EXCAVATION OF A PREHISTORIC STREAM-SIDE SITE AT LITTLE MARLOW, BUCKINGHAMSHIRE

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Excavations were carried out in advance of sand and gravel extraction at Little Marlow, Buckinghamshire. The principal site identified consisted of a large expanse of black earth and 'burnt stone' on both sides of a small stream tributary of the River Thames. A possible lake/river-side activity area was identified which showed phased evidence of burnt mound construction together with the excavation of a ditch and several post-holes. Worked flint and ceramics were recovered, but the general low level of occupation debris suggested of a non-domestic role for the site. A full palynological analysis of the context of the site was possible due to the presence of deep peat horizons and several radiocarbon determinations were obtained. The lower peats related to the early Mesolithic environment; the upper peats were of late prehistoric date with evidence of human activity and cereal cultivation. The study provides the first pollen analysis for South Buckinghamshire. To the north of the present day stream, radiocarbon dates showed activities to have taken place during the Middle and Late Bronze Age; to the south the activities were clearly of earliest Bronze Age date. It appears likely that the positioning of the activities were dictated by the nature of the migrating stream course and the changing water-table. The dispersed character of the archaeological evidence combined with the broad date range indicated by the radiocarbon dates suggest the intermittent use of a favourable location for an activity apparently not associated with contemporary household activities. The site is discussed in its local and regional context.

INTRODUCTION

Planning permission was granted to *Lafarge Aggregates Limited* (formerly Redland Aggregates Ltd) for the extraction of sand and gravel at Little Marlow Quarry, Little Marlow Parish, Buckinghamshire (SU87008765), and was subject to a number of conditions, one of which required that archaeological excavations took place prior to any works which had the potential to affect below ground archaeological remains. Such effects were considered likely as during an earlier evaluation the development area had shown the potential to contain sites of prehistoric date. This report details the findings of the archaeological investigations which were kindly funded by the developer.

The quarry lies to the south of the A4155 between Little Marlow village to the east, Easthorpe House to the west and a sewerage works to the south (Figure 1c). It is adjacent to Little Marlow village, but the actual area of extraction lay some 120m from the built-up area. The net area of extraction was approximately 25 ha. It is located on gently sloping ground falling from 39.0m OD in the north to approximately 26.5m OD in the south (a fall of 2.4%). The soils of the area are complex

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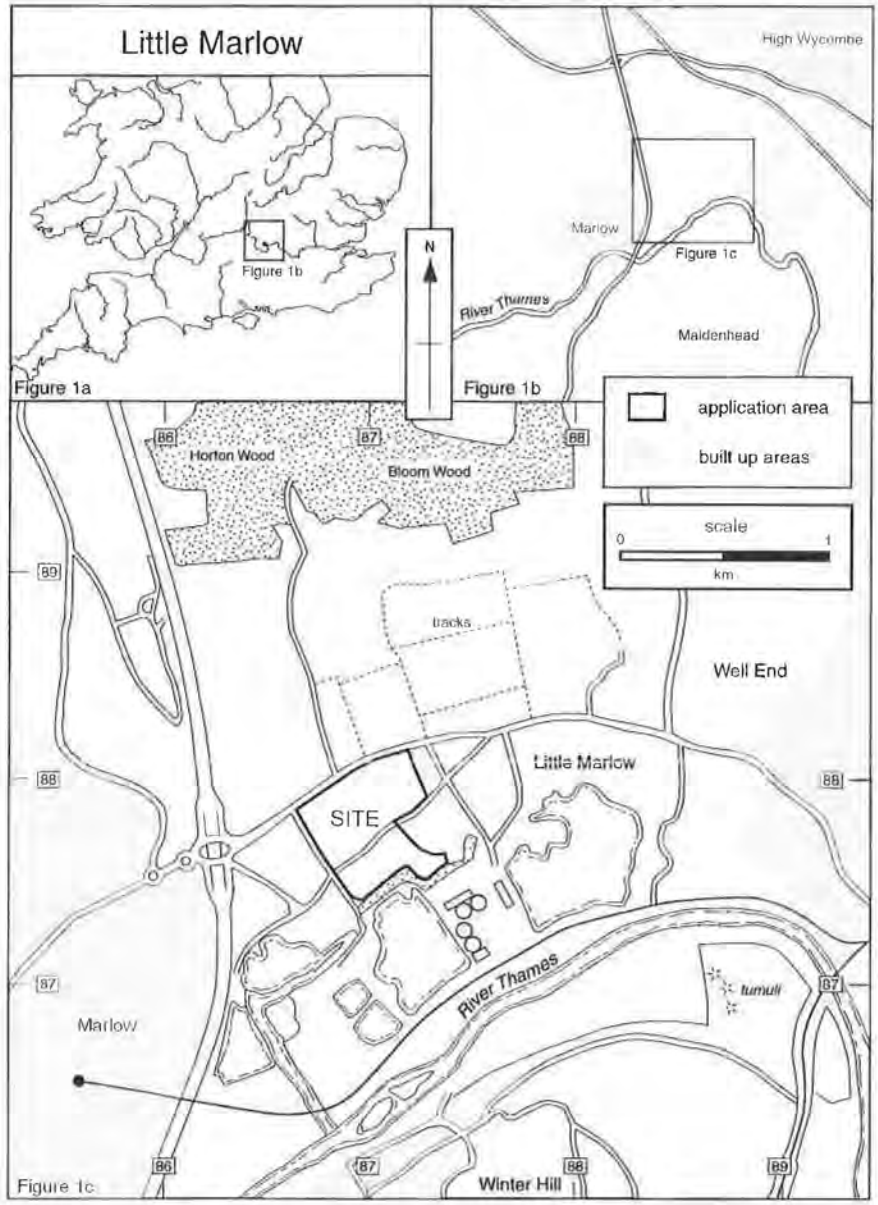

FIGURE 1 Site location.

but essentially consist of sandy silts and sandy silt loams. Brickearth (a windblown silt) is a major constituent of many of the soils. Deposits of brickearth were deeper in the centre of the application area where the deposit had banked up against the bluff at the junction of the Taplow and Flood Plain terraces. Brickearth had been eroded from the terrace tops. Alluvial deposits of the Enborne and Fladbury series had been identified in the south-east part of the application area adjacent to the stream. Boreholes had shown the depth of the alluvium to be about 1.2 m. At a depth of 0.6m the soils

became saturated. The underlying geology consisted principally of Taplow Gravels on the highest ground to the north-east, and Flood Plain terrace deposits on the remainder.

Before the field evaluation no archaeological sites had been recorded from the application area. Artefacts of prehistoric and Roman date had, however, been recovered from nearby sites. On the west side of Marlow, there are a series of ring-ditch cropmarks attesting to prehistoric activity in the district. On the opposite banks of the river, north of Cookham, further cropmarks have been noted.

The evaluation included the re-examination of aerial photographs and historical data (Kiberd 1994). No fieldwalking was undertaken as the fields were in pasture and no geophysical survey was conducted due to the unresponsive nature of the underlying soils. Trial-trenching did, however, take place to target aerial photographic features and to assess a cross-section of the site. A total of 64 evaluation trenches were positioned, covering *c* 6,000 square metres of the surface. Within these trenches little archaeology was revealed, however four 'sites' where further investigation was deemed appropriate were noted (Figure 2).

Site 1 was close to the northern boundary of the quarry, upon the raised gravel terrace. The evaluation identified several pits and post-holes of probable Bronze Age date, one of the pits containing several well preserved clay loom weights, but the ensuing open-area excavation added little to the picture, locating few further features of archaeological interest. It appears that the evaluation trenches coincided with what appears to be an isolated area of ephemeral activity, which may have been domestic in character, perhaps associated with mobility across the landscape.

Further down the gravel terrace, at the juncture with the brickearth, the evaluation identified a second area of 10 pits and 15 post-holes of late Iron

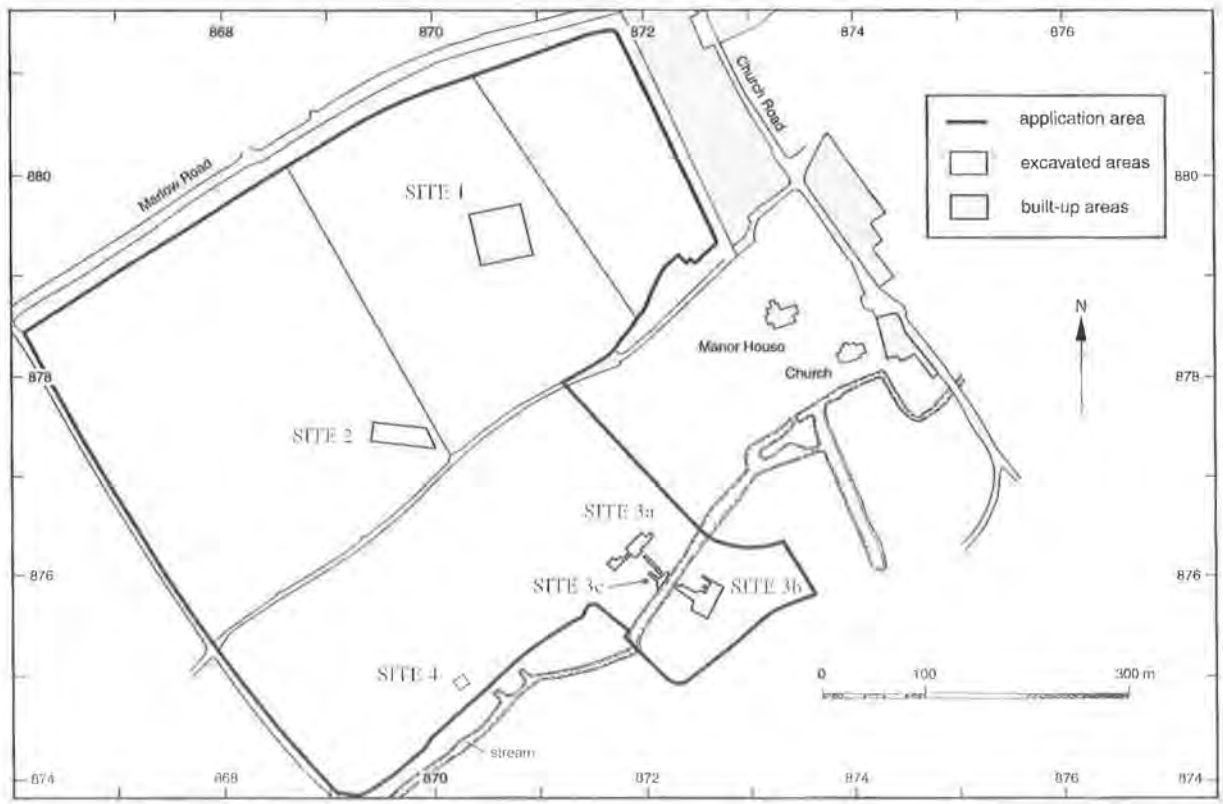

FIGURE 2 Location of the areas of excavation.

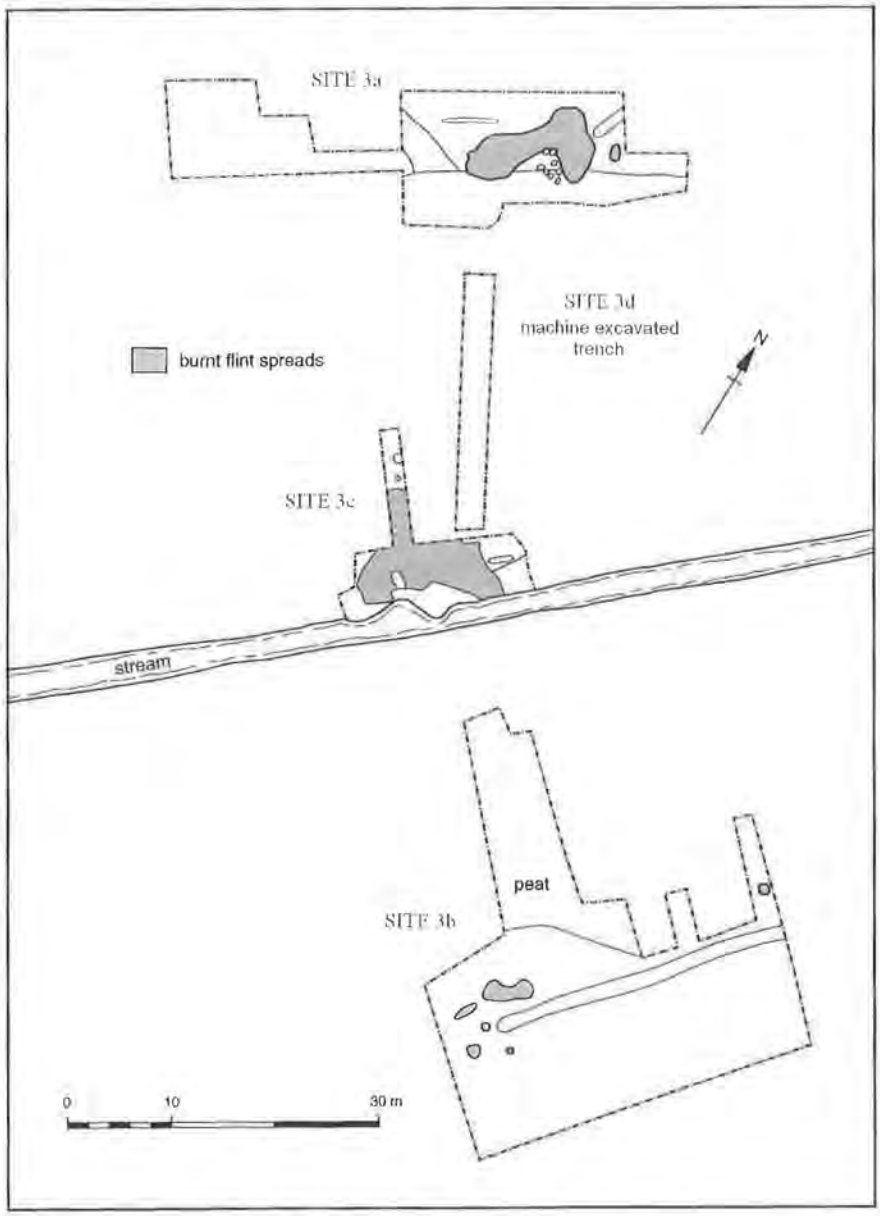

FIGURE 3 The stream-side activity, Site 3.

Age date (Site 2). The features here were in greater concentration, but following the opening up of the area as part of the further investigations, little structure or pattern to the remains could be elucidated. Given the presence of charcoal, burnt flint, slag and fired clay (245gms in pit 6745), an industrial aspect to the area is suggested.

To the south of Site 2, a single evaluation trench on the brickearth located a scatter of worked flint including a single tranchet axe. Again an area was opened up around the finds (Site 4), but this did not show the scatter to extend much beyond the con-

fines of the original evaluation trench. It appears the axe was an isolated find of Mesolithic date, which is not that unusual along the middle stretches of the Thames valley (Wymer 1968).

Of more significance, however, was the identification of a large expanse of black earth and burnt and fire-shattered flint on both sides of the stream tributary that traversed the site, which appeared to represent a possible lake or stream-side activity area (Site 3). The evidence indicated the presence of a so-called 'burnt mound' site, of which there was no indication on the surrounding ground surface. Clearing of the vegetation surrounding the area identified a further area of burnt stone eroding out of the northern stream bank. The recovery of several pottery sherds and worked flints from the evaluation indicated it was of probable Bronze Age date, and this was supported by a radiocarbon determination of 3270±90 BP (Beta-82560) obtained from one of the areas of flint burning on the northern bank. Again, an area was opened up around the perceived zones of activity in order to study them in more detail. The following report details the findings of this excavation.

The stream-side activity

The black-earth area extended from the southern end of evaluation trench 22 (50m to the north-west of the stream) to the stream and to a point at least 35m south of the channel (Figure 3). Investigations were carried out to recover archaeological and palaeo-environmental evidence. At times the site suffered nearly complete inundation when opened for investigation, (the southern field was often under water for most of the winter months), and excavation under these conditions was at times a difficult undertaking. Measures were taken to counter the flow of water while recording took place.

The area was examined through the excavation of three open areas (hereafter termed Sites 3a, 3b and 3c), together with a single machine section running NW to ES on the northern bank (Site 3d) (Figure 3). In addition to this a series of auger holes were positioned across the area and soil monoliths looked at. These were described in terms of presence of peat, burnt material, natural clay and depth to gravel.

The northern edge of the stream[8] (Fig 4)

Main area of activity – Site 3a

Site 3a, to the north of the stream, covered an area of approximately 50m east-west by 10m north-south and consisted of a 'potboiler' spread (an area of fire-cracked flint) surmounted in a deposit of dark earth. Associated with the burnt flint patches were occasional further features indicative of slight structural remains. The area was gridded out into east-west rows divided into 1 x 1m squares. Additional squares were positioned around the rows to allow for cumulative N-S sections to be assessed. The squares were taken down in 100mm (10cm) spits until undisturbed natural was reached. Finds and samples were recorded three-dimensionally.

A total of fourteen features were identified across Site 3a including two natural palaeochannels (Figure 4). The features of archaeological significance comprised the main area of burnt flint (6766), a smaller burnt spread (6798), the remains of a shallow linear [6772], a ditch [6765], which butt-ended at the edge of the main burnt spread and a group of several post-holes along the southern edge of the spread [6813–6816, 6790, 6792 and 6796].

One of the primary aims of the excavation was to locate and map the boundaries of the burnt spread (6766) identified during the evaluation. A radiocarbon determination of 3270 ±90 BP [Beta-82560] (1745 to 1385 BC at 2sd)[9], had been obtained during evaluation of this feature, showing it to be of late Middle to Late Bronze Age date. During the excavations, the full extent of the feature was uncovered (Figure 4).

The upper layers were a mixed dark brown clay with a high percentage of fire-cracked flint. This represented the mixing of the upper part of the burnt material with later colluvial and alluvial deposits. The layer extended over an area 15 x 8m and merged into the upper levels of the adjacent palaeochannel. The isolated patch of burnt flint, (6798), to the east of the main concentration was no doubt contemporary and perhaps represented an area of casual detritus associated with the use of the main area.

With the removal of the upper layer, the core of

[8] Within the text contexts of fills, deposits and layers are represented (6880), cuts as [6779] and samples as <25>.

[9] All radiocarbon calibrations have been worked out using Stuiver and Pearson's calibrated radiocarbon timetable based on Irish oak (1993).

the burnt material was exposed. This consisted a dark grey-black clay-silt matrix, containing frequent burnt flint inclusions and comminuted charcoal, staining much of the deposit black. The coarse granular mass of the core extended over an area of 10 x 7m. Excavation indicated a surviving depth, on average, of 200mm, although in places the depth approached 400mm.

The burnt layer followed the original ground surface, lying above gravel, clay and brickearth in different places. No evidence of a containing cut was found, indicating that the material was piled upon the natural contemporary land surface. Excavation suggested that perhaps a single ovoid depression had existed running approximately NE-SW, and that following periods of activity this was used to deposit the flint. The stratigraphy of the mound was simple, as would be expected of a feature formed almost entirely by dumping. Undulations and changes in the depth of the burnt spread were observed along its southern edge, however, no differentiation in the fill was evident. Three flint artefacts were recovered from the burnt spread, all being blades or blade-like forms.

Of particular interest were eight post-settings located along the southern boundary of the burning activity. These only became visible following removal of the fire-cracked flint and stone and consequently only the bases of them were observed. They were each filled with material identical to the burnt spread, suggesting they were contemporary with its formation. Six of the settings were overlain by outwash and grey alluvial deposits, suggesting they may have been constructed as posts within the water, perhaps part of a structural arrangement on the edge of the palaeochannel, with the burnt spread situated behind. It is believed that the arrangement could relate to the presence of a tem-

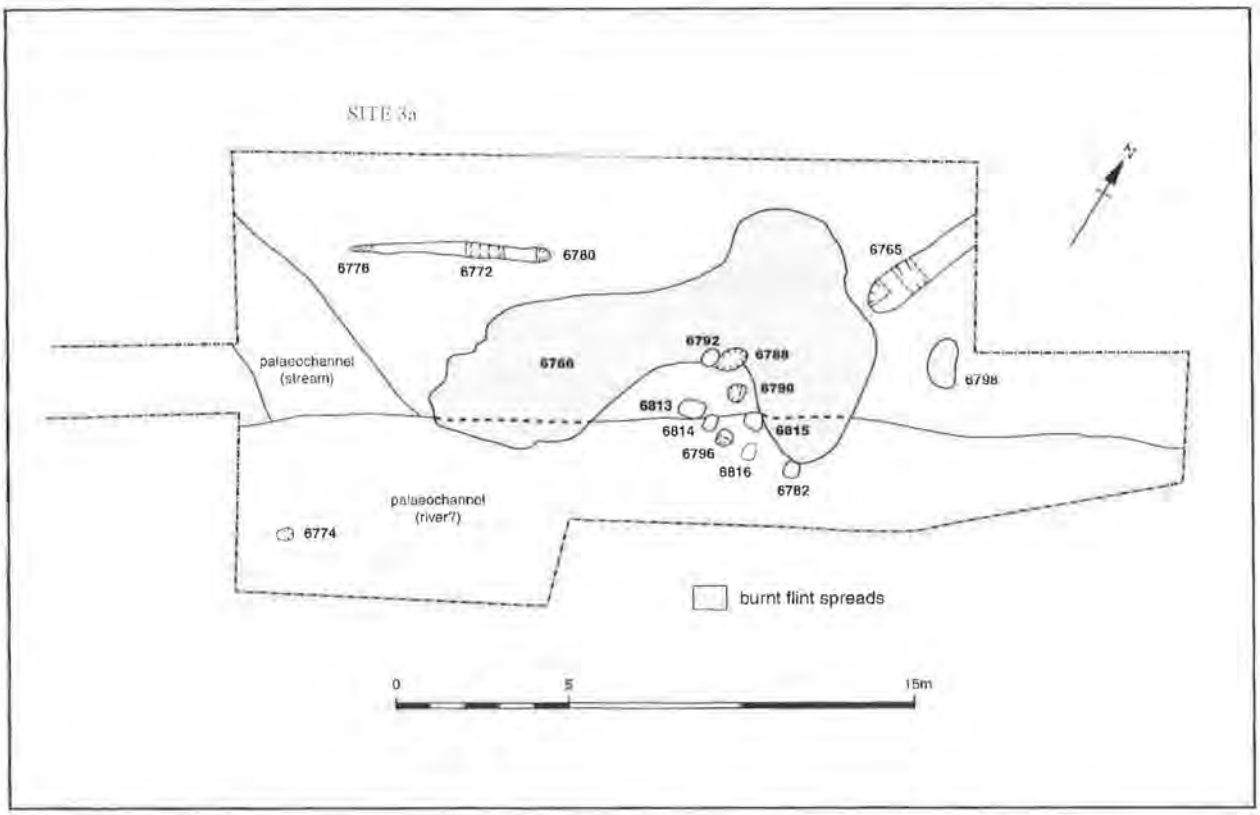

FIGURE 4 Burnt mound activity to the north of the stream, Site 3a.

porary structure possibly supporting an awning. Several large unburnt stones in this area were interpreted as weights for holding down such a cover.

Associated with the burnt spread was a linear feature [6780=6772] north-west of the main area of activity (Figure 4). It lay partly concealed under the mixed burnt flint layer and had slightly concave sides and base, tapering up to a shallow western butt-end and with a more abrupt sharp and squared eastern butt-end (6.2m length x 0.4m width x 0.2m depth). It was filled by a dark yellow-brown clay silt (6781=6773) with moderate charcoal flecks throughout. The fill of the eastern end was slightly darker than the rest of the feature, possibly reflecting its location closer to the burnt spread. It is possible it demarcated the northern extent of burning activity.

A second linear feature [6765=6794] was identified close to the eastern side of the burnt spread. It appeared to represent the butt-end of a ditch which was partially overlain by the burnt material. Excavation showed it to have a box-like profile with a very steep south-east edge, a flat base and a shallow butt-end. Two flint flakes, one showing signs of retouch, and several animal bone fragments from a cattle scapula were retrieved from its upper fill (6683). The primary fill (6764=6795) suggested it had been open prior to the burnt flint spread accumulating. Its secondary fill, however, was rich in charcoal and burnt flint debris, suggesting it was open when the piles of fire-cracked flint were being deposited.

The southern edge of the site was bounded by an east-west orientated palaeochannel. The regular deposition of silty clay within it suggests it had a slow to medium flow. It had evidently been in existence prior to the creation of the burnt spread, which had undoubtedly been deliberately positioned next to it so as to have direct access to a water source. A second palaeochannel, a palaeo-feeder stream, ran downslope and merged with the main palaeochannel to the immediate west of the burnt spread. The two channels formed a T-shaped junction with the archaeological features north-east of the confluence.

The almost-linear and shallow burnt spread, is perhaps better termed a 'potboiler' spread rather than a 'burnt mound'. The minimal amount of mixing and the fact that brickearth, rather than alluvial clay, sealed most of the deposit, indicates that only slight post-depositional disturbance to the feature has taken place. If this is the case, then the height of the deposit, as recorded, was unlikely to have been much different from its original height. Although some features were associated with the burnt material there was no evidence of an internal trough or a hearth forming a central focus over which the material had built up; a characteristic of 'classic' burnt mound sites. The feature does not therefore truly fall within the burnt mound definition. Functionally, however, potboiler and burnt mound sites may well have been similar.

Three flint artefacts were recovered during the excavations along the northern spread and 13 pottery sherds (*see artefact reports below*).

Extensions to the main area of excavation – Site 3c and 3d (Fig 5)

A trench 4m wide x 25m in length (Site 3d) was opened using a mechanical excavator from close to the southern edge of Site 3a toward the modern stream. This was positioned to observe natural deposits and the presence/absence of further burnt spreads, however, none were noted. Mixed yellow-grey clay layers were identified, indicating overbank flooding and the mixing of alluvium.

During the earlier evaluation it was noted that a burnt flint spread was eroding out of the stream bank. An area around this, Site 3c, was opened revealing a second burnt flint concentration, similar in composition to that in the main site to the north (see Plate 1). This spread extended 13m E-W and 10m N-S and was truncated to the south by a dilapidated wooden shelter on the stream edge, and by the stream itself.

The features of archaeological interest comprised the identifiable burnt spread (6754), a small rectangular pit [6729] and a possible trough feature [6821], which was sealed beneath the burnt deposit (Figure 5). A radiocarbon date from the main burnt spread (6754), 3660±40 BP [Beta-130864] (2140 to 1920 BC at 2sd), confirmed this activity to have been taking place during the Early Bronze Age, earlier than the activities identified further up the slope at Site 3a.

The flint-rich spread lay directly above natural, unscorched clays. A section excavated at the NE corner showed a clear edge, suggesting a containing cut. It appears fire-cracked flint and other burnt debris was deposited within a disused pit on the edge of the stream. A vertical-sided, flat-based rectangular cut, [6821] *c.* 1.1m by 2.2m, became vis-

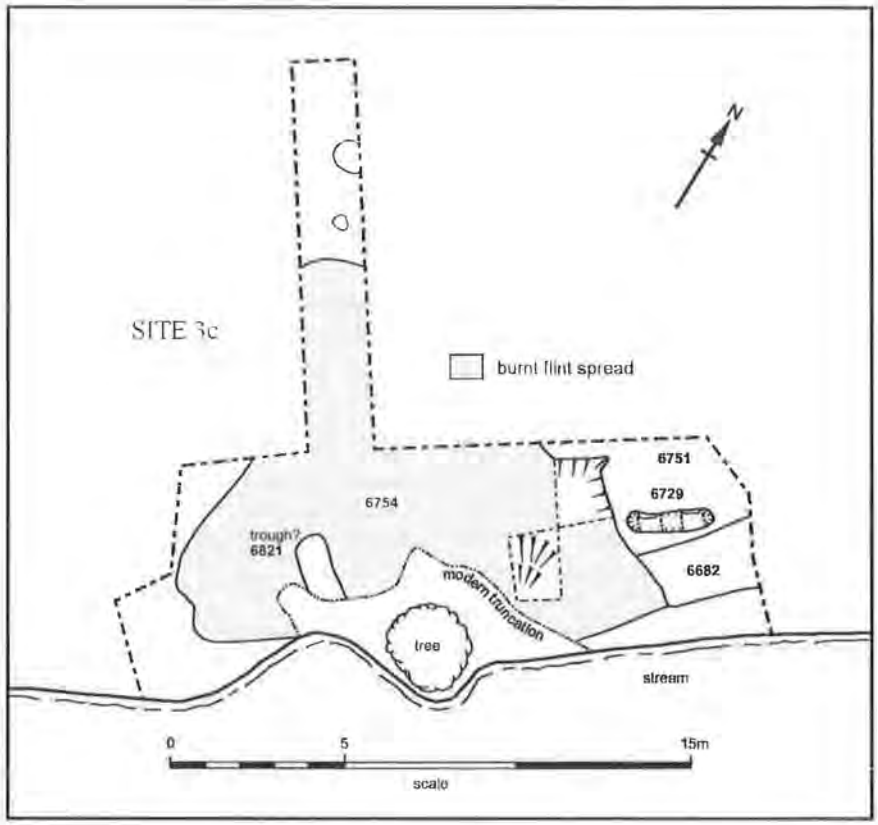

FIGURE 5 Burnt mound activity on the stream edge, Site 3c.

ible during the excavation of the burnt material, which perhaps represented a central fire pit or more probably a trough associated with the burning activity, whereby the heating or steaming of water took place by the immersion or quenching of heated stones. The fill of the feature (6822) was made up of burnt flint, but it was initially indistinguishable from (6754), the main burnt spread. Excavation, however, showed it to become progressively blacker and more charcoal-rich with depth.

The southern edge of the stream – Site 3b (Fig 6)

Main area of activity

Site 3b, to the south of the stream, similarly consisted of several burnt and fire-cracked flint spreads and dark earth patches, and covered an area of approximately 30m east-west by 25m north-south (Figure 6). The flint patches on this side of the stream were more closely clustered and cleaning of the area identified several pits, postholes and a ditch which appeared to demarcate the southern edge of the burnt flint activity. Excavation of the spread followed the methodology as per Site 3a being based upon rows divided into 1m x 1m boxes, each being reduced in 10mm spits. All finds recovered were recorded three-dimensionally.

During the investigations a number of clearly definable archaeological feature were identified (Figure 6). These comprised a main area of burnt flint (6680), five pit features [6727, 6728, 6759, 6817 and 6819] and a fairly substantial ditch [6750]. All these features were cut into the clay-rich natural alluvium. Bordering these to the north, and running up to the stream edge, was an extensive area of peat.

The burnt flint area was exposed as a 'kidney-shaped' spread covering approximately 8 x 20m. It has been stated that the 'kidney' shape represents the classic burnt mound morphology (Russell-White 1990, 87). Occasional burnt flint clusters were found to the north and east of the main area. The upper layer of the spread (6678) was a silty clay, dark orange-brown in colour with moderate inclusions of burnt and occasional unburnt flint. This horizon spread across the entire area as a disuse layer, representing fluvial mixing of burnt material and natural clay silts. Beneath this the burnt core survived as a rather irregularly shaped concentration of heavily fired flint, together with inclusions of charcoal in a clay silt matrix (6680). The burnt flint was densely compacted and formed approximately 80% of the context matrix. Occasionally, pieces of burnt sandstone were identified. Sandstone is a hard and relatively heat-resistant stone which was no doubt selected by the burnt mound users for its durability. On many burnt mound sites, excavators have identified the deliberate selection of suitable material to heat (Russell-White 1990, 87).

Sections across the feature revealed several well-defined edges. This, as observed with the stream-side spread to the north of the channel, suggests that a containing cut may once existed. Seven lithic artefacts were found within the burnt mound area, including flakes, a blade and a core and two broken halves of what appeared to have been flint weights with centrally bored holes. In addition a limestone fragment of a rubbing stone showing clear evidence of smoothed surfaces was also recovered. Charcoal from the central core of the deposit (6680) yielded a radiocarbon date of 3860 ±60 BP [Beta-130863] (2475 to 2140 BC at 2sd) showing this to be the earliest phase of burnt mound construction on the site. To the north of the stream, activities appear to have taken place during the Middle and Late Bronze Age; to the south the activities were clearly of earliest Bronze Age date.

The five pits each contained fire-shattered flint-rich fills. Four of these were in the general area of the burnt spread, and a fifth, [6728], lay isolated from the main area of activity, 30m to the east. Of the five pits, [6728] and [6759] were larger and of more regular plan and could have served as 'trough' pits for the purpose of heating. The other pits were small and irregular, and all difficult to distinguish from natural hollows.

Of particular interest was the identification of a ditch bordering the southern edge of the potboiler spread. This ran E-W and butt-ended level with the burnt flint activity. It had a slightly concave profile and became shallower as it tapered towards the east. The concentration of burnt flint within its primary fill (6715) increased when it came into close proximity to the burning activity, suggesting contemporaneity of utilisation of the two features.

At its western butt-end, the ditch truncated an earlier feature, probably an earlier phase of ditch cut [6750]. This was broader and had a stepped edge, suggestive of post-settings on the flanks. Four post-settings were also evident along its base. The fill (6723=6684) of the primary ditch, which had been truncated by the later ditch cutting [6749], was much richer in burnt flint and charcoal and was more compatible with the matrix of the potboiler spread, than the fill of the secondary cutting.

It is possible that the ditch and post-hole arrangement represents a post-based structure to the immediate south of a linear pit which contained the waste residue of burnt flint activities. While the relationship between the two features is not entirely clear, it appears that the primary phase of the ditch construction was contemporary with the main phase of burnt mound activity. The second phase of ditch cutting appears to post-date the main episode of burnt flint deposition, but the finds from its fill, including Bronze Age flint flakes, a blade and a weight, suggest this took place soon after.

Extension to the main area to the south of the stream

A trench was machine-excavated north from Site 3b toward the stream channel. This aimed to assess the presence/absence of burnt spreads closer to the modern day water channel and to gain a cross-section of the natural stratigraphy in the vicinity of the archaeological finds and across the valley floor.

The machined trench revealed an extensive accumulation of peat between the stream edge and the potboiler spread to the south, however, no further features or artefacts of archaeological significance were identified. Sections through the peat horizon showed it to exist to a depth of at least 1.5m, at which point the standing water table prevented further analysis. It was interesting to note that the peat deposit was not present on the northern side of the stream. Two sondages

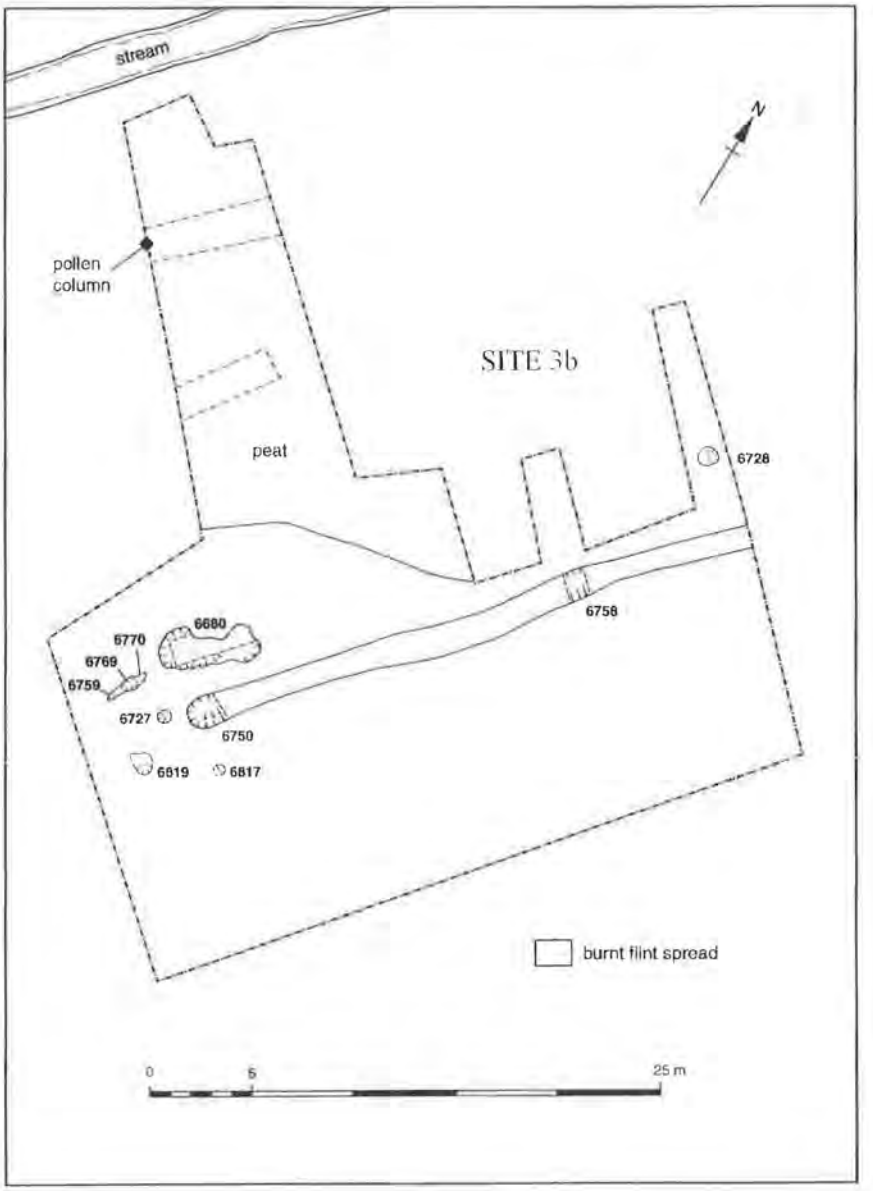

FIGURE 6 Burnt mound activity to the south of the stream, Site 3b.

were excavated through the peat horizons to examine their characteristics and to take a monolith sample for palynological and radiocarbon analyses (see below). Two principal phases of peat growth were identified, representing the environment of two contrasting periods. The lower horizons were of Late Devensian and early Holocene age (*c* 10,000 to 8,500 yrs BP) and relate to the early Mesolithic environment. The upper peat was of late prehistoric date and spanned the Bronze Age and therefore relates to the archaeology excavated at the site.

The Finds

Pottery by A Barclay

Introduction

This report analyses a selected sub-assemblage from Sites 3a and 3b. Other similar material, being 76 sherds of flint tempered pottery was recovered from the evaluation (Barclay 1994). A total of 57 sherds of pottery (290 g) was recovered from Sites 3a and 3b, most of which is of Bronze Age date, although some sherds could be of Early Iron Age date. The assemblage includes a small number of possible Collared Urn sherds of Early Bronze Age date, a cordoned sherd of probable mid or Late Bronze Age date and two Late Bronze Age rim sherds.

Methodology

Table 1 gives a quantification of the selected material by weight and sherd number. The pottery is characterised by fabric and form. The sherds were analysed using a binocular microscope (x 20) and were divided into fabric groups by principal inclusion type. Standard codes (*as produced by the Oxford Archaeological Unit*) are used to denote inclusion types: A = sand (quartz and other mineral matter), F = flint, G= grog. Size range for inclusions: 1 = <1 mm fine; 2 = 1–3 mm fine-medium and 3 = 3 mm < medium-coarse. Frequency range for inclusions: rare = <3%, sparse = <7%, moderate = 10%, common = 15% and abundant = >20%.

Fabrics

The Early Bronze Age sherds occur in a single fine-medium grog-tempered fabric (G2). Grog-tempering is common during the Early Bronze Age period and is replaced in the later Bronze Age by the use of flint. The later Bronze Age sherds are in either a fine or a fine-medium flint-tempered fabric (F1 and F2). Typically the flint temper has been deliberately calcined and crushed. The possible transitional Late Bronze Age/Early Iron Age or Early Iron Age sherds are in a fabric (AF2) that is principally tempered with coarse sand but also contains flint. The use of sand-temper becomes more common towards the end of the Late Bronze Age and during the Early Iron Age.

Forms

The assemblage includes three featured sherds from two vessels of different date. The earliest vessel form would appear to be that of a Collared Urn of Early Bronze Age date. One vessel is represented by a small fragment (*context* 6680) from the base of a collar, while another sherd (*context* 6680) with impressed twisted cord could come from the same vessel. Both sherds are from the main burnt flint mound to the south of the stream (Site 3b). The remaining featured sherd (*context* 6766) is from the neck of a plain vessel that has an applied cordon and this was recovered from the main burnt spread to the north of the stream (Site 3a).

Discussion

The earliest pottery belongs to the Collared Urn tradition of the Early Bronze Age and was recovered from the main burnt spread to the south of the stream, (6680), although a plain grog-tempered sherd from gully (6773) to the north of the stream could derive from a Beaker. Collared Urns are relatively rare in the middle Thames Valley and are generally found in funerary contexts (Longworth 1984). The discovery of Collared Urn sherds from a possible domestic context is therefore unusual.

Table 1 A summary quantification (sherd number, weight) of all prehistoric pottery from Site 3.

Context	*Deposit*	*EBA*	*wt*	*LBA*	*wt*	*EIA*	*wt*	*Sherd Total*	*Weight Total*
6679	Beneath alluvium	–		1	1g	–		1	1g
6680	Burnt spread	2	15g	–		–		2	15g
6766	Flint spread	–		3	71g	–		3	71g
6773	Fill of gully	1	2g	–		–		1	2g
6782	Flinty fill, edge of 6766	–		–		50	201g	50	201g
Total		3	17g	4	72g	50	201g	57	290g

However, recent excavations at Taplow and Dorney have also produced small quantities of Collared Urn material from domestic contexts (*unpub*).

The small number of flint-tempered sherds, that include one from the neck of a cordoned jar from (6679) (deposit associated with burnt spread to south of stream) and (6766) (main burnt spread to north of stream) are of Late Bronze Age date. Material of a similar date was found during the evaluation and subsequent excavation on the adjacent gravel terrace 350m to the north (Site 1)(*see* Kiberd 1994). This included a small number of plain rims from shouldered jars and a cordoned sherd from a pit which also contained cylindrical loom weights. All of the feature sherds from Site 3 and also Site 1 (large flint spread (6766) and linear feature (6688)) indicate a date within the Late Bronze Age and the fact that these vessels are shouldered forms perhaps suggests a date after 1000 cal BC. From the type of forms and absence of decoration it could be suggested that the sherds belong within the Plain Ware phase (1000–800 BC) of this period, although this is based on a very small sample. Parallels for all the feature sherds can be found at Runnymede Bridge (Longley 1980).

The 50 principally sand-tempered body sherds from the mixed flint fill of the burnt spread to the north of the stream (6782), are likely to be of either Late Bronze Age or Early Iron Age in date as the use of sand temper replaced flint during this time (*see* O'Connell 1986, 61).

The worked flint by P Bradley

Introduction

A small assemblage of 60 pieces of worked flint, three pieces of burnt unworked flint and a single piece of possible worked stone was recovered from the excavations at Little Marlow. The material from Sites 3a and 3b is discussed in detail together with a summary of the remaining assemblage found elsewhere across the site. Further details may be found in the archive. The material from Sites 3a and 3b is summarised in Table 2.

Raw materials and condition

The majority of the flint is mid to dark brown or grey in colour, with a thin buff or white cortex which is frequently worn. Cherty inclusions were frequently noted within the flint, which would have caused some problems during knapping. The flint is mostly lightly corticated. Much of the flint is very fresh, some pieces, notably those from unstratified contexts, are abraded and worn. Several pieces of flint from the brickearth horizons (such as those from Site 4, 200m to the west) are also very worn. The pieces of burnt unworked flint are heavily calcined, all have natural perforations, in the form of animal casts or burrows, through them.

Description

Seventeen pieces of worked flint and four pieces of burnt flint and stone were recovered from Sites 3a and 3b (Table 2) in addition to a number of frag-

TABLE 2 A summary quantification of all flintwork from Site 3.

Context	*Flakes*	*Blades, blade like flakes*	*Cores*	*Retouched forms*	*Other*	*Total*	*Burnt unworked flint*
6680	1	1	1 blade core	1 retouched flake	1 burnt stone possibly used as a smoother/rubber	5	–
6683	1	–		1 retouched flake	–	2	–
6684			–	–	–	1	1
6715	–	–	–	–	–	1	1
6722		–	–	–	–	1	1
6757	2*	1	–	1 misc retouched	–	4	–
6761	2	–	–		–	2	–
6766	–	3	–	–	–	3	–
U/S	1	1	–		–	2	–
Total	7	6	1	3	1	21	3

ments of worked flint recovered during the processing of the environmental samples. The assemblage is largely composed of debitage, only three relatively undiagnostic retouched pieces were recovered (Table 2). Two refitting flakes were recovered from context (6761), being the main burnt flint spread on the southern side of the stream. A burnt fragment of quartzite may have been used as a smoother or rubber. Flakes have been detached using hard and soft hammers, butts tend to be plain or linear. A couple of punctiform butts were recorded and there was a single faceted butt on a retouched flake from context (6683), being the upper fill of a ditch associated with the burnt spreads to the north of the stream channel. A few hinge fractures were recorded. Several flakes had blade scars on their dorsal faces.

The presence of blades, blade-like flakes and a blade core suggests a careful reduction strategy. This is typical of the Mesolithic or earlier Neolithic, and the occurrence of a tranchet axe on Site 4, 200m to the west indicates a Mesolithic component in the immediate landscape. The retouched flakes may be contemporary or of later date; one at least from context (6683) would seem to be contemporary given its careful production and the blade scar on its dorsal face. Some of the less diagnostic hard-hammer struck flakes may be of later Neolithic or Bronze Age date.

Flint from the other excavated areas within the quarry is dominated by debitage although a range of retouched forms were recovered (Table 2) including scrapers, a piercer and the Mesolithic tranchet axe. Two blade cores were recovered which together with the axe, blades and blade-like flakes confirms the occurrence of limited Mesolithic activity across the landscape. The scrapers have been made on fairly robust flakes; sometimes with cortex remaining and scraping angles are generally steep (typically 55–85). The piercer has been made on a side trimming flake. The technology of these pieces would accord with a later Neolithic or Bronze Age date.

Discussion

This small assemblage is largely undiagnostic except for a few pieces of Mesolithic flintwork. These pieces, however, have been incorporated into features of demonstrated Bronze Age date. Mesolithic flint is, however, found throughout in the area, including from deposits of brickearth at Marlow (Wymer 1977, 22) and many finds have also been dredged from the river Thames including numerous tranchet axes (ibid.). Mesolithic assemblages have also been recovered from Taplow, including worked antler, Cookham and Maidenhead (Wymer 1977, 23, 5–6, 9).

Neolithic and Bronze Age flintwork has also been recovered from the general area. Extensive excavations in advance of the Maidenhead-Slough Flood Alleviation Scheme have produced large flint assemblages including material from Taplow (Durden *in preparation*). Neolithic to Early Bronze Age material was recovered from three concentrations of flint from Maidenhead Thicket (Boismier 1995, 52). The dating of this material was established on technological grounds as very few retouched pieces were recovered (Boismier 1995, 57) (see Boismier for a summary of later Neolithic and Early Bronze Age flint finds in the immediate area of Maidenhead Thicket (1995, 63).

The Environmental Archaeology

Introduction

The archaeological evaluation at the site in 1994 identified a large area of 'black earth' rich in burnt flint on the north bank of the stream, which was interpreted as Bronze Age in date and identified as a 'burnt mound'. The deposits were composed of a grey silt/clay which contained many burnt flints, clearly represented a buried ground surface. This was overlain by up to 0.7m of brickearth and topsoil largely of colluvial origin. The 'burnt flint' horizon was also identified in a test pit south of the stream, and was again visible in the bank of the present stream channel. In these areas the burnt flint horizons were buried by alluvium. The evidence from the evaluation clearly indicated an extensive site.

During the evaluation a single sample was taken from context (2135), the burnt flint spread identified to the north of the stream, and subsequently described as Site 3a. Approximately 13 litres of sediment were processed, and this showed 16% of the sample to be composed of flint gravel, much of it fire-cracked. The sample produced two small pieces of flint-tempered pottery and a quantity of charcoal. The charcoal was submitted for radiocarbon analysis and produced a date of 3270±90 BP (Beta-82560 – *see* Table 3) confirming a Bronze Age date.

The evaluation showed this to be an area where further work, in the form of an open-area excavation, was required. Such an excavation would seek to assess, amongst other objectives, the evidence for contemporary woodland around the site. In addition, it was considered important to try to establish which species were being exploited for fuel, and whether the remains identified exhibited any evidence for woodland management. It was clear, however, that the deposits exposed during the evaluation had limited potential for the survival of preserved organic remains. Samples taken showed that only charred material survived. A programme of bulk sampling of archaeological features was therefore considered necessary, in order to maximise the retrieval of charred deposits for analysis.

The subsequent excavation revealed (at Site 3b) that the floor of the valley contained a peat and organic silt-filled palaeochannel. Because burnt flint was present within the peat profile, it represented the opportunity to obtain a palaeo-environmental sequence which may include deposits contemporary with the adjacent Bronze Age burnt mounds. A monolith sample was therefore taken during the excavation stage, immediately south of the modern stream (Figure 6). A broad indication of the age of the organic sediments was first established by the submission of a piece of ash branch (with approximately 100 growth rings) from a point in the peat sequence below the deposits in which burnt flint occurred. This produced a radiocarbon age of 6130±60 BP (Beta-101166 – *see* Table 3) and indicated that sediments contemporary with the burnt flint scatters were probably present higher in the peat sequence.

The excavations of the site, reported above, also resulted in a number of bulk soil samples from archaeological deposits being collected (including two from an Iron Age feature within Site 2 which was studied for comparative purposes). In addition, a few animal bones were recovered from the archaeological deposits and two were collected from the organic spoil removed by the machine from the machine cut trench, but with no stratigraphic data.

Radiocarbon Dating

Two series of radiocarbon dates were taken at the site. These were concerned with the dating of the individual burnt-flint scatters and the dating of the palaeo-environmental sequence in Site 3b. They have been discussed above in the context of the archaeology, and are summarised here.

The charcoal from contexts (6680) <25>, the central black layer in Site 3b to the south of the stream, and (6754) <32>, the flint spread in the

TABLE 3 Radiocarbon dates from Little Marlow, Buckinghamshire.

Burnt flint scatter dates

Sample no/ material	*Context*	*Lab. No.*	*Conventional C 14 age*	*Cal.age at 2 sigma*
94/22/01 Site 3a / charcoal	2135	Beta-82560	3270±90	BC 1745 to 1385
96/32 Site 3c, Stream Extn / charcoal	6754	Beta-130864	3660±40	BC 2140 to 1920
96/25 Site 3b / charcoal	6680	Beta-130863	3860±60	BC 2475 to 2140

Palaeo-environmental sequence dates – Site 3b, machine-dug trench

Depth / material*	*Context*	*Lab. No.*	*Conventional C 14 age*	*Cal. age at 2 sigma*
84–86 cm / organic sediment	6771	Beta-130860	2590±50	BC 825 to 760 BC 635 to 560
116–120 cm / organic sediment	6785	Beta-130861	4310±50	BC 3025 to 2875
127 cm / ash wood #	6785	Beta-101166	6130±60	BC 5230 to 4915
135–138 cm / organic sediment	6785	Beta-130862	9030±60	BC 8300 to 8190

* depth measured from a datum 20cm below modern ground surface
# roundwood branch with approximately 100 growth rings

river extension (Site 3c) on the northern bank was submitted to Beta Analytic, Florida, for radiocarbon dating so that all three main areas of burnt flint activity were individually dated (*see* Table 3). These samples, along with the first sample from the flint spread in Site 3a to the north of the stream, were submitted without identification of the charcoal and will almost certainly have included some heartwood, although the identified sample from (6680), <35>, included no oak. This will have had some influence on the accuracy of the dates, but the fact that there is no overlap between any of the three at the 2 sigma value (Table 3) suggests that the three areas of the site represent at least three different periods of activity spanning the entire Bronze Age.

The radiocarbon dates from the palaeo-environmental sequence in Site 3b clearly confirms the presence of a major hiatus in the sequence also identified from the pollen analysis (see below). The lower part of the sequence is radiocarbon dated to the Late Palaeolithic and Mesolithic periods, while the upper part of the sequence clearly spans the period of Bronze Age activity at the site (Table 3) and into the 1st millennium BC.

Soil Sample Methodology

The bulk soil samples were processed in the following manner. Sample volume and weight was measured prior to processing. The samples were washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.5mm mesh and an internal wet-sieve of 1mm mesh for the residue. Both residue and float were dried, and the residues subsequently re-floated to ensure the efficient recovery of charred material. The dry volume of the flots was measured, and the volume and weight of the residue recorded. A total of 263.5 litres of soil was processed in this way, the majority from the areas of burnt flint activity, although 2 samples were analysed from an Iron Age storage pit excavated in Site 2 for comparative purposes.

The residue was sorted by eye, and environmental and archaeological finds picked out, noted on the assessment sheet and bagged independently. A magnet was run through each residue in order to recover magnetised material such as hammerscale and prill. The residue was then discarded after being described. The float of each sample was studied under a low-power binocular microscope. The presence of environmental finds (ie snails, charcoal, carbonised seeds, bones etc) was noted and their abundance and species diversity recorded on the assessment sheet. The float was then bagged. The float and finds from the sorted residues constitute the material archive of the samples.

The individual components of the samples were then preliminary identified and the results are summarised below in Tables 4 and 5.

Bulk sample programme

The archaeological finds from the bulk samples were limited. The two Iron Age samples from the fills of a 'storage pit' [6745] on Site 2 were the most productive (Table 4). These produced waste flint flakes, a pottery fragment, animal bone, burnt flint, a few flakes of hammerscale and fired earth. A few fragments of coal in one of the samples were extremely small and may indicate contamination through movement of fine material through the soil. These two samples also produced the only significant charred plant remains (see below).

The remaining samples from Site 3a, 3b and 3c were largely devoid of finds other than burnt flint, which occurred in very large quantities and frequently comprised more than 95% of the residue after washing (Table 4). One sample, <25>, produced a single sherd of pottery, while a number produced one or more flint waste flakes. The brick/tile and coal fragments in <27> from Site 3c suggests that this sample has been contaminated by recent material moving down through the soil. Other finds include fragments of indeterminate animal bone, charred hazelnut shell, snails and uncharred seeds (Table 5). After burnt flint, charcoal was the most abundant material in all the samples. The uncharred seeds cannot be confidently identified as contemporary with the deposits and, given that intrusive material appears to be present in one or two of the samples, it is felt that these seeds are probably also contaminants.

Study of the snail fauna has identified a number of taxa (Table 6). The only sample rich in molluscs, <27>, derived from a sub-rectangular flat-based feature, [6729] in Site 3c, with a peaty clay mixed fill, (6736). The snail fauna shows a dominant aquatic and marsh element (Macan 1976) and suggests that the pit was probably subject to flooding or water-filled while these deposits formed. This is the only sample which includes taxa associated with shaded habitats and the relatively low proportion of burnt flint and charcoal in the sample, the

TABLE 4 Little Marlow. Archaeological finds from the samples.

site	sample	context	feature	sample vol. l.	Res. wt. kg	Pot #	Flint	Burnt flint #	Bone wt	date	comment
3a	94/22	2135	burnt flint spread							C14	
3b	17	6684	fill of linear feature	15	6.1			>95		BA	
3b	18	6685	fill of post-hole 6727	2.75	0.65			c 60		BA	
3b	19	6681	fill of pit 6728	19	2.35		1	>95		BA	
3b	24	6726	burnt flint fill of 6727	30	12.5		6	>95		BA	
3b	25	6680	central black layer	30	15	1/1		>95		C14	
3c	27	6736	peaty fill of linear feature	30	0.87		2	c 20	3	BA	(1)
2	28	6746	1st fill of storage pit 6745	18	0.92	1/<1	2	<20	16	Iron Age	(2)
2	29	6748	3rd fill of storage pit 6745	10	0.13		1		3	Iron Age	(3)
3c	32	6754	2nd flint spread	30	21		3?	>95		C14	
3c	33	6737	2nd fill of linear feature	0.5	25			<10		BA	
3b	34	6722	fill of linear feature	20	2.7			c 85		BA	
3b	35	6680	central black layer	8	2.7			>90		BA	
3b	39	6769	fill of gully west of burnt spread	6	0.47		2	>90		BA	
3a	45	6774	burnt patch in SW corner site 3a	1.25	0.19			<10		BA	
3a	46	6766	burnt spread	10	4			>90		BA	
3a	47	6766	burnt spread	18	7.15		5	>95		BA	
3c	48	6751	mid brown clay deposit, natural?	9	6.15			>95		BA	
3c	49	6751	mid brown clay deposit, natural?	6	2.95			>95		BA	

#fragment or sherd no/weight in grammes; # percentage of the residue that was burnt flint
Comments: (1) brick/tile, coal (contaminants?); (2) fired earth, coal (contaminants?), hammerscale; (3) fired earth, hammerscale

evidence for contamination, the relatively high frequency of waterlogged seeds and the apparent mixed fill perhaps suggests that this feature may not be contemporary with the Bronze Age activity at the site.

While the other samples with mollusca present produced much lower frequencies they show a generally similar assemblage with marsh and wet grassland elements (Evans 1972; Ellis 1969). A selection of this material was made for post-excavation analysis. Four samples with charred seed and nut remains, <25>, <28>, <29> and <49>, were selected for detailed study, two of these being from the Iron Age pit in Site 2. In addition, fourteen samples were submitted for charcoal identification and analysis and the palynological study of the organic sediment sequence in the machine cut trench of Site 3b was undertaken.

The Charred Plant Remains by John A Giorgi

Introduction and methodology

Sorted charred plant remains from four bulk samples were presented to the author for analysis. These were recovered from two burnt flint spreads associated with Bronze Age burnt mounds (Sites 3a and 3b) and two fills (primary and tertiary) of an Iron Age storage pit [6745] from Site 2, to be studied as a comparative analysis. The plant remains were identified using modern and charred reference material and reference manuals.

Results

The results are tabulated in Table 7. Most of the plant remains were recovered from the two Iron Age pit fills with only a few items being recovered from the Bronze Age features of Sites 3a and 3b. The plant remains will be discussed by period.

The Bronze Age samples:

The burnt flint spreads contained a large quantity of charcoal but very few other identifiable plant

TABLE 5 Little Marlow: Environmental finds from the samples.

sample	*context*	*sample vol. ltr*	*flot vol mL*	*charcoal* #	*cereal* #	*chaff* #	*charred seeds* *	*waterlogged seeds* *	*snails* #	*bone* #	*burnt bone*	*comments*
17	6684	15	1	3				1	1			
18	6685	2.75	<1	1				1				
19	6681	19	4	3				1	1			
24	6726	30	1	4				1	1			
25	6680	30	15	4			1	1				(1)
27	6736	30	40	1				3	5/3	1		(2)
28	6746	18	550	5+	2	1	3	2		3	+	(3)
29	6748	10	20	3	1			1	1	2		(4)
32	6754	30	5	4				2	1			
33	6737	0.5	10					3	2/2			(5)
34	6722	20	2	2					1			
35	6680	8	2	3								
39	6769	6	<1	3					1			
45	6774	1.25	30	5					1			
46	6766	10	10	4				1	2/1			
47	6766	18	12	5				2				
48	6751	9	2	3	1			2				(6)
49	6751	6	1	4	1							

frequency of items: 1=1–10; 2= 11–50; 3=51–150; 4=151–250; 5=>250

* frequency/diversity – frequency as above and diversity as follows: 1=1–3; 2=4–10; 3=11–25; 4=26–50 taxa.

\+ present

Comments: (1) hazelnut, sloe; (2) amphibian; (3) wheat, barley, oat, hazelnut, legume, sheep, field vole; (4) wheat, oat, pig, vole, amphibian, fish; (5) wood; (6) wheat

remains. A single grain, possibly of wheat (cf. *Triticum* sp.) was recovered from deposit (6751) while the spread (6680) to the south of the stream contained a nutshell fragment of hazel (*Corylus avellana*) and a fragment of a ?sloe/blackthorn (*Prunus* cf. *spinosa*) stone. The remains of these two wild fruits may have been accidentally incorporated into the deposit from nearby vegetation although both fruits may have been deliberately collected and used for food before the residues were discarded.

The Iron Age samples:

The two samples from the fills, (6746) and (6748), of the Iron Age pit [6745] both contained charred plant remains although the vast majority of the material (88% of all quantified remains from the site) came from the primary fill (6746) which includes a mix of mainly cereal debris with some wild plant seeds. Both fills contained cereal grains of wheat, some of which were identified as free-threshing bread/club wheat (*Triticum aestivum* s.l.). Oat (*Avena* spp.) grains were also found in both samples although it was not possible to establish whether these were wild or cultivated oats. Barley (*Hordeum* spp.) grains and a barley rachis fragment were found in the primary fill (6746) only; traces of the husks (the lemma and palea) on these grains suggests that they were hulled barley.

The main crops represented on Iron Age sites in southern Britain are spelt wheat (*Triticum spelta*) and hulled barley (Greig 1991, 306), while bread/club wheat is only sometimes found and usually only as a minor crop. Occasionally, however, bread/club wheat has been the dominant crop; for example, at Bierton, also in Buckinghamshire

TABLE 6 Mollusc taxa identified during the assessment of the soil samples.

sample:	*17*	*19*	*24*	*27*	*29*	*32*	*33*	*34*	*39*	*45*	*46*	
date:	*BA*	*BA*	*BA*	*BA*	*IA*	*BA*	*BA*	*BA*	*BA*	*BA*	*BA*	
Oxychilus alliarus												shade-loving taxa
Oxychilus cf cellarius												
Oxychilus sp.				+								
Retinella radiatula				+		+						
Retinella nitidula				+								
Cochlicopa lubrica				+								
Cochlicopa sp.				+								intermediate taxa
Hygromia hispida			+	++		+	+					
Vallonia excentrica	+			+		+	+					grassland taxa
Vallonia pulchella				+			+					
Vallonia sp	+	+						+	+			
Vertigo pygmaea				+								
Helicella sp.						+						
Cecilioides acicula									+			
Succinea sp.				+								marsh taxa
Carychium tridentatum				+								
Carychium sp.				+			+					
Lymneae truncatula	+			+			+					
Lymneae palustris				++			+					aquatic taxa
Valvata cristata		+			+							
Planorbis leucostoma	+	+		++	+					+	+	
Planorbis corneus				+								
Planorbis contortus				+								
Planorbis planorbis				+								
Bithynia tentaculata				+								
Bithynia leachii				+								

(Jones 1996, 32) and at Barton Court Farm in Oxfordshire (Jones 1986). The oats may be wild or cultivated although occasionally floret bases of cultivated oats have been found from the Late Bronze Age/Early Iron Age onwards (Jones 1996, 32).

The wild plants represented in fill (6746) came from a range of habitats. There were several cornfield weeds, corncockle (*Agrostemma githago*), bedstraw (*Galium* spp.) and bromes (*Bromus* spp.). These weed seeds are of a similar size to cereal grains and characteristic of grain storage deposits because they are difficult to separate from the grain other than by hand sorting. These weeds may have been accidentally imported onto the site with the cereal grains. Grassland plants were well represented by the wild seeds; these include self-heal (*Prunella vulgaris*) and ribwort plantain (*Plantago lanceolata*), both common in grassy places and mainly on neutral or basic soils; self heal, however, may also grow in other habitats (Clapham *et al* 1987). Other typical grassland plants were buttercup (*Ranunculus acris /repens /bulbosus*), sedge (*Carex* sp.) and the grass seeds, eg. meadow grass (*Poa* spp.). Greig (1984) highlights these species, amongst others, as useful indicators of hay; thus, the pit may contain residues of hay imported onto the site for fodder.

The remaining wild plants included hazelnut shell fragments and a small number of leguminous seeds, some of which were classified as vetch/tare/vetchling (*Vicia/Lathyrus* spp.). The small size of these seeds, however, suggests that they were probably wild plants rather than the residues of cultivated pulses, which may have either been imported onto the site as arable weeds or as part of the grassland assemblage.

TABLE 7 The charred plant remains from Little Marlow, Bucks.

	Period	BA	BA	IA	IA	
	Feature	BFS	BFS	PIT	PIT	Total
	context	6680	6751	6746	6748	
	sample	25	49	28	29	
	volume soil in litres	30	6	18	10	
Cereal grains						
Triticum. aestivum s.l.	bread/club wheat			5	1	**6**
Triticum sp(p).	wheat			3	1	**4**
cf. *Triticum* sp.	?wheat		1			**1**
Hordeum sp(p).	barley			6		**6**
Avena sp(p).	oat			4	1	**5**
cf. *Avena* spp.	?oat			3		**3**
indeterminate cereals	indet. grains (est.)			30	6	**36**
Chaff						
Hordeum rachis internode	barley rachis fragment			1		**1**
Other plants						
Ranunculus acris/ repens/ bulbosus	buttercup			1		**1**
Agrostemma githago L.	corncockle			1		**1**
Chenopodiaceae	–			1		**1**
Vicia/Lathyrus spp.	vetch/tare/vetchling			6		**6**
Fabaceae indet.	indet legume frags			6		**6**
Prunus cf. *spinosa*	?sloe/blackthorn	1				**1**
Rumex sp.	dock			1		**1**
Corylus avellana L.	hazelnut shell frags	1		3		**4**
Prunella vulgaris L.	self-heal			3		**3**
Plantago lanceolata L.	ribwort plantain			1		**1**
Galium spp	bedstraw			2		**2**
Carex sp.	sedge			1		**1**
Lolium/Bromus sp	brome/rye-grass			1		**1**
Bromus spp.	bromes			3		**3**
Poa spp.	meadow-grass			2		**2**
Poaceae indet.	indet. grasses			2		**2**
indet seeds	–			+	+	+
stems	–			1		**1**
Total		**2**	**1**	**87**	**9**	**99**

Key: Period : BA = Bronze Age; IA = Iron Age
Feature : BFS = burnt flint spread; PIT = storage pit

Discussion

The plant remains from the Bronze Age samples can provide little detailed information on human activities at the site. The Iron Age samples from the pit on the other hand provide evidence of the range of cereals used at the site which included bread/club wheat and hulled barley. The charred grain and large weed seeds may be burnt residues from the pit being used at one time for grain storage. The other charred plant remains, however, suggest that the residues of grassland plants, possibly gathered as hay fodder, were also dumped in the pit. Indeed, the range of other debris in the pit which included fired clay, burnt flint, animal bone, pottery and slag in both fills, suggests that the plant remains may be part of rubbish thrown into

the pit rather than related to the features primary function.

The Charcoal Residues by Rowena Gale

Introduction and methodology

Charcoal associated with the three distinct burnt flint scatters was mostly poorly preserved. An Iron Age storage pit from Site 2 up on the gravel terrace also contained charcoal, probably derived from domestic fuel. Wood identification was undertaken on the charcoal from both these areas, to establish the type and character of the fuels used over time.

Charcoal from the burnt mound deposits was mostly poorly preserved and heavily infiltrated with mineral (?iron) deposits. Charcoal from the storage pit was abundant and although better preserved was rather comminuted. The following samples were 50% sub-sampled: <24>, <46>, <47> and <28>.

Samples were prepared for examination using standard methods. Fragments from each sample were fractured to expose fresh transverse surfaces and sorted into groups based on the anatomical features observed using a x20 hand lens. Representative fragments from each sample were selected for detailed study at a high magnification. These were fractured to expose the tangential and radial planes, supported in washed sand, and examined using a Nikon Labophot microscope at magnifications of up to x400. The anatomical structures were matched to prepared reference slides.

When possible, the maturity (ie heartwood/sapwood) of the wood was assessed. The charcoal was too comminuted to record measurements of stem diameters.

Results

A summary of the taxa identified is given in Table 8. The anatomical structure of the charcoal was consistent with the taxa or groups of taxa given below. It should be noted that the anatomical structure of some related taxa cannot be distinguished with any certainty, for example, members of the Pomoideae (*Crataegus*, *Malus*, *Pyrus* and *Sorbus*) and Salicaceae (*Salix* and *Populus*). Classification follows that of *Flora Europaea* (Tutin, Heywood *et al* 1964–80).

Aceraceae. *Acer* sp., maple
Aquifoliaceae. *Ilex* sp., holly
Betulaceae. *Alnus* sp., alder
Caprifoliaceae. *Viburnum* spp., wayfaring tree, guelder rose/ or Cornaceae. *Cornus* sp., dogwood
Corylaceae. *Corylus* sp., hazel
Fagaceae. *Fagus* sp., beech; *Quercus* sp., oak
Oleaceae. *Fraxinus* sp., ash
Rosaceae. Subfamilies:
  Pomoideae which includes *Crataegus* sp., hawthorn; *Malus* sp., apple; *Pyrus* sp., pear; *Sorbus* spp. rowan, service tree and whitebeam. These taxa are anatomically indistinguishable.
  Prunoideae which includes *P. spinosa*, blackthorn
Salicaceae. *Salix* sp., willow and *Populus* sp., poplar. These taxa are anatomically similar.
Pinaceae. *Pinus* sp., pine

Bronze Age:

Site 3b to the south of stream.
Samples 19, 24, 35 and 39

The charcoal in these samples was poorly preserved and heavily impregnated with mineral deposits. In all samples except <24> the material was comminuted and sparse. Sample 24 included a much larger quantity of charcoal but much of the material was too degraded to identify. Sample 19 derived from the burnt flint and charcoal fill of (6728), and <35> from a central black layer, (6680). The samples contained a range of species including hazel (*Corylus*), oak (*Quercus*) sapwood and heartwood, ash (*Fraxinus*), beech (*Fagus*), alder (*Alnus*), holly (*Ilex*), blackthorn (*Prunus spinosa*), and hawthorn/*Sorbus* group (Pomoideae) (*see* Table 8). There was no evidence of dominance amongst the taxa.

Samples 17 and 34

Sample 17, from the black burnt flint fill (6684) of the linear feature across Site 3b, and sample 34 from an upper back-fill (6722) of the same feature both contained sparse charcoal fragments. Sample 34 included hazel and the hawthorn/*Sorbus* group, while sample 35 included alder/hazel (*Alnus*/*Corylus*), the hawthorn/*Sorbus* group (Pomoideae), beech, oak and blackthorn.

Site 3a to the north of the stream.
Samples 45, 46 and 47
The main 'potboiler' spread was sited on the northen bank of the modern river, in Site 3a. Sample 45, from the south-east corner of the area (sited in a palaeochannel) contained slightly larger fragments than those from Sites 3b and 3c. The sample consisted of beech, the hawthorn/*Sorbus* group and alder/hazel. Sample 46, from the same deposit, was comparatively large and was 50% sub-sampled. It comprised mainly oak sapwood and heartwood but also small quantities of holly, hazel, ash, blackthorn and the hawthorn/*Sorbus* group. Sample 47 from the main flint spread (6766) also included a larger quantity of material which, although rather less contaminated by mineral deposits, consisted mostly of small fragments. Taxa identified included oak roundwood (some probably quite narrow), sapwood and heartwood, the hawthorn/*Sorbus* group, maple (*Acer*), hazel and willow/poplar (*Salix/Populus*).

Site 3c on the northern stream bank.
Samples 27, 48 and 49
Site 3c was located on the northern bank of the river, between the two other flint scatters. Charcoal, <27>, from the peaty fill (6736) of a linear feature [6729] on the eastern side of the area, was sparse and included beech and pine (*Pinus*). Samples 48 and 49, both from mid brown clay deposits, were sited on the west and east sides, respectively, of the area. Both samples were degraded, infiltrated with mineral deposits and difficult to identify. Oak sapwood and heartwood, the hawthorn/*Sorbus* group and alder/hazel were common to both samples, and, in addition, blackthorn, and probably maple were present in sample 49. There is a possibility that <27> is not contemporary with the Bronze Age activities but later (see above). Perhaps the occurrence of pine and beech is to a degree supportive of this suggestion.

Iron Age:
Samples 28 and 29
Charcoal rich deposits were excavated from the primary, <28>, and tertiary, <29>, fills of storage pit [6745] in Site 2. Sample 28 consisted of large fragments (up to 10^3 mm), and was 50% sub-sampled. The charcoal was predominantly beech and, although probably not from narrow roundwood, it was not possible to assess the maturity of the wood. Holly and dogwood (*Cornus/Viburnum*) was also identified. Beech was also dominant in sample 29, with a small amount of hazel.

Discussion
Charcoal samples from the three Bronze Age sites, 3a, 3b and 3c, identified the use of a wide range of taxa, including maple, alder, hazel, beech, ash, holly, the hawthorn/*Sorbus* group, blackthorn, oak, willow/poplar and pine (although possibly later in date). Apart from samples 48 and 49, from the burnt spread in Site 3c, in which oak occurred more frequently than other species, there was no evidence to suggest any particular preference or selection of species.

Charcoal from the Iron Age storage pit [6745] in Site 2 was more abundant and better preserved, and indicated a clear preference for the use of beech. Small quantities of hazel, holly and possibly dogwood or *Viburnum* were also identified. Oak was a conspicuous absentee from these two contexts.

Although the condition of the charcoal from the burnt mounds was too degraded to determine whether the wood selected for heating the flints consisted of roundwood or cordwood, it was evident that the fuel was gathered from a wide range of trees and shrubs. Interestingly, the Iron Age material, which probably derived from domestic fuel residues, differed considerably from that used at the burnt mounds; and the apparent non-use of oak was unusual.

Charcoal from a Bronze Age burnt mound at Duffield House, Woodley, Berkshire, although poorly preserved, identified the use of oak, ash and alder/hazel (Gale unpubl.). Similarly, poor preservation of charcoal from a Late Bronze Age burnt mound at Reading Business Park, Berkshire, hindered the identification of fuel, which consisted mainly of oak, but also included the hawthorn/*Sorbus* group, maple, blackthorn, willow/poplar, alder/hazel and alder buckthorn (*Rhamnus cathartica*) (Gale unpubl.). At the burnt mound excavated at Cob Lane, Bourneville, alder was consistently used in preference to other species, which included oak, hazel, the hawthorn/*Sorbus* group, alder buckthorn and blackthorn (Gale unpubl.). Roundwood, predominantly from alder and ash, was used at a Middle Bronze Age burnt mound in the Sandwell Valley, in the West Midlands, together with hazel, oak, alder buckthorn, willow/poplar and elm (Gale unpubl.)

TABLE 8 Charcoal residues from the Bronze Age Burnt Mound and an Iron Age Pit.

site	date	context	sample	*Acer*, maple	*Alnus/Corylus*, alder/hazel	*Alnus*, alder	*Corylus*, hazel	*Fagus*, beech	*Fraxinus*, ash	*Ilex*, holly	Pomoideae, Hawthorn/	*Sorbus* group *Prunus*, blackthorn	*Quercus*, oak	Salicaceae, willow/poplar	*Viburnum/Cornus*, dogwood/viburnum	*Pinus*, pine
3b	BA	6681	19			9	1						2sh			
3b	BA	6726	24					4	2		7		4			
3b	BA	6680	35		1					1		10				
3b	BA	6769	39				2				?1					
3b	BA	6684	17				2				5					
3b	BA	6722	34		3			1			1	1	2			
3a	BA	6774	45		1			15			2					
3a	BA	6774	46				1		1	2	6	1	45sh			
3a	BA	6766	47	4			6				21		43rsh	1		
3c	BA	6736	27					3								1
3c	BA	6751	48		6						3		11sh			
3c	BA	6751	49	?13	26						11	10	21sh			
2	IA	6746	28					126		5					?2	
2	IA	6748	29				1	36								

BA = Bronze Age; IA = Iron Age; r = roundwood (diameter <20mm); s = sapwood; h = heartwood
(The number of fragments identified is indicated)

The frequent use of wetland species (alder, willow and alder buckthorn) could be anticipated from the siting of the burnt mounds in close proximity to rivers and streams. The use of these species at Little Marlow, however, appears to have been relatively sparse, although it is possible that these results reflect differential preservation of the charcoal rather than species selection or the local distribution of taxa.

Pollen analysis and stratigraphy by Robert G. Scaife

Introduction

Excavation of the Bronze Age sites at Little Marlow revealed a substantial thickness of peat and underlying organic silts within Site 3b (Figure 6). It was anticipated that this peat might provide pollen evidence for the local vegetation environment and possible human activity and land-use in the near region. Consequently, monolith profiles were obtained which have been subsequently analysed for pollen and spores. Pollen data show that there are two principle phases of peat growth present representing the environment of two markedly contrasting periods. Firstly, a lower peat and basal minerogenic horizon are of possible Late Devensian and early Holocene age (*c.*10,000–8500 BP) and relate to the early Mesolithic (Maglemosian) environment. A piece of wood (ash) found at a depth correlating with the hiatus yielded a radiocarbon age of 6130±60BP (Beta- 101166, see Table 3). An upper peat is clearly of late prehistoric date with evidence of human activity and cereal cultivation. This activity is regarded as Bronze Age and the radiocarbon dating clearly shows it extends well into the first millenium BC and relates to the archaeology excavated at this site. There are few such sites in this county and consequently, no locally comparable data. This analysis provides the first pollen analysis for South Buckinghamshire and this paper discusses the results of the pollen investigation.

Stratigraphy

The stratigraphy comprises a homogeneous, dark brown/oxidised, black detrital fen peat of *c.* 120 cm thickness. A basal sequence has higher mineral

content but with alternations of darker organic peat. Overlying the peat is a transitional phase where there is increasing silt content which becomes a grey/brown silty clay which is gleyed in the upper levels of the profile. The profile is described in more detail below, measurements are taken from a datum 0.2m below the modern ground surface.

Depth cm	
19 – 10	Grey, silty clay. Gleyed (7.5YR 5/8).
37 – 19	Grey/brown silty clay (10YR 4/2). Freshwater molluscs at 22–23cm (Planorbids and bivalves).
47 – 37	Transition between lower peat and upper silty clay.
115 – 47	Black detrital peat with occasional sand lenses (10YR 2/1 or 10YR and twigs at 106cm.
121 – 115	Large flint stone.
166 – 121	Black, humic detrital monocot. peat (10YR 2/1).
166 – 172	Silty peat.
176 – 172	More organic/peaty.
182 – 176	Silty organic sediment (10YR 3/2).
186 – 182	Darker, more organic.
193 – 186	Sandy silt, grey (10YR 4/1 or 2.5Y 4/2).
*** – 193	Basal coarse sand.

A large stone was present in the monolith at 121–115 cm. This may rest on an unconformity/ hiatus or truncation of the peat accumulation.

Pollen Methodology

Samples for pollen analysis were obtained from the excavated section using metal monolith profile tins (for location see Figure 4). These were described and sub-sampled for pollen at 4cm intervals in the laboratory. Standard procedures were used for the extraction of the sub-fossil pollen and spores (Moore and Webb 1978; Moore *et al.* 1991). Samples of 1–2ml were used in the analysis. Absolute pollen frequencies were calculated using the addition of an exotic marker (Stockmarr 1971 *Lycopodium* tablets) to a known volume of sample (1–2ml.). The recovered pollen and spores were identified and counted using an Olympus biological research microscope fitted with Leitz optics. A pollen sum of 300 dry land taxa plus extant marsh/wetland types and spores was counted where possible. Resulting data are calculated as a percentage of the dry-land types (the pollen sum) and marsh, spores and miscellaneous microfossils (e.g. *Pediastrum* and derived palynomorphs) were calculated as a percentage of these individual groups plus the pollen sum. Diagrams were plotted using Tilia and Tilia Graph in the Department of Geography, University of Southampton. Taxonomy in general follows that of Moore and Webbs 1978 modified according to Stace 1991 and Bennett *et al* 1994.

The Pollen Data

Five pollen zones have been delimited in the 150cm of peat and sediment examined. These are characterised as follows from the base of the profile upwards (see Fig 7):

MAR:1 192–164cm *Betula-Juniperus*-Poaceae-Cyperaceae. Silty organics with purer organic/ peats. Herbs are dominant (90%) at the base with trees and shrubs increasing in importance upwards. Trees and shrubs comprise *Betula* (10%), *Pinus* increasing from <5% to 25% and *Juniperus* (9%). Herbs are dominated by Poaceae (75% at the base, 50% above). Other herbs of note are *Filipendula*, *Galium*, Asteraceae types and large Poaceae (>45u). There are single/sporadic occurrences of other taxa including significant types; *Polygonum bistorta* type, *Helianthemum*, *Sanguisorba officinalis*, *Plantago media/major* type and *Artemisia*. Marsh and aquatic taxa are dominated by Cyperaceae (75%) with aquatic macrophytes and marginal aquatic taxa (*Typha*, *Sparganium*, *Alisma* type). There are substantial numbers of *Equisetum* (up to 60%). *Botrychium lunaria* is noted. The basal sample (192cm) contains *Pediastrum* (20%) and pre-Quaternary palynomorphs are present throughout.

MAR:2 164–132cm *Pinus*-Poaceae. Black/brown homogeneous detrital peats. *Pinus* is dominant, increasing to 90% tdlp. *Betula* and *Juniperus* in MAR:1 decline to low values and absence respectively. *Salix* to 5% is of note. Herbs decline sharply throughout this zone due to reduction in Poaceae (from 50% to <5%). Herb diversity is also small. Marsh spore taxa and pre-Quaternary palynomorphs show similar reductions with sharp declines especially of Cyperaceae and other types noted in MAR:1. A radiocarbon analysis of organics at 135–138cm produced a date of 9030±60 BP (Beta-130862).

MAR:3 132–122cm *Corylus avellana* type. Homogeneous detrital peat. *Pinus* declines sharply (90% to 15%) while *Corylus avellana* type expands to maximum values of 80%. *Quercus* and *Ulmus* are incoming in this zone (5% and 10% respectively). There are few herbs in either the dry land or marsh categories and their totals are <2%. *Pteridium aquilinum* spores become more important expanding from <1% to 10% (tdlp+spores). Percentages of Zygnemataceae also expand.

MAR:4 122–84cm *Quercus-Tilia-Corylus avellana* type-Poaceae. This zone is delimited by sharp breaks in a number of taxa present. *Pinus* and *Betula* occur continuously but at very low levels, *Quercus* and *Tilia* are the dominant trees (20% and 15% resp.) with sporadic occurrences of *Populus* and *Fraxinus*. *Corylus avellana* is the dominant shrub but with percentages markedly reduced from MAR:3. Within the herbs, Poaceae (c.60%), Lactucae (to 30%) *Plantago lanceolata* (6%) and Cereal type (10%) become important. In addition is a diverse range of other herbs including ruderals. Marsh taxa comprise Cyperaceae (20%) with *Typha angustifolia/Sparganium* type (to 20%) with aquatic and marginal aquatic taxa. *Pteridium aquilinum*, *Dryopteris* (monolete spores) type and *Polypodium* are present. A radiocarbon analysis on organic sediment near the base of this zone, 116–120cm, yielded a date of 4310±50 BP (Beta-130861) and indicates a Neolithic age for the lower part of the zone. A second date at the top of the zone, 84–86cm, has produced an age of 2590±50 BP (Beta-130860), suggesting that the zone spans the whole of the Late Neolithic and Bronze Age.

MAR:5 84–40 cm. This zone is delimited principally by the reduction in *Tilia* to absence and the expansion of *Fagus* (to 15% in the uppermost level in the transition to overlying minerogenic silts). *Quercus* and *Corylus avellana* type remain at similar levels to MAR:4 as do the majority of dry land and marsh herb taxa again dominated by Poaceae (60–70%) and Lactucae (23%), Cyperaceae (20%) and *Typha/Sparganium* type (10%).

Inferred Vegetation and Environment

It is strongly suggested from the pollen data shown in Figure 7a and b that there is a marked hiatus in the profile at 124–120cm, that is, between pollen assemblage Zone MAR:1–3 and MAR:4–5. The former appears to be of late Devensian and early Holocene (Flandrian Chronozone I) age whilst the latter is clearly late Holocene (Flandrian Chronozone III). This is evidenced by the sharp breaks in the representation of many taxa and the substantial changes in the ecology of the types found above and below 120–124cm and is confirmed by the radiocarbon dates obtained. Thus, there is an absence of data which relates to the middle Holocene (Flandrian Chronozone II) Atlantic period *c.*7,000 to 5,000 BP. There are also temporal gaps in the latter part of the Chronozone I sequence and the early part of Chronozone III (later prehistoric and Neolithic).

Late-Devensian and early Holocene vegetation changes

It is immediately clear that the lower zones (MAR:1–3) of this profile are of early Holocene age with Zone MAR:1 being possibly of late-Devensian cold stage. Zone 1 corresponds with the stratigraphically complex lower part of the profile comprising intercalated peat and silty peats whereas Zones 2 and 3 occur within the homogeneous detrital (monocot.) fen peat. The age of this lower zone is enigmatic being either **(a)** the Late-Devensian/Holocene transition at *c.*10,000 BP evidenced by the expansion of *Juniperus* and *Filipendula* responding to temperature amelioration, or **(b)** of earlier, possibly Windermere interstadial date (*c.*11,000–10,000 BP) which also supported birch, pine and juniper scrub woodland. This enigma revolves around the possibility of a hiatus at the Zone 1/2 pollen and the stratigraphical boundary noted. MAR:1 suggests a predominantly open herbaceous environment with *Juniperus* (juniper) scrub with some *Betula* (birch) and *Pinus* (pine). The latter taxa are wind pollinated, produce very substantial numbers of grains and are over-represented in pollen assemblages (Andersen 1970, 1973). The herb assemblages present, include taxa which are typical of the diversity of vegetation and habitat of the late-Devensian and early Holocene (Pre-Boreal; Flandrian Ia). Poaceae (grasses) and *Helianthemum* (rock rose) and *Botrychium lunaria* (moonwort) are representative of short turf grassland while *Filipendula* (meadow sweet), *Caltha* type (marsh marigold), *Sanguisorba officinalis* (greater burnet) and *Polygonum bistorta* type (bistort) are typical indicators of tall herb/meadow grassland. Disturbed habitats may be indicated by *Artemisia* (mugwort) and *Plantago major* type (although this

includes *P. media* which may derive from grassland). Other herb pollen taxa present are not identifiable to a lower taxonomic and thus plant community level. Very high percentages of Cyperaceae (sedges) and *Equisetum* (horsetail fern) and other poor fen type (*Typha/Sparganium*) are evidence that the depositional habitat was open sedge fen. Basal *Pediastrum* (freshwater algae) and sporadic pollen occurrences of aquatic plants suggests that there was initially standing or slow flowing freshwater.

Zone MAR:2 demonstrates the early Holocene (Boreal pine period; Godwin 1940;1975) dominance of *Pinus* (pine). This along with the expansion of *Corylus* (hazel), *Quercus* (oak) and *Ulmus* (elm) marks post glacial dynamic/successional changes. Such dynamic vegetation was a response to climatic amelioration and movement of woodland taxa from their glacial refugia. Such changes when viewed geographically were asynchronous depending upon the migration rates of the individual taxon, whether they were pioneer/colonisers (*Betula*) or dominants (oaks and elm). *Pinus* typifies such asynchroneity with early Holocene dominance in southern England at *c.*9,500–9,000 BP (Scaife 1980,1982,1987; Bennett 1978) but with progressively later arrival in the Midlands and north of England (Bennett 1978; Birks 1988). *Corylus avellana* is similarly typical of Boreal woodland and here, the very sharp expansion of hazel marks its arrival and establishment at this site (Zone MAR:3) *circa* 9,000 BP. Hazel similarly shows asynchronous changes again reflecting the positions of glacial refugia with earlier Holocene presence to the west of England (Deacon 1972) and in North West Scotland (Birks 1973). At Little Marlow, its arrival and dominance occurs just prior to the arrival of *Ulmus* and *Quercus*. Values of the latter are relatively small in Zone 3 and if truncation of the profile and/or cessation of peat accumulation had not occurred, it is certain that the dominance of oak and elm over pine would have been demonstrated.

This pattern of vegetation change/response to climatic amelioration, migration rates and pedological change has been described for various sites across Britain allowing geographical reconstruction of the vegetation throughout the Holocene (Birks 1988). However, there are relatively few sites in southern England and such data are scarce. This site provides valuable evidence for these changes. Without further radiocarbon dating, the time of arrival of the primary woodland elements can only be gauged by comparison with existing data. There are none from Buckinghamshire which have radiocarbon dates and comparisons must be made with sites from farther afield. As noted above, two possible interpretations may be made. First, that the basal Zone (MAR:1) is Late Devensian with a hiatus between MAR:1 and MAR:2 and second that the juniper and birch peak in MAR:1 marks the Devensian/Holocene transition at *c.*10,000 BP. Whilst a peak in juniper is frequently associated with this transition, this is generally followed by rapid expansion of birch to dominance. The values of birch seen here associated with the juniper peak are not great enough (given its high pollen production) to demonstrate its importance or dominance. This implies that there is either a hiatus in peat accumulation in which this widespread phenomenon would have been evidenced. Alternatively, it is possible that pine was the first major woodland coloniser in this region shortly after 10,000 BP.

The Late-Holocene, Neolithic to 1st Millennium BC

At 120cm there is a clear change in the pollen assemblages, both in percentages and taxa representing a major hiatus in the profile. Whether this was due to erosion or cessation of peat accumulation is not clear. However, radiocarbon date of 6130±60 BP (Beta-101166) for ash wood obtained at this point of hiatus, the large flint stone at 120–116cm and the date of 4310±50 BP suggests that the former may be true. The date obtained from the ash branch relates to the middle Holocene, later Mesolithic, Atlantic period. Pollen spectra are not representative of this period since the lower Zones (MAR:1–2) are clearly early Holocene and the upper Zones (MAR:4–5) are later prehistoric with evidence of human disturbance. It seems plausible that the ash wood and stone were resting on a stable peat/land surface while the radiocarbon date above indicates a restart of peat growth in the Neolithic. There is, however, no evidence of peat degradation/oxidation at this level indicating sub-aerial exposure.

Above this hiatus, the woodland comprises predominantly *Tilia* (linden), *Quercus* (oak) and *Corylus avellana* (hazel). The former is typically under-represented in pollen spectra since although it produces moderate quantities of pollen, it is entomophilous and flowers mid-summer when trees are in full leaf further inhibiting its dispersion. This implies that lime would certainly have been a significant element of local woodland.

In Zones MAR:4 and MAR:5 there is clear evi-

Little Marlow

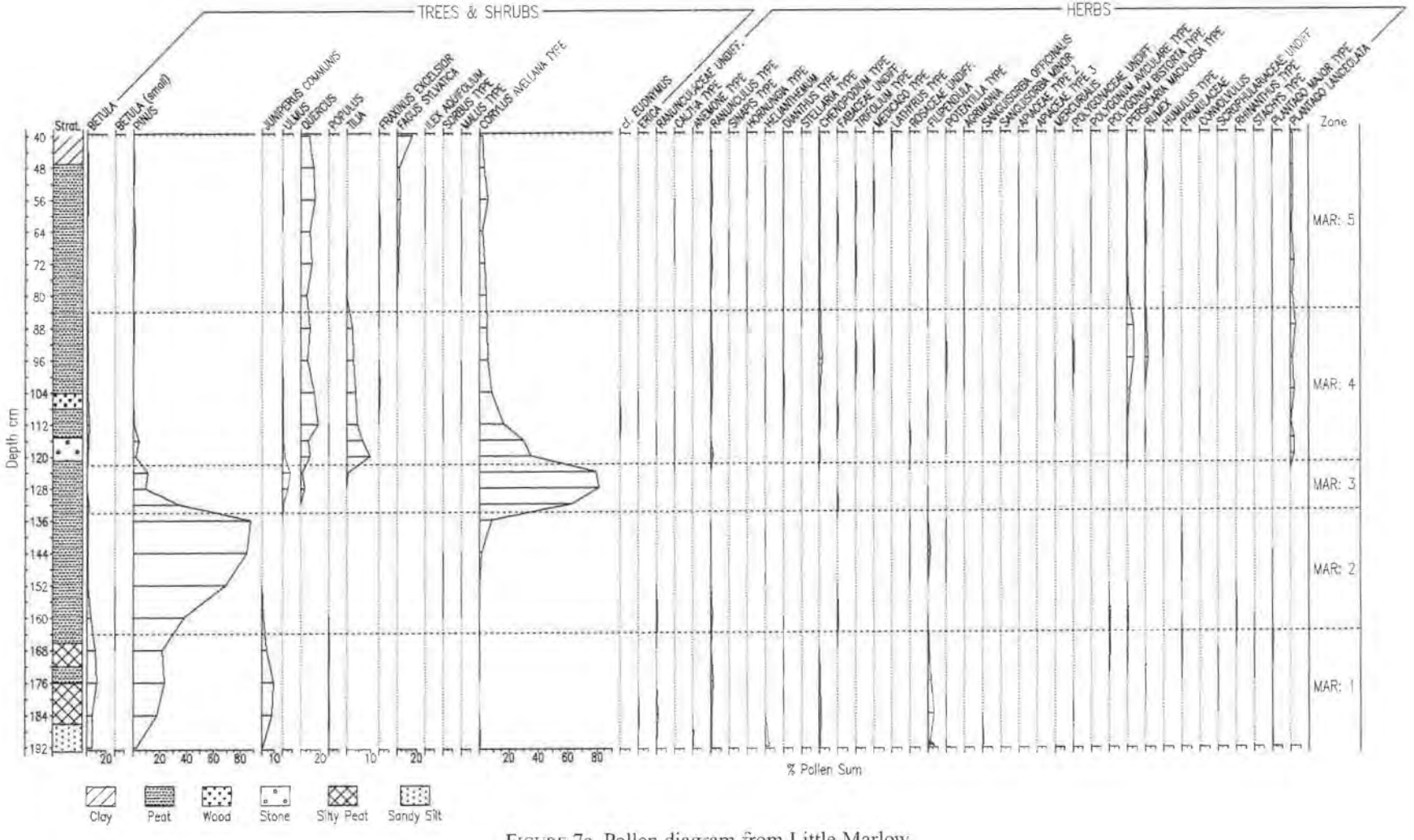

FIGURE 7a Pollen diagram from Little Marlow.

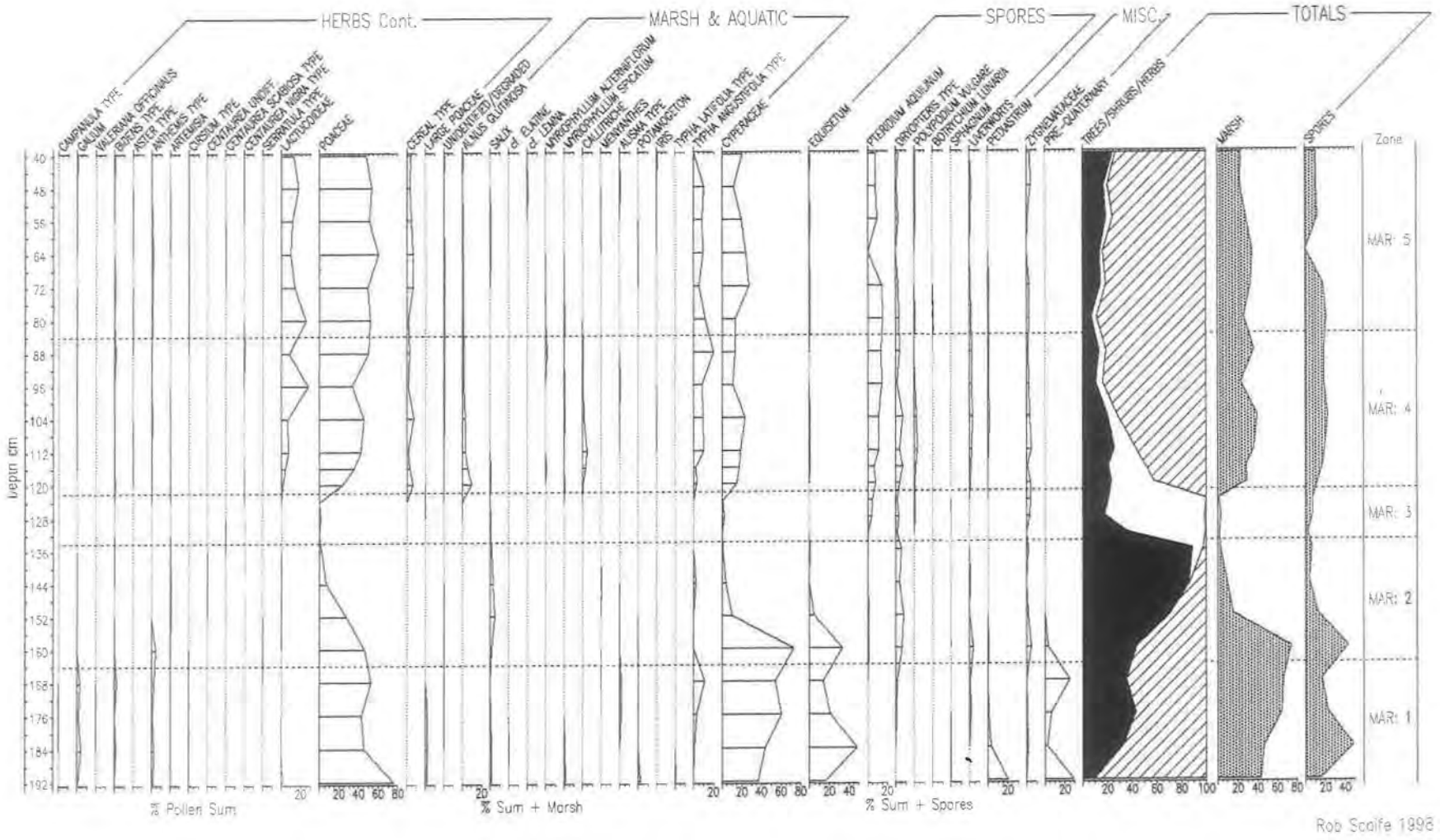

FIGURE 7b Pollen diagram from Little Marlow.

dence for human activity with arable cultivation shown by cereal pollen (*Hordeum/Triticum*) and associated weeds of disturbed ground and cultivation. There is, however, a very substantial representation of pastoral type with dominance of Poaceae (grasses), Asteraceae (daisy family) and especially Lactucae (dandelions, sow thistles and hawk-bits). Throughout these zones there are no significant variations in these pastoral and arable elements suggesting a continuity of mixed arable/pastoral land use which spanned the duration of the peat accumulation. Radiocarbon dates place this phase of activity from the latest Neolithic/Early Bronze Age to the 1st millennium BC. Despite the fact that woodland remains, the landscape also had substantial areas of open agricultural land during this period. The preceding Neolithic might be expected to have greater woodland cover and the subsequent late Iron Age and Romano-British period to be more open. Furthermore, the lime woodland noted above and its decline at the Zone MAR:4/MAR:5 appears to be the later prehistoric 'lime decline'. Once thought to be due to climatic change (sub-Boreal/sub-Atlantic transition) this event is now regarded as an anthropogenic event (Turner 1962) which is frequently associated with agricultural activity. Although asynchronous with dates ranging from the Neolithic (Scaife 1980,1987) to the Saxon (Baker *et al.* 1979) the majority of dates are for the Middle-Late Bronze Age at *circa* 3,000–3,300 BP providing evidence for increased pressure for agricultural land during this period. A small increase in cereal type in MAR:5 may be evidence of extension of arable cultivation in the 1st millennium BC.

With clearance of lime woodland, there appears to be an expansion of *Fagus* (beech) in Zone MAR:5 which may be secondary woodland colonisation. However, opening/removal of lime woodland may have extended the pollen catchment allowing ingress of this poorly represented taxon; that is, due to its high specific gravity and size which negates its widespread dispersal (Andersen 1970,1973; Tauber 1967). It is interesting to note that this is perhaps the first evidence of the beech woodlands of the Marlow region, which due to their maturity, have in places especially rare plant species such as the ghost orchid.

The Depositional Habitat

During the later/upper phase of peat accumulation, the autochthonous vegetation was fen/reed-swamp with areas of open water (or flooding from adjacent river??). Cyperaceae, Poaceae, *Iris*, *Typha angustifolia/Sparganium*, and *Alisma plantago-aquatica* were growing. Aquatics are represented by *Myriophyllum alterniflorum*, *M. spicatum*, *Callitriche*, *Lemna* and *Potamogeton*. Small numbers of *Alnus* are present but given its very substantial pollen production and wind dispersion it is clear that carr woodland was not locally present. It is possible that late prehistoric activity/woodland clearance was responsible for a locally higher ground water table, increased surface run-off and creation of anaerobic conditions and organic accumulation.

Animal Bone by D. James Rackham

Animal bone was apparently not preserved across most of the Bronze Age burnt mound site, and where it survived within the burnt flint spreads it was in very poor condition. It is not therefore possible to assess whether or not animal bone was a significant component of the originally deposited assemblage. Ten fragments were nevertheless recovered from the burnt flint spreads, a ditch fill and the peat deposits (6679, 6680, 6683, 6762, 6771 and 6776 see Table 9). These included fragments of domestic cattle and pig, and two bones of red deer, one of which was unstratified, but recovered from the organic deposits in the machine dug trench on Site 3b. In addition, a bantam-sized chicken humerus from (6776) in Site 3a, a layer described as a natural, light orange brown sandy-silt lying beneath the colluvial brickearth (6787), but above the burnt flint spread on the northern edge of the site, suggests that the colluvial deposits may date no earlier than the end of the 1st millennium BC, the earliest date for chicken in this country (Davis 1987).

Discussion of the Environmental Results

The period of archaeological activity at the site evidenced by the extensive burnt flint spreads is contemporary with local pollen Zone MAR4 which radiocarbon dating has established starts in the Neolithic and extends into the Late Bronze Age. The three radiocarbon dates on charcoal from the flint scatters fall within the Early to later Middle Bronze Age and presumably correspond with the middle part of this pollen zone.

While it is not immediately clear from the pollen

TABLE 9 Catalogue of animal bone from the burnt mound sites.

context	species	bone	side	fusion	measurement*	Comment	preservation**
6679	Cattle size	Metapodial	Fragment	Distal epiphysis fused		Distal condyle and fragments – unidentifiable- possibly red deer	2
6679	Pig	Humerus	Left			Distal half shaft- 2 pieces	3
6680	Cattle	Scapula	Left			Part of glenoid – neck and distal blade- fragmented – small animal	2
6680	Cattle size	Unidentified	Fragment			Indeterminate long bone shaft?	2
6683	Cattle	Scapula	Right	Distal epiphysis fused	GLP-66 LG 58 BG 47 SLC 54	Distal end fragmented – 11 pieces – fragments –large animal	3
6762	Red deer	Femur	Right	Distal epiphysis fused		Fragmented distal epiphysis- 5 pieces	3
6771	Cattle	Humerus	Right	Distal epiphysis fused	SD 33.3	Distal end and shaft- distal; broken	4
6776	Chicken	Humerus	Right	Distal epiphysis fused		Distal end and shaft- bantam size	
Unstrat Trench 3b	Cattle	Femur	Right			Midshaft – proximal end dog gnawed – knife cut mark on s haft – small animal- in spoil from peat	4
Unstrat Trench 3b	Red deer	Metatarsus	Right			Distal half of shaft – 3 pieces- in spoil from peat	3

* measurements after Von den Driesch, A. 1976 – *A guide to the measurement of animal bones from archaeological sites*, Peabody Museum, Bulletin 1.

** preservation was scored on a scale of 1-5: 1- enamel only surviving; 2 - bone very severely pitted and thinned, tending to break up; teeth with surface erosion and loss of cementum and dentine; 3 - surface pitting and erosion of bone, some loss of cementum and dentine on teeth; 4 - surface of bone intact, loss of organic component, material chalky, calcined or burnt; 5 - bone in good condition, probably with some organic component

diagram that the activities at the site had any discernible impact on the vegetational cover of the locale, the charcoal exploited by the people responsible for the 'burnt mounds' clearly reflects the cross section of the available resources of the area with no apparent selection of species or type. Unfortunately, the charcoal preservation was poor and yielded no evidence for management. The greater proportion of oak in the later sites, Site 3a and Site 3c, on the north bank of the stream could merely reflect easier access to established trees on the sides of the valley, while Site 3b to the south of the stream may have utilised trees growing on the floodplain. The presence of alder, only at the latter site, might also reflect this spatial availability.

The one clear pattern that does emerge from these data is a substantial change in the local woodland between the Bronze Age and the Iron Age. There is a pronounced rise in the beech component at the top of pollen Zone MAR5, accompanied by a fall in other tree taxa. This change appears to be strikingly reflected in the charcoal recovered from the Iron Age storage pit of Site 2 which is dominated by beech charcoal and has no oak. While this appears to reflect a selection of beech, the pollen data suggests that by the date of this Iron Age feature beech may have become the dominant species in the contemporary woodland, and was therefore the most readily available source for fuel.

The environmental evidence only indirectly throws light upon the function of the burnt mound sites. The dating evidence indicates that the site was a location at which a similar activity appears to have been undertaken, at intervals, over a long period of time. That this activity relied upon the proximity of water and wood, was presumably the reason for this being a favoured site. The fuel utilised was unspecific and reflects opportunistic exploitation of the available local resources.

Perhaps one of the most telling results is that despite the processing of fairly large quantities of sediment from the archaeological deposits, the quantity of material that can be related to domestic occupation is very limited. The absence of bone is problematic since preservation and survival is a consideration, although some bone did survive to

be recovered during the excavation. The recovery, however, of only one charred cereal grain, one sloe stone fragment and one hazelnut fragment from nearly a quarter of a tonne of archaeological deposit indicates a density of such remains that is extremely low, even by the standards of Neolithic and Bronze Age sites. Hazelnut fragments, at least, are fairly ubiquitous and would be expected in greater numbers than they were recovered here if the site included domestic occupation for any length of time. While this absence of occupation debris, apparent in the finds assemblages also, is not conclusive it is suggestive of a non-domestic role for the site.

The dispersed character of the archaeological evidence, combined with the broad date range indicated by the radiocarbon dates, suggest the intermittent use of a favourable location for an activity apparently not associated with contemporary household activities. The relative absence of domestic evidence suggests that the site is either fairly remote from contemporary domestic activity areas or that the site was visited and exploited relatively infrequently in human terms, perhaps annually or monthly, rather than daily or weekly. The interpretation of similar sites as sweat lodges could perhaps been seen in the context of a ritual annual or seasonal 'bath', perhaps at the start of spring or in the fall.

Discussion

Comparison of Little Marlow to other burnt mounds in Buckinghamshire

The burnt mounds at Little Marlow are amongst the first in the County to be positively identified and undergo detailed archaeological and palaeo-environmental investigation. There have been other burnt mound excavations in the county (see below) but the examples at Little Marlow should be singled out for the quality of evidence retrieved and the level of post-excavation investigations undertaken. An appreciation of the sites setting was also obtained through the investigation of a range of features in association, and situated around the various mounds.

Four burnt flint spreads approximating to those at Little Marlow are recorded in the Buckinghamshire Sites and Monuments Record at the time of writing. The first of these sites represent two slight mounds comprised entirely of heavily burnt flint from a field near Chalfont St Giles and the River Misbourne, noted in 1984[10]. The mounds were accompanied by small burnt flint fragment scatters and dark soils. Of the recovered flint from the mounds, and fieldwalking around them, 95% were waste flakes (211 of 220 pieces). The nine tools recovered included scrapers, a blade core and utilised flakes, but no pottery was found during the investigations (Smithson 1984).

Burnt flint, animal bone and Neolithic/Bronze Age pottery was excavated at a suggested burnt mound at Chesham, near the River Chess[11] and a further such feature was investigated at Little Missenden/Penn on the River Misbourne. At this site, heavy concentrations of small fragmented burnt flint were located at four separate locations[12]. Finally at Taplow, close to the River Thames, subsoil features were recorded with burnt flint concentrations, however, no datable finds were recovered[13] (Ford 1991).

Burnt spreads have also been noted more recently at Dorney (Eton Rowing Lake) and Lots Hole site (Environment Agency, Maidenhead-Windsor flood relief scheme).

Interpretation of the Little Marlow evidence

Dating

A long life-span for the use of burnt mound sites is recorded, from the Bronze Age through to the sixteenth century AD, although burnt stone debitage also occurs on archaeological sites as a result of various activities which have been practiced from as early as the Mesolithic (Brindley and Lanting 1990 55). The majority of sites, however, show a predominance of late third and second-millennium BC dates for their use, and the examples at Little Marlow are no exception to this.

The radiocarbon dates from the Little Marlow excavations show burnt mound construction to have taken place throughout the Bronze Age. It is

[10] CAS-1597 – NGR SU 9863 9465
[11] CAS-5682 – NGR SP 95983 01468
[12] CAS-5766 – NGR SU 9075 9657, SU 9078 9658, SU 9086 9664 and SU 9084 9646
[13] CAS-5798 – NGR SU 9122 8067

interesting to note that the earliest dates, within the earliest Bronze Age, came from the spreads to the south of the stream, and the pottery sherds from this area, from the Collared Urn tradition, are also of this general date. By the Middle Bronze Age activity had moved to the present-day northern bank of the stream and by the later Middle to early Late Bronze Age, activities had moved north again, being further up the slope. Again, pottery from the excavations tallied well with the radiocarbon dates. It appears likely that the positioning of the activities were being dictated by the nature of the migrating stream course and the changing water-table.

Function

While the date and setting of the Little Marlow mounds are relatively clear, their precise function is not easy to ascertain. Indeed, the function of most investigated 'burnt mound', 'potboiler' or 'boiling mound' sites is still unclear, despite a wealth of research (Hodges 1955, Cubbon 1965, Barfield and Hodder 1987, Buckley (ed) 1990, Hall and Coles 1994). Most are near a source of water, either stream, river or marsh and most comprise heavy concentrations of fire-cracked stone or flint, with little in the way of domestic artefacts present. There seems to be no disagreement that they represent the debris created as a result of heating or steaming of water by the immersion or quenching of heated stones. But what the water was heated for still largely remains speculative.

Cooking has been considered to be a primary function of these sites (Layard 1922, Fahy 1960, Cubbon 1965, O'Drisceoil 1988), and experimentation by O'Kelly (1954) and Fahy (1960) has shown that hot stones can be used most effectively to cook food quickly and efficiently. It has even been suggested that such sites may have been used for the extraction of grease from animal bone (Barfield 1991) or other processing of animal products (Welch 1995). However, the lack of animal bone and artefacts at the Little Marlow site, which would normally be associated with episodes of cooking or animal product processing, has led the authors to move away from these ideas. Indeed, as early as 1913 Forseyeth was questioning the interpretation of such sites as cooking or processing areas and rather favoured a connection with hot baths (1913, 179).

It is interesting to note that excavations by Curwen at New Barn Down, Clapham in the 1930s also suggested that the concentrated deposits of fire-cracked flint represented the remains of steam baths or a type of primitive sauna (Curwen 1934), the author proceeding to illustrate the suggestion with ethnographic parallels of sweathouses from Finland. A function associated with bathing or steaming has also been put forward more recently by Lucas (1965) and Barfield and Hodder (1987). Indeed, the general lack of animal bones from the majority of sites, including those at Little Marlow, gives this idea some credence.

Steaming activities are likely to have required an enclosed space and perhaps did not need a trough (although a feature tentatively identified as a trough was located close to the stream in Site 3c). A series of post-settings and large, unburnt stones were identified during the excavations of the northern-most spreads (Site 3a), and it is believed that these may have been associated with the formation of an enclosed zone, thus conforming to the needs of a steaming area. Posts may have been positioned to create a confined space and attached to them could have been an awning of skin, or other light organic material held down by the large stones. This temporary canopy could have covered an area where heated stones were placed and then quenched with water from the near-by stream, thus creating a steam bath. Flint and stones will no doubt have been repeatedly used until they cracked into smaller and smaller fragments. The resulting debris of fire-cracked stone and flint, charcoal and ash may have thereafter been cleared out of the activity area and cast to the side to create the burnt mounds.

The fact that the site, like so many others, is in a low-lying area prone to frequent flooding, indicates that it would have been unsuitable for any kind of permanent activity, rather pointing to seasonal utilisation. Indeed, despite the fact that burnt mounds are numerous and widespread, their numbers are not so high as to suggest an everyday use. O'Kelly (1954, 137) certainly believed that many of the Irish sites were the remains of impermanent hunting camps, perhaps being sited along transhumance pathways and visited infrequently, though nevertheless repeatedly for particular activities. Could it be that bathing activities were an infrequent affair, perhaps constituting a special event within a community? Could it have been that at the end of the winter, groups congregated along the stream side at a favoured location to create steam baths cleansing themselves in a specific communal event? The Little Marlow evidence

PLATE 1 The Site 3c burnt spread exposed on the northern stream bank.

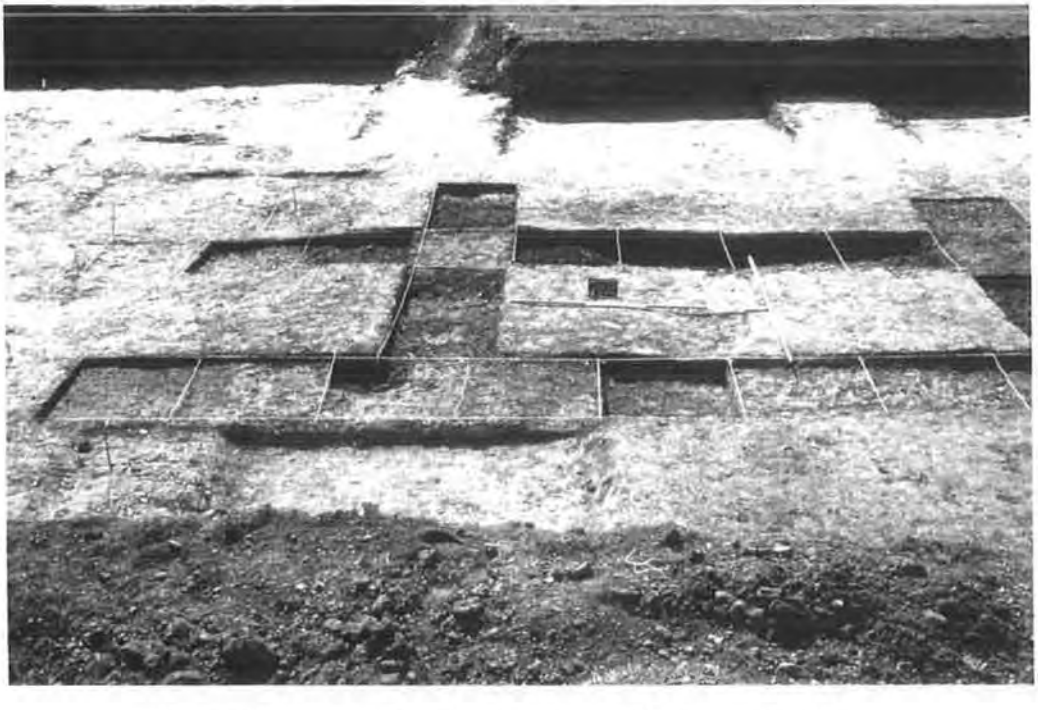

PLATE 2 Excavating the Site 3a burnt spread by 1m quadrants.

suggests people were repeatedly coming to this spot throughout the Bronze Age to heat water. While numerous visits were no doubt made to the area, the long time-span of activity, as reflected by the radiocarbon dates, indicates that visits could have been as few as once a year. We can only postulate what actually took place at these sites, but the evidence from Little Marlow suggests that an activity took place which involved the heating of water that took place infrequently, but also over a considerable period of time, and it does not appear to be associated with domestic activities, such as cooking or animal processing.

Associated evidence

Artefact density appears to be relatively low at the Little Marlow site, but this is usual at burnt mound sites. Many such sites are positioned on soils which have an acidic nature which precludes the preservation of certain organics, such as bone. The few pottery and flint artefacts, however, suggest that the mounds on either side of the stream were constructed over a number of visits, throughout the Bronze Age. Construction and utilisation of the features during this period is supported by the radiocarbon dates obtained. The very few finds, however, indicates that the visitors to this area were not leaving anything behind. They were heating water utilising heated stone and flint, but not carrying out activities which necessitated the use of tools, containers, animal by-products, or other artefacts associated with general domestic or industrial activities.

The presence of 'background' artefacts indicates that activity in the general area goes back to the Mesolithic. The earlier evaluation of the site (Kiberd 1994) showed a rather dispersed scatter of Bronze Age pottery and flint across the surrounding landscape, the majority not being associated with actual structural features. The most conclusive evidence of *contemporary* activity came from an area *c* 0.5 km north of the stream-side burnt mounds, being on the first gravel terrace. Here three, apparently isolated, features were excavated, consisting of two pits and a single post-hole. From one of the pits was recovered three poorly-fired clay loom weights together with a cordoned sherd of plain ware flint gritted pottery of suggested mid to (early) Late Bronze Age date (Barclay 1994). Despite opening areas for excavation to see whether the activity extended beyond the confines of the evaluation trenches, only five further features were identified, all being post-holes suggesting a lightly constructed structure, of a temporary nature.

Landscape setting

In 1990 various authors writing in the *International Contribution to Burnt Mound Archaeology* (Buckley (ed) 1990) stated that more palaeo-environmental evidence would go a long way towards helping our understanding and appreciation of burnt mound sites. Only rarely have burnt mound sites been excavated where the importance of environmental and geographical parameters have been demonstrated (*see for example* Williams *et al* 1987, Dockrill 1988). The excavations at Little Marlow represented a rare opportunity to carry out such palaeo-environmental investigations, with the presence of deeply stratified peat deposits bordering the site. Indeed, the results presented in this paper are the first to emerge from Buckinghamshire on this type of archaeological site.

The palynological analysis identified two phases of peat growth, the latter phase being of later prehistoric date (Early to Late Bronze Age) and relating to the archaeology excavated at the site. It showed that the activities of burnt mound construction and utilisation were in a landscape which had substantial areas of open agricultural land. While woodland remained in the landscape, there was a good representation of pastoral indicators including grasses, dandelions and thistles. In addition there is evidence of human activity in the form of limited arable cultivation, shown by cereal pollen and associated weeds of disturbed ground and cultivation. The pollen data indicate that during the Middle to Late Bronze Age there was a decline in lime woodland. This episode of decline is well recorded on other sites and is regarded as an anthropogenic event. The preceding Neolithic and earliest Bronze Age are likely to have been characterised by a greater and more diverse woodland cover. It is becoming accepted that across much of the British Isles removal of woodland cover for arable farming took place *during* the Bronze and Iron Ages and not, as once believed, during the Neolithic (Richmond 1999). The evidence from Little Marlow supports this view.

Beyond Buckinghamshire

Ireland and Scotland appear to have the majority of burnt mounds, or at least the majority still pre-

served. Ireland has at least 4,000 recorded examples, with County Cork alone having in excess of 2000 such sites, often found in groups of 10 or more along the banks of streams or marshy areas (O'Drisceoil 1988). In 1990 it was recorded that in excess of 800 examples were known throughout Scotland (Halliday 1990 60). Indeed, it has been proposed that the northern and western distribution reflected a real pattern of occurrence (Hedges 1975 61), however, as more sites are discovered throughout England, it is becoming clear that the construction of these sites is a more widely-spread phenomena, than once believed.

Many of the recorded Irish and Scottish examples have a more organised form than the Little Marlow examples, often with a central rectangular trough and sometimes a containing boulder revetment wall, as at Fahee South and Drombeg (O'Drisceoil 1988). The lowland English burnt mounds and potboilers, however, are generally less distinct and usually appear as small concentrations of burnt flint with few associated structures, although excavations on the River Soar in Leicestershire have recorded a 'timber tank' and a wattle-lined and plank-floored pit associated with burnt-flint scatters (Ripper *pers comm*). Recent excavations at Willington, South Derbyshire also found a trough, this time lined with 25 timbers of whole and split alder logs (Beamish 2005). In terms of their form, the Little Marlow examples are more comparable to the few recorded sites in the Midlands, especially around Birmingham (Nixon 1980, Barfield and Hodder 1987) and East Anglia (Layard 1922, Hall and Coles 1994), and perhaps also the recently excavated example at Patching in West Sussex (Stevens 1997). At all these sites, however, there is still debate surrounding functionality.

Summary

The burnt mound complex at Little Marlow represents an important example of a type of monument little recorded in the County. As stated by Russell-White and Barber (1990, 59) such sites are, individually, among the most boring with which a field archaeologist must deal. Unless studied to the degree as detailed in this paper, they merely add a new spot on the distribution map and contribute little to our understanding of the past. However, these sites hold the promise of fresh insights if secure dating is obtained and the sites are placed within their environmental context. It has been stated that 'the future of burnt mound studies lies in the patient accumulation of further dating ... and in pursuing the study of their relationships with other elements of the archaeological landscape' (*ibid*). The research undertaken at Little Marlow has done just this.

The function and history of these sites is generally sketchy, but the detailed study of the Little Marlow features will add to our understanding of the complicated nature of these sites. The authors have ventured to suggest that the excavated remains represent a site away from general areas of settlement, where wood was burnt to heat flint and stone which was subsequently dashed with quenching water to create steam. The steam was contained, at least in some of the areas, by a temporary awning held by posts, creating an enclosed zone which acted as a sauna. Such activities are thought to have taken place over several centuries in this location, but still represented an infrequent, and perhaps exclusive event. The results from the Little Marlow excavations are not offered, however, as a reinterpretation of all other such sites. It is unlikely that one function accounts for all the evidence accumulated on spreads and mounds of burnt stones in the British Isles.

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