EXCAVATIONS AT A NEOLITHIC SITE AT THE JOHN INNES CENTRE, COLNEY, 2000

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SUMMARY

In October and early November 2000 the Norfolk Archaeological Unit undertook an excavation on the site of a balancing pond adjacent to a new laboratory at the John Innes Centre, Colney, Norwich. This work was commissioned by W.S. Atkins Consultants Ltd., on behalf of the John Innes Research Institute. Previous evaluation trenching had revealed a Neolithic dark brown soil layer and related features, sealed beneath colluvium, and containing large quantities of flint-knapping waste. The aim of the excavation was to elucidate the nature of this dark brown soil layer.

Excavation revealed a natural hollow within which a brown forest soil had been preserved, overlain by a buried Neolithic topsoil which in turn had been sealed by a Neolithic occupation layer and contemporary flint-knapping waste, represented by approximately 28,000 struck flints. Over the occupation layer it appears that some kind of rectangular structure, represented by post-holes and substantial elongated post-pits or trenches, had been constructed, and a possible floor surface of redeposited flint cobbles laid. This report presents the archaeological, artefactual and environmental evidence associated with this striking combination of features.

Introduction

(Plate 1; Figs 1 and 2)

The construction of a new laboratory at the John Innes Centre, Colney, provided an opportunity for the Norfolk Archaeological Unit to undertake excavation of the site of a balancing pond (Site 9332). The work took place between 9 October and 6 November 2000. The archaeological excavation and report production were generously funded by W.S. Atkins Consultants Ltd.

Topography and geology

The John Innes Centre is located approximately 4.5km west of the centre of the City of Norwich (NGR TG 1820 0755, Fig. 1). The proposed balancing pond was located at the lowest point (*c.* 12.50m OD) of a slight valley, formerly the line of an ancient watercourse that flowed north-westwards to join with a big meander in the River Yare approximately 500m distant. The sides of this valley slope gently upwards to the north and south with a gradual downward slope towards the north-west and the river.

Immediately to the east of the site lies the modern John Innes laboratory, with attendant car parks on the slopes to the north, and the experimental fields of the Institute to the west (Fig. 2). On the higher ground beyond the southern valley side lies the site of the new Norfolk and Norwich Hospital.

The underlying geology of the area consists of glacial sands and gravels of Anglian date interleaved with pockets of chalky boulder clay.

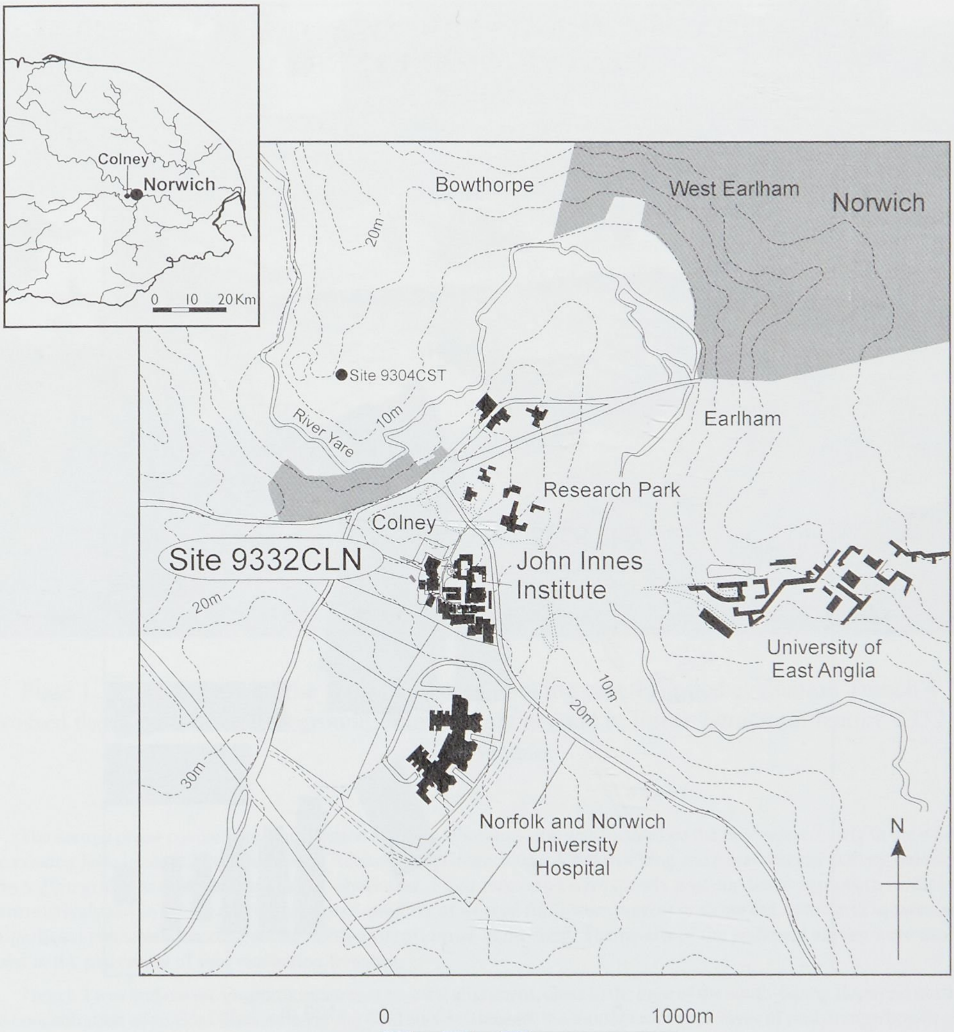


Figure 1. Location of the John Innes Centre. Built-up area toned; contours at 5m intervals.

Archaeological background

The area of the Tas and Yare valleys south and west of Norwich is rich in prehistoric sites, most of them known through crop-marks. Past archaeological fieldwork has tended to concentrate on the sites to the south of Norwich, most notably around the confluence of the two rivers and the Arminghall Henge (Clark 1936), during construction of the Norwich Southern Bypass (Ashwin and Bates 2000) and at Eaton Heath (Wainwright 1973). Until recently, however, rather less field-work had been carried out in the area immediately to the west of the city.

Fieldwalking in the vicinity of the John Innes Centre has recovered artefacts that suggest both Mesolithic and Neolithic occupation. Small quantities of Mesolithic and Neolithic worked flintwork were collected during archaeological evaluation and monitoring of the site of the new Norfolk and Norwich Hospital (Site 31871), although modern agriculture may have destroyed traces of any contemporary cut features that might once have existed here (Ashwin 1996, Percival 1998). On

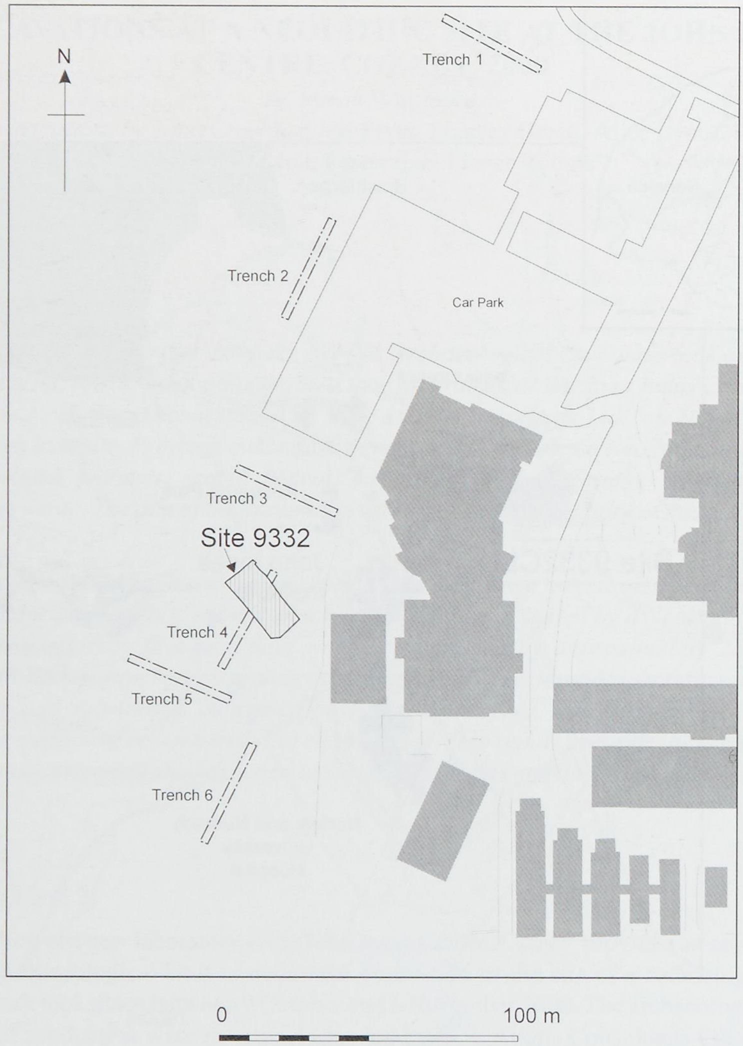


Figure 2. Location of excavation area and trial trenches. John Innes Centre buildings toned.

the north side of the River Yare, evidence for Neolithic settlement and flint-knapping has recently been excavated at Bowthorpe (Percival 2002), approximately 1km to the north-west (Site 9304).

Occupation of later date has also been noted in the immediate area. This includes the ring-ditches of Bronze Age barrows (Sites 9335 and 9336) on the nearby slopes, Romano-British pottery and coinage found on the ridge of higher ground to the north (Sites 9337 and 9338), and an Early Saxon cemetery to the west (Sites 19139 and 19191).

The phased programme of construction work being carried out at the John Innes Centre led to parallel series of archaeological interventions. This involved two phases of evaluation and subsequent groundworks monitoring. The first was carried out prior to the construction of new car parking facilities on the slopes to the north (Penn 2000, Nokkert 2000). Two evaluation trenches were excavated. Trench 1 was aligned approximately east-to-west along the plateau at the top of the slope. Two undated linear features were noted in this trench, along with a large shallow pit containing three flint flakes. Trench 2 was oriented north-to-south and followed the downwards slope towards the lowest point of the field to the south. A small, ephemeral pit containing a solitary struck flint was excavated in this trench.

Plate 1. General view of the excavation area, looking east. Emptied evaluation Trench 4 crossed the picture in the foreground; immediately beyond it, linear ?structural feature *1352* is clearly visible.

The second phase covered the construction of a new laboratory and was focused on the field immediately to the west of the existing John Innes Institute buildings (Adams 2000, Green 2001). A fieldwalking and metal detector survey, based on a 20m x 20m grid, was undertaken over the whole area. Finds recovered were mostly post-medieval or modern in date and were relatively few in number. However, small numbers of worked flints were present in all but one of the grid squares, with a significant concentration close to the north-eastern corner of the field. The results of the walkover survey were used to assist in the placement of four evaluation trenches.

Trench 3 was laid out on an approximate east-to-west alignment, close to the base of the south-facing slope and north of the concentration of worked flints noted in the field survey. Beneath the modern topsoil, a layer of mid orange/brown silty sand, found in all of the evaluation trenches and interpreted as colluvium, sealed a rectangular pit containing burnt flint and charcoal which was thought to be of indeterminate prehistoric date.

Trench 4 was oriented north-to-south and was located at the lowest point of the site in a position that intersected with the most noticeable concentration of surface flint. Excavation revealed the presence of a colluvium sealed Neolithic occupation layer, rich in struck flints. It was the discovery that this significant deposit coincided with the proposed position of a balancing pond that necessitated further excavation.

Trenches 5 and 6 were positioned on the north-facing slope, south of Trench 4. Colluvium was present in both trenches. The only features of archaeological interest observed were three modern post-holes and a pit cut through the colluvial layer.

Method

An area measuring 12m by 27m was mechanically stripped using a 360° excavator provided by R.G. Carter Ltd. Overburden comprising 0.35m of topsoil and 0.40m of colluvium was removed until the interface between the colluvium and the dark brown occupation soil was encountered. The exposed area was cleaned manually and the extent of the occupation layer and spread of flint-knapping waste planned (Fig. 3). The backfill of the previous evaluation trench was summarily removed by hand in this area.

Excavation involved the division of the area into 1m^2 grid units, with each grid square allocated an alphanumeric identifier. Each grid square was excavated in spits of 50mm depth, with each spit allocated an individual context number. The

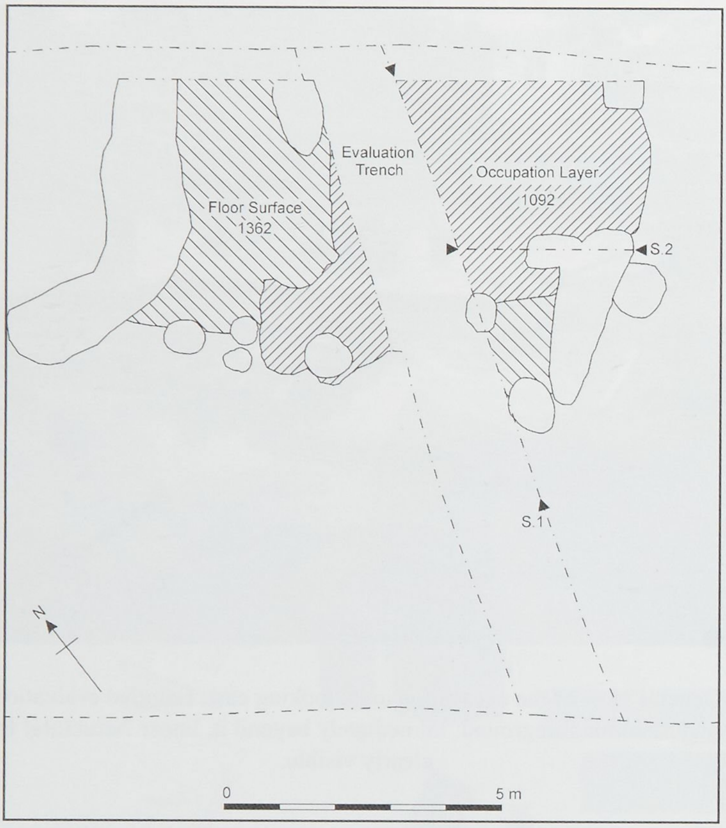


Figure 3. Plan showing extent of occupation deposit *1092* and floor *1362*

soil from each of the 277 spits was hand-sieved through an 8mm mesh and any artefacts retained. Due to the post-depositional disturbance evident throughout the sequence, and the arbitrary nature of the spits, it was often difficult to define the boundaries between the different layers.

The weather was an important influence on the conduct of the excavation. Most of the work was undertaken in heavy rain, which tended to accumulate at the lowest point of the field: the eastern half of the site. This meant there was a considerable depth of standing water in this area for almost the entire duration.

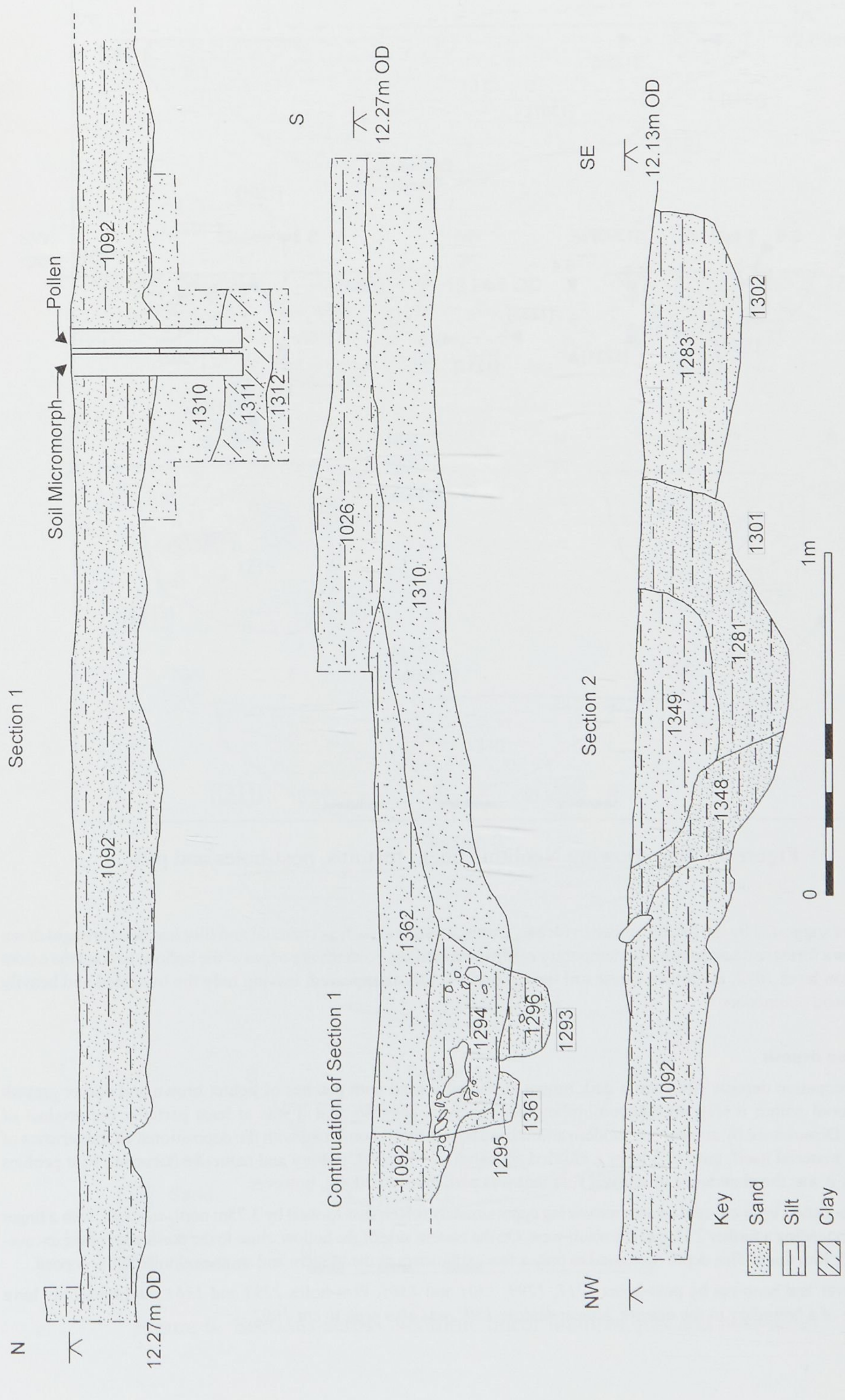
Excavation results
(Plates 2 and 3; Figs 3–6)

Natural hollow

The deposits examined appeared to have developed within a slight natural hollow. This hollow was not clearly visible in the surface topography and it only emerged after the removal of the modern topsoil and the colluvium. The hollow measured approximately 9.50m east-to-west, with the southernmost 6.50m of its north-to-south extent exposed within the excavation area.

Brown forest soil

Within the natural hollow, a clay- and iron-depleted brown sand ('brown forest soil') of Neolithic date had formed. This comprised a 75mm-thick buried brown forest topsoil horizon overlying a 0.30m-deep brown forest subsoil. The characteristics of the topsoil horizon indicate soil formation under pine and oak woodland, an interpretation consistent with the



Fgure 4. Principal recorded sections through the complex of Neolithic features and deposits, showing location of pollen and soil micromorphology sample columns. For location, see Fig. 3.

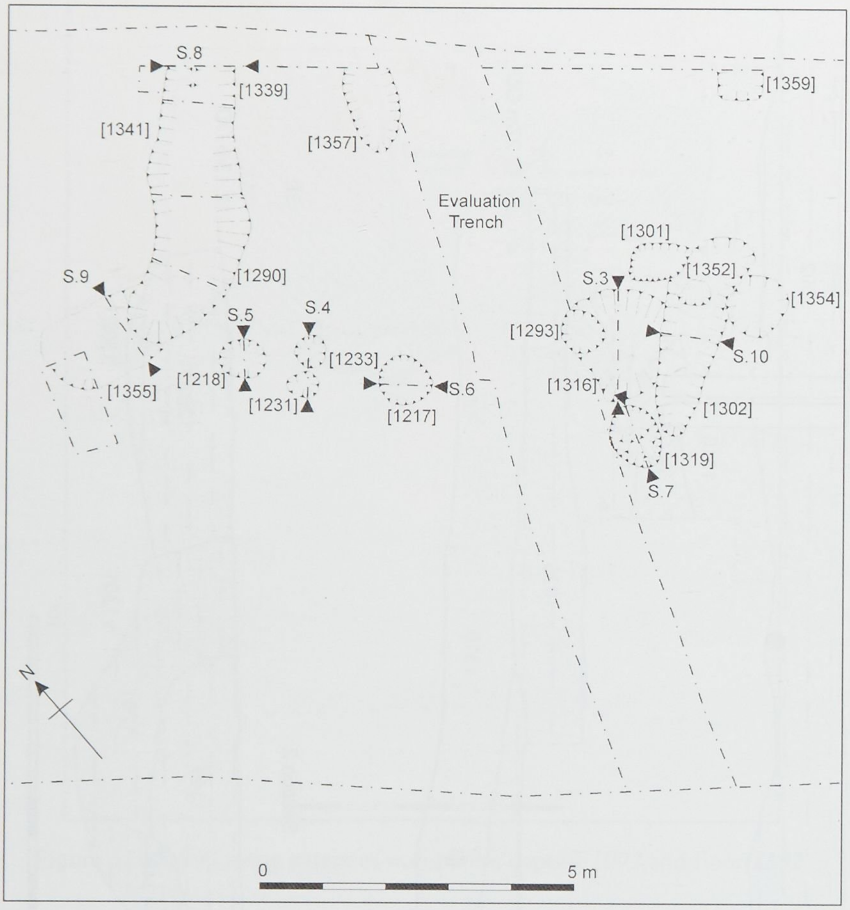


Figure 5. Plan showing Neolithic linear features, post-holes and pits

environment suggested by the limited pollen evidence. Cultural material such as charcoal and flint had been brought down into the brown forest soil horizons by contemporary earthworm activity. Towards the edges of the hollow, beyond the extent of occupation layer *1092*, the brown forest soil topsoil horizon had disappeared, leaving only the truncated and heavily leached subsoil component.

?Occupation deposit

Possible occupation deposit *1092* was a dark brown humic silty sand with patches of lighter brown and darker greyish brown material within it (Fig. 4). Micromorphological analysis suggests that it was at least partially the product of middening. Disturbance by ancient and modern animal and root activity, combined with the depositional characteristics of the midden material itself, gave this layer a mottled appearance. Charcoal, pottery and naturally occurring flint pebbles were noted; it was the abundance of worked flint that was particularly striking, however.

The occupation layer covered an area measuring approximately 6.70m east-to-west by 3.75m north-to-south, with a finger of material extending a further 2.10m to the south-west. On the eastern side of the hollow, close to the north edge of the excavation, it was 0.30m thick. This depth decreased to only a few centimetres at the western and southern limits of the deposit.

This layer had been cut by post-holes *1217*, *1293*, *1301* and *1361*. Post-holes *1293* and *1361* might possibly have formed part of a boundary to the deposit. Linear feature *1302* was also seen to cut *1092*.

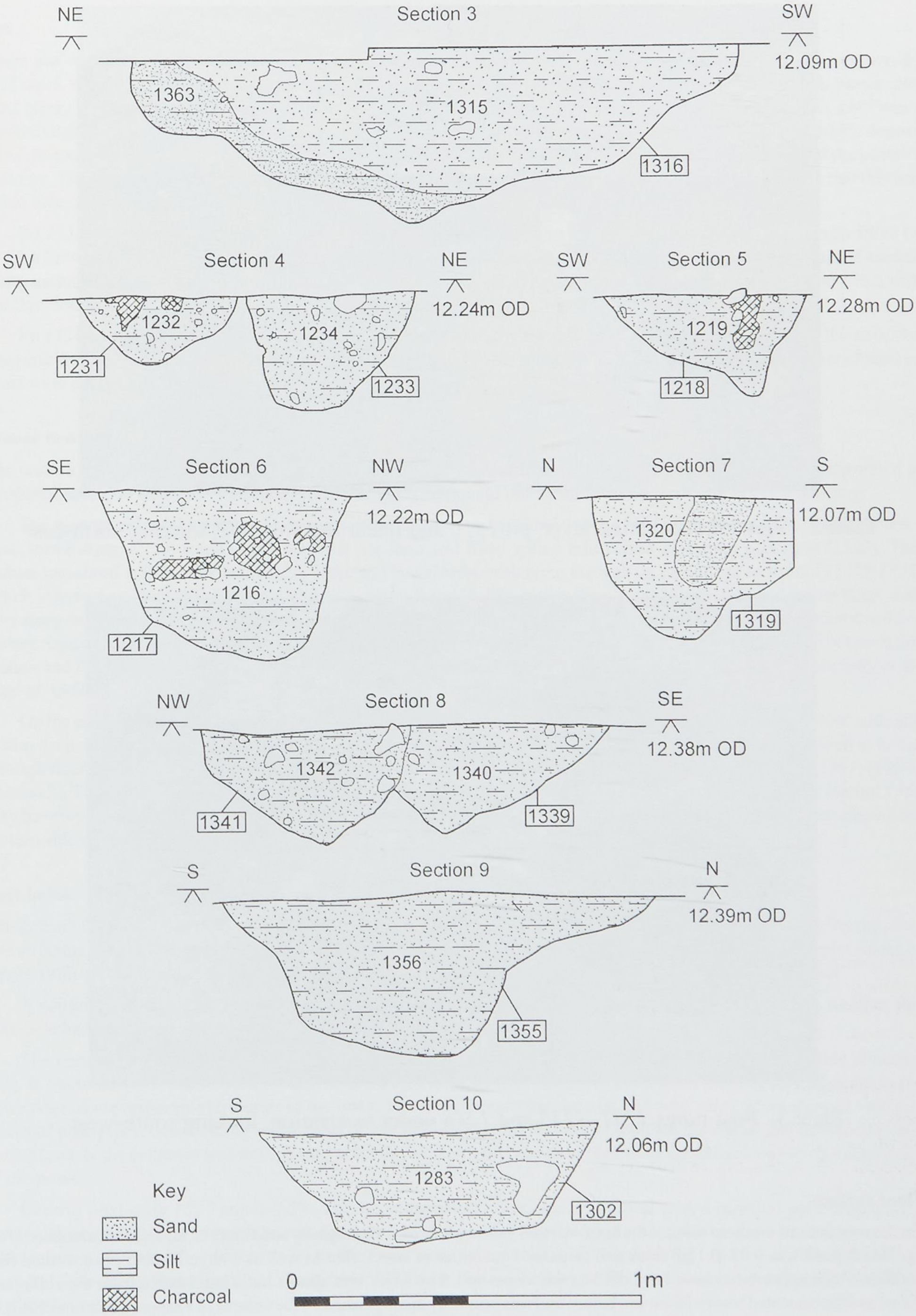


Figure 6. Sections across Neolithic linear features, pits and post-holes

Plate 2. View of occupation layer, pit *1316* and linear feature *1302*, looking north-east

Plate 3. Post-holes *1231*, *1233* and *1218* under excavation, looking south-west

Floor surface

On the western and southern sides of the hollow, a mid yellowish-brown slightly silty sand layer (*1362*) had accumulated (Fig. 3). This deposit was 0.05–0.15m thick and contained quantities of struck flint as well as a large number of unworked flint nodules which appeared to have been deliberately deposited. This layer was almost indistinguishable from the colluvium above and the truncated brown forest soil below, and was primarily distinguished by the volume of knapping debris within it.

While this layer has been tentatively interpreted as a floor surface, it may represent a disturbed or trampled natural ground surface. Stratigraphically, it was noted to overlie the midden deposit. It is possible that this material originated as upcast from the excavation of the linear features that form the boundary to the putative structure. This upcast may have been placed into the hollow as levelling material, with the deliberate placement of flint cobbles creating a firm surface.

Pits

Three pits were excavated within the area of the hollow. Pit *1316* was an irregular rectangular shape, with uneven, weathered sides, measuring 1.80m in length, 1.20m wide and 0.52m deep (Fig. 6, Section 3). A 0.10m-thick, dark brown silty sand layer (*1363*) covered its base, tipping down its northern and north-eastern sides. Overlying this, deposit *1315* was a uniform light brown silty sand backfill resembling the brown forest soil. This pit appeared to be sealed by midden deposit *1092*. Its eastern edge had been truncated by linear feature *1302*, which formed part of the eastern boundary of the putative building. The irregularity of the feature, combined with its position in the stratigraphic sequence, may indicate that this was a tree hole, maybe representing woodland clearance.

Pit *1357*, by the northern limit of excavation, was 0.60m deep, 0.85m wide and at least 1.35m long. It was filled by *1358*, a light brown silty sand with numerous larger flint pebbles and smaller cobble inclusions. A large number of worked flints, including thirteen flint cores, were recovered from this feature. It had been cut through floor surface layer *1362*, with the flint nodules within (*1362*) appearing to define its western and southern edges.

Pit *1354* was located on the east side of the hollow and was cut by the eastern edge of linear feature *1302*. It was 0.24m deep and 0.95m in diameter and was filled with a light reddish-brown slightly silty sand (*1353*). A small number of worked flints were present.

Linear features

The eastern and western sides of the hollow were defined by linear features. These have been tentatively interpreted in structural terms, as trenches or elongate pits which may have held one or more component timbers of a building.

The western side of the putative structure was formed by a sharp-sided trench (*1341*) with an irregular slightly pointed base, terminating 4.25m south of the northern site limit and filled with a mid yellowish-brown silty sand (*1342*). This feature measured 1.30m wide and 0.55m deep, and had clearly been recut through an earlier linear feature (*1355*/*1339*) which followed an identical alignment (Fig. 6, Sections 8 and 9). The earlier trench was 1.30m wide and 0.50m deep, with very steep sides and an irregular flat base. It was filled with a slightly paler silty sand than the recut. At the southern end this feature turned south-westwards before terminating 1.2m beyond the terminus of trench *1341*. The relationship between this feature and floor surface *1362* was unclear, although it was noted that the flint nodules within *1362* stopped abruptly at the edge of *1341*.

On the east side of the hollow lay steep-sided linear feature *1302*; this had a concave base 3.25m long, 0.90m wide and 0.35m deep, and was filled with a mid reddish-brown silty sand (Fig. 6, Section 10). This linear feature appeared to be cut through floor surface (*1362*) whilst its relationship with occupation layer (*1092*) was obscured by post-hole (*1301*) (Fig. 6, Section 2). This feature terminated 2.50m from the northern excavation limit. Close to this baulk, the edge of feature *1359* may have represented a continuation of the structure's boundary. This implies the presence of a 2.15m-wide entrance on the eastern side of the potential building.

Post-holes

Altogether nine post-holes were identified. Three (*1293*, *1301* and *1361*) were located within the area enclosed by the putative structure. Two of these (*1293* and *1361*: Fig. 4, Section 1) were intercutting, presumably indicating replacement or repair. Both appeared either to have been cut through or to have marked the boundary of the occupation layer.

A solitary post-hole (*1352*) was observed cut through the base of linear feature *1302*. It is uncertain whether this post-hole had been truncated by the linear feature or was an integral structural component within it.

The remaining post-holes (*1217*, *1218*, *1231*, *1233* and *1319*) formed the southern edge of the possible structure (Fig. 6, Sections 4–7). These were broadly aligned east to west, with examples positioned immediately adjacent to the inner edge of the respective terminals of the linear features representing the east and west sides. Most showed vestigial traces of post-pipes, occasionally in the form of patches of charcoal that might indicate the use of fire-hardened posts. Unfortunately the evidence was too ephemeral for any meaningful comment regarding the dimensions or characteristics of the posts.

Central post-hole *1217* appeared to cut the occupation layer, and was filled with a mottled pale brown silty sand with abundant dark greyish brown patches which was very similar to the occupation deposit in appearance. This layer was markedly different from the light orange or yellowish brown silty sand that filled the other post-holes forming this alignment. Post-hole *1319* was the only example that was seen to cut through the floor surface layer.

'Colluvium'

A uniform mid orange-brown silty sand deposit, approximately 0.40m thick, covered the entire area. This deposit directly sealed the occupation layer and floor surface and was originally thought to represent a continuous and gradual accumulation of hillwash from the slopes to the north and south. Fragments of clay pipe, brick, coke and post-medieval pottery within this deposit were probably introduced from manuring spreads, intended to raise the pH of the acid and relatively infertile sandy soils. Their presence at the base of this layer suggested that it had been ploughed, and thus might better be considered as a ploughsoil. Differences observed in the distribution and classification of the flint debitage recovered during hand excavation of the lowest levels of the 'colluvium' indicate that the base of the deposit might represents the plough-disturbed remnant of another occupation layer.

The finds

Flint

by Peter Robins
(Figs 7 and 8)

Introduction

Approximately 28,600 lithic artefacts (Fig. 7 for general distribution) were recovered, from 313 contexts, together with a number of burnt flints and a few heat-shattered quartzite fragments. Shatter pieces bearing no clear evidence of flaking were also collected, and these totalled 2000. Only the flint recovered from the excavation and that from evaluation Trench 4 has been included within this report. The flint found during the fieldwalking and from the other evaluation trenches was also Neolithic in character, but with a small number of Bronze Age flakes present.

The principal context groupings considered were colluvium (78 contexts), floor surface (49 contexts) and the occupation layer (100 contexts), together with 56 contexts representing discrete pits, post-holes and ditches. Artefacts recovered from unstratified or mixed contexts, the backfill of the evaluation trench and topsoil, from site cleaning, and those found in exploratory test-pits dug prior to excavation have been included in a miscellaneous category. This information is quantified in Table 1. The artefact content of the four principal archaeologically defined context groupings have been considered separately, with the classification of each assemblage summarised in Tables 2 and 3. All of the flint data was entered into an Access database prior to analysis.

The occupation layer

Seven arrowheads, all of leaf type, were recovered from the occupation layer. Only two of these arrowheads were substantially complete (Fig. 8, F7 and F8), the others being transversely snapped fragments. In addition, a snapped secondary flake, displaying shallow bifacial flaking and partial reduction of its bulb, probably represented an unfinished example. Two more leaf arrowheads (Fig. 8, F5 and F6) found in grid squares in which the floor surface edge was blending into the occupation deposit, may also have derived from the latter material.

Another diagnostic tool recovered from the occupation layer was the burin, of which three were found. Two were simple dihedral types (Fig. 8, F2 and F3) but the third, which superficially resembled a dihedral, was apparently formed by two adventitious fractures, rather than by burin blows, on the distal end of a secondary flake, with the tip showing extensive abrasion and loss of micro-spalls. No burins were found in any of the other layers or features.

Two serrated flakes were identified, both from the occupation layer. One was formed from a long tertiary flake with a finely serrated, slightly concave, left edge with traces of gloss (Fig. 8, F1). The other was on a rather irregular secondary flake, probably a transverse core face rejuvenation flake; its right edge was serrated, but more coarsely than the first.

The largest category of classifiable tools in the assemblage from the occupation layer was the scraper, with 21 being present. Most were rounded-end scrapers on short flakes.

The only axe present had a flaked butt end and had broken diagonally through an area of coarse-grained inclusion, leaving a hinged fracture (Fig. 8, F15). There were no traces of polish. The occupation layer also contained the only identified quartzite artefact, a cobble that had been flaked bifacially along one edge to form a chopper.

Borers, knives, notched pieces and denticulates were scarce. One unusual find was a long forked implement (Fig. 8, F11). This had a narrow, triangular sectioned long arm and was made from a grainy pale grey flint. It closely resembled in form (while exceding in size by a factor of two) an example in the Sturge Collection (No. 107), from North Stowe in Suffolk (Smith 1931).

Despite the large number of flakes in the debitage, only 20 miscellaneous retouched pieces and 24 apparently utilised flakes were identified.

Debitage not only formed the major component of the midden assemblage but also gave an insight into the technology employed. The cores could be classified by Clark's system as used for Hurst Fen (Clark 1960). This system is set out in Table 4. Full details of the classification are given in Table 5, where the comparable figures for Hurst Fen are also shown.

The cores from the occupation layer show a higher percentage of both categories A and B than that seen at Hurst Fen, with very few of the keeled types (categories D and E) characteristic of the latter site being present. Only a single example of a 'flat' core as illustrated by Clark (*ibid.*, 217) was found (Fig. 8, F9).

Apart from cores, 55 trial pieces were identified: these were nodules or fragments of flint from which one or two flakes had been struck but which had then been discarded.

Although the range of classifiable tools in the occupation layer strongly suggests an Early Neolithic date (a conclusion supported by the associated pottery), further evidence may be gained from the composition of the assemblage of cores and flakes which form the major part of the assemblage. One of the clearest trends in the lithic industries of the 4th and 3rd millennia is a progressive abandonment of regular, systematic blade production, as evidenced by both cores and flake composition. The overwhelming majority of the cores in the present assemblage are small and had probably been worked to a point at which they were no longer useful. Their earlier history is only accessible by reference to the core trimmings and to the flakes produced from them. The 29 core trimmings (Table 2) include only three crested flakes, which are characteristic products of the preparation of cores for blade formation. Most of the other trimmings are core tablets or partial tablets (removals of the working edge of the core) and give little evidence of the form of the cores themselves (Fig. 8, F14). The few face-renewal flakes (Fig. 8, F13) do not suggest blade production. It is of interest that almost half of the 'true' blades in the occupation layer are derived from a group of squares centred around grid square I4.

Of the total of 5969 flakes recovered from the occupation layer, only 283 (4.7%) can be classified as narrow, or blade-like, in form, *i.e.* as having relatively parallel sides and arrises. This indicates an almost complete abandonment of blade production techniques, and suggests that the assemblage should not be ascribed to a relatively early stage of the Early Neolithic.

Uneven horizontal distribution of artefacts within the occupation layer is apparent, though the disturbance caused by the earlier evaluation trench may have been a factor here. Nevertheless, two major foci appear discernible, with the densest concentration of both tools and debitage being located on a block of grid squares defined by G1–3 through J1–3. A second block, from grid squares D4–6 through to F4–6, had a particularly high concentration of cores.

The vertical distribution also seems to confirm the existence of two focal points. That in the western part of the site (blocks D and E) was at a higher level (spits 2 and 3) than that in the eastern area (blocks H and I) where it was concentrated within spits 3 and 4. It is worth noting that the five leaf arrowheads found in block H were all at a lower level still, notably in spits 4, 5 and 6.

Floor surface

The floor extended over 26 grid squares and lay, in part, above the occupation layer; it was sealed overall by the ploughed colluvium deposit. The tool and debitage content is shown in Tables 2 and 3.

Two leaf arrowheads were recovered from the floor deposit (Fig. 8, F5, F6); however, as has already been stated, these came from the blurred boundary between the floor and the occupation layer and may properly belong with the latter grouping. Burins and serrated pieces were absent from the relatively small assemblage of tools from the floor deposit. One notable piece was a tanged adze blade (grand tranchet), one of two found on the site (Fig. 8, F10 and F12).

Debitage in the floor contexts included 117 cores, with the highest concentration in grid square E2. Numbers diminished rapidly to the west but more slowly to the south. Flake debitage followed the same pattern. An unexpected component of the core debitage was a single struck Levalloisoidal core (Fig. 8, F16).

'Colluvium'

The possible colluvium was represented by 78 contexts which had acted as a sealing layer over the whole area of the excavation, and was overlain by topsoil. It is thought to have been affected by medieval or post-medieval agricultural practices and therefore open to infiltration by artefacts of later periods.

The colluvium, in contrast to the occupation layer below, produced no arrowheads, burins, bifaces or serrated pieces. Scrapers (including the only double-ended scraper recovered), borers and notched pieces were present, mainly in the eastern and southern areas of the site. The rounded end scrapers on short flakes were smaller, on average, than those from the occupation layer.

Cores were mainly confined to the eastern half of the site while flakes, though widely distributed, tended to follow the core pattern. Analysis of the cores in the colluvium layer shows a marked contrast in type distribution when compared with the occupation layer and floor surface. Colluvium had a lower percentage of type A and a higher percentage of keeled types D and E, a ratio more closely comparable with Hurst Fen.

Feature type	*Quantity*	*% of total quantity*	*Weight (kg)*	*% of total weight*
Colluvium	44	4.9%	0.136	4.7%
Occupation layer	526	59.0%	1.828	63.7%
Floor surface	54	6.1%	0.165	5.8%
Natural	26	2.9%	0.080	2.8%
Feature *1302*	58	6.5%	0.139	4.9%
Feature *1290 / 1341*	57	6.4%	0.067	2.3%
Post-hole *1217*	10	1.1%	0.023	0.8%
Post-hole *1233*	1	0.1%	0.029	1.0%
Post-hole *1293*	9	1.0%	0.015	0.5%
Post-hole *1301*	14	1.6%	0.050	1.7%
Post-hole *1319*	16	1.8%	0.036	1.3%
Post-hole *1352*	2	0.2%	0.008	0.3%
Pit *1316*	26	2.9%	0.118	4.1%
Pit *1354*	2	0.2%	0.004	0.1%
Pit *1357*	24	2.7%	0.078	2.7%
Pit *1359*	11	1.2%	0.050	1.7%
Unstratified	11	1.2%	0.043	1.5%
Total	**891**	**100.00%**	**2.869**	**100.00%**

Table 1. Total flint artefacts by context

Context Group	*Retouched tools*	*Cores*	*Core trimmings*	*Blades*	*Blade-like flakes*	*Other flakes*	*Trial pieces*
Occupation layer	91	237	29	29	254	5686	55
Floor	38	117	7	4	65	1310	16
Colluvium	40	76	2	23	174	1330	14
Features	38	72	15	2	76	2037	24
Miscellaneous	17	67	6	3	85	1181	15
Total	**224**	**569**	**59**	**61**	**654**	**11544**	**124**

Table 2. Struck and retouched flint artefacts (excluding chips and spalls)

Tools	*Occupation layer*	*Floor*	*Colluvium*	*Features*
Arrowheads	7	2	-	3
Bifaces	1	1	-	2
Borers	5	1	2	5
Burins	3	-	-	-
Denticulates	1	-	1	2
Knives	2	3	2	3
Misc. retouched	20	9	8	7
Notched	3	1	5	1
Scrapers	21	8	12	10
Serrated	2	-	-	-
Tranchet (grand)	-	1	-	-
Utilised	24	11	10	4
Hammerstones	2	1	-	1
Total	**91**	**38**	**40**	**38**

Table 3. All tools from layers

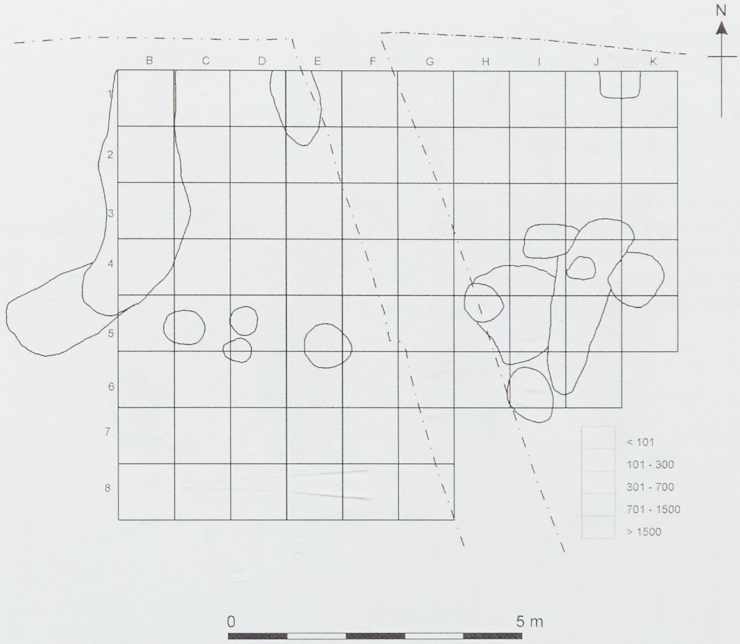


Figure 7. Summary of gridded collection of flint

Type	*Description*
A	One platform
A1	Flakes removed all the way round
A2	Flakes removed part of the way round
B	Two platforms
B1	Parallel platforms
B2	One platform at an oblique angle
B3	Platforms at right angles
C	Three or more platforms
D	Keeled with flakes struck from two directions
E	Keeled with one or more platforms

Table 4. Classification of core types

Context grouping	*A*	*B*	*C*	*D*	*E*	*Total*
Occupation Layer	144 (67.5%)	47 (22%)	12 (5.5%)	8 (4%)	2 (1%)	213
Floor	69 (65.5%)	26 (24.5%)	3 (3%)	4 (4%)	3 (3%)	105
Colluvium	28 (40.5%)	24 (35%)	3 (4.5%)	9 (12.5%)	5 (7.5%)	69
All features	30 (44.5%)	22 (33%)	6 (9%)	5 (7.5%)	4 (6%)	67
HURST FEN	**41%**	**21%**	**5%**	**15%**	**18%**	

Table 5. Classification of identifiable and complete cores

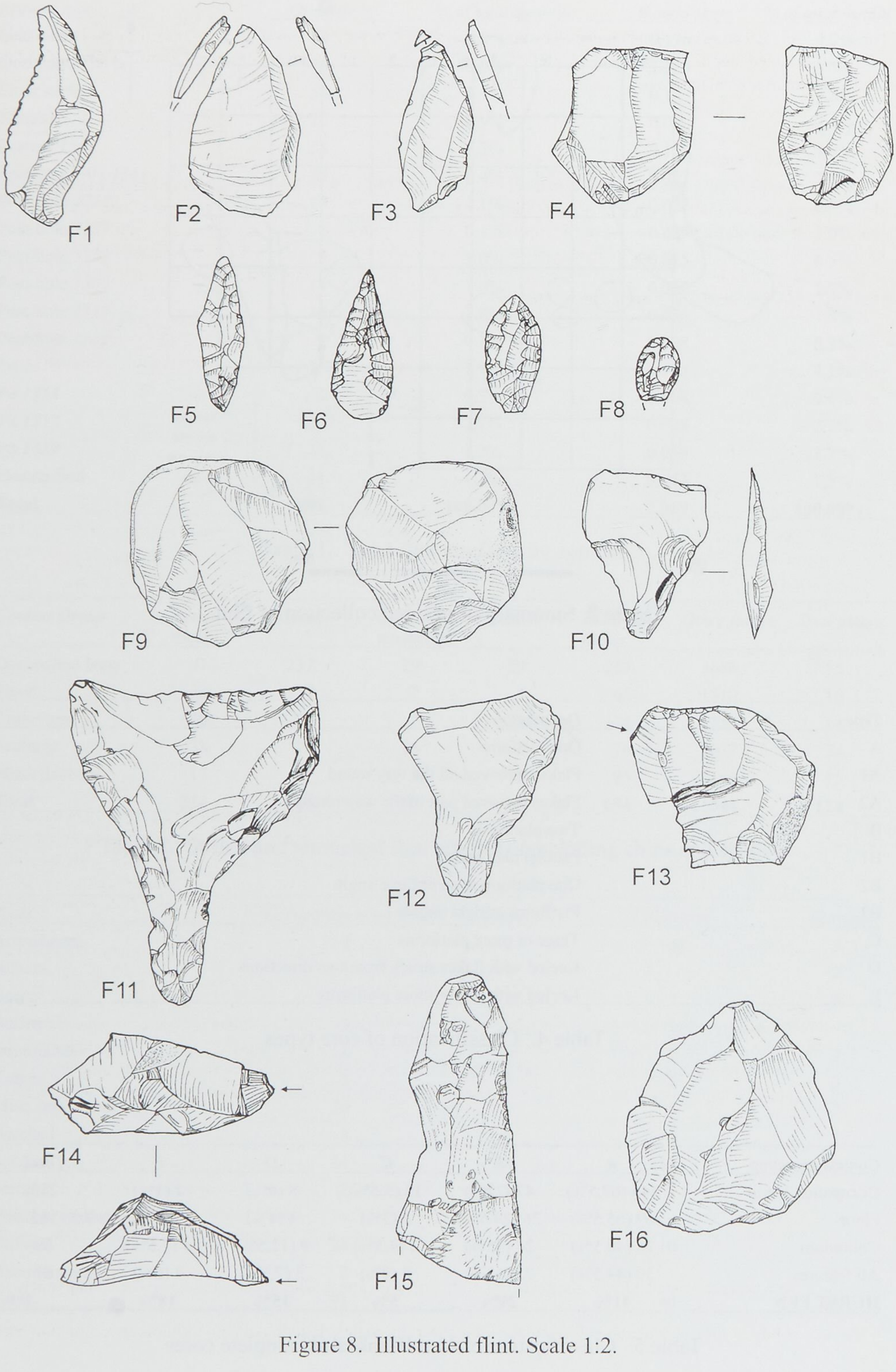


Figure 8. Illustrated flint. Scale 1:2.

Cut features

Nineteen discrete features were distinguished by the excavators and classified as linear features, pits and post-holes. Many of these contained significant numbers of artefacts, parallelling those in the layers described above. A few individual artefacts require special mention.

Linear feature *1332/1341* contained an axe or adze roughout in grey mottled flint and an oval biface, broken at one end, which was possibly an unfinished laurel leaf or discoidal knife. Linear feature *1302* produced a small leaf arrowhead and post-hole *1319* a complete leaf arrowhead.

Linear feature *1302* contained large amounts of debitage; altogether it yielded nineteen cores, eight trial pieces, 62 shatter pieces and seventeen fragments of burnt flint. In contrast *1332/1341* contained only four cores, one trial piece, 30 shatter pieces and 40 fragments of burnt flint, the latter being concentrated at its southern terminus. Pit *1357* contained sixteen cores and 55 shatter pieces, whilst the larger pit *1316* contained only two cores, 51 shatter pieces and 32 fragments of burnt flint. Post-hole *1217* contained 26 cores, 75 shatter pieces and 35 burnt fragments. Such a high concentration of flint might indicate its use as post-packing material.

Catalogue of illustrated flint
(Fig. 8)

F1 Serrated flake (context *1203*)
F2 Burin (*1153*)
F3 Burin (*1238*)
F4 Core (*1229*)
F5 Arrowhead (*1053*)
F6 Arrowhead (*1103*)
F7 Arrowhead (*1221*)
F8 Arrowhead (*1243*)
F9 Core (*1125*)
F10 Tanged adze blade (grand tranchet) (*1140*)
F11 Implement (*1153*)
F12 Tanged adze blade (grand tranchet) (*1124*)
F13 Core rejuvenation flake (*1313*)
F14 Core rejuvenation flake (*1238*)
F15 Axe (*1203*)
F16 Levallois-type core (*1105*)

Discussion

No pre-Neolithic artefacts were recovered, nor was there any evidence of post-Neolithic knapping activity. The extensive recovery of spalls and chips from sieving allowed a careful search for microliths to be carried out, but with negative results; blades and bladelets were rare in the debitage. The occupation layer and floor surface would appear to be Early Neolithic and this is in keeping with the presence of leaf arrowheads, burins and serrated flakes, though the complete absence of laurel leaves — which were so common at Hurst Fen — is surprising. The occurrence of a tanged adze blade from the floor surface, together with a second example from a mixed context, is of particular interest as this rare form has been associated with the later Neolithic or Early Bronze Age. Healy (1980, 259–60) cites examples from Windmill Hill and Grimes Graves.

The main occupation layer and floor surface are characterised by a very low proportion of retouched artefacts (1.7% of the total struck pieces). This suggests that the principal activity was the production of tools which were then removed from the site unless they were damaged during manufacture, as witnessed by the broken and incomplete arrowheads and the single broken axe (Fig. 8, F15). The sparse tool kit comprises those types, such as scrapers, borers, burins and knives, that would be used in preparative or manufacturing activities. The presence of large numbers of shattered fragments suggests not only that relatively poor grade raw material was being employed, but also that it was being brought to the site without any preliminary selection.

The core technologies seen in the occupation layer and the floor surface were virtually identical, with the dominant types being A2 (Fig. 8, F4) and B2. Numbers of core tablets and core edge rejuvenating flakes (Fig. 8, F14) accompanied the cores, but crested flakes and transverse core face removals (Fig. 8, F13) were rare. Core distribution within the occupation layer suggests that some stratification existed within it, with a shift of focus from one area to another at a slightly higher level, and with a change in emphasis from arrowhead production to an activity requiring the use of burins. There was no obvious difference in core technology between the two foci.

The other principal defined deposit, the possible colluvium, is deficient in artefacts of all types when compared to the occupation layer. Tool types (other than the absent arrowheads, bifaces, burins and serrated pieces) closely resemble in relative numbers those of the occupation layers, but there are clear differences in terms of core technology. Colluvium cores have a lower percentage of type A and a higher percentage of type B (mainly B3) and of keeled forms (types D and E). Core trimming flakes are almost absent but the proportion of discarded trial pieces to well-used cores is much higher than in the occupation layers. The greater diversity of core types may be seen as a developmental feature, since the occupants of the site must have accessed much the same sources of raw material. Analysis of the core types in the colluvium shows a strong resemblance to those of Hurst Fen. A major difference is apparent in the accompanying tool kit, however: the presence of laurel leaves, serrated flakes and leaf arrowheads at Hurst Fen contrasts with their complete absence from the colluvium at Colney.

Core distribution in the colluvium is dispersed and favours the periphery of the excavation area, with a greater concentration at the eastern end. Tools and other debitage show a similar distribution. This clustering may indicate that the lowest levels of the colluvium represent a plough-damaged occupation deposit containing flint of a later technological phase than that from the layers below.

Overall, the flint assemblages recovered from the excavated cut features were neither sufficiently diagnostic or large enough for meaningful analysis. Sufficient quantities of debitage, including fifteen cores, were recovered from pit *1357* to suggest that the features assemblage resembled the colluvium in its lithic type distribution. Elongated pit feature *1302* contained tools that closely resembled those from the occupation layer, including one leaf arrowhead, but had a core type distribution intermediate between those of the occupation layer and the colluvium. Post-hole *1217* contained a wide range of debitage, including 26 cores and three retouched tools. Typologically, this material resembled the occupation layer in its composition.

A full report on the analysis of the flint assemblage has been included within the project archive.

Pottery
by Sarah Percival
(Fig. 9)

Eight hundred and ninety-one sherds of pottery, weighing 2.869kg, were recovered from 108 contexts. The majority of the sherds were Earlier to Middle Neolithic Plain Bowl forms dating to *c.* 4000–2900 BC, with the remainder of indeterminate prehistoric date.

Method

The assemblage was analysed in accordance with the guidelines for analysis and publication laid down by the Prehistoric Ceramic Research Group (PCRG 1992). The total assemblage was studied and a full catalogue prepared. Sherds collected from the residues of the environmental samples were included in the analysis. The sherds were examined using a binocular microscope (x10 magnification) and were divided into fabric groups defined by the inclusion types present. Fabric codes were prefixed by a letter code representing the main inclusion present (F representing flint, G grog and Q quartz). Vessel form was also recorded, R representing rim sherds and U undecorated body sherds. A catalogue and full report are held in the project archive.

The assemblage

Eight hundred and sixty-five sherds weighing 2.776kg were identified as being of Earlier Neolithic date. The pottery was fragmentary and no reconstructable vessels or profiles were recovered. The rim forms are simple and suggest that the assemblage comprised open bowl forms. A number of carinated body sherds indicate vessels with upright shoulders, perhaps similar to those identified at Broome Heath, Ditchingham (Wainwright 1972). No Grimston Ware, as defined by Manby (1970) and Smith (1974), was identified and no decorated sherds were present. Some sherds had missing surfaces, possibly the result of abrasion damage sustained during on-site sieving.

Fabric

Two main fabrics were identified. Fabric F1 and F2 (Table 6) both containing crushed sub-rounded flint, which had a crazed appearance from contact with heat. Small quantities of mica, visible as small glistening plates, were present in a number of sherds. A third fabric contained small quantities of grog and quartz sand (fabric G1). No fabrics with shelly inclusions or organic voids were noted.

The sherds were hard and well fired, and ranged in colour from dark brown/orange to buff/orange. The distinction between fabric F1 and fabric F2 was based on the surface finish, with F2 representing the more finely finished wares. The majority of sherds of fabric F1 had smoothed surfaces which were not finely finished or burnished. Sherds of fabric F2 had closed surfaces and 172 sherds (0.547kg) were burnished (19.88% of total sherd count).

The predominance of flint tempering corresponds well with Earlier Neolithic assemblages from Southern Britain (Cleal 1995), and in particular with those from Northern East Anglia such as Broome Heath, Ditchingham (Wainwright 1972) and Spong Hill, North Elmham, Norfolk (Healy 1988).

Form

The rim forms were classified following the rim typology used with respect to Hurst Fen, Suffolk (Longworth 1960), Windill Hill, Wiltshire (Smith 1965), Spong Hill, Norfolk (Healy 1988, fig. 57) and other assemblages (Table 7). No heavy, developed, expanded or 'T' shaped rims were present.

The rim forms were most frequently out-turned, though some had slight external thickening. The remaining rims were simple, upright forms; these can be rounded, pointed or flattened. Most of the vessels had thin walls, where the thickness of the fabric does not exceed 8mm. Eight sherds exhibited distinct changes of angle, suggesting that they came from carinated bowls with well-defined shoulder ledges low on the body of the vessel. These, along with the lighter rims, indicate a close parallel with the assemblage from Broome Heath, Ditchingham (Wainwright 1972, fig. 15 P1). The assemblage was too fragmentary to allow full identification of the vessel forms.

The vessels appeared to be coil-built as many sherds displayed coil fractures. It is possible that 'thumb pots' formed from a single lump of clay were also produced. This is suggested by the presence of a lump of fired clay with two deep fingertip impressions which may represent a pot which was abandoned during manufacture (Fig. 9, P11). It is also possible that this piece represents a test firing and, as such, could be considered a waster. This limited range of production techniques, confined to coil-made and thumb-built pots, has been noted within earlier Neolithic assemblages at The Stumble, Essex (Brown, forthcoming) and Windmill Hill (Smith 1965).

Deposition

The majority of the sherds were found within the occupation layer, which produced 63.7% of the total assemblage weight (1.828kg). The remaining sherds came from within the fills of cut features (0.580kg, 20.9%) and from 'colluvium' (0.124kg, 4.5%), with the floor surface deposit, sherds derived from disturbed natural deposits and unstratified finds contributing the remainder (Table 8).

The average overall sherd weight for the assemblage was small, being only 0.0032kg. The small size of the sherds suggests that the material within the mound may have been exposed on the contemporary surface and become trampled and fragmented. Sherds from the occupation layer were slightly larger than the overall average (typically 0.0035kg), whilst those from the colluvium and floor surface were 0.0031kg and those from the cut features were slightly smaller (0.0027kg). The sherds from the cut features were also slightly more abraded than those found within the midden. This may suggest that the sherds within the cut features were redeposited pieces from the midden when they had been cut through it. No stylistic differences were noted between the pottery from the occupation layer and that found within the cut features or the redeposited colluvium.

Catalogue of illustrated sherds

P1 Fabric F1, rim type R2, *1056* (midden), grid square I1, spit 3.
P2 Fabric F2, rim type R3, *1070* (midden), grid square J1, spit 3.
P3 Fabric F2, rim type R2, *1206* (midden), grid square I1, spit 5.
P4 Fabric F2, rim type R2, *1227* (midden), grid square G2, spit 5.
P5 Fabric F2, rim type R2, *1228* (midden), grid square H2, spit 5.
P6 Fabric F2, rim type R3, *1237* (midden), grid square H1, spit 6.
P7 Fabric F2, rim type R3, *1238* (midden), grid square G1, spit 6a.
P8 Fabric F2, rim type R3, *1238* (midden), grid square G1, spit 6a.
P9 Fabric F2, rim type R3, *1291* (ditch), fill of *1290*.
P10 Fabric F1, rim type R2, *1322* (midden), grid square H3, spit 4.
P11 Fabric F1, fired clay object, *1206* (midden), grid square I1, spit 5.

Discussion

The earliest pottery found in Great Britain is thought to have arrived in the south of the country around 4000 BC (Thomas 1999, 98; Gibson 1990, 59). The Colney assemblage is characterised by fine, undecorated bowls with simple rims and a marked carination low on the body of the vessel and may date to *c*. 200 years or more after this inception, to around 3800–3300 BC (Barclay 2000). The assemblage can be assumed to represent the remains of domestic occupation and the context of its discovery, within a occupation deposit, supports this. The occupation layer at Colney can be classified as an 'open' site in terms of Thomas's contextual categorisation (Thomas 1999, 103), and confirms his finding that such non-ceremonial sites feature predominately inflected or carinated forms. Even though the pots can be assumed to have been essentially functional and show evidence of use, for example through the presence of smoke marks (Thomas 1999, 98), it possible that they also carried a non-utilitarian significance to the users which cannot be discerned from the surviving archaeological record (Herne 1988, 26).

It is known that Early Neolithic plain carinated bowl styles had a long currency, beginning *c*. 4000 BC and continuing in use to *c*. 3100 BC (Thomas 1999, 99). The longevity of the bowl form means that the pottery cannot help much

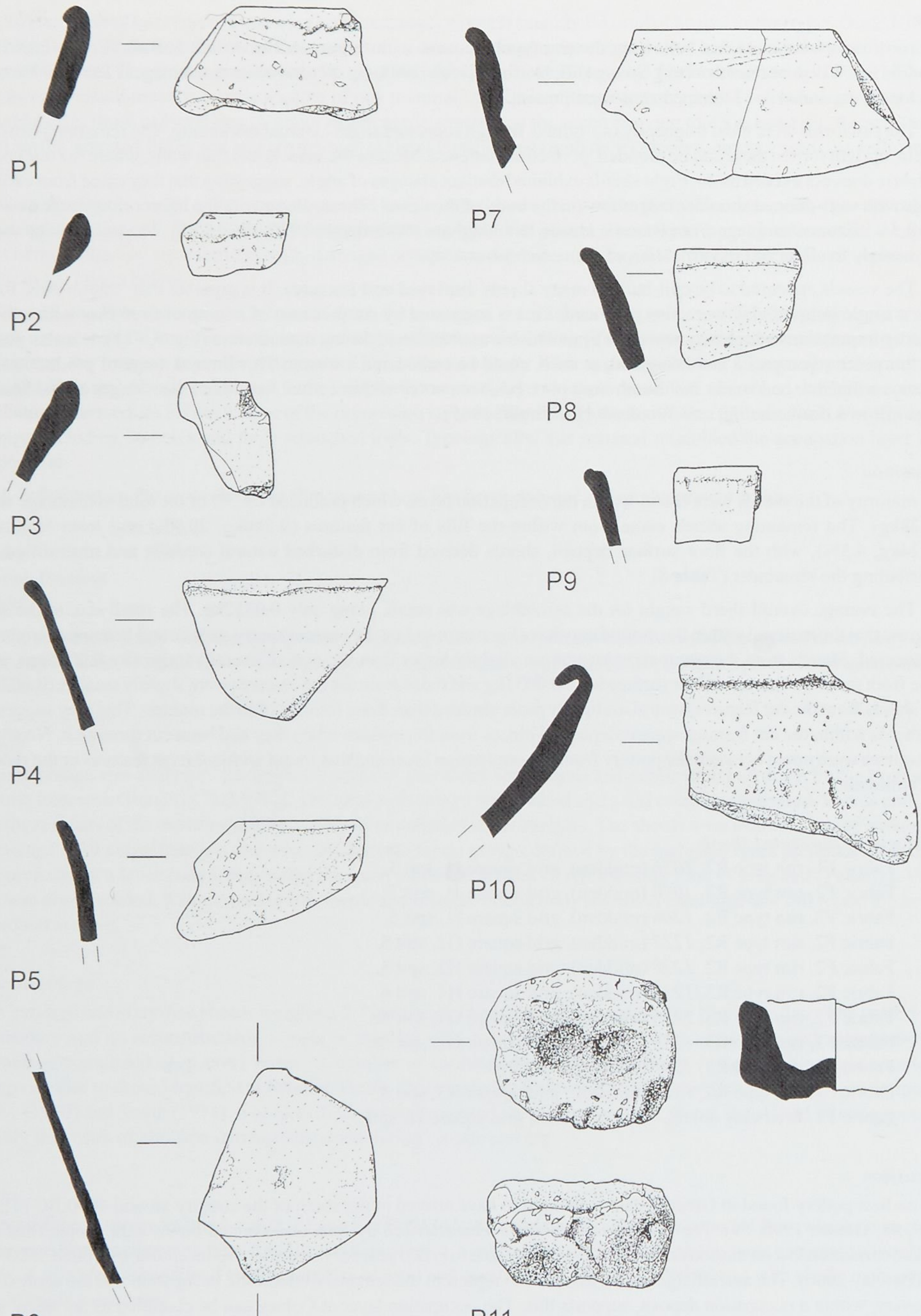


Figure 9. Illustrated prehistoric pottery. Scale 1:2.

Fabric	Description	Quantity	Weight (kg)
F1	Abundant, medium to course, sub-angular, flint. Flint protrudes from exterior surface.	554	1.692
F2	Moderate to sparse, medium to fine, sub-angular, flint. No flint protrudes onto the surface.	303	1.086
G1	Moderate to sparse, medium to fine, sub-angular, grog. Moderate quartz-sand.	17	0.052
Undiagnostic		17	0.039
Total		**891**	**2.869**

Table 6. Quantity and weight of pottery by fabric

Type	Description	Quantity	% of total quantity	Weight (kg)	% of total weight
R1	Simple,	9	20%	0.033	13%
R2	Out turned or rolled or pressed outwards	24	52%	0.151	58%
R3	Externally thickened	13	28%	0.076	29%
Total		**46**		**0.260**	

Table 7. Quantity and weight of pottery by rim form

Feature type	Quantity	% of total quantity	Weight (kg)	% of total weight
Colluvium	44	4.9%	0.136	4.7%
Occupation layer	526	59.0%	1.828	63.7%
Floor surface	54	6.1%	0.165	5.8%
Natural	26	2.9%	0.080	2.8%
Feature *1302*	58	6.5%	0.139	4.9%
Feature *1290/1341*	57	6.4%	0.067	2.3%
Post-hole *1217*	10	1.1%	0.023	0.8%
Post-hole *1233*	1	0.1%	0.029	1.0%
Post-hole *1293*	9	1.0%	0.015	0.5%
Post-hole *1301*	14	1.6%	0.050	1.7%
Post-hole *1319*	16	1.8%	0.036	1.3%
Post-hole *1352*	2	0.2%	0.008	0.3%
Pit *1316*	26	2.9%	0.118	4.1%
Pit *1354*	2	0.2%	0.004	0.1%
Pit *1357*	24	2.7%	0.078	2.7%
Pit *1359*	11	1.2%	0.050	1.7%
Unstratified	11	1.2%	0.043	1.5%
Total	**891**	**100.00%**	**2.869**	**100.00%**

Table 8. Quantity and weight of pottery by feature type

in clarifying the duration of the occupation or refining interpretation of the nature of the deposition. It remains unclear if the occupation layer represents a gradual build-up of material from continuous habitation or several chronologically separate episodes of deposition. Similar deposits to those found at Colney have been observed at the Stumble, on the Essex coast, where a superficial artefact-rich layer had been deposited or had accumulated in an area previously occupied by post/stake structures. Once the midden-like deposits had built up, further features were then cut through the layers and into the subsoil (Brown forthcoming). The deposits at the Stumble covered a substantial area, around 142m^2, and Brown suggests that widespread surface scatters of artefacts may have been common on Neolithic sites, although these may since have been lost to agricultural activity. Substantial scatters of flint found during fieldwalking in the area around the excavation site at Colney imply that similar extensive superficial deposits may have existed here too and those that have survived more recent ploughing have done so only because of their protected location with a natural hollow.

Fired clay

by Alice Lyons

A total of 23 fragments of fired clay; weighing 0.169kg, was recovered from the excavation. It was of a sandy fabric with common small quartz inclusions; unusually, there are no voids that would suggest the inclusion of vegetable matter (normally dung). The fabric ranges in colour from reddish yellow to brown and was generally quite soft, or low fired. One partial withy impression, of a substantial twig (diameter 18mm), was noted.

This is a small, very abraded, assemblage; however, the material itself is positive evidence for structures in the vicinity, with the survival of a partial withy impression indicating wattle and daub technology. The condition of the material and the fact that none was retrieved *in situ* indicates that all the fired clay was residual.

Animal bone

by Julie Curl

A very small quantity of unidentifiable fragments of burnt animal bone (0.008kg) was recovered, almost entirely from spits within the occupation deposit *1092*.

Environmental evidence

Soil micromorphology and soil chemistry

by Richard Macphail *and* John Crowther

Method

Nine thin section and seventeen bulk sample studies were carried out, employing soil micromorphology, grain size, organic matter, phosphate and magnetic susceptibility analyses. The sampling strategy required the selection of material to study: i) the full palaeosol sequence up into the occupation deposit, ii) the development of the occupation deposit, iii) possible spatial differences within the occupation layer, including soil from outside the structure, iv) comparisons with some of the pit and post-hole fills. The methodology followed the precedent of the soil investigations carried out for the Raunds Prehistoric Project (Macphail 1999b).

Results

Biological mixing (some clearly dating back to the Neolithic) and leaching led to very low amounts of organic matter, fine material, phosphate and ferruginous magnetic minerals being preserved in the occupation horizon. The burrowing of earthworms through the colluvium that buried the Neolithic sequence was probably responsible for mixing later material such as coal, fired clay and some of the charred seeds into these deposits. For this reason, the soil results of the soil analyses have to be treated with caution.

Brown forest soil

Soil formation processes on the underlying glaciofluvial deposits seem to have followed a path of acidification and of clay and iron depletion. By the Neolithic these processes had formed a weakly developed argillic brown sand ('brown forest soil'), with the micromorphological characteristics of the upper brown forest topsoil horizon inferring soil formation consistent with the limited pollen evidence for the presence of pine and oak woodland. The clearance of this woodland would have exacerbated the leaching of the soils. Unlike at Broome Heath in Norfolk (Wainwright 1972), no subsequent podzolisation of the brown forest soils had taken place at Colney.

This brown forest topsoil probably supported an earthworm population, which was probably responsible for the mixing of burnt and worked flints down into the lower brown forest subsoil. The classic site of Iping Common, Sussex, is characterised by Mesolithic flints that were worked down-profile into the brown forest soils by earthworms, before podzolisation occurred in later prehistory (Keef *et al.* 1965).

Insect burrowing would also have been a factor in the downward migration of artefacts. A burrow fill within the lower brown forest subsoil horizon contained inwashed fine humic soil which also included phytoliths and charcoal, indicating that this material originated from a disturbed occupation soil. This movement of fine material from the occupation surface into the subsoil horizons is reflected in levels of phosphate being equal or above mean values for the site as a whole.

Neolithic occupation

If the 'colluvium' was simply a valley-bottom ploughwash layer, the Neolithic occupation deposit *1092* and underlying soil would probably feature marked amounts of fine-textured textural pedofeatures (*e.g.* clay coatings), as soil of ploughwash origin were filtered down-profile. This hypothesis is based upon experimental studies and investigations of ancient soils buried by ploughwash colluvium (Farres *et al.* 1992; Macphail 1992; Macphail 2000). The Neolithic occupation and buried soils do contain clay coatings and infills; however, these are often dark coloured (humic?), impure (containing silt and charcoal), and show the leaching effects of being in an acid soil environment. All of these features indicate that they are ancient and likely to pre-date the colluvium. In addition, their presence is patchy, inferring physical breakdown through biological mixing of the soil. If these clay coatings were contemporary with the development of the 'colluvium' then at least some of the present biological fabric would have been expected to become clay-coated, but this was not the case.

The effect of soil leaching was probably more intensive in the occupation horizon. This would have reduced the amount of phosphate preserved and would explain the lack of magnetic susceptibility enhancement recorded in the soil, as the leaching would have destroyed or removed most of the ferruginous (magnetic) minerals that would have developed during the Neolithic occupation. The natural translocation of clay from the upper soil horizons into the subsoil, and even into the parent material sands, would have carried both organic matter and phosphate down-profile (Parfenova *et al.* 1964). These processes thus help explain the lack of strong differences in chemistry between the occupation soil and the soils beyond the boundary of the possible Neolithic structure.

Discussion

It can be suggested that by the Neolithic period an acid loamy sandy brown earth soil had formed under woodland. The presence of clay coatings in the brown forest subsoil horizons is consistent with natural soil horizonation; their presence as dark and poorly preserved features in the occupation soil and buried brown forest topsoil horizon is anomalous. Previous studies and reviews have shown that dark clay textural features can form in topsoils through occupation disturbance, such as trampling activity, but in these cases such disturbance has to be accompanied by animals excreting liquid waste in the form of organic matter and phosphate. This supposed mechanism in acidic soils was first inferred at a Danish Iron Age site; this interpretation was later supported in the case of Neolithic/Bronze Age Raunds (Northamptonshire) by microprobe analysis which demonstrated that soil phosphate was concentrated in these dark clay coatings (Macphail and Cruise 2001; Nørnberg and Courty 1985). It was also found that macrofossil and insect (dung beetles) data supported the interpretation of the Early Neolithic landscape at Raunds as being open and used for cattle ranching (Macphail 1999b). Similar arguments were employed to explain enhanced levels of phosphate at the Early Neolithic sandy midden site at Eton Rowing Lake, Middlesex, and at Neolithic Hazleton, Gloucestershire, albeit with phosphate levels lower than those recorded at Colney (Tim Allen *pers. comm.* 1999; Macphail 1999a; Macphail and Linderholm in press). Phosphate analysis at these sites revealed that it was likely that a high proportion of the phosphate was in an organic form, as found in experimental dung manured fields in Sweden (Engelmark and Linderholm 1996). Moreover, ongoing studies of prehistoric trackways in Scania (Southern Sweden) provide a further example of the association of dark textural features and enhanced levels of organic phosphate, in a zone where animal passage was probably concentrated. At Eton Rowing Lake, where enhanced magnetic susceptibility was also measured, small artefacts, charcoal and bone were noted in thin section, in addition to textural features that had been partially reworked by biological activity.

The above sites are therefore useful analogues to Colney, where there is a possible correlation between dark clay textural features and enhanced quantities of organic phosphate, the last being unusual because of the very low amounts of organic matter preserved in the soil. It can also be suggested that the rare examples of very broad burrows containing inwashed occupation soil and abundant dark and impure textural features might possibly indicate burrowing during the Neolithic occupation by invertebrates such as dung beetles.

Although the above hypotheses need to be treated with caution, because of the paucity of preserved microfeatures and chemical indicators of Neolithic activity, they do appear to support archaeological interpretation of the linear features and post-holes as marking an enclosure utilised as an animal pound and for middening. Unfortunately, there are insufficiently preserved soil microfabrics to allow any discussion of possible Neolithic cultivation of this midden site, as has been proposed (for example) at the widely separated sites of Hazleton long barrow and Tofts Ness, Orkney (Dockrill and Simpson 1994, Macphail 1990).

A full report on the soil micromorphology and soil chemistry is held within the project archive.

Pollen
by Frances Green

Twelve pollen samples were taken during the excavation, including a 0.50m long monolith which spanned both the occupation deposits and the underlying brown forest soil. Despite efforts to concentrate the pollen, the frequencies observed were consistently very low and their preservation very poor. The presence of abundant hyphae of soil fungi suggests this was a biologically active horizon and this is likely to account for the poor preservation and resultant low pollen count.

The presence of *Pinus* (pine), *Quercus* (oak) and *Corylus* (hazel), combined with taxa consistent with vegetation that may have developed in disturbed land, suggests an intentional clearing in pine and oak woodland. The complete absence of *Alnus* (alder) from the pollen record is unusual, given that it is nearly always present in pollen assemblages post *c.* 7000 BP and is relatively resistant to corrosion. This absence may reflect the depositional processes that created the occupation layer or may indicate that alder did not grow well in this area, or that it has been missed due to the low pollen frequencies.

Plant macrofossils
by Val Fryer

A cruciform array of environmental samples was taken through occupation layer *1092* to allow any spatial differences in its make-up to be observed along both its east-to-west and north-to-south axes. These samples were taken from each excavated spit within the two transects. Each sample was approximately five litres in volume. All cut features were also sampled, with samples of ten litres being taken. In total 37 samples were examined.

The samples were processed by manual water flotation/washover with the flots collected in a 500 micron mesh sieve. The dried flots were scanned under a binocular microscope at low power and the plant macrofossils and other remains noted. The non-floating residues were collected in a 1mm mesh sieve and hand-sorted to recover artefacts. Only 10% of the smallest worked flint spalls were kept, due to the difficulty of sorting them from the substantial quantities of natural gravel within the residues.

With the exception of charcoal fragments, plant macrofossils were extremely rare and in most cases appeared only as single specimens within a sample assemblage. However, cereal grains/chaff and weed seeds were recorded from 21 samples, notably barley and wheat, with barley being predominant. Preservation was poor to moderate with a high proportion of the grains surviving in a very fragmentary state. Small fragments of hazel nutshell were recovered from six samples. Tiny pieces of coke were noted in almost all of the samples, suggesting a degree of intrusive material derived from later activity on the site. Unfortunately the presence of this intrusive material indicated that the charcoal was of little value for radiocarbon dating.

Discussion

The results of the excavations represent an important addition to current knowledge of the prehistoric sequence from the valleys of the Tas and Yare south and west of Norwich, which emerged as one of the core areas of 20th-century prehistoric study in East Anglia (Clark 1936, Ashwin and Bates 2000). Much fieldwork in Norfolk over the last twenty years or so has investigated large areas in advance of quarrying or road construction, yet despite this extensive coverage evidence for Early Neolithic occupation has remained elusive.

In the Neolithic period the terrain would have appeared relatively uneven, with periglacial hollows and similar topographic blemishes much more prominent than they are in the plough-flattened landscape of today. The excellent preservation of the archaeological sequence at Colney was primarily due to its formation within a periglacial hollow. The dept of this hollow had protected features and deposits from the ploughing that had removed any trace of the brown forest topsoil horizon or evidence of Neolithic occupation which might once have existed elsewhere on the site. Although located at the lowest point in the field under investigation the hollow was not visible on the surface, and thus it is distinctly possible that other such natural features had also been masked by agricultural levelling. Darvill argues that fieldwork should be targeted towards contexts that promote survival (Darvill 1996, 80): this view is supported by the findings from Colney, although recognition of ploughed-out periglacial hollows in the modern agricultural landscape might prove quite difficult without large-scale, open area stripping.

The hollow appears to have been used as a dump for waste material which included a vast quantity of flint-knapping debris. Flint, when freshly struck, can be razor sharp and therefore undesirable in any environment where people are likely to encounter its incisive properties by accident. It is probable that the flint knapping was not taking place *in situ* and that the occupation deposit was the product of regular clearance of refuse from a domestic context. This in turn suggests that further evidence for structures, or occupation, might be found nearby. The excavated evidence does not indicate whether this was the result of prolonged settlement or of relatively brief occupancy, although the number of different vessels present in the ceramic assemblage does hint at a longer timespan. The subsequent construction of a building within the hollow suggests that the site environs may have been a focal point for activity over an extended period.

Some time after the deposition of the occupation material, a rectangular structure appears to have been erected around the periphery of the hollow. This structure was represented by post-holes and by linear features which were probably elongated post-pits or trenches. The linear features forming the long sides may represent beam slots but their depth probably argues against this. It seems more likely that they represented pits or trenches dug to hold one or more posts. Further post-holes within the footprint of the building may have indicated internal partitioning. From the excavated evidence it is difficult to understand the constructional method thoroughly. The current state of knowledge concerning Neolithic structures has been set out in Darvill's summary typology and catalogue of excavated examples (Darvill 1996), although this paper cannot, of course, take into account many interesting examples that have been excavated or published more recently. The structure excavated at the John Innes Centre may fall within Darvill's Type A (rectangular, post-framed), although without an opportunity to record a complete ground plan this remains conjecture.

The upcast from these features, mixed with a large number of flint cobbles, appears to have been used to create a levelled floor surface within the structure. This technique has recently been observed at Bridlington, Humberside, where excavation of a pear-shaped Late Neolithic structure revealed that cobbles had been similarly used to form a floor surface within the building. Incidentally, this building had also been constructed within a natural hollow (Fenton-Thomas in prep).

The soil micromorphology suggests that at some point in this sequence the occupation deposits had been subjected to disturbance and trampling by livestock. It is impossible to tell for certain whether this occurred prior to the construction of the putative building, whilst it was in use or after its abandonment.

Very little can be said about the abandonment of the possible structure. Since the flint evidence suggests that the basal levels of the colluvium/ploughsoil may at one time have represented an occupation layer related to the use of the building, it is likely that ploughing has removed any evidence for a dismantling event. No trace of posts survived within the larger post-pits or trenches, and this may indicate that they had been removed during dismantling. Some of the smaller post-holes did show vestigial traces of post-pipes, which may have indicated that they originally held fire-hardened posts.

Viewed individually, the different archaeological components that made up the Early Neolithic site at the John Innes Centre, Colney, are not unique to Norfolk. Neolithic brown forest soils have previously been studied at Broome Heath, Ditchingham (Wainwright 1972), substantial Neolithic flint assemblages have been excavated at Broome Heath and at Hurst Fen (Clark 1960) and insubstantial structural evidence recorded at Bowthorpe (Percival 2002) and Eaton Heath (Darvill 1996, Wainwright 1973), amongst other sites. Taken together, however, and along with the presence of a midden, the disparate strands of archaeological, artefactual and environmental evidence recorded at Colney combine to create a recorded sequence so far unparalleled within Norfolk, and of wider interest to Neolithic studies.

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