# Excavations at Eden Walk II, Kingston: environmental reconstruction and prehistoric finds (TQ 180 692)

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**Summary**

*Excavations in Kingston Upon Thames town centre in 1977 produced further evidence of an ancient channel of the Thames, associated with occupation debris from the Neolithic to the Roman period. Environmental samples provided evidence of the changing river regime and the local environment. Also a mass of burnt flint, finds of Bronze Age and Iron Age and Roman pottery, worked flint, worked antler, human and animal bones were found. The possibility is discussed whether layers of waterlogged vegetation encountered at the water table were accumulated and used by prehistoric man. As well as prehistoric finds, Romano-British pottery, building material and animal bones were recovered.*

## Introduction

Between 1965 and 1982 almost the whole of the area of Kingston town centre bounded by Clarence Street in the north, Eden Street in the south and east, and St James Road in the west, saw redevelopment of one kind or another (fig 1). Early indications of the presence of prehistoric occupation came during stage I of redevelopment, with the discovery of a Neolithic mace head (Field & Penn 1981), and subsequently with the salvage recording during 1965 of middle Neolithic cultural material. This was found at + 4.62m OD within silts of an ancient river channel by students of Kingston Polytechnic (Penn *et al* 1984). The channel was initially thought to be a former course of the Hogsmill river, but subsequently was seen to represent a braided channel of the Thames that remained marshy into the Medieval period and later (Penn & Rolls 1981).

A second stage of development was planned to take place during the 1970s and in advance of this Kingston Museum conducted excavations in 1974, 1976 and 1977. One of the aims was to establish the nature of the occupation as well as the extent of the channel. While a few prehistoric finds came to light during 1974 and 1976, it was only during the final season, 1977, that the river channel was encountered with associated prehistoric occupation debris. The spread of Medieval and Post-medieval features across the upper levels of the site will be dealt with in another report (Nelson & Serjeantson *in prep*). The final stage of redevelopment, phase III, in the area of the Knapp Drewett printing works was excavated by the Museum of London (McCracken *in prep*) and will be the subject of a report in due course.

## The excavations

In 1974 three trenches, 74A, 74B and 74D (fig 1), were opened by L Gillibrand (Gillibrand 1974). In one of these, 74A, a deep sounding was excavated to the water table where waterlogged deposits containing worked flint were found. Neither time nor equipment

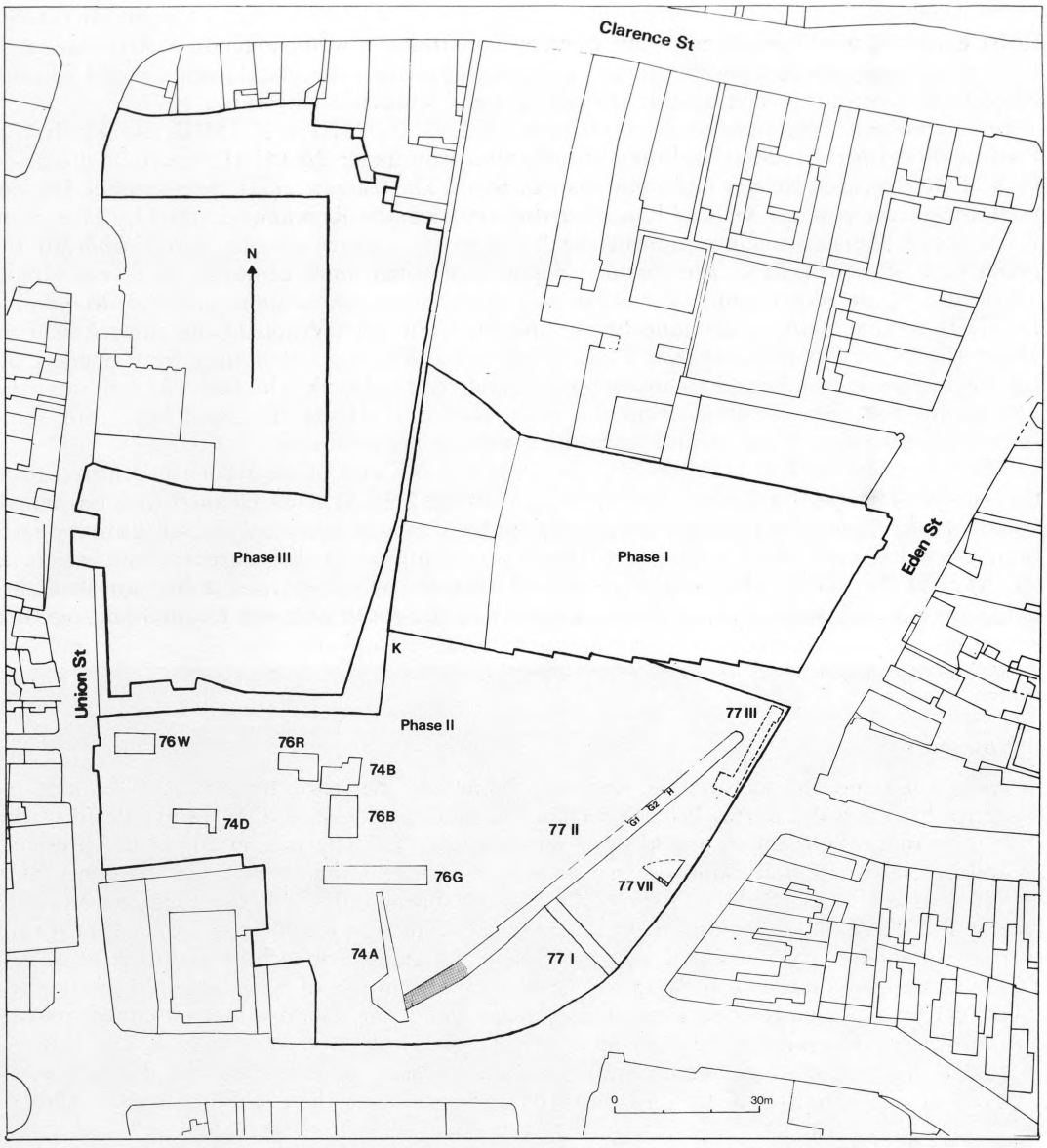


Fig 1. Eden Walk, Kingston: plan of the three phases of redevelopment between 1965 and 1982. The trenches excavated in phase II (1974–77) are shown. The prehistoric deposits in trench 77II discussed here are stippled. K = approximate location of kiln seen during site watching

allowed these deposits to be investigated further. While four further trenches (76B, 76G, 76R, 76W) were excavated by Gillibrand in 1976, no features earlier than Medieval were encountered, and only a few redeposited finds of earlier date were present (Gillibrand 1976).

In the final season of phase II of the redevelopment, exploration of any possible remaining prehistoric levels was given the highest priority. At the time few excavations in the London area had explored deposits at this depth and this undertaking by Kingston Museum was a pioneering attempt to work at the water table, well below the depth reached by Medieval and later features. The Royal Borough of Kingston Council allowed six weeks for

excavation, and a small grant from the DoE permitted a skeleton staff to work on site full time, a complement enhanced by volunteers from Kingston upon Thames Archaeological Society at weekends and other times (fig 2). Excavations took place from 7 April to mid-May, with some site-watching and salvage between June and November 1977.

Four trenches were opened by D Hinton, 77I, 77II, 77III and 77VII (fig 1). In 77I Post-medieval and Medieval building foundations were investigated, which will be discussed in a further report (Nelson & Serjeantson *in prep*). The longest, 77II, was intended to cut across the river channel seen in 1965. This trench *c*3.5m wide was excavated by Hymac to 2.5m below the existing ground surface for 92m in a north-easterly direction from the south end of trench 74A. The surface deposits of 77III were removed to reveal almost sterile gravel, at which point excavation was abandoned. Excavation was also abandoned in 77VII so that work could concentrate on 77II. The photograph of the site taken from above (fig 3), shows trenches 77I, 77II, 77III and 77VII soon after they were opened. At the beginning it was hoped to investigate further trenches, IV, V and VI, but time did not permit this. The findings from the main trench, 77II are discussed here, but some finds from the other trenches and from site watching are described.

The alignment of 77II was NE-SW, but here the NE end of the trench is referred to as the North. The east and west sections of the trench (fig 4) were cleaned and described, with the west side being treated in greater detail than the east, because of limitations of time. Detailed excavation within the trench was confined to the southern end, where at the level of the water table, the Hymac had revealed wood, part of a human skull and pottery. As much as possible of the trench floor at the south end was cleaned and planned

Fig 2. Eden Walk, Kingston: Trench 77II, excavation in progress. The cleaned west section can be seen.

Fig 3. Eden Walk, Kingston: photograph from above of area of phase II excavations, from the north

(fig 5). A Post-medieval well in the middle of the south end of the trench was demolished and a narrow channel dug along the centre of the trench to drain water into a sump from which it was constantly pumped out.

The section drawings include only the lower layers, those with prehistoric and early associations. The upper layers, dating from Post-medieval times when the channel was almost silted up, will be dealt with in the further report.

The excavation was not taken to the water table at the north end of trench 77II, but localised exploration of the deposits at the water table took the form of three test pits dug along the west section of the trench to establish the extent of the area of waterlogged vegetation and prehistoric cultural material. The west sections of these, G1, G2 and H are shown in fig 6.

## Stratigraphy

Five main phases of river channel deposits in Trench 77II are summarised in Table 1. They consist of

Phase 1 River gravel layers (23, 26) which had to be investigated in deep soundings below the water table

Phase II Waterlogged vegetation layers (9, 17, 19, 11, 33) including some substantial timbers (Microfiche 58–9 & Table 4), and in upper levels disturbed by machining, a human skull. Presumed date, Late Neolithic to Early Bronze Age. (Microfiche 71–2 & fig 7)

Phase III Burnt Flint layer (8). Bronze Age. (Microfiche 67–8)

Phase IV Later river activity (3, 3A-B, 4A, 5–7, 11–12, 15, 25, 37–8) with Iron Age to Romano-British finds

Phase V Clay with rootlets (2). Early Medieval, mainly sterile.

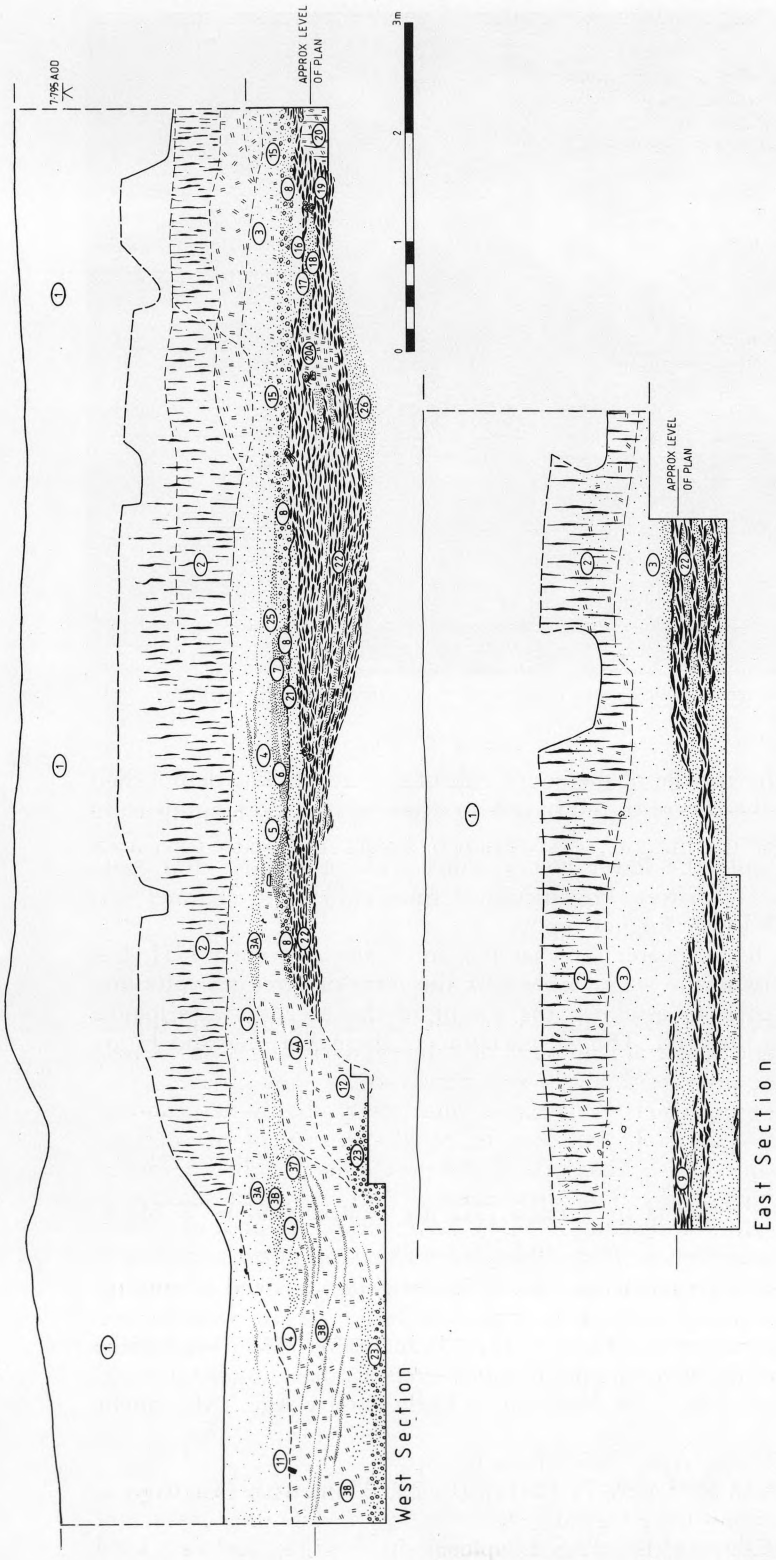


Fig 4. Eden Walk, Kingston: east and west sections of the south end of trench 77II. The west section was drawn in greater detail than the east section. Table 1 gives summary descriptions of the layers.

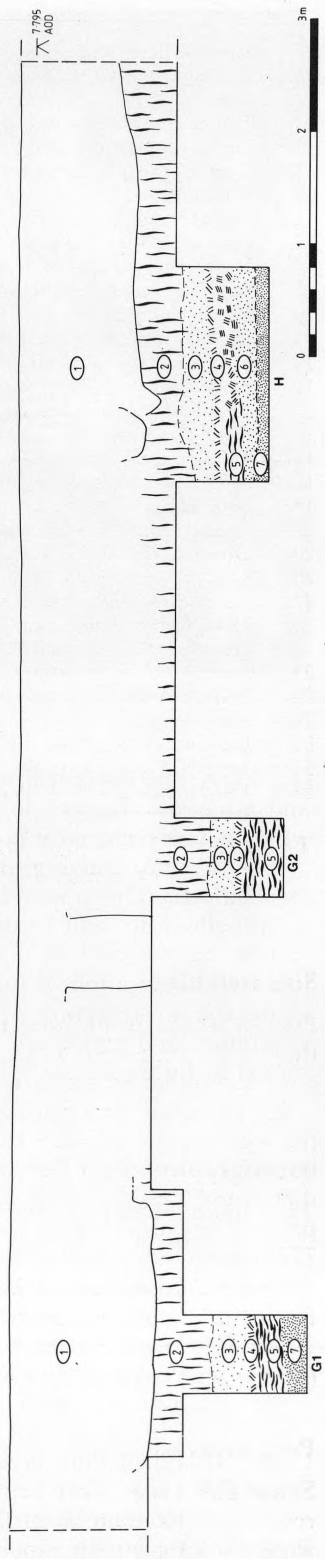


Fig 6. Eden Walk, Kingston: west sections of three test pits at the north end of trench 77II. 1. Post-medieval disturbance. 2. Brown clay with rootlet streaks. 3. Heavy blue-grey clay. 4. Black stained organic layer at base of clays. 5. Brown organic vegetation. 6. Laminated sand and silt. 7. Clean gravel and sand

| | |
|---|---|
| 1. | Post-medieval disturbance |
| 2. | Greenish-brown silty clay with dark vertical rootlet traces |
| 2A. | Laminated grey-green silty clay (not on section - see plan) |
| 3. | Lenses of brownish yellow sands and silts |
| 3A. | Discontinuous lenses of yellow iron-stained sand within 3 |
| 3B. | Lens of green-brown sand within 3 |
| 4. | Dark silty sand |
| 4A. | Dark blue-black clay |
| 5. | Coarse iron-stained sand |
| 6. | Wedge-shaped lens of dark clay |
| 7. | Sand with some iron staining |
| 8. | Burnt flint pebbles |
| 9. | Dark brown compressed peaty vegetation |
| 10. | Stiff dark clay fill of gully (not on section—see plan) |
| 11. | Sandy silt |
| 12. | Laminated greeny black clay |
| 15. | Dark clay |
| 16. | Yellow sand |
| 17. | Dark brown compressed vegetation, same as 9 |
| 18. | Sand mixed with chalky granules |
| 19. | Dark brown water-logged vegetation with roots |
| 20. | Greenish clay with roots |
| 20A. | Patch of grey-green clay |
| 21. | Sand mixed with granular chalky deposit |
| 22. | Dark brown water-logged vegetation including substantial pieces of wood, interspersed with sand and granular chalky deposits |
| 23. | Gravel |
| 25. | Bedded sands |
| 26. | Small gravel |
| 33. | Dark brown vegetation including substantial pieces of wood, same as 22 (not on section—see plan) |
| 37. | Lens of fine sharp sand |
| 38. | Heavy dark brownish-blue clay |

TABLE 1. Eden Walk II, Kingston: summary description of layers from excavated area of trench 77II

## Site watching

For 16 weeks from June to October 1977 D Hinton was able to observe the deposits as they were removed by machine and a certain amount of salvage recording was carried out. A number of artefacts from the prehistoric levels were recovered.

He recorded his impression that trench 77II "cut across what was probably an island in the water course" and that "the west bank was seen to be 25–30m W of the eastern boundary of Knapp Drewett's premises", ie Phase III of the development. He also noted that wood deposits were not confined to the immediate area of 77II, and that wood was present in holes dug by the contractors in 33 and 35 Eden Street, ie in the area of trench 77I, immediately to the E of the main trench. Burnt flints were also seen in these holes.

The exact position of the finds was not recorded, except that some were noted as coming from "layer 8", ie the burnt flint layer, and others from "layer 9", ie the waterlogged vegetation layer. The most important are a human femur, three worked red deer antlers (fig 9), and a number of sherds from a Neolithic pot (fig 10 a–d).

## Post excavation

Some post-excavation work began immediately the site was closed, and some finds were recovered from the burnt flint layer and waterlogged vegetation layers while the contractors were working on site. In 1978 members of KUTAS completed the marking and first level


Fig 5. Eden Walk, Kingston: plan of excavated area of southern end of trench 77II showing extent of burnt flint layer (8) and the top of some of the water-logged vegetation layers. Parts of these were planned in detail; on the east side the main timbers only were planned

summary record of the finds, but the material was subsequently left in Kingston Museum store until a decade later when it was investigated by the present writers. In that period the stored material and records were moved five times and by 1987 stored organic material had deteriorated, and some labels had rotted or faded. The inconsistent cross-referencing between the notebook records, plans, sections, photographs and finds made it difficult to reconstruct the precise circumstances of the recovery of some of the finds, and some of the layer numbers on the plan have been extrapolated from the notebook descriptions and the original section drawings. The authors all worked on the excavation of trench 77II in 1977, and have carried out analyses of the excavated material in the intervening period.

## Environmental samples

An important aim of the excavation was to build upon the environmental data obtained in 1966 (Penn *et al* 1984), and consequently much effort was directed towards obtaining appropriate samples for subsequent analysis.

Four types of samples were taken:

1. 1kg soil samples were taken at 10m intervals for the length of trench 77II for sediment analysis. The results are discussed in microfiche, M 54.
2. Some of the waterlogged timbers were recovered and stored in stout polythene sacks.
3. A 2kg bag of burnt flints.
4. Six bulk samples were taken of the waterlogged vegetation deposits, with a total volume of 43.5 litres. These are described in microfiche, M 53.

## Radiocarbon dates

Four determinations have been obtained, three on material recovered in the excavation which were submitted to Harwell in 1977, and a fourth on a human femur found in a waterlogged vegetation layer beyond the area excavated, which was submitted to the Oxford radiocarbon accelerator unit in 1990 (table 2). Two samples were taken to date the waterlogged vegetation layer, one from layer 22 and a second from vegetation in the middle of the trench which was adjacent to and the equivalent of layer 19. The height here was +5.34 OD. The first, on a piece of unidentified wood, gave a date of 3470 ± 80 BP (HAR-2497) and the second, on a piece of alder (*Alnus glutinosa*), a date of 3560 ± 90 BP (HAR-2498). These results are in good agreement, and the date of 3550 ± 85 BP (OxA-2924) for the femur also fits with these.

| *Laboratory reference* | *Context* | *Material* | *Delc 13 %/10* | *Age BP* | *Age corrected to (one s.d.)* |
|---|---|---|---|---|---|
| HAR-2468 | 77II,8 | bone | −22.5 | 2330±60 | 407–383 cal BC |
| HAR-2497 | 77II,22 | wood | −27.9 | 3470±80 | 1896–1688 cal BC |
| HAR-2498 | 77II,27 | wood | −28.3 | 3560±90 | 2034–1772 cal BC |
| OxA-2924 | vegetation layer | human bone | −21.1 | 3550±85 | 2030–1770 cal BC |

TABLE 2. Eden Walk II: Radiocarbon dates

Conversion of HAR-2497 to calendar age, using the Pearson & Stuiver (1986) calibration with the maximum intercepts method, gives 1896–1688 cal BC at one standard deviation. HAR-3560 calibrates to 2034–1772 cal BC at one standard deviation. OxA-2924 calibrates to 2030–1770 cal BC. The three results, which appear to date broadly the same event, can be combined to give a date of 3523 ± 49 BP which calibrates to 1929–1773 cal BC at 1 s.d. However, though these date the vegetation layer and some of the material found in it,

the pottery found is from a broader date range, in this case most plausibly explained as due to residuality.

The fourth sample, on a cattle jaw (*Bos taurus*) (fig 8), was from the surface of the burnt flint layer. The determination was 2330 ± 60 BP (HAR-2468). At one standard deviation, the calibrated date is 407–383 cal BC. The range is 24 years, whereas at two standard deviations the range is 503 years. The calibrated range is narrowed at one standard deviation because it meets the calibration curve at its steepest; at two it is broadened because it takes in the flat Iron Age section of the curve. The date is consistent with the later pottery, though the sherd which was lying on the jaw itself is part of the rim of a Deverel-Rimbury urn, which is not found in Surrey after about 900 BC (Needham 1987, 116). The context is the surface of layer 8, at the interface with layer 4A filling the later channel, which could account for the anachronous association.

## Detailed Analyses

SEDIMENTS (Microfiche, M 53–6)

Microscopic and particle size analysis was carried out on the sediments. The samples suggest a marshy environment with periods of high energy, ie streams after winter floods, which carried gravel and coarse sand and deposited it in lenses.

MOLLUSCS AND DIATOMS (Microfiche, M 57)

The molluscs and diatoms from all samples studied indicate fresh, moving water and are compatible with the results of sediment analysis.

| *Context* | *Sample* | | *Comment* |
|---|---|---|---|
| 22 | 111 | Dry. | Large disintegrated timber |
| 22 | 112 | Dry. | c.35cm long roundwood with bark |
| 22 | 113 | Dry. | 30cm long radially split plank |
| 22 | 114 | Dry. | Possibly radially split plank 2 × 10cm cross-section |
| 22 | 115 | Dry. | Bark shell c.5cm diameter |
| 22 | 116 | Dry. | c.10cm diameter bark shell |
| 22 | 117 | Dry. | Possibly radially split plank 1 × 10cm thick |
| 22 | 118 | Wet. | 30–50cm length of broken roundwood with bark |
| 22 [3] | 120 | Dry. | Many parts of apparently similar roundwood with bark, originally 1–2m long. Very flattened and shrunk. Max current diameter 5cm |
| 22 [1] | 126 | Wet. | 1. Rounded with bark, c.10cm diameter and 20cm in length. Apparently chopped at both ends<br>2. Badly rotted length of roundwood, 15cm diameter<br>3. Roundwood with bark, 45cm in length and 15cm diameter. Apparently chopped at both ends |
| 23 [2] | 125 | Wet. | 1. Roundwood, badly rotted<br>2. Apparently radially split lump<br>3. Mass of rotted timbers |
| 22 [4] | 119 | Wet. | Broken length of roundwood, 30–50cm |
| 9 | 101 | Dry. | Bark shell, c.5cm diameter |
| 9 | 102 | Dry. | Disintegrated |
| 9 | 103 | Dry. | Roundwood strip, c.20cm<br>Small twigs |
| 9 | 104 | Dry. | Only soil left |
| 9 | 105 | Dry. | Disintegrated, possibly large radial plank |
| 9 | 106 | Dry. | Lots of small twigs, 0.3–0.5cm diameter |
| 9 | 107 | Dry. | Many small twigs<br>Bits of disintegrated timber<br>Hazelnuts and acorns |
| 9 | 109 | Dry. | Very destructured. Possibly roundwood with bark c.5cm diameter |
| 9 | 110 | Dry. | Timber too broken up for identification<br>Small twigs |
| 27 | 123 | Dry. | Flattened plank, c.1cm thick |

TABLE 4. Eden Walk II, Kingston: wood samples

Fig 7. Eden Walk, Kingston: photograph of human frontal bone (SF1) *in situ* on the prehistoric deposits

Fig 8. Eden Walk, Kingston: group of finds (SF5) from the burnt flint layer (8), from adjacent to the gully at the south end of the trench: cattle jaw, rim sherd and red deer metacarpal. A radiocarbon date of 2330±60 BP was obtained on the jaw.

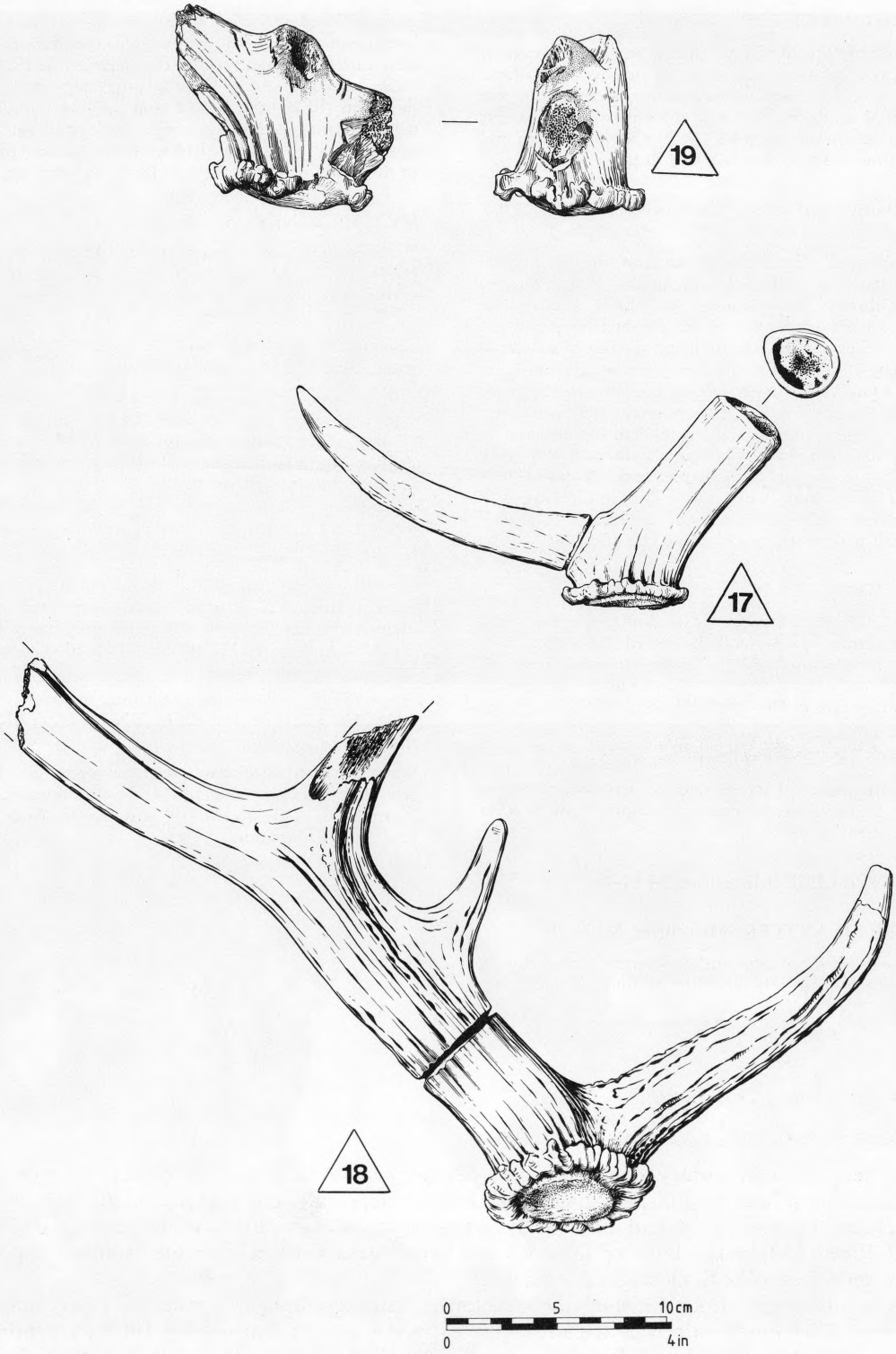


Fig 9. Eden Walk, Kingston: three worked and partly worked red deer antlers found during site watching.

WOOD (Microfiche, M 58–9)

The main objective of the study was to determine if the wood accumulated naturally or was an artificial structure, but poor preservation of much of the material made it extremely difficult to confirm this from the samples themselves. The identifications and interpretations are summarised in table 4.

PREHISTORIC POTTERY AND FIRED CLAY (Microfiche, M 60–3)

Six pieces of Mortlake ware, all from the same vessel (fig 10a–d) were found from layers of waterlogged wood during site watching. Two Early Bronze Age sherds were recovered, a small sherd of grey ware with herring-bone decoration and the rim of a collared urn (fig 10e). A large rim sherd recovered from layer 8 is from a Deverel-Rimbury bucket urn (fig 10f). About 30 Iron Age sherds were recovered from layers 12, 8, 7 and 3A, the latter with Roman material in reworked sediments. Sixteen are in a friable grey fabric with calcined flint temper, and fifteen of a hard sandy grey ware with sparse flint tempering and interior slip. These include the base sherd of a wide jar and part of the rim of a cup (fig 10g).

WORKED FLINT (Microfiche, M 64–5)

A total of 92 pieces of struck flint were recovered from trench 77II, from layers 26, 22 and 8 (fig 11a–f, h-1) including an oblique transverse arrowhead. A leaf shaped arrowhead (fig 11g) was found in the deep sounding dug in 1974 (trench 74A).

STONE OBJECTS (Microfiche, M 65–6)

Two fragments of saddle querns were found, one in layer 2 and a second among the burnt flint in layer 8. (See M fig 14)

BURNT FLINT (Microfiche, M 67–8)

WORKED ANTLER (Microfiche, M 69–70)

Three worked red deer antlers were recovered during site watching (fig 9). Two are unfinished: SF17 has been cut through the beam and preliminary cuts have been made round the brow tine, and preliminary cuts have also been made round the beam of SF18, probably with the aim of making an antler sleeve. On the third, SF20, the brown tine has been removed using burning combined with a cruder chop. It is possible that SF17 and SF18 were deliberately placed in the water to soften them to facilitate working.

HUMAN BONES (Microfiche, M 71–2)

Three human bones were recovered from prehistoric levels: the frontal bone of a skull (fig 7), a left clavicle and a right femur.

PREHISTORIC AND ROMANO-BRITISH ANIMAL BONES (Microfiche, M 73–8)

A small quantity of animal bones was present: 70 from prehistoric contexts, and 158 from layers 3 and 3A with other Romano-British material. Both groups include bones with traces of butchery, indicating an origin in human settlement.

ROMANO-BRITISH POTTERY (Microfiche, M 79–80)

Romano-British pottery was recovered from several contexts (table 12), most of which are reworked. The majority of the 37 sherds are coarse grey wares from the Alice Holt kilns, but two small abraded sherds of samian ware were found.

ROMANO-BRITISH BUILDING MATERIAL (Microfiche, M 80)

Some brick, tile and daub was recovered, also from reworked contexts. Most of the tile is in the local red sandy fabric, but two combed flue tiles are from near Harrold, Bedfordshire.

## Discussion and conclusions

### TOPOGRAPHY OF THE RIVER CHANNEL

The general sedimentary context of the Eden Walk area is not in doubt. In previous excavations it was established that river channel deposits were present in the area to be developed between 1974 and 1977. In a re-examination of the Eden Walk I material (Penn *et al* 1984) and in the light of later excavations it was evident that the channel deposits were more complex than originally thought.

After the excavations finished the developers sank a diaphragm wall on three sides of the site. The north side was already defined by the sheet piling of the 1965 excavations. The contractors' boreholes for the construction of the diaphragm wall yielded valuable subsurface information. The information from the boreholes and observation during the

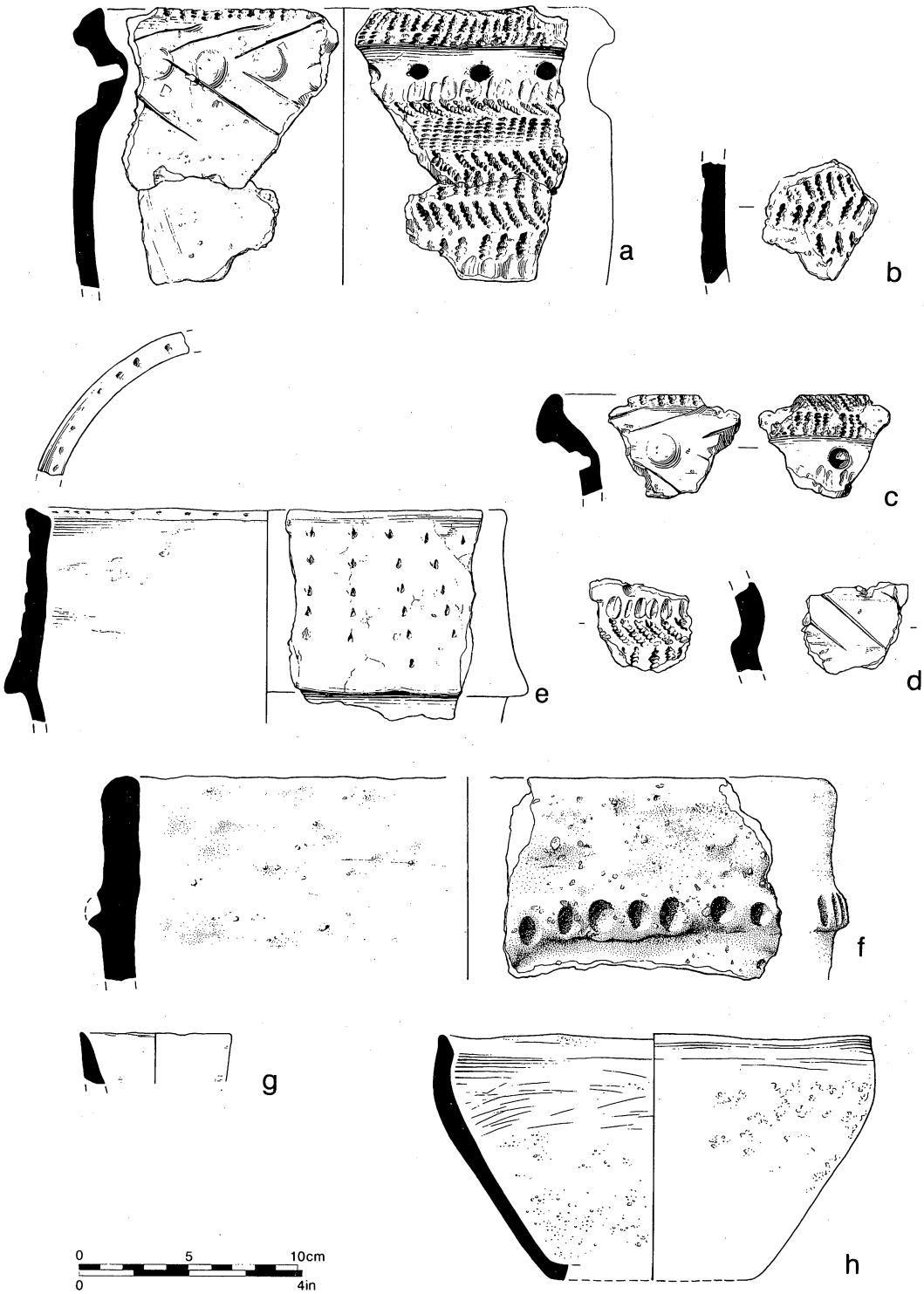


Fig 10. Eden Walk, Kingston: prehistoric pottery. a–d: Mortlake ware, sherds probably from the same pot (site watching) e: collared urn (site watching) f: rim sherd of Deverel-Rimbury urn (top of 8) g: rim of cup (12) h: bowl (12). Drawn by D W Williams

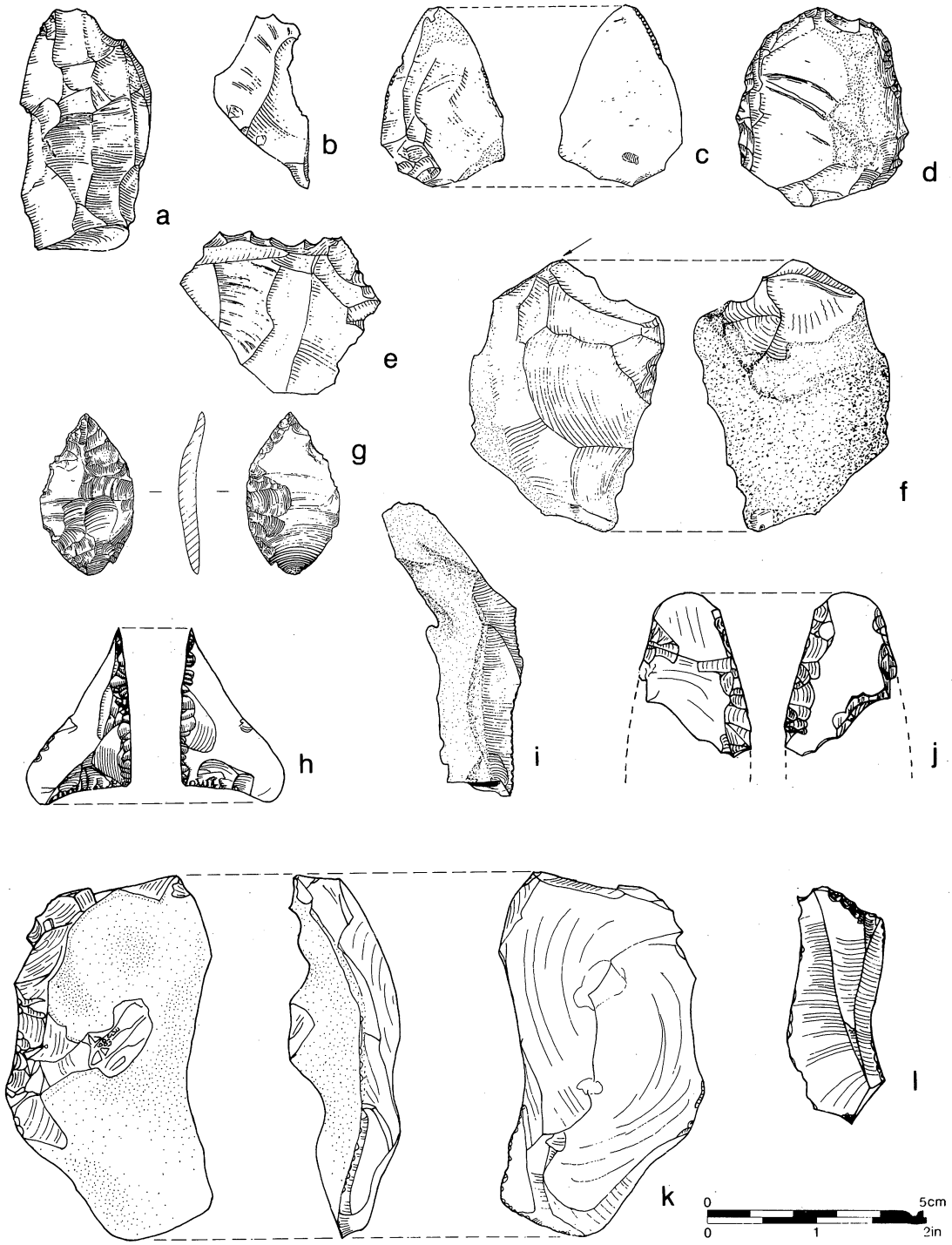


Fig 11. Eden Walk, Kingston: worked flint. a: core (26) b: scraper (26) c, d: utilised flakes (26) e: utilised flake (8) f: utilised flake (22) g: arrowhead (trench 74A, deep sounding) h: arrowhead (26) i: utilised blade (26) j: knife (site watching) k: utilised flake (site watching) l: fabricator (26)

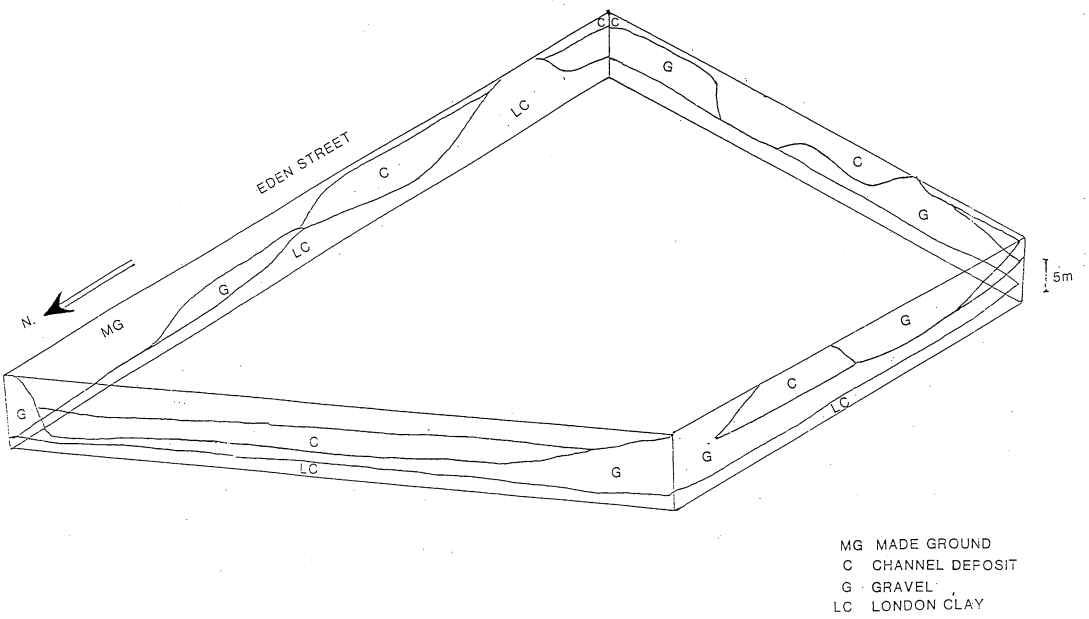


Fig 12. Eden Walk, Kingston: Fence diagram of the perimeter of the Eden Walk II development area from the north, showing the sediments

clearing of the site indicated that a complex series of river deposits within a braided river system are present. These data, combined with the sections from the 1965 excavation, have been presented as a fence diagram (fig 12). It shows a simplified stratigraphy of London Clay overlain by gravels and channel deposits.

An irregular London Clay surface has gravels of various ages on it. Between these occur channel deposits, which are variable deposits of clay, silts, sands and vegetation charged sediments. By interpolation, a possible environment is produced in fig 13. It shows that an area of low-lying gravel islands is interlaced by a series of water channels. Flow is from

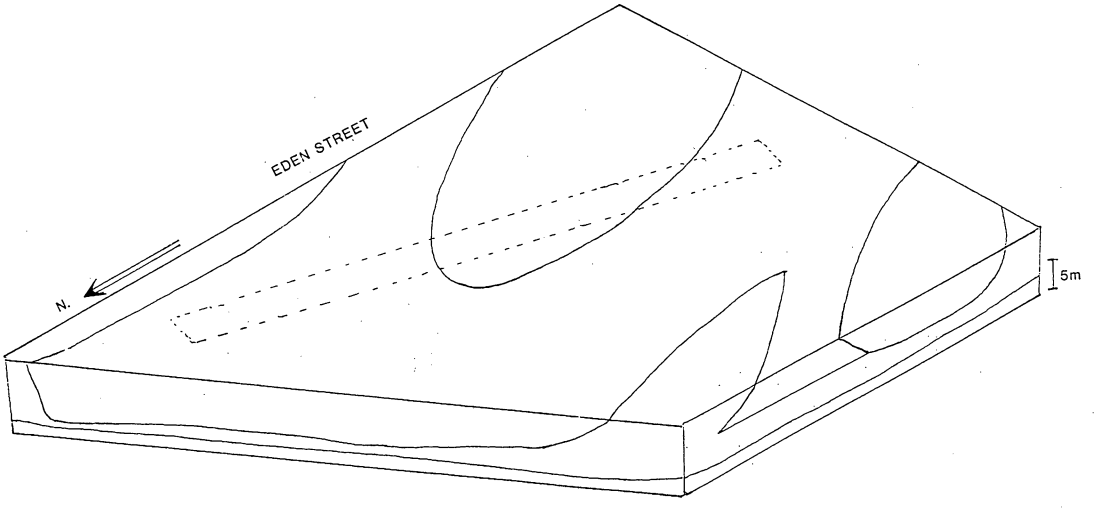


Fig 13. Eden Walk, Kingston: Reconstruction diagram of topography of Eden Walk II from the north, showing that the prehistoric environment was a braided channel with islands. Based on fig 12, sections examined in 1965, and trench 77II

south to north and presumably channels were subject to variable flow. The presence of calcareous material in the sediments may indicate that the water and sediment from the Hogsmill River was entering the area, for it rises in the North Downs, the nearest source of chalk; however it is likely that the whole of the lower Thames system was calcareous.

### THE PREHISTORIC DEPOSITS

A most intriguing question raised by these excavations is whether or not the two principal deposits, the burnt flint layer and the waterlogged wood, were of human construction or accumulated naturally. This question was raised at the time of the excavation, and answering it has been one of the main aims of each of the environmental analyses. The evidence however is still inconclusive.

At the time of excavation the waterlogged timbers were considered to be the remains of a platform or other structure, and there is some evidence to support this view. The deposits contained worked flint in fresh condition, potsherds, and animal bones which derive from human activity. The timbers themselves were regularly aligned, and at the north-west end of the trench there appeared to be a deliberate boundary to the wood, formed by timber no 123, which divided layer 33 from layer 34. A number of the timbers were split radially, the usual method of working wood in prehistoric times, and the longest timber (3) appeared to have been deliberately trimmed of side branches. The ends of some of the timbers could have been worked, though evidence for this was inconclusive. What appeared to be an upright stake was present at the north-east end of the excavated area. The analysis of the sediments from the lower part of the vegetation layers indicates that they are not characterisic of those in which drifted wood has accumulated, as the high sand content indicates high current strength, too much to allow deposition of the timber by natural means. If it is accepted that the wood was placed in position by human agency, it may represent a building or crannog, the remains of a riverside platform, or even a trackway across a silting channel.

A second possibility is that the timbers were deposited by beavers. This would fit with the sedimentary evidence from the lower layer of vegetation, the size and orientation of the timbers, and the possible traces of working.

There is also much evidence to support the view that the wood accumulated naturally. The sedimentary analyses suggest that the uppermost part of the vegetation did so in natural, marshy, non-flowing water conditions. Flooding, perhaps seasonal, may leave timbers stranded in a regular orientation. Even where wood lying apparently deliberately oriented is examined *in situ* and studied as soon as it is removed from the ground, it can be difficult to say whether or not the deposit had a natural or man-made origin. The evidence of human working on the wood was inconclusive, as radial splitting and the lack of side branches on the long timber also occurs naturally in alder. Some of the animal bones have striations on the surface indicating water transport. Other artefacts and settlement debris in the deposits were not in any concentration. Finally it is becoming increasingly clear that waterlogged vegetation layers are commonly present at and below the water table in former channels of the river (Tyers, Needham, pers comm). In the trench examined in 1965 a few metres to the north they were found 1m below the water table, and contained Middle Neolithic finds. The C14 dates provide a *terminus post quem* for the formation of the deposits but cannot separate the upper and lower layers of vegetation.

Without doubt the burnt flints themselves and the other finds amongst them have a cultural origin. The human and animal bones have well preserved surfaces and the flint is sharp. The gully at the south end of the trench was thought at the time of excavation to be a cut feature. The excavator was of the opinion that the burnt flints were a 'distinct layer of deliberately deposited potboilers', possibly built up on the wooden platform beneath.

What is less clear is to what extent the deposits have been modified by running water. The deposit was quite dense, and burnt flints made up 70% of the volume in one sample.

The mean size of the flints was small and nearly all were fragmentary, and they were observed to grade to a smaller size at the edge of the deposit, a phenomenon of water transport. The conclusion of the sedimentary analysis was that this aspect of the feature was the product of active river flow, with a high sand content and low clay and silt content. However, at the north-west corner of the trench there was a lens of coarse sand, clearly water-lain, intervening between layer 8 and the vegetation layers, suggesting an interval between the two episodes.

The burnt flint inevitably invites comparisons with the many burnt mounds now recorded for the British Isles. Similar deposits, found either as dense scatters or burnt mounds are ubiquitous (Buckley 1990). In southern Britain they have been recorded from the New Forest and at South Lodge Camp (Barrett *et al* 1980, 188) and at Runnymede, further up the Thames, a large quantity of burnt flint is present in the late Bronze Age levels (Needham 1987).

The exact process that caused the particular degree of crackling is not known for certain, but the two main suggestions are that either the flints were heated and then placed in water in cooking pits, pottery vessels or skins to cook meat or the stones were heated and then water was thrown over them to make some kind of sauna or steam bath (Barfield & Hodder 1987). The burnt flints from Eden Walk almost certainly have a common purpose with burnt flint spreads seen elsewhere, but the limited area of excavation and the possibility that they are not *in situ* inevitably places limits on any contribution which this deposit can make to discussion of their function. The date obtained from this layer was 2330±60 BP. Though their character is basically Bronze Age, they may start earlier and, in Ireland at least, continue into the Middle Ages (Baillie 1990).

The sequence of later river activity begins with the fill of the gully at the south end of the trench. It was thought to be a cut feature, and if so was probably cut for drainage. The diagnostic finds from the gully fill (layers 4A and 12) are mostly contemporary with the finds from layer 8, but include an admixture of Roman pottery and tile, which belongs more readily with material from channel-fill lenses above. The diatoms from the gully fill show that it was not an isolated ditch, but was connected with the open river.

The series of sandy layers above are all fluvial in origin, as analyses of the sediments, molluscs and diatoms confirm. The inclusion of a group of finds such as the group from 3A show a still active regime eroding and redepositing material from bank-side settlement or other activity. All the cultural material in the middle channel-fill layers is therefore in a secondary context, having been washed in from elsewhere. The date range of the pottery and other finds from trench 77II is Iron Age and Romano-British, but elsewhere in Eden Walk, (in trench 76?), early Anglo-Saxon material was found in similar river channel-fill.

Some time between the middle and the end of the first millennium AD the river regime changed to one slow deposition of silt and clay (Kingston brickearth), which accumulated as the channel investigated here slowly silted up, and which became colonised with plants leaving rootlet traces. The brickearth is present throughout virtually the complete length of trench 77II, and it appears that the trench cut the line of the channel at a very oblique angle. The traces of rootlets show that the channel was shallow and marshy, perhaps seasonally flooded.

## FUTURE PRIORITIES

Unfortunately the real nature of prehistoric settlement at Eden Walk is now unlikely to be adequately understood since the sediments have been removed as the town centre has been demolished. The site however has served an extremely useful purpose in providing a salutary reminder of geomorphological principles. It reinforces a basic point that on floodplains there is no such thing as 'natural', something which has only been appreciated in London as a whole in the last decade. At this site the deposits with prehistoric material were covered by over a metre of naturally deposited clay and sand. Just as important, it is

a reminder that the flood plain terrace is a development which wholly post-dates the last Ice Age, and that during the last 10,000 years river activity has affected settlement along the banks.

Sites are likely to be found mainly by chance, since they will usually be deeply buried by alluvium. In such conditions there will be restricted opportunities to excavate, but the dual nature of the deposits makes it imperative that every effort is made to do so. Preservation of organic materials in the calcareous clay or in waterlogged sediments is excellent, so that when the opportunity to examine the deposits is given, it will be particularly worthwhile.

It is clear from the wealth of prehistoric artefacts found in the Ditton to Wandsworth reaches of the Thames, that the area was of great importance for settlement and/or ritual activity at all periods from the Mesolithic to the Late Bronze Age. Appropriate effort needs to be made to understand it. A conspicuous start has been made with the excavations at Runnymede, but it is clear that there is potentially very much more.

One priority is to try to predict the course of ancient channels, and for this a programme of boreholing as well as analysis of contractors' boreholes, such as that carried out at Kingston (Penn *in prep*), needs to be pursued. The costs of excavation will be logistically expensive, but at a time when there is renewed appreciation of the need for excavation to research standards it needs to be carried out if prehistoric archaeology in the Thames Valley is to make progress.

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## BIBLIOGRAPHY

Annable, F K & Simpson, D D A, 1964 *Guide catalogue of the Neolithic and Bronze Age collections in Devizes Museum*

Baillie, M, 1990 Provision of dates for *fulachta fiadh,* in Buckley 1990, 165–9

Barfield, L & Hodder, M, 1987 Burnt mounds as saunas, and the prehistory of bathing, *Antiquity* **61**, 370–9

Barrett, J C, 1973 Four Bronze Age cremation cemetries from Middlesex, *Trans London Middlesex Archaeol Soc,* **24**, 111–34

—, Bradley, R, Bowden, M & Mead, B, 1983 South Lodge after Pitt-Rivers, *Antiquity,* **57**, 193–204

Binford, L R, 1981 *Bones: ancient men and modern myths.* New York

Brothwell, D, 1981 *Digging up bones,* British Museum (Natural History)

Buckley, V (ed), 1990 *Burnt offerings.* Dublin

Cotton, J, 1981 Bronze Age pottery from Wood Lane, Osterley, *Trans London Middlesex Archaeol Soc,* **32**, 18–23

Emery, P, 1990 Eden Street, Kingston upon Thames, Excavation round-up 1989: part 2, London Boroughs, *London Archaeol,* **6.7**, 190

Field, D & Cotton, J, 1987 Neolithic Surrey: a survey of the evidence, in Bird, J & Bird, D G (eds), *The Archaeology of Surrey to 1540,* SyAS, 71–96

Field, D & Penn, J, 1981 A late Neolithic macehead from Kingston upon Thames, *Trans London Middlesex Archaeol Soc.,* **32,** 15–17

Gillibrand, L, 1974 Kingston upon Thames, Eden Walk, *DoE archaeological excavations 1974,* 99

—, 1976 Kingston upon Thames, Eden Walk, *DoE archaeological excavations 1976,* 135

Green, H S, 1980 *The flint arrowheads of the British Isles,* Brit Archaeol Rep, **75**

Grigson, C, 1978 The craniology and relationships of four species of *Bos* 4: The relationship between *Bos primigenius* Boj. and *B. taurus* L. and its implications for the phylogeny of the domestic breeds, *J Archaeol Sci,* **5,** 123–52

Harcourt, R A, 1974 The dog in prehistoric and early Britain, *J Archaeol Sci,* **1,** 151–75

Higham, C W, 1967 Stock rearing as a cultural factor in Prehistoric Europe, *Proc Prehist Soc,* **34,** 84–106

Lawrence, M J & Brown, R W, 1974 *Mammals of Britain: their tracks, trails and signs*

Legge, A J, 1982 Grimes Graves: the agricultural economy, in R Mercer, *Grimes Graves,* HMSO

Longworth, I H, 1983 *Collared urns of the Bronze Age in Great Britain and Ireland*

Lyne, M & Jefferies, R, 1979 *The Alice Holt/Farnham Roman pottery industry,* CBA Res Rep **30**

MacGregor, A, 1985 *Bone, antler, ivory and horn*

Maltby, J M, 1979 *Faunal studies on urban sites: the animal bones from Exeter, 1971–75,* University of Sheffield

McCracken, S, (*in prep*) *Eden Walk III: report on the excavation of the Knapp Drewett site, 1982*

Millett, M, 1979 The dating of Farnham (Alice Holt) pottery. *Britannia,* **10,** 121-37

Needham, S P, 1986 A Bronze Age baron at Runnymede? *Brit Mus Soc Bull,* **51,** March 1986, 18–23

—, 1987 The Bronze Age, in Bird, J & Bird, D G (eds), *The Archaeology of Surrey to 1540,* SyAS, 97–137

—, & Longley, D, 1980 Runnymede Bridge, Egham: a Late Bronze Age riverside settlement, in Barrett, J & Bradley, R (eds), *The British Later Bronze Age,* Brit Archaeol Rep, **83,** 397–436

Nelson, S & Serjeantson, D, (*in prep*) *Eden Walk II: The Medieval and Post-Medieval results from the excavations of 1974–77*

Newcomer, M, 1977 Experiments in Upper Paleolithic bone work, in H Camps-Fabrer (ed), *Methodologie appliquée à l'industrie de l'os préhistorique,* Colloques internationaux de CNRS, **568.** Paris

O'Connell, M, 1986 *Petters Sports Field, Egham,* SyAS Res Vol, **10**

Pearson, G W & Stuiver, M, 1986 High-precision calibration of the radiocarbon time scale, 500–2500 BC, *Radiocarbon,* **28 No 2B,** 839–62

Penn, J, Field, D & Serjeantson, D, 1984 Evidence of Neolithic occupation in Kingston: excavations at Eden Walk, 1965, *SyAC,* **75,** 207–24

Penn, J S & Rolls, J D, 1981 Problems in the Quaternary development of the Thames Valley around Kingston: a framework for archaeology, *Trans London Middlesex Archaeol Soc,* **32,** 1–12

Serjeantson, D, 1981 The Kingston area in Roman and Anglo-Saxon times, in Woodriff, B, (ed), *The archaeology of Kingston upon Thames,* Kingston Polytechnic

—, 1989 Animal bones from the Roman levels, in Draper, J, Excavations at Great Chesterford, Essex 1953–55, *Proc Cambridge Antiq Soc,* 37–41

Sheppard, D, 1975 Two Bronze Age urns from Kempton Park, *Trans London Middlesex Archaeol Soc,* **26,** 281–2

Shipman, P, 1981 *Life history of a fossil: an introduction to taphonomy and palaeoecology,* Cambridge Harvard University Press

van den Driesch, A, 1976 *A guide to the measurement of animal remains from archaeological sites,* Peabody Mus Bull, **1**