clavicles and scapulae (Stirland 1986) suggest the woman died in her mid to late twenties. Her stature was calculated from the lengths of the long bones (Trotter and Gleser 1952) to be approximately 1.67m. The teeth are overcrowded and cavities and caries can be seen in the molars. A radiograph of the right mandible showed a large apical abscess below the second molar. This would have caused severe discomfort.

Artefacts: pottery and flint

Pottery

by R. Boast

Fourteen sherds of fingernail-impressed Beaker, indicating an early 2nd millennium date, were recovered. Twelve sherds were from the pre-mound soil and two were found in the topsoil.

Further comparative work on the pottery from the site will be carried out by Sarah Percival in conjunction with her work on the pottery from a second FMP excavation of a burnt mound at Northwold (Crowson in prep.).

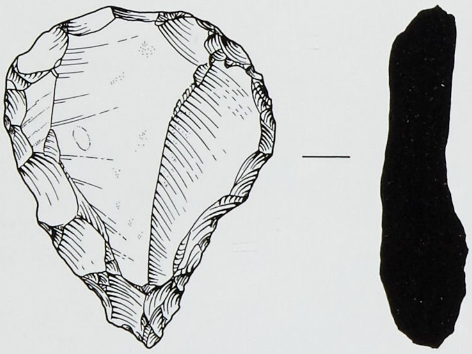

Fig. 12 Flint scraper from grave *67*. Scale 1:1

Worked flint

by M. Edmonds

Sixty-eight pieces of struck flint were found. Of these seven were recovered from the ploughsoil and 15 from stratified features. The rest of the flint resulted from the rapid scanning of 10% of the burnt flint from the sieving of the samples from the ploughsoil and mound. This scan suggested that only 0.06 % of the burnt flint was struck. Few, if any, diagnostic artefacts were recovered. Given the size and characteristics of the assemblage and a lack of comparative dated material from other Fen edge sites, it is difficult to draw any secure chronological inferences from it. Considering the nature of the context it is likely that the bulk of the group can be attributed to the Later Neolithic/Early Bronze Age.

Flint from chalk deposits makes up a significant proportion of the assemblage, with some flakes struck from nodules and cores of gravel flint. The bulk of the flakes reflect core reduction, with no evidence for an emphasis upon blade or narrow flake production or for any stages in the production or maintenance of other bifacial tools. The majority of the flakes are secondary or tertiary removals.

The number of formally-retouched tools is low. They include the scraper associated with the inhumation (Fig. 12) which has a steep working angle (70 degrees) and appears to have been trimmed to create a narrow tang or piercing/boring edge at its proximal end.

Discussion

Sites in the Wissey Embayment can be seen to have followed a similar distribution on the sandy ridges and low hills along the eastern fen edge from the Mesolithic period onwards, and a wide variety of artefacts have been recovered. A sharp increase in the density of sites occurred during the Later Neolithic/Early Bronze Age, (Silvester 1991, figs 45–47, 49, 70–73). This probably reflects the range of different environments available for exploitation, with different environments perhaps being exploited seasonally (Healy 1996, 180). Although the majority of the 'pot-boiler' sites followed the same distribution as that of other settlement, a few (including Feltwell 171) were located on the sandhills to the south-west and north-west of the area (Fig. 2). As well as giving the opportunity to investigate one of the few upstanding burnt mounds in the Norfolk fens, the present work also provides a chance to look at prehistoric activities occurring on the sandhills away from the densely occupied fen edge. Virtually no other types of site from the period have been identified in these areas. These variations in the distribution of burnt mounds may indicate that the availability of the necessary resources was as important a locational factor as proximity to settlement.

The location of burnt mound sites away from permanent settlements has been suggested by some authors as indicating temporary occupation associated with food processing or hunting (Layard 1922, O'Drisceoil 1988). At Swales Fen, Suffolk, a withy-lined pit containing animal bone, associated with a burnt mound and situated *c*. 1.5km from an Early Bronze Age settlement at West Row Fen (Martin 1988), was interpreted as a cooking pit. With regard to burnt mounds which were probably unsuitable for permanent occupation, and where excavation has failed to yield either animal bone or finds usually associated with settlement, it is popularly suggested that they served 'saunas' or sweat lodges (Barfield and Hodder 1987). However Petersen and Healy (1986) have suggested that burnt flint itself may have been an end product needed for pottery-making or some other industrial process. Other suggested activities include any domestic, industrial or ritual process which may have needed hot water or steam (Barfield 1991), and a wide range of historical and ethnographic parallels have been cited. Clearly water was required at the site and a possible water channel, observed close to the mound, may have been its source. Whatever the nature of the process which heated it, the flint at Feltwell Anchor must have represented a valuable resource since it is relatively sparse in the sandy deposits revealed beneath the mound. It seems probable that it was imported from elsewhere, possibly by river from the chalk uplands to the east. If this were the case, the effort involved in transportation might help explain the frequent re-use of the material which is suggested by the small size of most of the burnt flint found at the site.

There is considerable evidence for tree clearance of varying magnitude in eastern and southern England in the Bronze Age (Waller 1994, Wiltshire 1997, Wiltshire and Murphy 1998, Wiltshire 1999, Wiltshire in prep.). Bioarchaeological evidence from Feltwell Anchor has also indicated that areas of woodland had been cut to allow arable and pastoral farming in the locality. Although its size, duration, and intensity of occupation cannot be demonstrated, a settlement (or sites) probably lay fairly close to the burnt mound. Charcoal evidence suggests that alder was exploited as the main fuel while sedges were used as kindling. The pollen spectra indicate that alder was available in the vicinity. Alder makes a poor wood fuel, although its efficiency is improved when it is used as charcoal. Its use as the main fuel at the site, when oak — a more efficient fuel — was perhaps more abundant and closer to hand, might indicate preferential selection.

Palynological evidence from pit *44* indicates that woodland had been cleared away from its catchment. In zone FWA/1 (Fig. 7) the curve for woody taxa shows that their representation fell to below 50% of total land pollen and spores. In simple terms (Heim 1962) this may show that 50% of their flowering potential had been removed either by felling or cutting, presumably both to create glades for agriculture and for the functioning of the burnt mound. The recovery of lime in zone FWA/2 indicates that this tree was particularly subjected to intensive management during the functional life of the pit, and this is not surprising in view of the wide variety of resources provided by this plant. It is exceedingly interesting to have evidence of a recovery of lime after its apparent demise in the Bronze Age. Other fenland sites which have been subjected to palynological investigation have been too far removed from the origin of human activity to detect such local changes in woodland (Waller 1994). The results obtained from Feltwell Anchor have provided another opportunity for highlighting the potential value of sample material from feature fills in providing information on heterogeneity in the Bronze Age landscape and land management (Wiltshire 1998).

Pit *44* seems to have been an enlargement of a natural hollow; bioarchaeological evidence indicates that it was not only open during the functional activity of the burnt mound, but that it also acted as a reservoir that may have been filled, at least periodically, with water from another source. Alternatively the pit may have fulfilled a more central role in activity at the site. It was located towards the putative channel and in the same general area as the high charcoal concentrations recorded in the south-western part of the mound. This indicates that the pit had been constructed near the main centre of activity. But there is no evidence, as often seen, for the crescent-shaped development of burnt flint mounds around a focal activity point (Pasmore and Pallister 1967; Crowson in prep.).

The original purpose of the timber trough found discarded in the pit remains unclear. There was no evidence that it was used for cooking: although it could have been used for heating water for food or some other purpose, it may have been unrelated to the hot stone technology. At Clashroe, Co. Cork, a similar trough, was found set in a pit next to a burnt mound and hearth (Hurley 1990). The trough was 1.80m long, hollowed by axe or adze from a single oak trunk, and blocked at one end with a plank set in a groove. A radiocarbon determination from the Clashroe trough produced a date of 3490±35 BP (GrN-13.877).

The precise nature of activity occurring at the site remains unclear. Its environs had been cleared of woodland and there is evidence for nearby farming. People working at the site would have needed to eat, and at least some food was prepared there, but it does not appear that cooking was the main reason for the development of the mound; indeed, it may have been unnecessary if there were a settlement nearby. Cereal pollen implies crop production or processing, which in turn, implies settlement of some duration, even if on a seasonal basis. Rather than being part of usual domestic activity, however, it seems more likely that the site was a focus for some specific activity or that it functioned as a meeting place, perhaps seasonally, over a number of years. The development of the burnt mound itself probably represents some specialised process.

When the mound was abandoned the pit accumulated some of its debris-rich fill. Trees, particularly lime, appear to have recovered and the open glade, within which the burnt mound was located, was gradually encroached upon by woodland. The canopy remained open enough to support areas of weedy grassland, and cereals were still being produced or processed near the site. But the centre of activity seems to have moved away and the mound was re-used for burial. The sparseness of Late Neolithic/Early Bronze Age burial evidence from the Wissey Embayment was noted during the Fenland Survey (Fig. 2), and the far lower number of barrows known from the eastern (compared to the western) fen edge has also been recorded (Hall and Coles 1994, fig. 39).

The skeleton was the first burial from the Norfolk peat fens to be excavated under modern controlled conditions. Previously the large number of barrows known from the upland to the east (Lawson et al 1981, fig. 5) was thought to suggest the seasonal use of the Fen, and the relative frequency of monuments along river valleys leading down into the Fens has been suggested as indicative of migratory movement and territorial expression (Evans 1987). Disarticulated human bone has been found in Early Bronze Age fen edge settlements, however, and several skeletons found from the Fens in Methwold parish in the 1950s and 60s seem to date to this period, one of them at least probably being a deliberate deposition (Fig. 2; SMR sites 2542, 2550 and 2585). In the 1930s the skeleton of 'Nancy' (Fig. 2, SMR site 2586), a young female dated to the Early Bronze Age by an associated jet bracelet, was found near the Southery/Methwold parish boundary (Healy and Housley 1992; Healy 1996). Another female burial with associated jet ornaments is known from Soham Fen, Cambridgeshire (Roberts 1998). Roberts suggests that these latter two individuals may be representative of a group of female 'status' burials and that the Feltwell burial may be another example.

Further burial evidence is known from Feltwell where thirty individuals, with associated Early Bronze Age material, were found in a natural hillock on the fen edge (Healy 1996, 30–35) and Early Bronze Age burials in natural mounds are known from Chippenham (Martin 1977) and Mepal (Fox 1923), both in Cambridgeshire. The use of natural mounds for ritual purposes, if not for burial, may also be seen at Longham, Norfolk (Wymer and Healy 1996). It is possible that the upstanding mound at Feltwell Anchor provided a convenient or desirable landscape feature in which the burial could be placed, such a feature being at a premium in the otherwise flat fen landscape. A lack of earlier Neolithic monuments such as causewayed enclosures from the eastern Fen edge, despite evidence for extensive occupation, has also been highlighted. It is possible that in an earlier period, too, natural landscape features were utilised for monumental purposes (Ashwin 1996). If so the use of pre-existing mounds for burial in the Early Bronze Age may indicate the persistence of a long-lasting local tradition.

Considering the nature of the mound material as an end product or discard resulting from the activity taking place at the site, it seems most likely that the burial within the mound represented a secondary use of the site. This is supported by the manner in which the radiocarbon dates from the skeleton were significantly later than those from the mound. The radiocarbon age range for the burial is consistent with those from a number of Norfolk barrows (eg. Bowthorpe, Trowse: summarised in Lawson *et al* 1986, fig. 1; Ashwin and Bates 2000, fig. 180). These other dates were generally from pyre charcoal, however, and the fact that the Feltwell date is on bone may enhance its interest.

The primary objective of the Fenland Management Project was to secure — in conjunction with the results of the previous two Fenland Projects — a record of the archaeological landscape linked to environmental studies prior to the destruction of important remains (English Heritage 1992). The work at Feltwell Anchor has provided information about the environment at the time of the activity there, and about the effect that the activity at the site may have had on that environment. Although there was no clear evidence for the use to which the hot flint itself had been put, the excavation of the site has provided a first opportunity to investigate a burnt mound in the Norfolk Fens and carry out full analysis of some of the material from it. The unexpected discovery of the burial within the mound has demonstrated the site's continued use, and may indicate a wider practice of utilisation of available low mounds or hillocks in the otherwise relatively featureless Fen landscape. It is possible that other sites of this kind remain unidentified, countering the conspicuous dearth of previously-recorded burials and ritual monuments from the eastern Fen edge.

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Assessment and further analysis of the artefactual and environmental evidence was carried out by Robin Boast (pottery); Richard Darrah (timber trough) Mark Edmonds (flint); Charly French (soil); Rowena Gale (charcoal); Rosemary Luff (human and animal bone); Peter Murphy (plant macrofossils and molluscs); Mark Robinson (insects) and Patricia Wiltshire (palynology and pollen diagrams). The illustrations for this report were prepared by David Dobson, with the exception of the drawing of the timber trough which was by Steven Ashley.

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BIBLIOGRAPHY

Apling, H., 1931, 'Bronze Age Settlements in Norfolk', *Proc. Prehist. Soc.* 6, 365-70

Ashwin, T.M., 1996, 'Neolithic and Bronze Age Norfolk', *Proc. Prehist. Soc.* 43, 44-66

Ashwin, T.M. and Bates, S.J., forthcoming, *Excavations on the Norwich Southern Bypass, 1989-1991. Part I: Excavations at Bixley, Caistor St Edmund and Trowse*, E. Anglian Archaeol.

Bagyaraj, D.J. and Varma, A., 1995, 'Interaction between Arbuscular Mycorrhizal Fungi and Plants: Their Importance in Sustainable Agriculture in Arid and Semiarid Tropics', in Gwynfryn Jones, J. (ed.), *Advances in Microbial Ecology* 14 (New York, Plenum Press), 119-142

Barfield, L.H., 1991, 'Hot stones: hot food or hot baths?', in Hodder, M.A. and Barfield, L.H., *Burnt Mounds and Hot Stone Technology. Papers from the Second International Burnt Mound Conference Sandwell, 12th-14th October 1990* (Sandwell Metropolitan Borough Council)

Barfield, L. and Hodder, M., 1987, 'Burnt mounds as saunas, and the prehistory of bathing', *Antiquity* 61, 370-379

Bradshaw, R.H.W., 1981, 'Quantitative reconstruction of local woodland vegetation using pollen analysis from a small basin in Norfolk, England', *Journal of Ecology* 69, 941-955

Brimble, L.J.F., 1948, *Trees in Britain: wild, ornamental and economic and some relatives in other lands* (London, Macmillan & Co. Ltd.)

Calcote, R., 1998, 'Identifying forest stand types using pollen from forest hollows', *The Holocene* 8(4), 423-432

Coles, J.M., 1976, 'Forest farmers: some archaeological, historical and experimental evidence', in De Laet, S.J. (ed), *Acculturation and Continuity in Atlantic Europe: IV Atlantic colloquium, Bruges*, 59-66

Crowson, A., in prep., *Hot Rocks in the Norfolk Fens: A Burnt Mound at Northwold*, E.Anglian Archaeol.

Daniels, R.E. and Eddy, A., 1985, *Handbook of European Sphagna* (Institute of Terrestrial Ecology, Natural Environmental Research Council, Huntingdon)

Domsch, K.H., and Gams, W., 1972, *Fungi in agricultural soils* (London, Longman)

Donisthorpe, H. St. J.K., 1939, *A Preliminary List of the Coleoptera of Windsor Forest* (London, N. Lloyd)

Earwood, C., 1993, *Domestic Wooden Artefacts in Britain and Ireland from Neolithic to Viking times* (University of Exeter Press)

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

Edlin, H.L., 1951, *British Plants and their Uses* (London, Batsford)

Edwards, K.J., 1993, 'Models of mid-Holocene forest farming for north-west Europe' in Chambers, F.M. (ed.), *Climate change and human impact on the landscape* (London, Chapman & Hall), 133-146

Evans, C., 1987, 'Nomads in "Waterland"? Prehistoric transhumance and fenland archaeology', *Proc. Cambridge Antiq. Soc.* 76, 27-39

English Heritage 1992, 'The Fenland Project: from Mapping to Management', *A Seminar at the Society of Antiquaries on 23rd October 1992. Research Objectives of the Fenland Management Project*

Fox, C., 1923, *The Archaeology of the Cambridge Region* (Cambridge)

Gowen, M., 1988, *Three Irish Gas Pipelines: New Archaeological Evidence in Munster* (Dublin)

Greig, J.R.A., 1982, 'Forest clearance and the barrow builders at Butterbump, Lincolnshire', *Lincolnshire History & Archaeology* 17, 11-14

Hall, D., and Coles, J., 1994, *Fenland Survey, An essay in landscape and persistence*, English Heritage Archaeological Report 1 (London, English Heritage)

Havinga, A.J., 1971, 'An experimental investigation into the decay of pollen and spores in various soil types.' In Brooks, J. Grant, P.R. Muir, M. van Gijzel, P. and Shaw, G. (eds), *Sporopollenin* (London, Academic Press), 446-479

Healy, F., 1991, 'Lithics and Pre-Iron Age Pottery', in Silvester, R.J., 1991, *The Fenland Project Number 4: The Wissey Embayment and the Fen Causeway, Norfolk*, E. Anglian Archaeol. 52

Healy, F., and Housley, R.A., 1992, 'Nancy was not alone: human skeletons of the Early Bronze Age from the Norfolk peat fen', *Antiquity* 66, 948-955

Healy, F., 1996, *The Wissey Embayment: a survey of the evidence for pre-Iron Age settlement accumulated prior to the Fenland Survey*, E. Anglian Archaeol. 78

Heim, J., 1962, 'Recherches sur les relations entre la végétation actuelle et le spectre pollinique récent dans les Ardennes Belges', *Bulletin Societé Royale Botanique Belgique* 96, 5-92

Hurley, M.F., 1990, 'Two fulahta fiadh in County Cork', in Buckley, V., *Burnt Offerings. International Contributions to Burnt Mound Archaeology* (Wordwell Ltd–Academic Publications, Dublin), 38-39

Hyde, H.A. and Harrison, S.G., 1977, *Welsh Timber Trees: Native and Introduced* (Cardiff, National Museum of Wales)

Hodder, M.A. and Barfield, L.H., 1991, *Burnt Mounds and Hot Stone Technology. Papers from the Second International Burnt Mound Conference, Sandwell, 12th-14th October 1990* (Sandwell Metropolitan Borough Council)

Ingold, C.T., 1965, *Spore Liberation* (Oxford, Clarendon Press)

Iscan, M.Y, Loth, S.R and Wright, R.K., 1985, 'Age estimation from the rib by phase analysis: white females', *Journal of Forensic Sciences* 30, 853-863

Jacobson, G.L. and Bradshaw, R.H.W., 1981, 'The selection of sites for palaeovegetational studies', *Quaternary Research* 16, 80-96

Keatinge, T.H., 1982, 'Influence of stemflow on the representation of pollen of *Tilia* in soils', *Grana* 21, 171-174

Layard, N.F., 1922, 'Prehistoric Cooking Places in Norfolk', *Proc. Prehist. Soc. East Anglia* 3(4), 483-498

Lawson, A.J. Martin, E.A. and Priddy, D., 1981, *The Barrows of East Anglia*, E. Anglian Archaeol. 12

Mallik, A.U., Gimingham, C.H. and Rahman, A.A., 1984, 'Ecological effects of heather burning 1. Water infiltration, moisture retention and porosity of surface soil.', *Journal of Ecology* 72 (3), 767-776

Martin, E.A., 1977, 'The excavation of two tumuli on Waterhill Farm, Chippenham, Cambs. 1973', *Proc. Camb. Antiq. Soc.* vol. 66, 1-26

Martin, E.A., 1988, 'Swales Fen, Suffolk: a Bronze Age cooking pit?', *Antiquity* 62, 358-9

Mook, W.G., 1986, 'Business meeting: Recommendations/Resolutions adopted by the Twelth International Radiocarbon Conference', *Radiocarbon*, 28, 799

Moorrees, C., Fanning, E.A. and Hunt, E., 1963, 'Age variation of formation stages for ten permanent teeth', *Journal of Dental Research* 42 , 205-213

Murphy, P., 1988, 'Palaeoecological studies of three Bronze Age 'burnt flint' sites near West Row, Mildenhall', *Ancient Monuments Laboratory Report* 165/8 (London, English Heritage)

O'Drisceoil, D.A., 1988, 'Burnt mounds: cooking or bathing?', *Antiquity* 62, 671

Pasmore, A.H. and Pallister, J., 1967, 'Boiling Mounds in the New Forest' *Proc. Hampshire Arch. Soc.* 24, 14-19

Pearson, G.W. and Stuiver, M., 1986, 'High-precision calibration of the radiocarbon timescale, 500-2500 BC', *Radiocarbon* 28, 839-62

Petersen, F. F. and Healy F., 1986, 'The Excavation of Two Round Barrows and a Ditched Enclosure on Weasenham Lyngs, 1972' in Lawson A.J., 1986, *Barrow Excavations in Norfolk, 1950-82*, E. Anglian Archaeol. 29, 70-103

Pigott, C.D., 1991, '*Tilia cordata* Miller', *Journal of Ecology* 79, 1147-1207

Roberts, J., 1998, 'A contextual approach to the interpretation of the Early Bronze Age skeletons of the East Anglian Fens', *Antiquity* 72, 188-96

Rodwell, J.S., 1991a, *British Plant Communities 1: Woodlands and scrub* (Cambridge University Press)

Rodwell, J.S., 1991b, *British Plant Communities 2: Mires and heaths* (Cambridge University Press)

Round, F.E., 1981, *The Ecology of Algae* (Cambridge University Press)

Silvester, R.J., 1991, *The Fenland Project Number 4: The Wissey Embayment and the Fen Causeway, Norfolk*, E. Anglian Archaeol. 52

Stace, C., 1991, *New Flora of the British Isles* (Cambridge University Press)

Stirland, A., 1986, *Human Bones in Archaeology* (Shire Publications)

Stuiver, M. and Reimer, P.J., 1986, 'A computer programme for radiocarbon age calculation', *Radiocarbon* 28, 1022-30

Suchey, J.M., Wisely D.V. and Katz, D., 1986, 'Evaluation of the Todd and McKern Stewart methods of ageing the male *Os pubis*' in Reichs, K. (ed.), *Forensic osteology: advances in the identification of human remains* (Springfield, Illinois: Thomas)

Tipping, R. and Carter, S., 1994, 'Soil Pollen and Soil Micromorphological Analyses of Old Ground Surfaces on Biggar Common, Borders Region, Scotland', *Journal of Archaeological Science* 21, 387-401

Trotter, M. and Gleser, G.C., 1952, 'Estimation of stature from long-bones of American Whites and Negroes', *American Journal of Anthropology* 10, 463-514

Turner, J., 1962, 'The *Tilia* decline: an anthropogenic interpretation', *New Phytologist* 6,1, 328-341

Waller, M.P., 1988, 'The Fenland Project's environmental programme' *Antiquity* 62, 336-343

Waller, M.P., 1994a, *The Fenland Project 9: Flandrian Environmental Change in Fenland*, E. Anglian Archaeol. 70

Waller, M.P., 1994b, 'Paludification and pollen representation: the influence of wetland size on *Tilia* representation in pollen diagrams' *The Holocene* 4, 430-434

Ward, G.K. and Wilson, S.R., 1978, 'Procedures for comparing and combining radiocarbon age determinations; a critique', *Archaeometry* 20, 19-31

Wiltshire, P.E.J., 1993, *Feltwell Anchor (FWL 23650): Assessment of Potential for Pollen Analysis*, unpublished report for Norfolk Archaeological Unit/English Heritage

Wiltshire, P.E.J., 1995, 'The effect of food processing on the palatability of wild fruits with high tannin content', in Kroll, H. and Pasternak, R. (eds), *Res archaeobotanicae* (Kiel, Oetker-Voges-Verlag), 385-397

Wiltshire, P.E.J., 1997, 'Palynological Assessment Report', in Stevens, S., 'Excavations at Potlands Farm, Patching, West Sussex', *Sussex Archaeol. Colls* 135, 59-70

Wiltshire, P.E.J., 1999, 'Pollen', in Evans C., 'The Lingwood Wells: Waterlogged remains from a first millennium BC settlement at Cottenham, Cambridgeshire', *Proc. Camb. Antiq. Soc.* 87, 11-30

Wiltshire, P.E.J., in prep, 'The Pollen', in Crowson, A., *Hot rocks in the Norfolk fens: A burnt mound at Northwold*, E. Anglian Archaeol.

Wiltshire, P.E.J., and Edwards, K.J., 1993, 'Mesolithic, early Neolithic, and later prehistoric impacts on vegetation at a riverine site in Derbyshire, England', in Chambers, F.M. (ed.), *Climate change and human impact on the landscape* (London, Chapman & Hall), 157-168

Wiltshire, P.E.J. and Murphy, P.L., 1998, 'An Analysis of Plant Microfossils and Macrofossils from Waterlogged Deposits at Slough House and Chigborough Farms', in Wallis, S. and Waughman, M., *Archaeology and the Landscape in the Lower Blackwater Valley*, East Anglian Archaeol. 82, 172-204

Wymer, J.J. & Healy, F., 1996, 'Neolithic and Bronze Age Activity and Settlement at Longham and Beeston with Bittering: Excavation of the Longham Mound — Site 7239', in Wymer, J.J., *Barrow Excavations in Norfolk 1984-1988*, E. Anglian Archaeol. 77

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