Evidence of Neolithic occupation in Kingston: excavations at Eden Walk, 1965

with notes on Medieval animal bone and ground axes from Kingston

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Summary

Excavations at Eden Walk, Kingston, transected a sequence of sediments shown to represent an ancient river course. Amongst this sequence Neolithic occupation debris was encountered indicating that the channel was beginning to silt up during that period

Introduction

In 1965 deep excavations took place in the centre of Kingston for the construction of a multi-storey car park. This is situated at NGR 1800 6925 on ground bounded by Marks and Spencers Ltd to the north, the Surrey Comet printing works on the west, Eden Street to the east, and Eden Walk passage to the south. The top of the site lay at 7.62 metres OD and was some 350 m east of the River Thames and a similar distance north of the Hogsmill stream.

The developer's[1] excavations provided an opportunity of investigating the sediments of the area and this was done by students of the Geology Department of Kingston College of Technology. During the course of this examination small deposits of prehistoric occupation debris were encountered and the immediate area was considered in greater detail. Environmental analysis was carried out on a number of soil samples and an interim report issued and circulated locally (Penn 1968). The archaeological material together with selected environmental samples was then deposited at Kingston museum.[2]

In 1974, 1976 and 1977 further excavations took place at adjacent sites (Smith 1977, 281; Gillibrand, unpublished manuscript in Kingston museum; D Hinton forthcoming), partly with the object of ascertaining the extent of occupation and confirming the sediment sequence. These have produced further evidence of early settlement from the late Neolithic onwards, and will be dealt with in a future publication.

Since early Neolithic occupation evidence, and in particular environmental evidence from such sites, is scarce in the London Basin it was felt desirable to consider and present here the archaeological evidence from the 1965 excavations even though they were of a salvage nature and originally conducted for geological purposes. The site is crucial for the interpretation of later excavations and is of importance also for demonstrating the extent of river movement since the Neolithic period (Penn & Rolls 1981).

The Excavation

The developer's excavation involved opening a rectangular area of some 2,300 sq m and approximately 6 m deep. Attention was focussed on the site at a late stage and consequently the north and west faces and a portion of the east face were shuttered and inaccessible. Construction work was also in progress on the floor of the site.

Of the available sections, the eastern, running parallel to Eden Street, showed bedded flint gravels of the Flood Plain Terrace resting upon the weathered surface of the London Clay. The southern face, A–B on plan (fig 1), showed sands and clays also resting on the weathered surface of the London Clay. This section *c* 48 m long was recorded (fig 2) and interpreted as a silted up river channel. During this process bone was seen protruding from the extreme eastern end of the section and upon closer examination a few pieces of handmade pottery were found. The

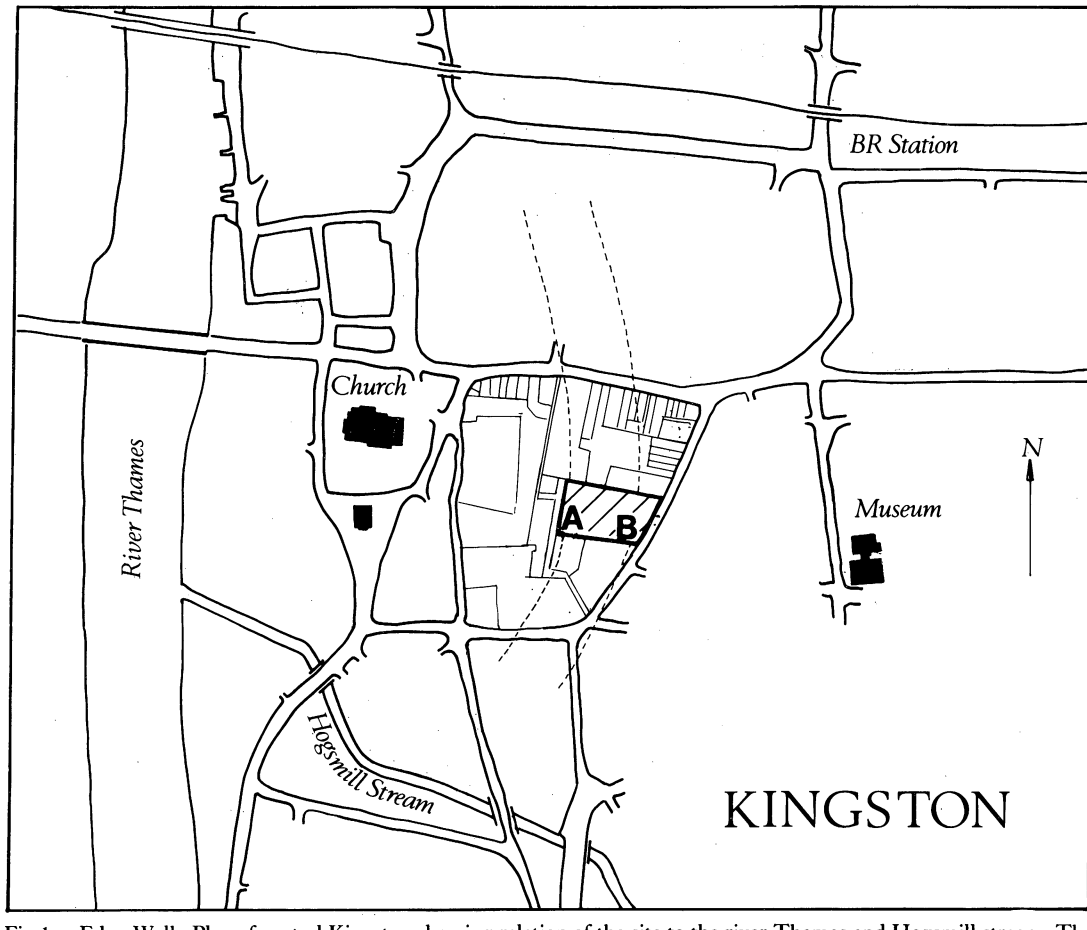

Fig 1. Eden Walk: Plan of central Kingston showing relation of the site to the river Thames and Hogsmill stream. The suggested course of the ancient channel is indicated by the broken lines (scale 1:2,500).

immediate area was examined more carefully and a 7.5 m length of the face was taken back 0.5 m and excavated stratigraphically. Sediments originally recorded in a general way were here subdivided and plotted in greater detail.

THE DEPOSITS

The sediments illustrated in fig 2 are listed below.

1 Obscured
2 Unstratified sandy clay
3 Disturbed
4 Brickearth
5 Loam
6 Disturbed black clay
7 Sandy clay with rootlets
8 Sands and clays
9 Sandy clay
10 Sand
11 Sandy brickearth
12 Gravel and rootlet clays
13 Drifted wood and clay
14 Black clay with plants, nuts, leaves and shells
15 Rootlet clay
16 Gravel
17 Sandy rootlet clay
18 Sands and clays
19 Current bedded clays and sands
20 Sand
21 Sandy loam

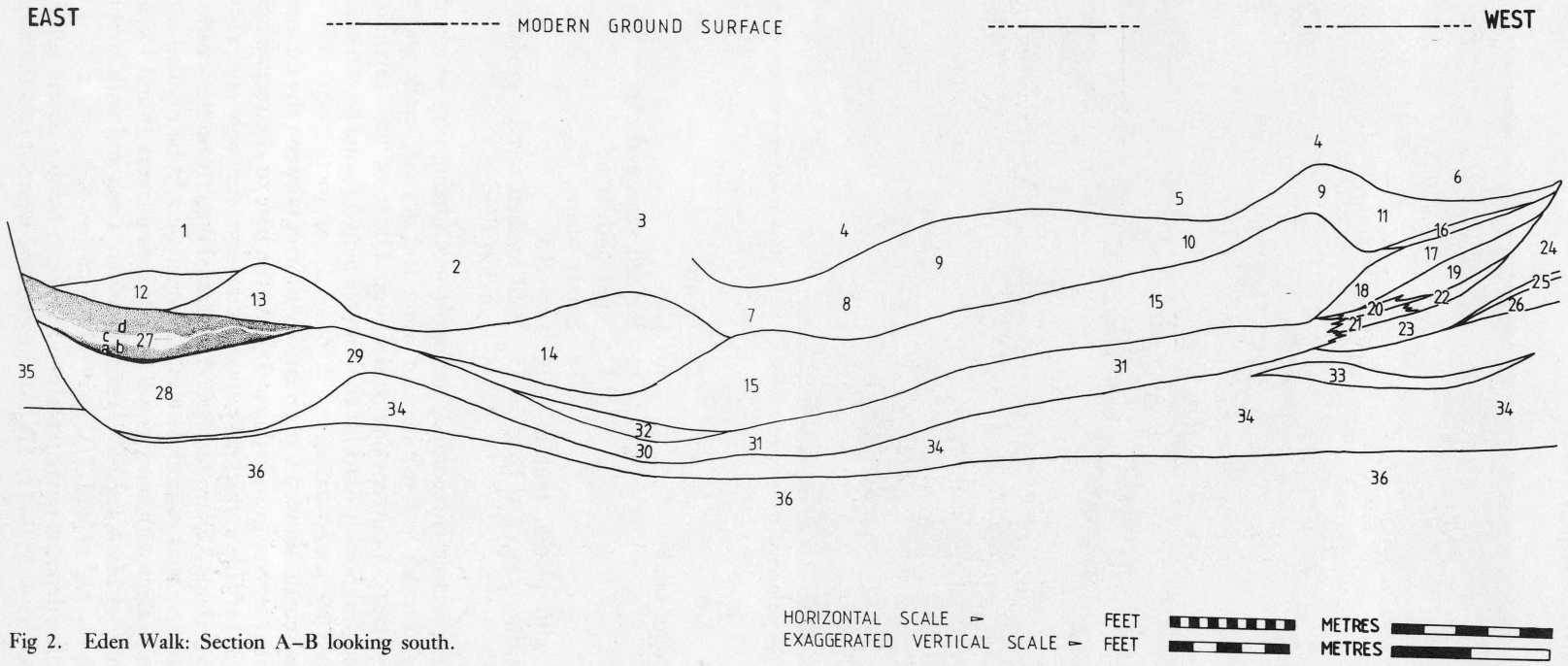

Fig 2. Eden Walk: Section A–B looking south.

Plate 1. Eden Walk: Point bar sediments at the western end of the section across the ancient channel.

22 Rootlet clay
23 Current-bedded orange sand
24 Coarse sand
25 Clay
26 Sand
27 Sands and clays, with plants, bones, potboilers and neolithic pottery at base
28 Sandy clay
29 Loam
30 Clay
31 Bedded sand and clay
32 Sand with bone
33 Sandy loam
34 Gravel
35 Well bedded terrace gravels
36 London Clay

Only the lower part of the section is recorded, the upper levels being very much obscured and disturbed by machinery. Present is a sequence of water laid gravels, sands and rootlet clays representative of various stages of current flow and silting. The term 'brickearth' is used in the general sense of the Geological Survey Map.[3] It contains elements of wind blown loess, but this is reworked and redeposited by water action.

The eastern end of the section showed a steep erosive contact between the fill material (layers 27 and 28) and the bedded terrace gravels (layer 35). At the base of the section was a layer of gravel (layer 34). This was variable in thickness, towards the east often only one pebble thick, but thickening westwards to perhaps a metre or more. This rested directly on the weathered London Clay. Deposits on the eastern and central part of the section could be divided into two main units, a lower unit of sandy clays with some gravel (incorporating layers 28 and 34), and an upper unit consisting dominantly of black organic clays with much wood and with subordinate sand lenses (incorporating layers 13, 14 and 27).

To the west of centre the deposits range widely in lithology, being a poorly sorted mixture of gravel, sand and clay (layers 4, 5, 7–11, 15). At the extreme western end the sediments were

transitional sands, thin clays, and other point bar (Allen 1965) deposits. These range widely in lithology, and were a mixture of gravel, sand and clay but with the proportion of gravel increasing downwards until the gravel of the lower part of the deposit rested directly on the London Clay (layers 16–26) (pl 1). Crossbedding was present through the mass of bar sand above the gravel, and also present were beds of flat bedded sand formed of thin horizontal to gently tilted laminae. These probably represent aggradation on the smooth sediment surfaces on the inside of a meander.

The nature and relationship of the sediments strongly suggested that this represented a section through an old cut-off river channel. Originally this was thought to be the Hogsmill, but relationships between sediments both on this and later excavations suggest that it was a sub-channel of the Thames (Penn & Rolls 1981). The large scale of the channel became evident in plan during the 1977 excavations, and topographical and borehole evidence from elsewhere in Kingston adds support to this view (Penn forthcoming).

The remainder of the channel fill suggests that these deposits probably belonged to the 'neck' type of cut-off (Allen 1965). Thus where a river abandons its old channel completely, the bed load sediment forms plugs at the immediate ends of the cut-off and any remaining fill enters as overbank flows. The silty sands, sandy silts and clays which formed a major part of the deposit, as well as the organically rich blue black muds correspond largely to the neck cut-off channel fills described by Fisk (1944; 1947) in work in the Mississippi valley. Freshwater shells occurred where there were bodies of water, and at higher levels there were rootlet clays. This sequence was also found by Frazier & Osanik (1961) in the USA, and is consistent with the views of Briggs & Gilbertson (1980, 53–65) on channel behaviour under non-glacial conditions in the Upper Thames Valley.

Of the two main lithological units, the lower (layers 28 and 34) had a mollusc fauna dominated by *Bithynia* which prefers quiet water conditions. The upper unit (layers 13, 14 and 27) was dominated by the molluscs *Lymnaea* which prefers slow standing water and *Planorbis*, which prefers weedy water. In addition to these which occurred in great numbers other molluscs were also present together with frog bones and the bones and teeth of mammals. This suggests that the lower unit represents a stage when intermittent flow occurred, while the upper unit suggests a period of standing water.

Vegetable matter formed an important constituent of the deposits of the upper unit. In many of the dark clays, leaves and wood were tightly packed together with the wood often being represented by logs up to 15cm or more in diameter. Recognisable leaves included oak, hazel, birch and elm. In some places the black clays were packed with hazel nuts, many of them showing signs of having been gnawed and opened by rodents. Small catkins were abundant, and seeds included hazel, bramble, thistle, dogwood and cherry; further it should be borne in mind that some plants are insect pollinated and therefore do not appear in pollen spectra. Too few samples were taken to allow any statistical exercise to be undertaken. A summary listing is shown on Table 1.

The evidence suggests that during the early stages the abandoned channel may have had some contact with the main stream. Subsequently sediment only entered the channel during overbank flows and the fine clays and abundance of plant material resulted. In the later stages the pools of water became more localised and in the final stage, represented by rootlet clays, plants grew down the sides of the channel to fill the area completely.

Detailed work at the eastern end of the section concentrated on a portion of the upper unit (layer 27) and the major subdivisions are noted below in ascending order.

27a Resting on the brown sandy clay of the lower unit was a layer of black organic clay with much wood, hazel nuts and leaves. This varied in thickness from 8 to 16 cm, thickening towards the west to 40cm. At the base of this layer a number of sherds of middle Neolithic pottery were discovered, together with worked flint, potboilers, animal bone, worked antler, and a fragment of sarsen. Soil samples were taken for pollen analysis from the artefact level and from the upper part

Table 1: Summary listing of identifiable material from layers 27b, c and d

level	27b	27c	27d
Gastropods			
Acroloxus lacustris (L)	/	/	
Ancrylus fluviatilis (Müller)		/	
Bithynia tentaculata (L)	/	/	
Cepaea sp	/		
Clausilia sp	/	/	
Cochlicopa lubrica (Müller)		/	
Discus rotundatus (Müller)			
Lacinaria biplicata (Montagu)		/	
Lymnaea peregra (Müller)	/	/	/
L peregra (Müller) forma ovata Draparnaud	/		
L stagnalis (L)	/		
Oxychilus alliarius (Müller)		/	
Physa fontinalis (L)			/
Planorbarius corneus (L)	/	/	/
Planorbis leucostome (Müller)	/		
P planorbis (L)		/	/
Succinea putris (L)		/	
Vallonia costata (Müller)		/	
Valvata piscinalis (Müller)	/	/	/
Vitrea crystallina (Müller)			/
Viviparus fasciatus (Müller)	/		
V viviparus (L)	/		/
Zonitoides excavatus (Alder)	/		
Bivalves			
Pisidium amnicum (Müller)	/		
Pisidium sp		/	
Sphaerium lacustre (Müller)	/	/	
Sphaerium sp	/	/	
Insects			
Leptocerus sp			/
Disticus sp			/
Vertebrates			
Arvicola terrestris		/	
Microtus arvalis	/		
Rana sp		/	
Fish vertebrae			/
Plants			
Betula sp	/		
Carex sp	/		
Cornus sanguinea (L)	/		
Corylus avellana (L)		/	
Epilobium sp	/	/	
Hippuris vulgaris (L)	/		

level	27b	27c	27d
Potamogeton sp	/		
Prunus avium (L)		/	
Quercus sp		/	
Ranunculus sp	/		/
Rubus fructicosus		/	/

of this layer which was subsequently termed 27b.

27b The upper portion of the black organic clay layer was devoid of occupation evidence though it contained branches and a varied molluscan fauna.

27c A layer of sand some 8cm thick with localised sand and clay lenses, some wood, and lenses of shells. A number of bone fragments and potboilers were present.

27d An upper layer of black organic clay of greater thickness than 27a/b but containing sand lenses and shell bands. Roots and twigs were plentiful and in places large logs occurred. A number of animal bones were recovered and molluscs were plentiful. Above this were rootlet clays and the gravels of layer 12.

The Pottery

Fifty two potsherds were recovered, all from layer 27a, at least three and possibly four or more vessels being represented. Two of these are round based. In size the sherds range from 13cm across down to mere scraps. The sandy clay matrix is patchy though predominantly light yellowish brown in colour (Munsell 10 YR 6/4) with reddened areas indicating localised intensive firing. It is heavily tempered with large calcined flint inclusions up to 1cm across. The outer surface varies considerably and localised black patches probably indicate burning. In some places these extend across breaks, suggesting that fire may have been a cause of breakage. The white calcareous deposit known as 'Thames race' also occurs in places on the interior surfaces and across some breaks. The interior exhibits horizontal wiping of the clay, the striations suggest with some tool rather than with fingers. Few sherds are abraded and most breaks are clean, despite the friable nature of the material. Three sherds have a black deposit adhering that has the appearance of carbonised food debris, though this has not been analysed. The sherds were sorted into three groups, each probably identifiable with a single pot.

1 Thirty six thick and very coarse sherds of between 14 and 16mm thickness. These include the externally thickened rim and rounded base assembly (fig 3:1). The sherds probably represent part of an S-profiled bowl of relatively large capacity.

2 Nine fragments with a matrix essentially that described above, with medium thick walls and averaging 12mm. These included the externally thickened rim of an open bowl (fig 3:2) with a mouth diameter of 220mm. A rounded base assembly (fig 3:3) and a decorated sherd (fig 3:5), probably from separate vessels, are also present. Ornament on this latter consists of simple fingertip decoration arranged loosely in columns.

3 Five fragments of a thinner walled, average 8mm, vessel. These are of a slightly finer fabric consistency from that noted above, and include a rim (fig 3:4). This exhibits a concave outward flaring neck with a flat topped rim 188mm in diameter. Decoration consists of a series of diagonal grooves on top of the rim. There is no evidence of decoration on the neck or shoulder though a slight indentation or pit is present and this might be one of a number around the circumference of the neck.

Typologically the bowls appear to have affinities with the British Neolithic, even though the

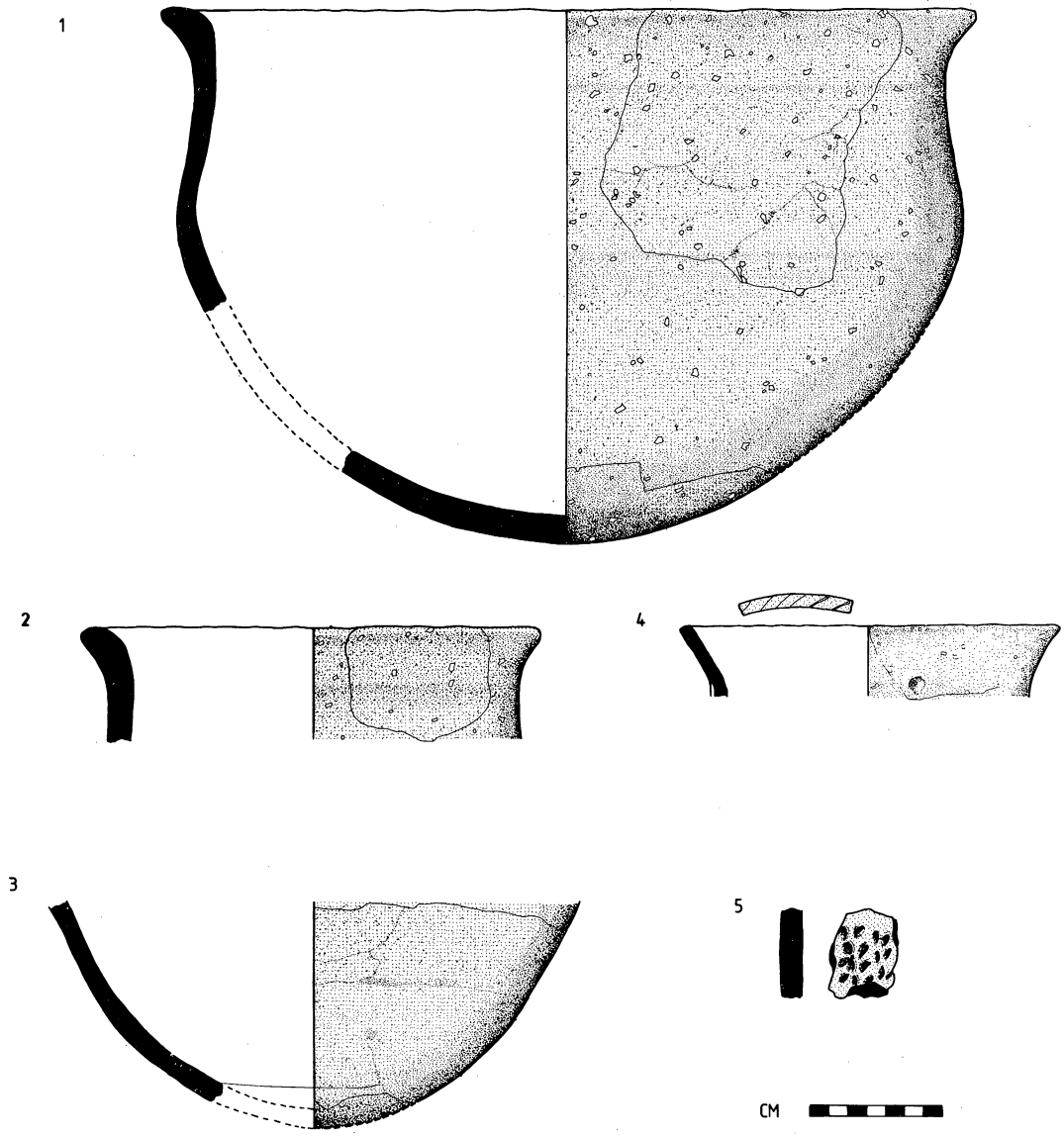

Fig 3. Eden Walk: Neolithic pottery (¼).

fabric is not exactly matched elsewhere. The thickened rims and near S-shaped profiles are similar to examples from Eaton Heath (Wainwright 1973) and Broome Heath (Wainwright 1972) in Norfolk, and to pottery from the causewayed structures at Abingdon (Leeds 1927) and Orsett (Kinnes 1978). A good portion of the pottery from the Staines enclosure is also comparable in fabric and form (R Robertson-Mackay pers comm). The bowl from Pangbourne in Berkshire has general similarities of texture and form, and also features incised strokes on top of the rim (Piggott 1929, 30–9).

In West London small assemblages of Neolithic pottery have also come from Putney where the excavator described the material as similar to that from Kingston (Warren 1977, 9) and from Twickenham where Smith (1968) compared the material to pottery from Marlow, Buckingham-

shire (Smith & Wymer 1964, 286–95). Like Kingston and Staines, these are also riverside sites.

Diagonal rim slashing is a common Neolithic trait. It occurs on bowls at Ebbsfleet (Burchell & Piggott 1939) in conjunction with pits on the neck. The outward flaring rim however does not occur at Ebbsfleet, though it does occur on Ebbsfleet type vessels at Thorpe, Surrey (Grimes 1960, 181–5). Perhaps significantly fingernailing begins to appear at Ebbsfleet and occurs again at Thorpe. Fingernail rusticated decoration also occurs on Mildenhall style pottery at Hurst Fen (Clark et al 1960) and the example from Kingston might fit into either of these traditions. The group seems to draw characteristics from Abingdon ware, Mildenhall ware and Ebbsfleet ware, perhaps representing a fusion of these types. The fingernail decoration perhaps argues for a date towards the end of the middle Neolithic.

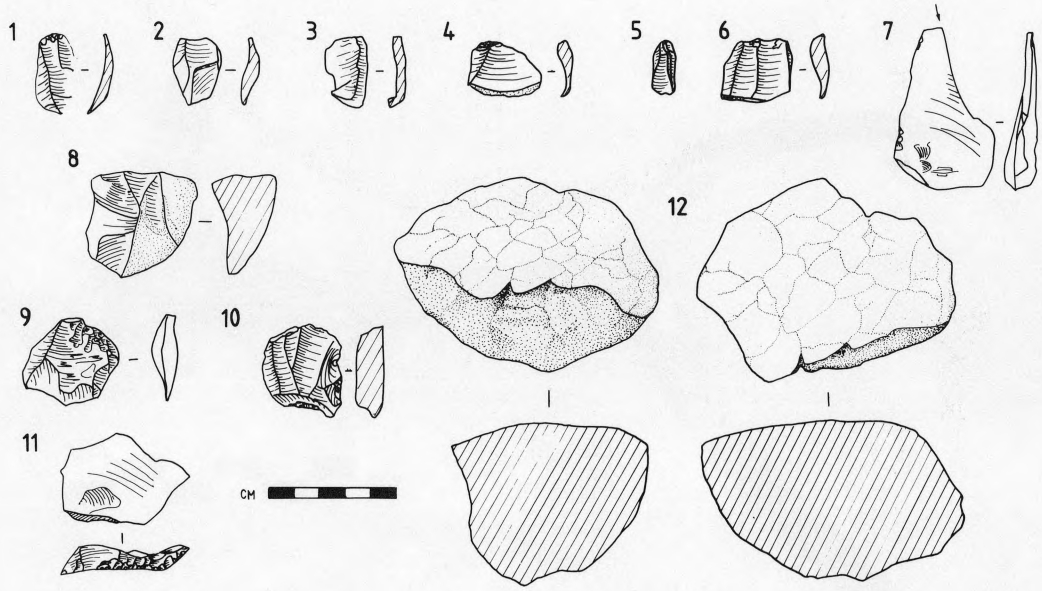

Fig 4. Eden Walk: Stone and flint (½).

Stone and Flint Objects

A large fragment of sarsen (fig 4:12) weighing 435gm was recovered from 27a. The upper/outer 'cauliflower' surface is crazed and reddened, evidently by fire; the other faces are cleanly fractured. This may indicate that heat was used to break up the rock. Sarsen fragments are not uncommon on Neolithic sites and were recovered from both Windmill Hill (Smith 1965) and the Staines enclosure (R Robertson-Mackay pers comm). Four well abraded scraps of coarse sandstone, a small nodule of chalk and a number of calcined flint 'potboilers' were also recovered. Potboilers were also recovered from layer 27c.

A small flint assemblage numbering only 21 pieces was recovered from layer 27a. Apart from four shattered pieces of pebble gravel, the raw material is Downs flint, and is in pristine condition. The assemblage is all waste though a number of pieces bear evidence of utilization. Significant pieces are illustrated (fig 4) and described below.

1–4 Three long and one short squat flakes.
5 Small microblade
6 Core trimming flake from which 5 was probably struck.

7 Large flake, snapped, probably a burin though no evidence of use is visible at the facet.
8 Shattered fragment of a core.
9 Core trimming flake, possibly an axe thinning flake, with an extremely prominent bulb that may indicate anvil knapping. Flake facets on the upper face display soft hammer technique and the platform has been prepared for flaking.
10 Core for microblades with evidence of working on one edge.
11 Core trimming flake.

A number of angular rolled flint gravel pebbles also come from the same layer. Four larger nodules have evidence of crushing, and thermal fracture of some suggests that these at least were not river deposited.

Plate 2. Eden Walk: Worked antler from the Neolithic levels (scale in inches).

The Animal Remains

Three pieces of red deer antler and a horn core came from Layer 27a. One almost complete antler from a stag of three or four years shows traces of working (fig 5:1; Pl 2). It had been sawn through the beam in the region of the trez tine and a groove was cut round one of the tines in the crown, presumably with the aim of detaching the tine. The groove had been made by cutting into the antler from opposing angles. It extended almost around the tine and was 2.5mm at its deepest point. A second tine had been partly sawn and partly broken off the beam and had scratches around the tip which could probably be ascribed to use (fig 5:2). The third fragment, part of a beam with one complete rudimentary tine, had no traces of use or wear.

The piece of broken bovine horn core partly attached to the skull was recovered from layer 27a. It had a minimum basal diameter of 47mm and was therefore notably smaller than the horn

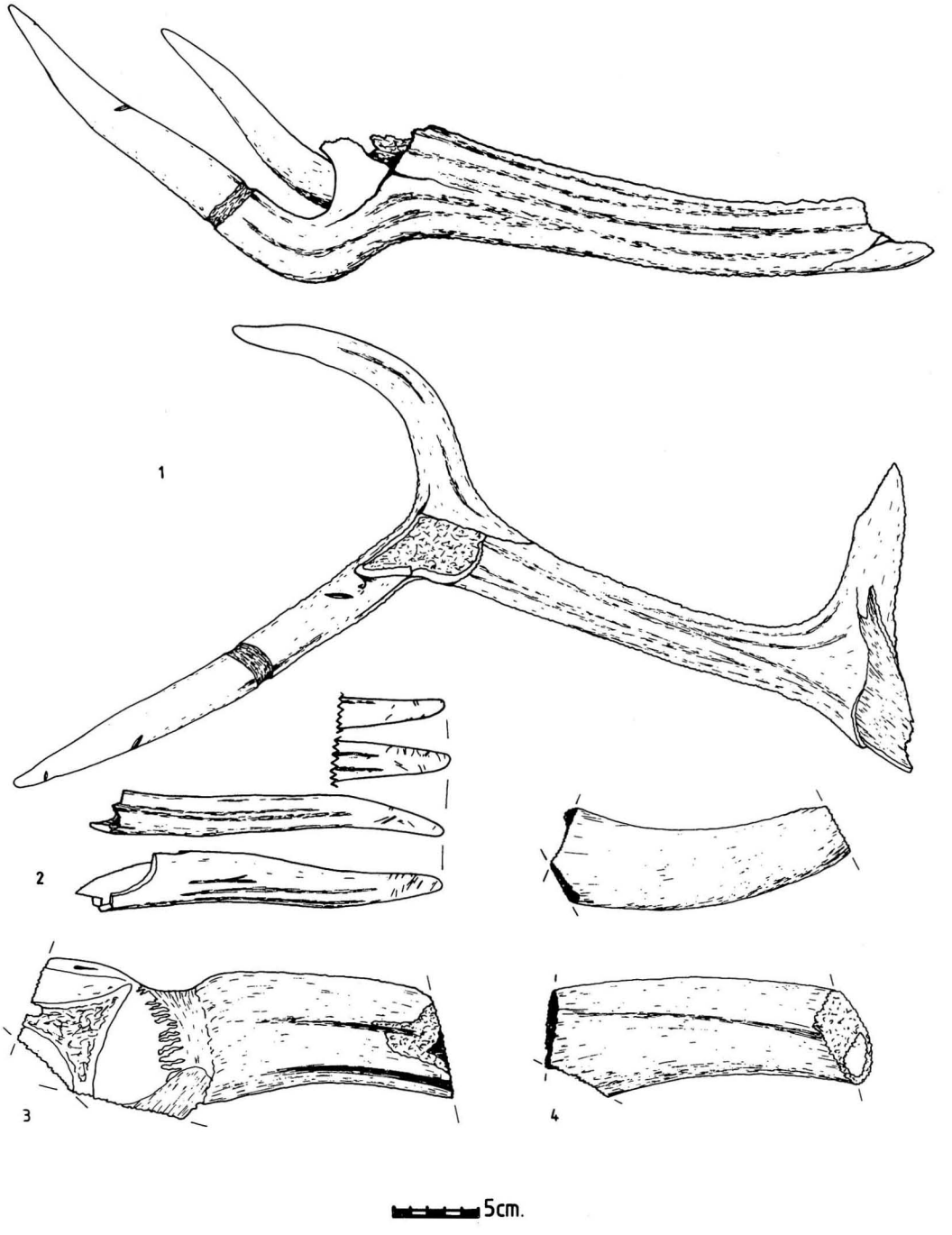

Fig 5. Eden Walk: Prehistoric antler and Medieval horn cores (¼).

cores recovered from elsewhere on site. It is similar in size to Neolithic cattle horn cores from Hambledon Hill (A Legge pers comm). Cut marks occur on the frontal bone round the base of the horn. Such marks are thought to have been made during the skinning process.

The validity of the evidence of bone recovered from levels 27c/d and from layer 13 is in some doubt. Some of it exhibits medieval characteristics and it may well be that the material has become mixed during storage or that disturbance of layer 13 resulted in a contaminated sample. It seems likely that layer 13 may have slumped in from the gravel terrace, though modern disturbance above this makes relationships rather unclear. Because of this uncertainty animal remains from 27c/d and layer 13 are presented separately.

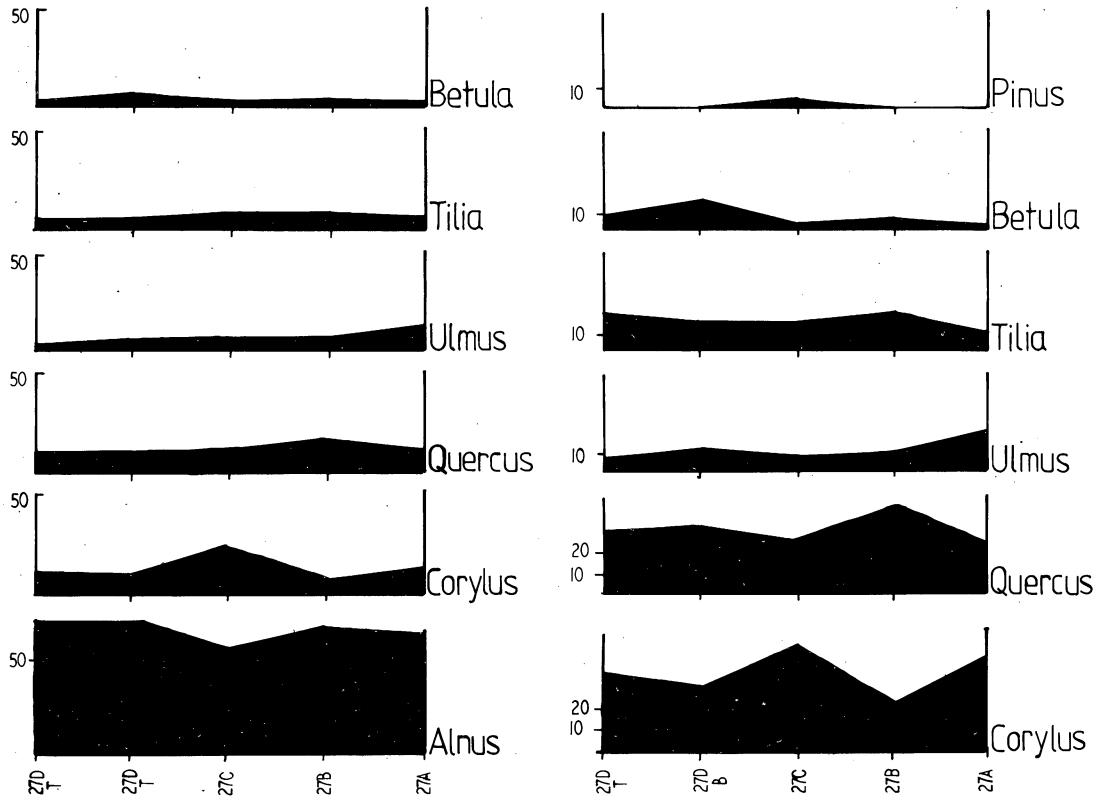

Fig 6. Eden Walk: Pollen diagrams with and without *Alnus*.

Pollen Evidence

The original analysis considered only the tree pollen content of the flora (Penn 1968). Without reliable data on the ratio of tree pollen to non-tree pollen it is difficult to give as clear an estimate of the pollen zones represented as might be desired. With this in mind D T John of Kingston Polytechnic, Geography Department, re-examined the original slides and although discolouration of the mounting medium made accurate counts difficult the general validity of the pollen spectra (fig 6) remains good.

It may well be that the base of the profile lies just above the zone VIIa/VIIb — Atlantic/Sub-boreal boundary (H Godwin pers comm, 1965). Thus 27a exhibits all the representative trees of the mixed forest of Atlantic times ie alder, oak and relatively frequent elm and lime. Hazel is also important but interestingly birch is subordinate to the other species, and

markedly so. In broad terms the frequency is alder>hazel>elm>lime>birch. Among these lime is insect pollinated and therefore far more important than its frequency suggests.

By 27b there is a marked decline in elm, while oak experienced a corresponding increase. Birch and lime show rises and the importance of hazel diminished noticeably. These characteristics are remarkably similar to those of the transition from the primary forest of Atlantic times to the beginnings of the spread of secondary forest in Sub-Boreal times.

At the level represented by 27c there is evidence in the pollen of a temporary clearance in whatever woodland cover existed, since there is a marked expansion of hazel at the expense of other trees especially oak (for convenience hazel, a shrub, is considered here as a tree). Pine also makes an appearance and this would not be out of place in a local context.

The woodland to some extent recovered by the time sample 27d (bottom) was deposited, but the most notable resurgence was that of birch. Periodic fluctuations of this kind are typical of Neolithic and Bronze Age pollen diagrams. The recovery to some extent continued thereafter, for lime becomes more important again at level 27d (top). Oak remained more or less constant and birch together with elm again declined.

There are no clear signs of woodland clearance. Such information as can be presented by the non-tree pollen is as follows. The proportion of non-tree pollen is uniformly less throughout the profile. Spores of ferns are present, and given the dominance of trees this is to be expected. However there is also grass and heather pollen in all samples,and these tend to confirm the presence of clearings nearby. The presence of weed plants like *Rumex* (dock), often taken as indicators of human activity, provides some confirmation of this.

A further indicator of the age of the sediments is the presence of Ash pollen in 27b–d, since this tends not to occur until after zone VIIa.

Dating

The pollen evidence suggests a date for layer 27 just above the VIIa/VIIb boundary. In conventional terms this would provide a date shortly after 3000bc though while this date would seem compatible for the open mouthed bowls it seems a little early for the presence of Ebbsfleet characteristics.

Conclusions

As long ago as 1852 historians believed that the Thames originally ran to the foot of Kingston Hill, some ½ mile east of its present course (Biden 1852, 3). Their evidence was provided in the numbers of freshwater shells found in the brickearth. A local geologist even pointed out that there were signs of a meander near Kingston Market place (Grist 1917, 100). The evidence presented here is interpreted as an ancient water course, probably a sub-channel of the Thames, which was cut off from the major channel and began to silt up during the Neolithic period. There is some doubt as to the length of time involved in the silting process since the upper levels of the deposit were obscured. A ditch with associated Iron Age pottery (D Hinton pers comm) and another with pagan Saxon pottery associated (Kingston museum records ER17) from later excavations however suggest that attempts at drainage were being made during those periods, though it seems likely that the channel was still marshy during the medieval period (M Hinton forthcoming) and subsequently may have been utilized as part of the town ditch. Certainly at that time a water course on this alignment was important enough to need a stone bridge to carry London (Clarence) Street over it, and a water boundary, presumably remnants of the channel, is shown on 19th-century plans of the area (Wakeford 1982).

The marshy character of the area may also have led to the use of this part of Kingston for noisome industrial processes. A whiteware kiln was in operation close to Eden Street (Hinton 1980) and others are known of in the vicinity (D Hinton pers comm). The evidence for industrial bone and horn working has been discussed by Armitage (1980) and a further contribution is made below.

The nature of the Neolithic occupation is elusive. Domestic debris may have been thrown into the deposit from a site on the adjacent gravel bank. Certainly the artefacts are little abraded and have experienced little river movement, and an alternative explanation may be that human occupation of the channel floor may have taken place temporarily if it dried out between overbank flows. Such overbank flows are likliest to occur during winter months and thus seasonal occupation during the summer months appears a possibility. The channel banks would certainly provide a degree of shelter.

Other evidence of Neolithic settlement in the Kingston area is scanty, and apart from the Later Neolithic evidence encountered on subsequent Eden Walk excavations is composed almost entirely of a large number (45) of ground flint and stone axes, the majority of which were dredged from the Thames (see below). Amongst those that have been petrologically examined four came from Group I, and one each from Groups III and XVI. The connection, if any, between this large concentration and the site at Eden Walk is at present unclear. The axes however hint at a fairly sizeable or established settlement somewhere nearby.

Medieval Animal Bone

The bone recovered from levels 27 c/d and from layer 13 appears to exhibit medieval characteristics and may therefore have become mixed at some point during storage. It is here

Table 2: Summary table of medieval animal bone.

	cattle	horse	cattle-size	sheep/goat	pig	dog	sheep-size	fowl
skull	x		x	x[sh]		x		
horn core	see table							
maxilla				D				
upper tooth	C	C						
mandible	P;D							
lower tooth				C				
cerv vertebra						Cf		
vertebra indet			x				x	
rib			x				x	
scapula	Df				Df			
humerus	Duf							C
radius	Cf;Pf							C
metacarpal	Duf;Cf			Cuf				
pelvis	x			x				
femur	x							
	Puf							
tibia	CDf, Df			Df		Cf		
fibula					Cuf			
metatarsal	Duf;Cf							
limb bone indet			x					

x = fragment(s) present; P = proximal end;
D = distal end; uf = unfused;
C = complete; sh = sheep.
f = fused;

recorded in one group and listed in fig 8. With the exception of three bones of a dog, the bone was chopped or broken and is likely to represent settlement or industrial waste. Complete fused bones were measured.[4]

The presence of a quantity of bovine horn cores suggest that the material is waste from an industrial workshop. Subsequent excavations at Eden Walk (Gillibrand unpublished typescript Kingston museum) produced many horn cores and it is likely that these are fron the same source. A predominance of horn cores in urban deposits may indicate tannery waste (Schmid 1972; Prummel 1978) or waste from a horn workshop (Armitage & Clutton-Brock 1976, 329–48). There is evidence that this sample is hornworking waste. All the horn core tips were absent, and on seven out of twelve they appear to have been sawn off (fig 5:3–4, fig 9). Three detached tips were also found. One of the horns (ref no 23) had also been chopped through above the point of attachment to the skull. Cuts on the frontal bone were clearly visible on two examples, though it is impossible to be certain with three others as they have been heavily impregnated with polyvinyl acetate.

The horn cores from the excavations of 1974 and 1976 were examined in a recent investigation of changes in medieval cattle size in Britain (Armitage 1980, 405–13). The measurement range of the basal circumference and its mean is compared below with the figures obtained by Armitage.

	S	mean(mm)	range(mm)	SD	SE
Eden Walk 1965	7	239.4	210–280		
Eden Walk 1974 & 1976	7.2	200.3	119–273	30.6	3.6

For various reasons no inference should be drawn from the greater mean size of the 1965 sample. Positive evidence that the two samples are contemporary is lacking. Furthermore, variations in the proportions of cows, steers, and bulls might also affect the results, as might variation in the age classes present. The diameters recorded in the table indicate whether the horn core tends more to the round shape of the bulls or the more oval shape of cows.

Table 3: Summary table of bovine horn core details.

		Dimensions			*Working*		
Ref No	Age class	max basal diameter mm	min basal diameter mm	basal circumference mm	knife cuts on skull	chopped from skull	tip chopped off
4	adult						/
20	sub-adult				?		?
21	sub-adult	75.0	71.0	225	?	/	/
23	adult						/
26	adult	70.5	65.5	213		/	?
27	sub-adult	69.0	66.5	210	/	?	
36	?	96.0	84.0	280	?		
37	adult	83.0	69.0	240	/		
38	sub-adult	89.0	74.0	253		/	?
56	adult	89.0	75.0	255			
58	adult	92.5	80.0				

Table 4: Neolithic stone and flint axes from Kingston.

No	Material	Provenance	Location	References	Type
1	Flint	Thames, Kingston	KM 733	A & J 7	A
2	Flint	Thames, Kingston	LM49.107/121	A & J 14	Ai
3	Flint	Thames, Kingston	LM49.107/125	A & J 17	Ai
4	Group I	Thames, Surbiton	LM49.107/116	A & J 47	D
5	Group I	Thames, nr Kingston	KM 726	A & J 53	D
6	Greenstone	TQ 192693	KM 1340	*SyAC* **51**, 141	D
7	Group III	Thames, Kingston	LM49.107/128	A & J 65	E
8	Group I	Thames, Kingston	KM 722		E
9	Group I	Thames, Kingston	KM 839	A & J 89	F
10	Flint	Kingston Hill	KM 1165		F
11	Flint	Kingston Elm Vale	KM 723		F
12	Flint	Thames, nr Kingston	KM 730		I
13	Group XVI	Thames, Kingston	BM WG 77		I
14	Flint	Kingston town	KM 719		I
15	Flint	Thames, Kingston	LM49.107/123	A & J 145	I
16	Flint	Thames, Kingston	KM 724		I
17	Flint	Thames, Kingston	KM 717		I
18	Flint	Thames, Railway Bridge	KM L139		I
19	Flint	Thames, Kingston	KM 727		I
20	Flint	Thames, Surbiton	LM49.107/95	A & J 177	J
21	Flint	Thames, Kingston Bridge	BM 1913, 6–13, 1	A & J 185	K
22	Flint	Thames, Kingston	LM49.107/138		K
23	Flint	Thames, Kingston	LM49.107/137	A & J 213	N
24	Flint	Thames, Kingston	LM49.107/135	A & J 227	O
25	Flint	Thames, Kingston	LM49.107/140	A & J 228	O
26	Flint	Thames, Surbiton	LM49.107/104	A & J 257	R
27	Flint	Thames, nr One Tree	LM49.107/21	A & J 260	R
28	Flint	Thames, Kingston	KM 11		U
29	Flint	Thames, nr Kingston	KM 718		U
30	Flint	Thames, Kingston	KM 728		U
31	Flint	Thames, Kingston	KM 12		U
32	Flint	Thames, Railway Bridge	KM 1122A		U
33	Flint	Thames, Kingston	KM 835		U
34	Flint	Thames, Kingston Bridge	KM 2294		U
35	Flint	Thames, Kingston Bridge	KM 834		U
36	Flint	Thames, Kingston	KM 731		U
37	Flint	Thames, Railway Bridge	KM 1122B		U
38	Flint	Chelsea Waterworks	Soc Antiq		U
39	Basalt	Chelsea Waterworks	Soc Antiq		U
40	Flint	Thames, Kingston	LM49.107/91		U
41	Stone	Coombe Hill	Guildford Museum	*SyAC* **1**	U
42	Greenstone	Kingston Hill	Unknown	*Arch J* **26**, 288	U
43	Stone	Kingston Hill	Unknown	*JBAA* **37**, 187	U
44	Flint	Kingston Hill (Coombebury Cottage)	Private		U
45	Flint	Thames, Kingston	Private	*SyAS Bull* **173**	U

Ground Axes from Kingston

The West London stretch of the Thames is prolific in the number of ground stone and flint axes brought up by dredgers. Major concentrations occur at Teddington (19+), Wandsworth (11) and Battersea (16) with a larger group from Hammersmith (22). Most of these have been listed by Adkins & Jackson (1978). At least 17 have been dredged from the Thames adjacent to Kingston town centre and an equal number from immediately up and down stream.

Restricting the survey to the present administrative boundaries, and excluding those implements marked 'probably' or 'possibly' from Kingston, there are 45 Neolithic ground flint and stone axes. Of these 35 come from the river and the rest are land finds. Few axes can be provenanced with absolute accuracy. Neither is there much information about the circumstances of discovery. Many were simply purchased from dredger crews by collectors such as G F Lawrence. William Roots notes the recovery of some that came to be in his collection, in particular two (nos 47 and 48: see fig 10) that were found 'deep in the clay whilst digging the Chelsea Waterworks at Kingston' (Anon 1860, 84).

The majority of axes are complete though the river finds display a variety of conditions. This factor applies to all axes from the Thames (Adkins & Jackson 1978, 9). Few land finds are available for comparison, but those that are available are complete. Well used and broken axes dominate the land finds further south in Surrey and also downstream at the occupation sites on Ham Fields. Tyler (1975, 3) notes the contrast in distribution of fragments to complete axes, and demonstrates that fragments are largely confined to the higher ground. He explains this as collection bias, though acknowledges that the low areas may have been heavily forested and axes were used and lost in these areas. This however does not explain the lack of fragments.

In terms of general distribution of the Kingston axes a thin scatter of axes can be traced to the higher ground of Coombe Hill, with only the odd find coming from the Brickearth of the Floodplain. The major concentration is based on the Thames between Kingston town centre and Surbiton.

Most axe types are represented though there is a clear preference for Adkins & Jackson (1978) type I, eight of these being present, all but one from the river. The majority however are of undefined types. The whole range of sizes is present, though groups can be identified around 160, 265, 395, 490 and 675 gm. In general these are larger and heavier than the three groups 150, 225 and 300 gm identified by Tyler (1975, 5).

ABBREVIATIONS

LM = Museum of London
BM = British Museum
KM = Kingston Museum
Adkins & Jackson (1978) reference numbers are given where available and all axes have been categorised according to their system.

NOTES

1 MacAlpine & Sons.
2 Kingston Museum records ER:34.
3 Geological Survey map 1975 South London sheet 270 1:50,000.
4 Kingston Museum records ER:34.

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