Excavations at Whitehawk Neolithic enclosure, Brighton, East Sussex: 1991–93

by Miles Russell & David Rudling

with contributions by
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Ken Thomas
David Underwood
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Excavations in advance of a housing development on land adjacent to Tilgate Close, Brighton, at the south-western margins of Whitehawk Neolithic enclosure, revealed a 90 m strip of prehistoric tangential ditch, the presence of which had first been detected by Dr Cecil Curwen in 1928. Investigation of this feature has led to the reassessment of the constructional sequence of the Neolithic monument. Further rescue investigation to the north and north-east of the housing development has helped better define the extent of surviving prehistoric remains at the site.

INTRODUCTION

Between March 1991 and July 1993 the Field Archaeology Unit of University College London was involved in four rescue archaeological projects at, or adjacent to, the important Whitehawk Neolithic causewayed enclosure (often referred to as 'Whitehawk Camp'), Brighton, East Sussex (NGR TQ 33050470) (Figs 1 & 2).

The first two of these projects were associated with the construction of a new housing development on land adjacent to Tilgate Close at the south-western margins of the scheduled ancient monument (Fig. 3). Unfortunately, the potential significance of this development site was not recognized during the planning stages of the scheme and thus neither an archaeological evaluation, nor a programme of mitigation measures designed to preserve important archaeological remains either *in situ* or by record (i.e. excavation and/or a watching brief) were arranged. Fortunately, during initial topsoil stripping in late March 1991, Mr Geoffrey Bennett, a planning officer of Brighton Borough Council, observed a linear feature cut into the chalk. Mr Bennett then contacted Dr Andrew Woodcock, the County Archaeologist for East Sussex, who in turn contacted David Rudling of the Field Archaeology Unit, and on behalf of the County Council agreed with him a programme of immediate rescue investigations. These and subsequent on-site works were supervised by Miles Russell. The follow-on excavations were commissioned by Brighton Borough Council.

The two other archaeological projects at Whitehawk were carried out between January and July 1993. Both projects were associated with schemes to enhance an area within ditch circuits 1 and 2 of the scheduled ancient monument (Fig. 2). At this location the monument is crossed by Manor Hill Road (Fig. 3). The work was commissioned by Brighton Borough Council, who as owners of the site were responsible for the enhancement measures. An archaeologist was required to supervise firstly the careful removal of chalk bunding which, erroneously and illegally had been deposited on land on the southern side of Manor Hill in order to prevent unwanted occupation of the site by travellers, and secondly, the insertion of 88 bollards and four gates. These were positioned mainly along the sides of Manor Hill Road, and almost all outside the scheduled area, in order to prevent future unwanted vehicular access. Both projects were supervised by Patrick Murray.

Since completing the fieldwork and initial assessment report stages of the various projects at Whitehawk, both Miles Russell and Patrick Murray have left the Field Archaeology Unit. Responsibility for the final post-excavation stages of these projects was thus undertaken by David Rudling, who had been the Unit's project manager for all four projects. Miles Russell was commissioned to write various parts of this report, notably the descriptions of, and discussions about the fieldwork that occurred under his direction. All the retained finds and the site archives have been deposited at Brighton Museum.

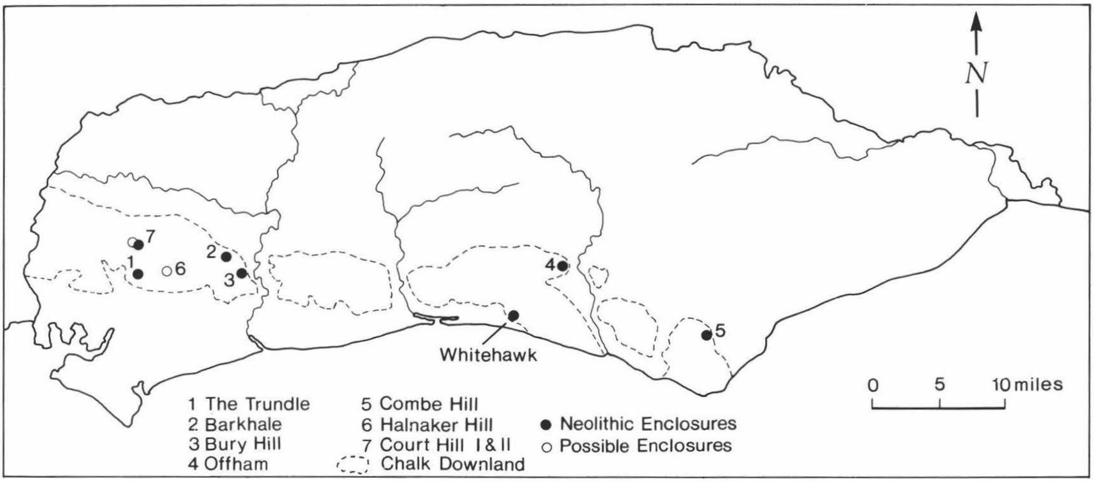

Fig. 1. Whitehawk Neolithic causewayed enclosure. Location plan and sites of other Neolithic enclosures in Sussex.

THE 1991 EXCAVATIONS

Excavation work commenced at Whitehawk following confirmation of the identification by the authors of part of a linear cut feature running across the approximate centre of the proposed development area. As this feature appeared to represent a continuation of the tangential ditch first identified during fieldwork conducted at the site in 1928 (Williamson 1930, 58–9; Curwen 1934, 99), it was considered important to identify, excavate and record as much of it as possible before any further areas of subsoil were removed (*see* below, Areas A and B).

For the rest of the development area it was decided to maintain a watching brief and, after topsoiling, to clean and carefully inspect the line of the southern end of the eastern fork of the development's road scheme (Fig. 3). Whilst most of the areas examined were devoid of archaeological finds, the southern end of the cleaned roadway revealed a concentration of features. This concentration is referred to as Area C. The main excavation of Areas A–C was conducted between the 1st and 26th April 1991.

Unfortunately, most of the land to the north of the exposed tangential ditch had been destroyed prior to archaeologists visiting the site. The full extent of archaeological features within the western margins of the Neolithic enclosure must therefore remain unknown.

AREAS A AND B

Methodology

All remaining vestiges of topsoil overburden were cleared from Area A by a 360° excavator using a ditching bucket 1.65 m wide. Once exposed, the chalk subsoil was cleaned by shovel scraping and the edges of the linear feature defined. All resultant spoil heaps were examined by hand for possible finds overlooked during the initial period of machine clearance.

An attempt was made to record the full length of the linear feature aligned north-west –south-east (Context 18), as first noted in March 1991. Some 69 metres were exposed within the initial area of machine clearance (Fig. 2, Area A), Unfortunately, an 11 m section of the western end of the trench had already been destroyed by the construction of an access road for works traffic. Owing to the constant flow of heavy vehicles at this point, it was felt prudent, for health and safety reasons, to avoid archaeological examination of the feature within a 6 m strip bordering either side of the road. Area B was cleared mechanically to the north-west of the existing access road in an attempt to trace any continuation of the linear feature. A 10.5 m strip of ditch was exposed here; it ended in a rounded terminal, some 12 metres from the western boundary of the development area (Figs 2, 3 & 4).

Excavation work commenced at the south-eastern end of the ditch, within the area earmarked for the construction of a second access road (Fig. 3).

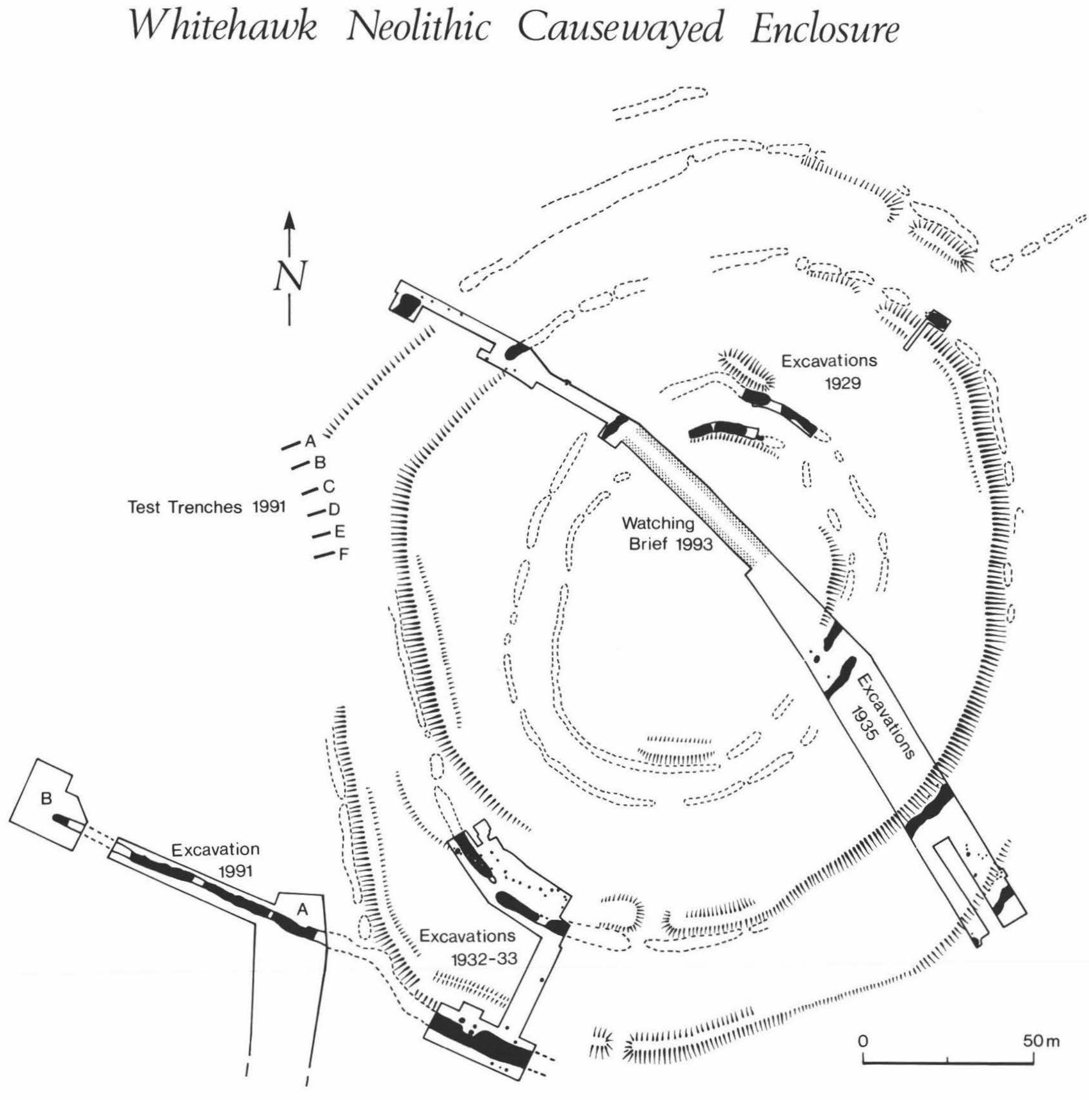

Fig. 2. Whitehawk Neolithic causewayed enclosure. Plan of the earthworks and the locations of all archaeological investigations at the site.

All fills within this part of the ditch were removed by hand and sections drawn at various intervals (Figs 5 & 13). A randomly selected 2 m square area of ditch wall between sections 2 and 3 (Fig. 4) was carefully cleaned with brushes in an attempt to record any constructional tool marks. An environmental column was also taken from section 2 (Fig. 13, *see* below report by Ken Thomas).

In order to speed up the recording works, thus preventing any costly delay in construction, it was decided that the central block of the ditch, between sections 5 and 7, would be emptied down to primary fills with the aid of a JCB excavator using a bucket 1.2 m wide. The mechanical extraction of these layers was carefully monitored and all resultant soils were examined for artefacts. The edges of the ditch were cleaned back with shovels and the surviving primary fills (*c.* 0.3–0.5 m deep) were removed by hand.

With the central area of the ditch recorded, work

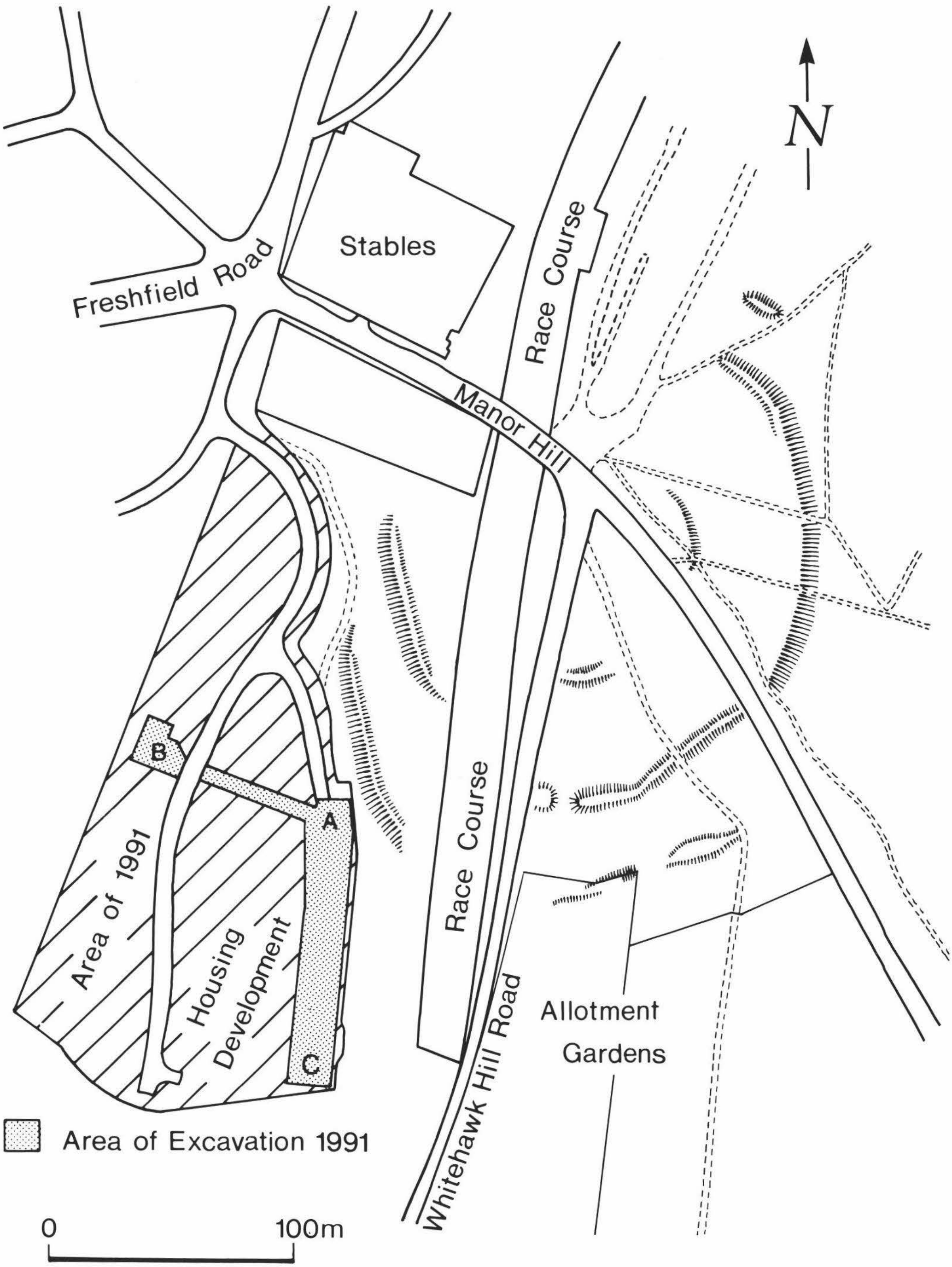

Fig. 3. Whitehawk 1991. Locations of the areas of housing development and archaeological excavations in relation to the Neolithic enclosure.

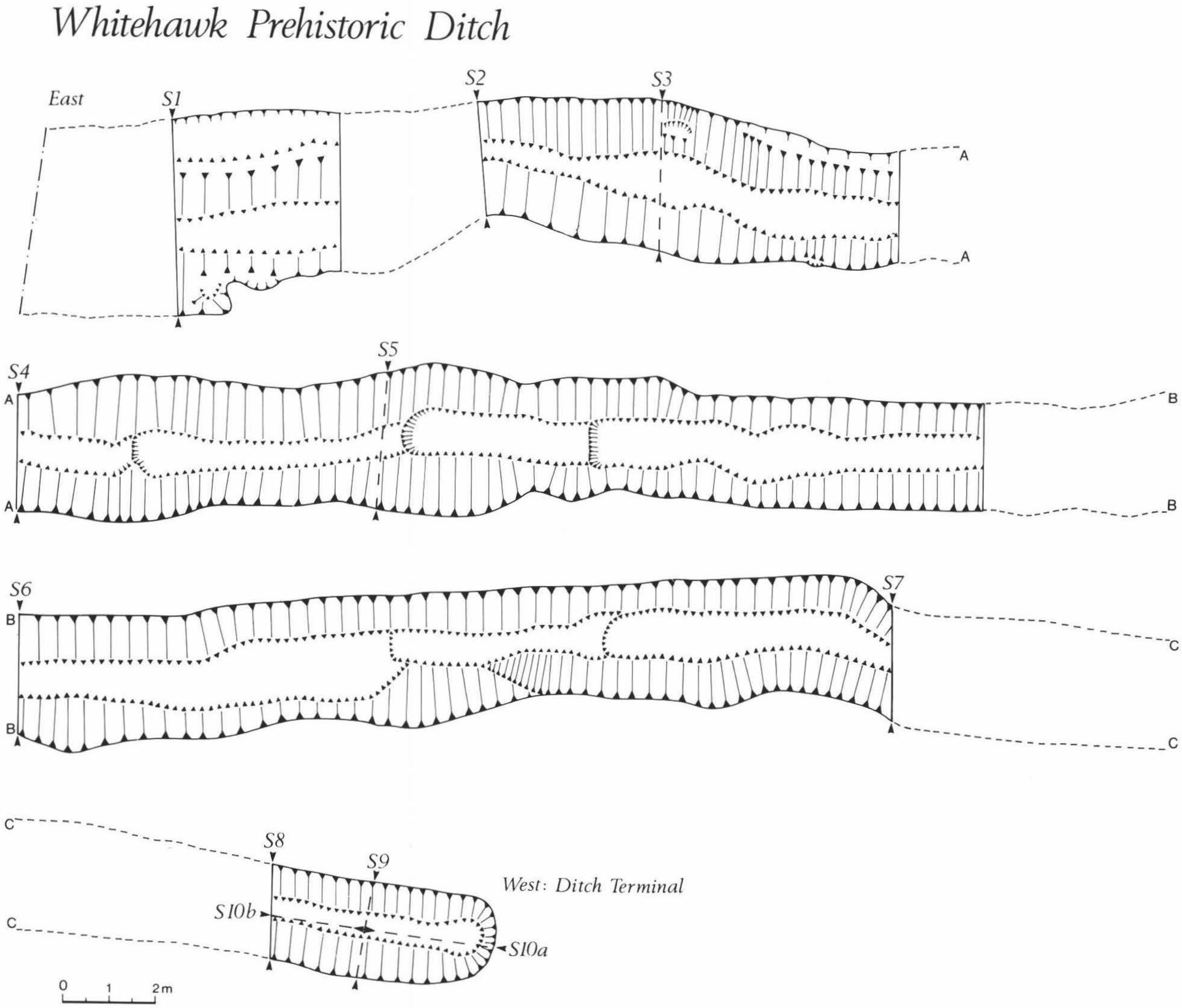

Fig. 4. Whitehawk 1991. Plan of the tangential ditch.

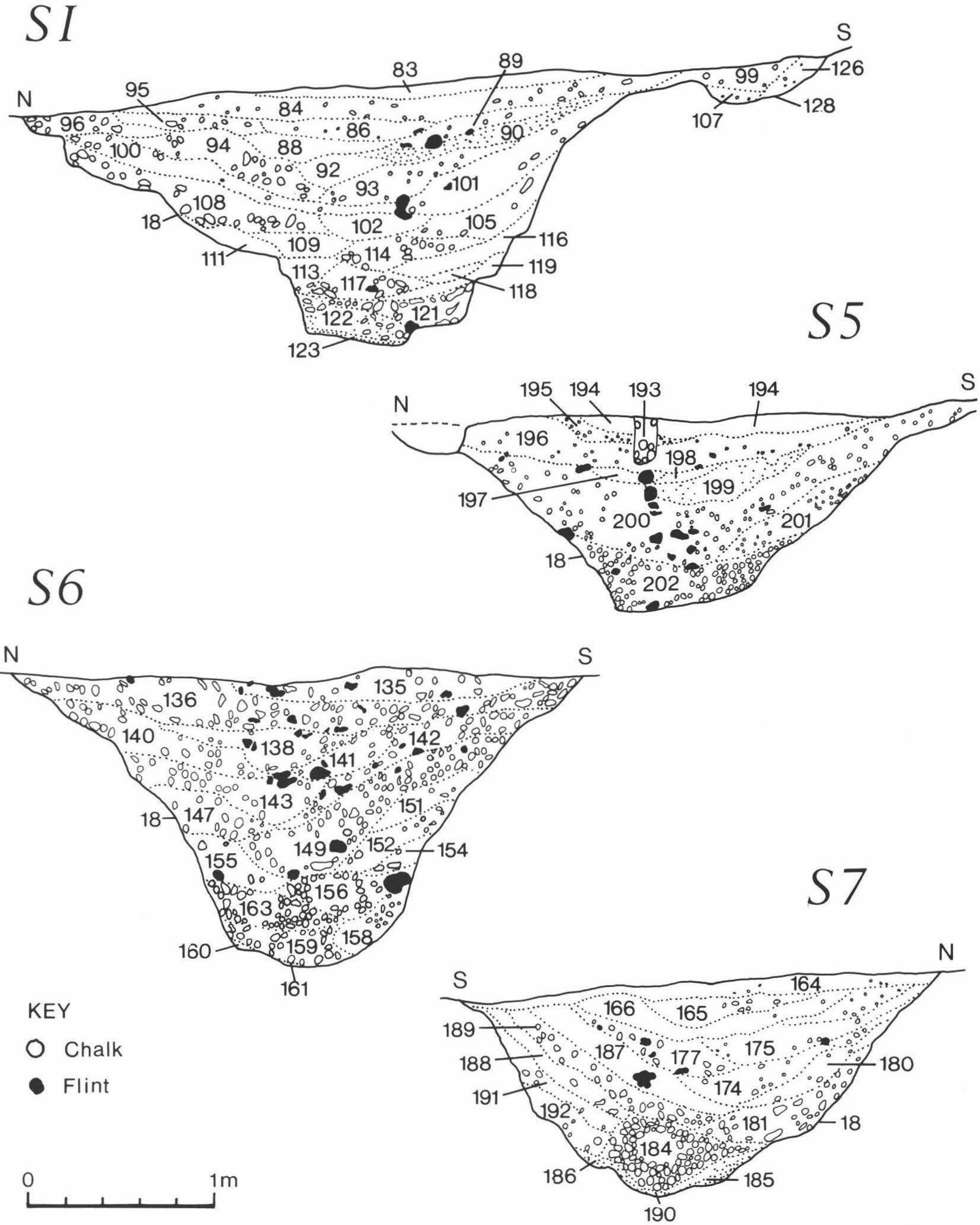

Fig. 5. Whitehawk 1991. Sections across the tangential ditch.

concentrated upon the exposed north-western terminal within Area B. This segment of ditch was quadranted, all fills being removed by hand. Opposing quadrants of fill were removed first (Fig. 6, section 10b; Fig. 7, sections 9 & 10a). Context numbers 212–223 were assigned to deposits within the west and east quadrants and numbers 512–523 to their opposite counterparts within the north and south quadrants.

A 2–5 m strip was cleared on both sides of the ditch exposed within Areas A and B and a 20 × 20 m area was cleared around the north-western terminal. Both exercises were designed to locate any associated features.

Results

Context 18, as exposed within Areas A and B, consisted of an apparently single, linear, irregularly-sided feature. It was traced across the development area for a maximum length (assuming that the feature was originally continuous) of 90.5 m and it ended in a roughly rounded terminal (Fig. 4). No associated features were detected within the immediate vicinity of the ditch or within the general area of the western terminal.

The overall width and depth of the ditch varied considerably and it was clear that the feature had been constructed as a series of interconnected segments. Depth of stratigraphy within the ditch again varied, surviving to a maximum depth of 1.5 m (Fig. 5, section 6) and minimum depth of 1 m (Fig. 5, section 5). The edges of the ditch had, in most areas, been badly weathered, giving the feature a wide U-shaped section. Enough survived of the profile beneath primary silt accumulation, however, to suggest that the original form of the ditch had been that of a fairly steep-sided, roughly flat-bottomed 'V'. Twenty-four circular antler pick marks of conical section, and ranging between 16 and 28 mm in diameter, were recorded from within the 2 m square area of carefully cleaned ditch wall (*see* above).

Four basic units of soil accumulation were identified within the cut (*see also* Thomas, this report). Primary silting was represented by a thin (maximum thickness 40 mm), discontinuous deposit of silty clay (Contexts 17, 123, 160/1 & 190). This presumably represents soil which collected at the base of the cut within weeks of its original excavation (*cf.* Pitt-Rivers 1898, 25; Jewell & Dimbleby 1966, 314–15). No finds were recovered from this primary deposit. The secondary unit of soil accumulation, comprising around 60% of all recorded soil within the ditch, consisted of chalky loam with dense quantities of coarse chalk and flint rubble. These deposits, which were relatively consistent throughout the feature, presumably represent material weathered from the ditch edges. Some 70 unretouched flint flakes (Contexts 16, 102, 521 & 522) were recorded from this secondary deposit.

A series of finer silt loam soils covered the chalk rubble. These soils contained 588 unretouched flint flakes (Contexts 3, 4, 6, 136, 516, 517, 518, 519 & 520), 1 tool (Context 517), six flint cores (Contexts 517 & 519), three fragments of animal bone (Contexts 5, 81 & 518) and one sherd of East Sussex Ware (Context 518). Upper units of soil accumulation contained two fragments of animal bone (Contexts 513 & 527), 73 unretouched flakes (Contexts 2, 80 & 136), one sherd of Early Neolithic pottery (Context 530: residual?) and three fragments of Romano-British pottery (Context 530). A single cylindrical cut (Context 193), measuring 0.11 m in diameter and 0.25 m in depth, had been driven from the modern ground surface through upper soil units Contexts 194, 195, and 196 (Fig. 5, section 5) (*cf.* Curwen 1936, fig. E, iv). No finds were retrieved from the fill of this feature.

No evidence of a bank or rampart was recorded from either side of the ditch (Curwen (1934, 100) states that in 1928 no trace of an earthwork was noted within the area of the tangential ditch), though it must be noted that all major topsoil deposits, including any potential surface features, had been largely removed in the course of preliminary construction work and prior to the archaeological investigation. No obvious patterns of differential weathering, which could be used to postulate the former presence of a soil dump (*cf.* Atkinson 1957; Holden 1972, 89–90), were noted within the chalk bedrock, and no obvious traces of soil 'weighting' were detected within the fill of the ditch.

A second parallel linear cut feature (Context 128), measuring between *c.* 0.7 m in width and 0.2 m in depth, was recorded from the southern margin of Context 18 (Fig. 4; Fig. 5, section 1). The exact relationship and full extent of this 'shoulder' to Context 18 remains unknown, though a study of the observed stratigraphy would appear to indicate that its upper fill (Context 127) had been cut by the larger feature, making it stratigraphically earlier than Context 18. A single sherd of Early Neolithic pottery and four unretouched flakes were recovered from the upper level (Context 132) of Context 128 during initial topsoil clearance.

Interpretation

The linear feature recorded from within Areas A and B at Whitehawk would appear to represent the

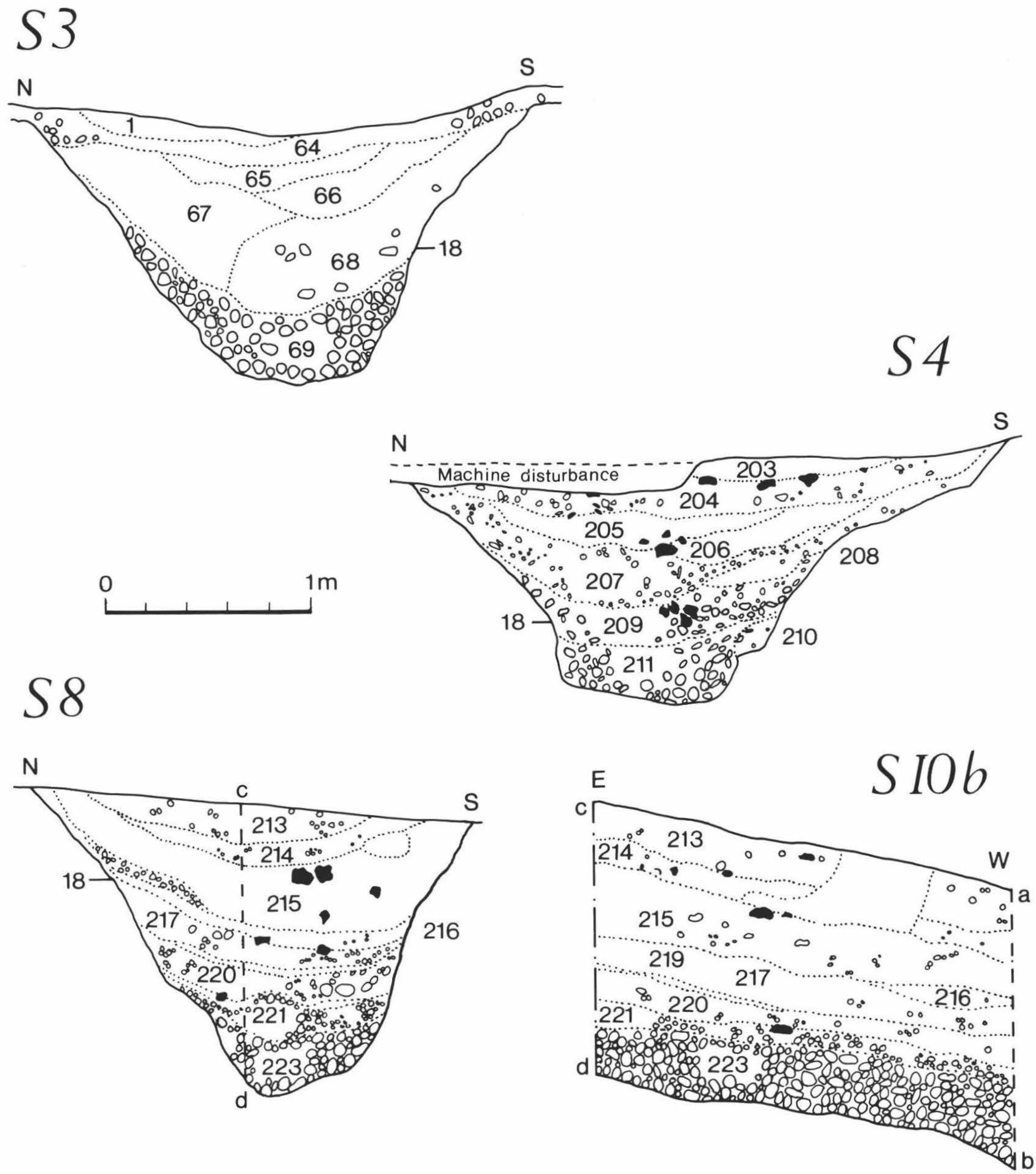

Fig. 6. Whitehawk 1991. Sections across the tangential ditch.

continuation of the 'tangential' ditch first plotted at the extreme south-western margins of the Neolithic enclosure in 1928. The constructional form of the ditch (a continuous, segmented cut) is consistent with the segment of ditch circuit 4, to which it is apparently joined (Curwen 1934, pl. xii and 101–4).

The artefactual assemblage recorded from circuit 4 is also comparable with the material retrieved from Context 18 excavated in 1991 (*see* Hamilton,

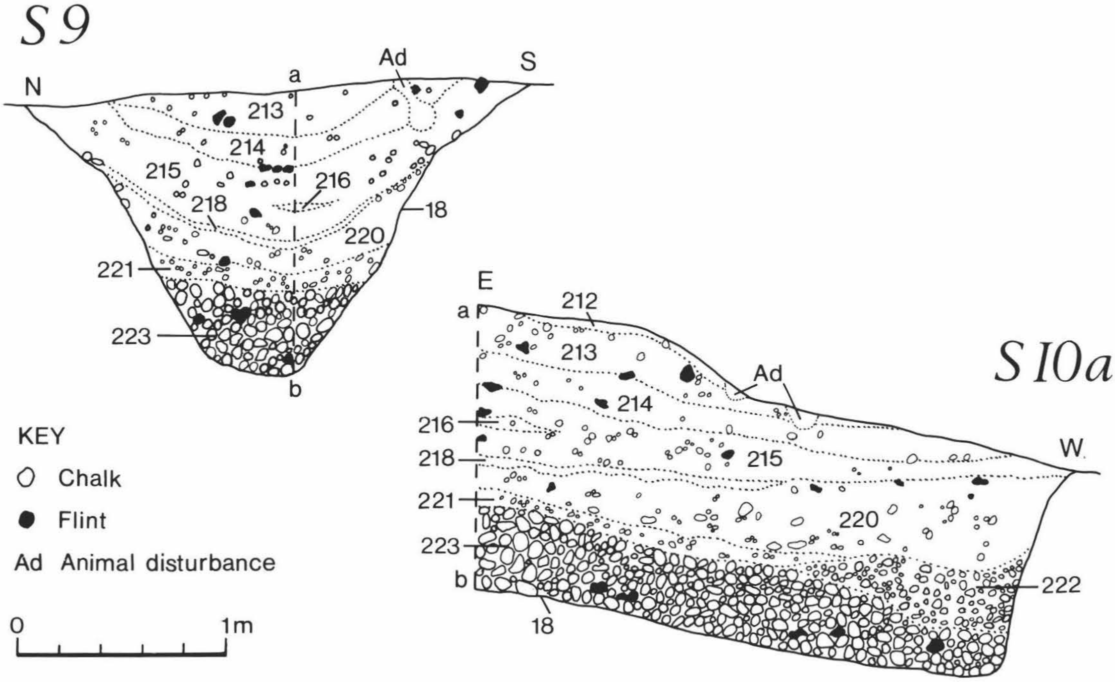

Fig. 7. Whitehawk 1991. Sections across the western terminal of the tangential ditch.

Underwood and Wood, this report), in that it consisted of small quantities of Early Neolithic pottery (10 of the 13 sherds retrieved apparently deriving from an earlier segment of ditch cut: *see* below), limited faunal remains (the celebrated roe-deer skeleton being located in a pit to the north of the feature and not from ditch fill accumulation: Curwen 1934, 102), 11 flint tools and 311 unretouched flint flakes (Curwen 1934, 104).

It is interesting to note that, in having tangential ditches (at the south-western and north-eastern peripheries) Whitehawk is not unique, for the Trundle, another multi-ditched Neolithic enclosure in Sussex, also possessed such a feature in the form of the so-called 'spiral' ditch extending from the south-western margins of the main enclosure circuit (Curwen 1929: *see* below). The full extent and form of the spiral ditch, and its relationship to the inner Neolithic circuit, are unfortunately unknown as the feature has never been tested by excavation.

The tangential ditches from Whitehawk and the 'spiral' ditch from the Trundle may originally have been cut in an attempt to separate significant portions of the surrounding landscape or to better define major points of approach or entrance (*see* below: Discussion). To search for a purely functional or 'rational' explanation for the ditches, in terms of defensive capability (*cf.* Williamson 1930, 57–9) or herd control/movement, is, however, probably misguided, for the structural and artefactual data so far compiled (Williamson 1930; Curwen 1929; 1931b; 1934; 1936; Bedwin 1981a) suggest that Whitehawk and the Trundle, were neither domestic centres nor centrally placed fortified enclosures.

The discovery of Romano-British pottery from the upper levels of the western terminal of Context 18 of 1991 may indicate a period of agricultural intensification within this area after the Roman conquest. Roman plough activity here, on the western slopes of Whitehawk Hill, may help to explain the 'invisibility' of the tangential ditch as a surface feature in more recent times. The full nature of post-Neolithic activity upon Whitehawk Hill is unclear, though Beaker, Bronze Age and Iron Age/Roman finds have been made from time to time (Horsfield 1824, 43; Curwen 1934; 1936; East Sussex County Council SMR TQ 30 SW 11) and it is clear that, prior to the modification of the race course in 1822, a series of round barrows of unknown date existed close to the outer circuits of the Neolithic enclosure (East Sussex County Council SMR TQ 30 SW 11).

AREA C

Methodology

In addition to Areas A and B, a further area (C) was cleared to the immediate south of Context 18, prior to the construction of a second access road. The full extent of Area C, as exposed, measured 21 × 96 m (Fig. 3). All topsoil was again mechanically stripped to the natural chalk bedrock, and then cleaned by shovel scraping. All sub-surface archaeological features found in this way were excavated by hand.

Results

Fifty-five features, ranging in size from 90 mm–2.2 m, and in depth from 14–24 mm, were recorded cutting into the chalk of Area C (see archive for further details). A concentration of such features was discovered at the southern end of Area C (Fig. 8, microfiche). Seven of the defined features appeared to represent root/burrowing disturbance, three represented areas of machine penetration, while a further eight were identified as natural solifluction hollows. No finds of pre-nineteenth-century date were retrieved from the remaining 37 features.

The partial remains of an articulated dog burial were retrieved from Context 10, at the southern end of the trench, and a small group of juvenile dog bones was recorded from Context 37 (Fig. 8, microfiche; *see* Wood, this report). A group of six small, roughly circular cuts (Contexts 54, 55, 56, 57, 59 & 62: Fig. 8, microfiche), averaging 0.4 m in diameter and 0.3 m in depth, was recorded from the extreme southerly end of Area C. The features appeared to define an arc of 7.1 m internal diameter. No datable finds were retrieved from the fills of these features, though a small amount of fire-cracked flint (15 g) was noted from within the upper fill of Context 57. Context 62 had been extensively disturbed, at its north-eastern edge, by the insertion of an iron bar. A series of five circular stake-holes (Fig. 8, microfiche) was recorded to the immediate north-east of Contexts 57 and 59.

Interpretation

None of the features recorded from within Area C could conclusively be shown to be of pre-nineteenth-century date. This is interesting considering that Whitehawk Hill has been the focus of a wide range of comparatively recent activities, not only the digging and maintenance of allotments and market gardens, but also of periodic fairs and horse racing (*cf.* Curwen 1934, 101). All these pursuits will have involved some form of ground disturbance, usually for the construction of temporary/semi-permanent buildings. It is within this category that the series of post- and stake-holes, together with the dog burials, recorded from the southern margins of Area C may, without further dating evidence, be assigned.

THE TRIAL TRENCHES (A–F)

Methodology

During August 1991 Brighton Borough Council asked the Field Archaeology Unit to provide an archaeological assessment of a series of six test trenches cut through an area of disused track to the immediate north-east of the main housing development (Fig. 2) and excluded from the scheduled area at that time. These trenches had been hand cut by the developers in an attempt to define the extent of a nineteenth-century bottle dump which had threatened ground stability within this area.

The trenches had an average length of 3.6 m and were 0.8 m wide (Fig. 9, microfiche). Only one trench (D) had been excavated down to the natural chalk, a depth of 1.1 m from present ground surface. The sections within all six trenches were cleaned by hand and the stratigraphy recorded (Figs 10 & 11, microfiche). No further excavation was conducted within the area of the trenches, though all loose soil was removed to facilitate recording. All trenches were backfilled on completion of the assessment.

Results

Trench B partially disturbed the nineteenth-century rubbish dump (Context 512). Fragments of over 230 bottles were recovered from this deposit, together with pieces of mussel shell, corroded ironwork and two fragments of clay pipe. Trenches C and D exposed a series of chalk loam deposits (trench C, Contexts 502, 503, 504 & 505; trench D, Contexts 508, 509 & 510), dropping westwards. No datable artefacts were recovered from these layers. The stratigraphy within trenches A, E and F consisted of archaeologically sterile topsoil and deposits laid to make up the trackway.

Interpretation

It is possible that the soil 'dump' deposits recorded from trenches C and D represent the remains of a section of slumped earthen bank, with the area of nineteenth-century refuse, noted within trench B, representing 'modern' rubbish deposits within the outer hollow of an enclosing ditch (in much the same way as modern rubbish was, until recently, accumulating within the east-facing ditch hollows of the Neolithic enclosure).

Although the exact location of circuit 4 of the Neolithic enclosure, as originally defined in the 1928 survey, remains unknown within this area owing to the position of the trackway and the former presence of allotments (Williamson 1930, pl. I; Curwen 1934, 99), it is clear that if the line of bank and ditch here was originally parallel to that of circuit 3 (Fig. 2), it would have been bisected at some point by trenches A–E. The possibility therefore exists that the deposits recorded within trenches B, C and D represent the denuded remains of the fourth circuit of the Neolithic enclosure (Fig. 9, microfiche). Lack of datable material from the supposed bank deposits unfortunately precludes a definitive statement at this time.

THE 1993 WATCHING BRIEFS

The two enhancement schemes undertaken in 1993 (*see* above: Introduction) required supervision/observation by an archaeologist. This work was undertaken by Patrick Murray, who produced an assessment report upon completion of the fieldwork (Murray 1993).

METHODOLOGY

The supervision of the removal of the chalk bunding which had been deposited on land to the south of Manor Hill (Figs 2 & 3) was required by English Heritage in order to ensure that no damage occurred to the underlying archaeological features and deposits. The chalk overburden was removed with the use of a mechanical excavator in the first instance (i.e. the upper levels), and then by hand only. The chalk deposits were successfully removed without any disturbance to the scheduled ancient monument.

The watching brief associated with the erection of 88 bollards and 4 gates to prevent vehicular access (*see* above: Introduction) involved observation during the cutting of the holes for the posts. An inspection was made to see if any archaeological features or deposits had been disturbed, and all removed soil was examined for finds. Bollards 1–52 and gate A were positioned on the south side of Manor Hill; bollards 53–82 and gate B were positioned on the north side of Manor Hill and bollards 83–88 and gates C and D were located in Whitehawk Hill. The bollards are *c.* 110 mm in diameter, and the holes cut for them averaged *c.* 600 mm deep.

RESULTS

The watching brief undertaken during the erection of the bollards and gates revealed no archaeological features. In most cases the bollard holes were cut through disturbed or made-up ground containing modern material. Archaeological finds were limited to a number of flint flakes.

THE FINDS

THE WORKED FLINT By David Underwood

A total of 1102 humanly struck flints was recovered from the 1991 excavations (Areas A–C). The raw material is nodular chalk flint with unabraded cortex. Such flint occurs naturally in the chalk into which the Whitehawk enclosure ditches were dug — the material could therefore have been extracted from the upcast. Flaked surfaces are patinated matt white. The composition of the assemblage was as follows: 1087 unretouched flakes; 3 tools (a small convex scraper on a flake, a retouched flake and a severely fire-damaged hammerstone); and 12 cores.

A small sample of 50 flakes was extracted from the fill of the tangential ditch (Contexts 517 & 518) for attribute analysis. The results show a mean breadth:length ratio around 4:5. It is noticeable that flake-striking platforms tend to be large in relation to the overall width and thickness of the flake. There are no soft-hammer struck flakes in the entire assemblage — this was confirmed by an inspection of all flakes, not just the measured sample. Parallel flake edges and prepared striking platforms are rare. Pairs of conjoining flakes were found in Contexts 517 and 524. In each case it was clear that successive flakes had been removed without any intervening preparation of the striking platform. All the cores recovered are flake cores, the majority being irregular multi-platform cores. Deep hinge terminations to flake negatives are noticeable on one example. The two retouched pieces found are basic flake tools and are not chronologically sensitive. They are both formed by non-invasive retouch of hard-hammer flake blanks.

Catalogue of illustrated pieces (Fig. 12)

1. Small convex ('button') scaper on hard-hammer flake. Context 133.
2. Retouched flake; hard-hammer flake with non-invasive retouch on one lateral edge. Context 517.

3–5. Flake cores. Context 517.

6. Polygonal flake core. Context 2.
7. Flake core with single platform. Context 4.

Discussion

The flintwork recovered from the 1991 excavations has more in common with later Bronze Age assemblages (Underwood, in Rudling forthcoming) from Downsview and Mile Oak (two settlement sites excavated in advance of the construction of the A27 Brighton Bypass), than with Neolithic assemblages from the region. At the Offham causewayed enclosure (Drewett

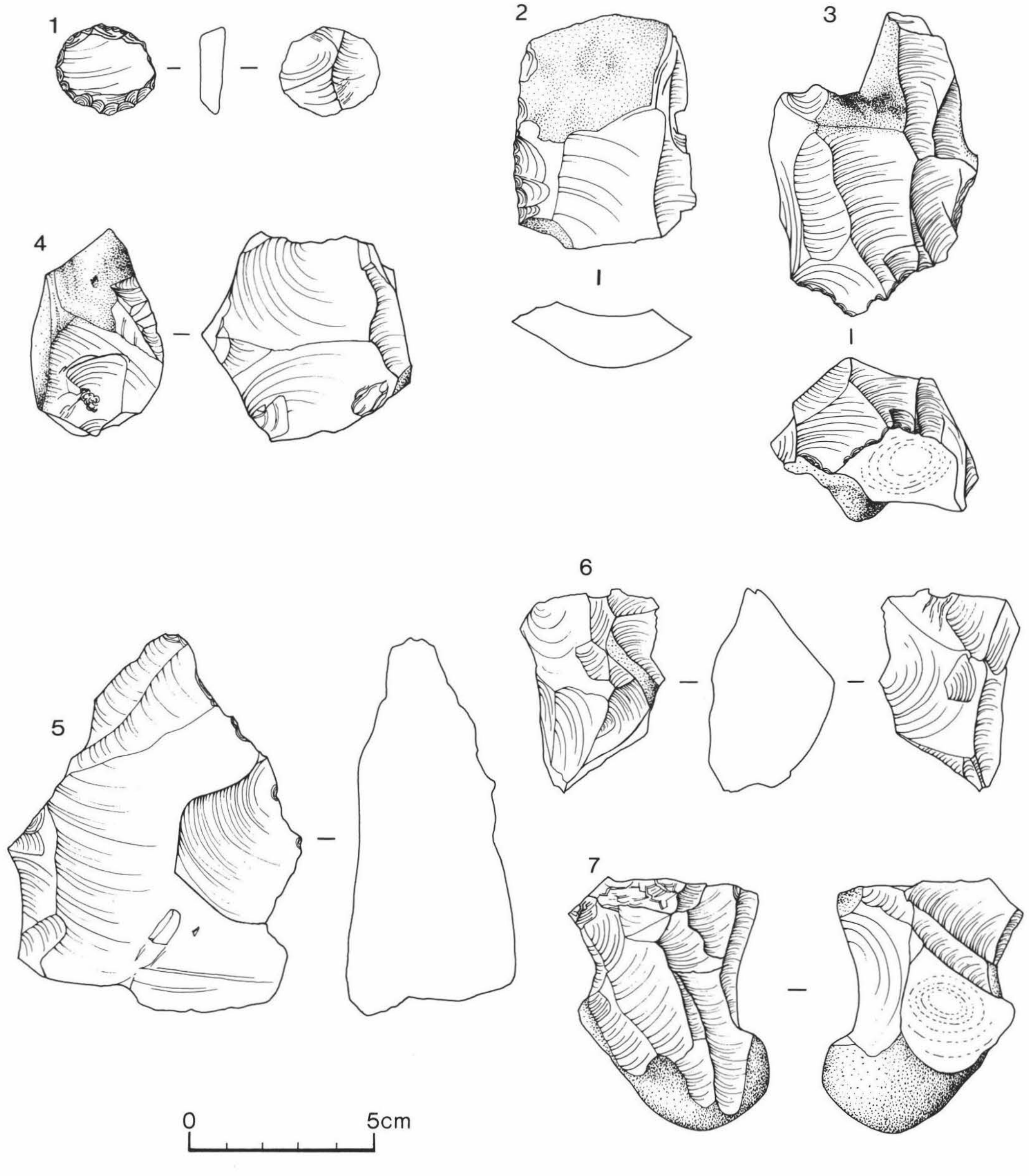

Fig. 12. Whitehawk 1991. Flintwork.

1977) characteristic Neolithic invasively-flaked tool forms were recovered; these are absent at Whitehawk. The complete absence of soft-hammer struck pieces is at odds with the Neolithic domestic assemblage at Bullock Down (Holgate 1988) and is suggestive of a later period (*cf.* Place 1985). The overall lack of standardization and control in flaking, and the tendency towards relatively squat flakes, are consistent with the trends documented by Ford *et al.* (1984) as typical of the Late Bronze Age. With regard to the Neolithic, the apparent crudeness of the flintwork recovered from the tangential ditch at Whitehawk may be explicable in terms of technology: this material represents the waste from the initial roughing-out of flint nodules procured during excavation of the ditch, and finer flintworking took place elsewhere. It must be pointed out, however, that the crude appearance of the few cores discarded in these contexts does not support this idea.

THE POTTERY AND ITS IMPLICATIONS

By Sue Hamilton

A total of sixteen sherds was recovered during the 1991 excavations at Whitehawk. Two of these sherds can be attributed to the important and quite substantial Early Neolithic assemblage already recovered from the site (Williamson 1930; Curwen 1934). The remaining sherds are Romano-British.

The Neolithic sherds are undecorated body sherds and lack evidence of vessel form. These sherds are ascribed to the Early Neolithic on the basis of their fabric characteristics (*see* below). One of them was the only pottery find from Context 132 (a fill of linear cut Context 128) to the immediate south of the tangential ditch. The other Neolithic sherd may have been residual as it was retrieved during initial machine clearance, with five Romano-British East Sussex Ware sherds from the upper soil (Context 530) of the western terminal to the tangential ditch.

It is now clear that the pattern of Neolithic artefact deposition on causewayed enclosures was neither random nor uniform. Concentration of pottery finds in inner ditch circuits and ditch terminals or buff ends is a recurrent theme at certain sites (Robertson-Mackay 1987, table 1, 36, 55). With this in mind the minimal quantity of pottery recovered from the 1991 excavations at Whitehawk is notable. It mirrors Curwen's (1934, 104 & 111) observation of a lack of pottery in the fourth, outer ditch compared with the significant quantities of Early Neolithic pottery recovered from the inner ditches (Williamson 1930). Such patterning may have been controlled by the practicalities of settlement refuse disposal, or by a more abstract ideology of 'refuse' deposition/disposal.

Curwen's excavations recovered Beaker pottery from a pit, and from the outer ditch circuits. This Beaker pottery from the ditch circuits was separated from the Early Neolithic accumulation by a sterile band of silt (Curwen 1934, fig. 4, 112). This pre-Beaker ditch infill would have negated the primary morphological function of the site. It is possible, however, that the site retained some of its original locational or ideological significance during the Beaker period. No Beaker pottery was recovered from the 1991 excavations but the lack of any post-Beaker prehistoric pottery from these excavations may be of significance in relation to a consideration of the Roman sherds (*see* below).

Two Romano-British fabric types were present (*see* below). Romano-British sherds were recovered from upper soil contexts (Context 80: 1 sherd Fabric RB2; Context 131: 7 sherds Fabric RB1; Context 518: 1 sherd Fabric RB2; Context 530: 5 sherds Fabric RB1). Seven of the East Sussex Ware (Fabric RB1) sherds came from a single flat base. The remaining Romano-British sherds were undecorated body sherds. The large time gap between this pottery and the Late Neolithic Beaker finds may suggest that it took until at least the early 1st century AD before there was local population pressure significant enough for this previously 'respected' tract of land to be incorporated into settlement or agricultural use again.

POTTERY FABRICS

Early Neolithic fabrics

Fabric N1: Coarse flint-tempered

This is a buff/red coloured fabric with sherd thickness of approximately 8 mm. The flint inclusions are quite abundantly present and measure up to pebble size (5 mm). The matrix also has a scattering of medium sand grade quartz. This fabric is equivalent to Piggott's Whitehawk Fabric 'a' (Curwen 1934, 114) and compares with the Neolithic Fabric D from Bishopstone (Bell 1977, 18).

Fabric N2: Fineware with some fine flint

This fineware is reduced black/dark brown throughout. It has a small quantity of 'fine', medium sand grade (<0.5 mm) flint tempering and small quantities of medium sand grade quartz inclusions. Sherd thickness is approximately 6 mm. This fabric is the equivalent of Piggott's Whitehawk Fabric 'b' (Curwen 1934, 114) and comparable to Bishopstone Neolithic Fabric C (Bell 1977, 17).

Romano-British fabrics

Fabric RB1: East Sussex Ware

This fabric is extensively described by Green (1980). The variant of this fabric present at Whitehawk includes fossil shell inclusions and the fabric is well-smoothed.

Fabric RB2: Fine 'grey' ware

This is an evenly-fired dark grey ware tempered with abundant fine (<0.25 mm) quartz sand. The sherd thickness is approximately 6 mm.

FAUNAL REMAINS By Wendy Wood

In total 166 fragments of animal bone were recovered from the 1991 excavations. Of these, 138 (83.13%) could be identified according to anatomical part and species. Many of the bones are very fragmentary and considerably eroded, making the identification of pathological conditions difficult.

The majority of the recorded bone assemblage is undated, having been retrieved from modern/disturbed contexts, machine clearance levels and shallow features to the south of the tangential ditch, and thus unfortunately does not provide useful data concerning the prehistoric economy of the site. Most bone finds probably represent the end result of a particular subsistence strategy and have become incorporated into archaeological contexts as food refuse. A fairly diverse species sample has been recovered, including both fish and bird remains, representing refuse disposal of various periods.

In only six cases could faunal remains recovered during the 1991 excavations be securely tied to prehistoric ditch fill deposits: Context 5 (horse metapodial); Context 80 (cow cervical vertebra); Context 81 (horse metapodial); Context 513 (horse metapodial); Context 518 (sheep/goat metacarpal); Context 527 (cow scapula).

A full report on all the bone finds made during the 1991 excavation forms part of the site archive.

A CONTRIBUTION TO THE ENVIRONMENTAL HISTORY OF WHITEHAWK NEOLITHIC ENCLOSURE

By Ken Thomas

(with technical assistance from S. Bloor and S. Mellalieu)

The 1991 rescue excavation of one of the tangential ditches of the causewayed enclosure at Whitehawk, near Brighton, produced a series of soil samples for analysis and environmental interpretation.

The author is grateful to Stan Bloor and Simeon Mellalieu (then undergraduates at the Institute of Archaeology) for undertaking the laboratory extraction of the land molluscs from the samples and for sorting many of the specimens into general species groups.

The samples

The soil samples analyzed here were taken as a column through the complete sequence of sediments exposed in the ditch section (Fig. 13). Samples were taken at 55 mm intervals, except for two at 0.40–0.43 m and 0.43–0.45 m. There was considerable variation in the deposits in the ditch, from the modern thin relatively stone-free soil to the lowest deposits which were dominated by chalk fragments. Each sample was air-dried and then weighed; the weights of the samples processed are given in Table 1. Each sample was processed for the recovery of shells of land snails, following the general procedures given by Evans (1972).

The chalk and flint fragments recovered were fractionated on 4.0 mm, 2.0 mm, 1.0 mm, 0.71 mm and 0.5 mm mesh sieves, and each fraction weighed. All identifiable fragments of land snails, down to 0.5 mm in size, were recovered, identified and counted. Table 1 shows the general results of the particle-size distributions of the samples (only the very coarse and very fine fractions are given here). Unfortunately, the fractions from sample number 2 were lost before they could be weighed.

The data in Table 1 show some interesting trends. The surface soil (sample 1, 0–50 mm) is quite fine, but the samples become coarser with depth down to the base of sample 6 (300 mm), when the sediments become very fine again down to the base of sample 11 (at 500 mm). They remain moderately fine down to sample 15 (650–700 mm), when there starts a progressive and rapid coarsening, with increasing amounts of chalk in the medium to coarse gravel fraction. From sample 18 downwards (0.8–1.6 m) there is a remarkably constant pattern of predominantly coarse chalky material (ranging between 60 and 80 per cent, by weight) with fine soil material in the interstices (ranging between 20–40 per cent by weight). These relatively constant values, coupled with the very low densities of mollusc shells in the samples, suggest that the lower 67% of the fill of the ditch probably accumulated quite quickly, under fairly constant conditions of erosion (i.e. relative constancy both of erosive forces and the nature of the sediment supply).

The overall interpretation of the sedimentary data from the ditch samples is that the ditch filled in quite rapidly, or under fairly constant environmental conditions, for some two-thirds of its depth. This was followed by a slowing down, possibly resulting in a standstill at around 300–450 mm, when a soil might have started to develop. This is shown both by a marked change in the sediments in this part of the ditch, and by a huge increase in the density of snail shells recovered (Table 1). After this there was an acceleration of the process of infill, with coarser deposits entering the ditch and causing it to fill up to its present extent; the modern thin soil is developed in these last deposits.

The land snail assemblages

The density of land snail shells in the samples is shown in Table 1, having been corrected for variation in original sample size. Unfortunately, the specimens recovered from samples 12 and 16 were accidentally mixed, and have therefore been lost to this analysis (although no species were present in the resulting mixed assemblage which were not also found in adjacent samples; the total mixed assemblage contained only 52 specimens from 10 taxa, indicating that the dramatic decline in the numbers and diversity of snails recovered from the majority of the deeper samples must have started around sample 12, i.e. from about 0.5 m downwards in the sequence).

The taxa of land molluscs recovered are listed in Table 2 (a & b), the numbers of specimens recovered from each sample being shown. Many of the shells were in very good condition, although some were badly encrusted with redeposited chalk. Some specimens were, however, severely eroded, probably because they had been incorporated in these deposits as shells which were already residual from much earlier environments. Many of the apices of *Pomatias elegans*, and all of the apices of *Cochlodina laminata* and *Clausilia bidentata*, are probably residual. However, shells of *Pomatias elegans* from samples 32 (1.5–1.55 m), 29 (1.35–1.40 m), 23 (1.05–1.10 m), and 13 (0.55–0.6 m) were in good condition and probably represent individuals living in the ditch, or on its chalky sides.

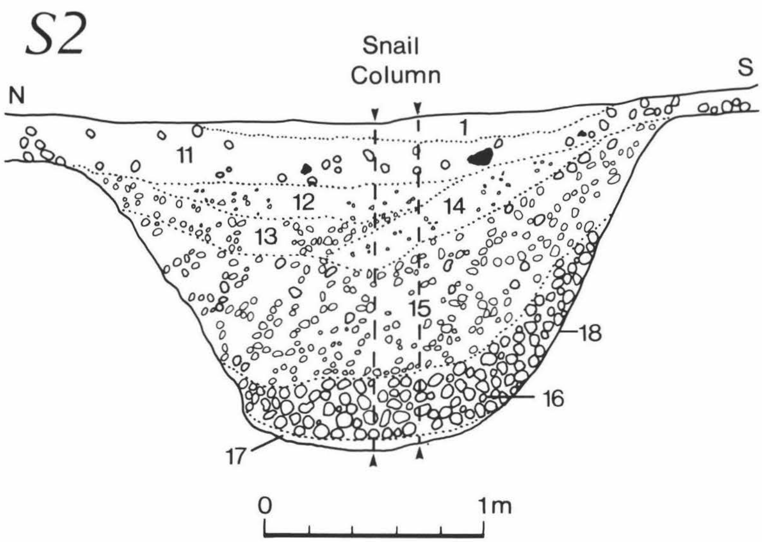

Fig. 13. Whitehawk 1991. Section 2 across the tangential ditch.

The most striking features of the mollusc assemblages are their low taxonomic diversity, with no assemblage having more than 14 taxa (and most having considerably less) and the dramatic change in the abundance of molluscs after sample 11 (from 0.5 m downwards). The small assemblages, not surprisingly, also have low taxonomic diversity. The sudden change in the abundance of snail shells has been interpreted above in terms of the rapidity with which the ditch gained some two-thirds of its fill. This was probably not favourable to snails living in the ditch at various times, and also might have lead to the destruction of the delicate shells of some species.

The variation in abundance of mollusc shells through the top 0.5 m of the sequence (Table 1) probably relates to their incorporation in more slowly accumulating deposits, and in slowly developing soils. It has already been suggested that a soil might have developed in the deposits spanning samples 7 to 11. There is a significant increase in the abundance of snail shells in these samples which might support this hypothesis. Detailed interpretation of these assemblages is difficult because if they are, indeed, associated with two soil-forming episodes (one at around 0.3 m and the other at the present-day surface), then bioturbation in those soils would inevitably have caused some degree of mixing (Carter 1990). However, the general ecological implications of the assemblages are fairly clear.

Table 1. Particle size composition of the Whitehawk mollusc samples and shell densities.

Sample number	Total weight	%> 4 mm	%< 0.5 mm	No. of shells kg^{-1}
1	1077	12.4	84.8	246
2	1695	*	*	275
3	1621	37.8	54.8	583
4	1709	40.3	49.7	382
5	1097	37.1	50.7	374
6	1013	30.0	54.7	441
7	1246	11.0	79.0	661
8	977	6.5	77.2	767
9	546	9.4	75.8	850
10	426	9.6	71.1	636
11	1348	16.0	82.6	284
12	1369	18.4	52.2	#
13	1110	17.9	50.2	19
14	974	18.7	51.9	16
15	927	21.6	51.7	19
16	1460	37.6	40.3	#
17	1491	54.7	29.9	6
18	1074	65.5	27.6	6
19	1495	67.4	28.0	10
20	1355	67.3	28.4	37
21	1450	72.3	24.7	12
22	1150	74.1	24.5	4
23	1720	70.0	27.1	22
24	1558	72.4	25.0	19
25	829	78.2	21.0	1
26	778	77.5	21.9	1
27	1040	75.6	23.4	5
28	1337	76.6	22.4	1
29	944	73.3	25.3	1
30	1029	77.0	22.0	0
31	1252	73.2	23.9	2
32	1675	66.1	27.7	8
33	791	56.3	33.9	6

* Fractions lost before weighing.
\# Shells extracted from samples 12 and 16 accidentally mixed (see text for comments).

Ecological interpretation of the assemblages of snails

Despite the presence of some shade-loving species, the assemblages shown in Table 2 (a & b) are dominated by open-country species, especially those of short-turfed grassland. Even the very impoverished samples (from sample 13 down) have a consistent representation of open-ground, mainly grassland, taxa, including *Pupilla muscorum*, *Vallonia species*, and *Helicella itala*.

As noted above, some of the shade lovers are probably residual shells from some earlier woodland episode, which is not clearly attested from the data presented here (but *see* the discussion below). Some of the well-preserved shells of shade-loving species such as *Carychium tridentatum* and *Aegopinella pura* must have come from snails living near, or in the ditch. However, such species are not obligate woodland forms, and have been recorded in long grass and other locally shaded microhabitats (Cameron & Morgan-Huws 1975). *Discus*, *Oxychilus* and *Vitrea*, as well as *Trichia striolata*, all found here, have been recorded by Evans and Jones (1973) as being frequent in some rock-rubble habitats (although on limestone bedrocks, rather than the Chalk). In short, none of the relatively infrequent shade-loving species encountered in these assemblages are necessarily indicative of woodland or even scrub environments; all could have survived in the sheltered microhabitat of the ditch, especially if it was, at times, well-vegetated with tussocky grasses and other plants.

The traditional method of analyzing assemblages of land snails is to assign each species to an 'ecological group' (*see* Thomas 1985 for a discussion), and to make an interpretation based on the most prevalent ecological group, or groups. Recently, Evans (1991) has attempted to loosen this esentially uniformitarian link between ancient snails and their modern counterparts by identifying recurring associations ('taxocenes') of species in ancient autochthonous assemblages, and using these to interpret past ecological conditions. Table 3 shows the frequencies of Evans' 'dry-ground taxocene' represented in the Whitehawk assemblages. This taxocene is characterized by *Pupilla*, *Vertigo*, *Vallonia* and *Helicella*, along with four 'subsidiary taxa': *Pomatias*, *Cochlicopa*, *Limacidae* and *Trichia hispida* (Evans 1991, 80–81). [Note: in this Table I have put together the assemblages from some very small samples, and I have included all *Pomatias* (even though some are probably residual). Even if this procedure is invalid, the numbers involved are so small as to make very little difference overall.] It is clear from both Table 2 (a & b) and Table 3 that the assemblages of snails from the ditch overwhelmingly indicate dry open-ground conditions throughout. It is probable that the ditch was dug in an open, essentially grassland environment, and that such habitats persisted throughout the unknown period over which the ditch filled in.

Discussion

This section falls into two parts. Firstly, there is a consideration of these results in relation to earlier work on molluscs from this site. Secondly, the results are compared with those from other causewayed enclosures in Sussex.

Table 2(a). Absolute frequencies of land molluscs from Whitehawk.

Sample No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**13**	**14**	**15**
Depth (cm)	**0–5**	**5–10**	**10–15**	**15–20**	**20–25**	**25–30**	**30–35**	**35–40**	**40–43**	**43–45**	**45–50**	**55–60**	**60–65**	**65–70**
Pomatias elegans (Müller)	2	11	6	9	5	6	2	1	–	–	3	4	5	6
Carychium tridentatum (Risso)	–	–	–	–	–	–	–	–	–	–	1			
Cochlicopa lubrica (Müller)		1	5	2	4	5	20	5	1	4	–	–	–	
Cochlicopa lubricella (Porro)	1		2	6	3	2	10	7	3	3	–	–	–	–
Cochlicopa sp.	1	3	5	16	9	11	33	12	16	7	14		–	1
Vertigo pygmaea (Draparnaud)	5	14	11	4	7	10	24	28	20	7	14	–	–	–
Pupilla muscorum (Linn.)	177	332	471	357	228	230	357	363	208	118	177	10	5	6
Vallonia costata (Müller)		6	8	14	25	44	51	102	43	25	44	1	–	2
Vallonia excentrica (Sterki)	11	24	54	54	47	44	131	54	53	42	38	1	–	–
Vallonia sp.	–	9	–	–	–	6	23	3	14	10	22	–	1	–
Punctum pygmaeum (Draparnaud)	–	1	–	1	–	1	12	5	7	2	11	1	–	–
Discus rotundatus (Müller)	–	–	1	–	1	–	–	–	–	–	–	–	–	–
Arionidae	–	–	–	–	–	–	–	–	–	–	+	–	+	–
Vitrina pellucida (Müller)	–	–	–	–	–	–	2	11	2	–	1	–	–	1
Nesovitrea hammonis (Ström)	–	4	4	–	–	1	–	1	–	1	–	1	–	
Aegopinella pura (Alder)	1	–	–	–	–		5	–	4	–	–	–	–	–
Aegopinella sp.	–	–	–	–	–	–	–	–	–	1	1	–	–	
Oxychilus sp.	–	–	–	–	–	–	–		–	–	–	–	–	
Limacidae	–	–	–	–	–	–	–		–	–	3	–	–	
Cecilioides acicula (Müller)	2	3	1	8	3	6	1	–	–	–	–	–	–	1
Cochlodina laminata (Montagu)	–	–	–	–	1	–	–	–	–	–	–	–		
Clausilia bidentata (Ström)	–	–	1	–	–	1	–	–	–	–	–	–	–	–
Candidula intersecta (Poiret)	23	–	2	–	–	–	–	–	–	–	–	–	–	–
Helicella itala (Linn.)	14	27	81	37	16	9	34	13	19	6	10	–	1	–
Trichia hispida (Linn.)	15	17	254	132	61	76	130	125	69	46	41	–	3	1
Trichia striolata (Pfeiffer)	15	17	44	18	5	1	5	5	–	4	2	–	–	–
Cepaea hortensis (Müller)	–	1	–	–	–	–	–	–	–	–	–	–	–	–
Cepaea sp.	–	–	+	–	–	–	–		–	–	–	–	–	
Cepaea/Arianta	–	–	1		1	–		–	–	–	–	–	–	
Totals*	**265**	**466**	**945**			**447**	**749**	**464**	**271**	**383**	**21**	**16**	**18**	
No. of Taxa*	10	12	14	11	12		14	12	12	10	14	7	6	7

* Excluding *C. acicula*

Table 2(b). Absolute frequencies of land molluscs from Whitehawk.

Sample No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Depth (cm)	**75–80**	**80–85**	**85–90**	**90–95**	**95–100**	**100–105**	**105–10**	**110–15**	**115–20**	**120–25**	**125–30**	**130–35**	**135–40**	**140–45**	**145–50**	**150–55**	**155–60**
P. elegans	2	1	2	6	1	–	11	3	–	1	–	–	1	+	4	–	
C. tridentatum	–	–	3	1	1	2	–	–	–	–	–	–	–	–	4	–	
C. lubrica	–	–	–	1	–	–	–		–	–	–	–	–	–	–	–	–
Cochlicopa sp.	–	–	–	–	–	–	1		–	–	–	–	–	–	–	–	
P. muscorum	5	2	9	25	9	2	15	12	1	–	3		–	–	2	1	1
V. costata	1	–	1	6	2	–	2	3	–	–	–	–	–	–	–	–	1
V. excentrica	–	–	–	–	–	–	1	3	–	–	–	–	–	–	–	–	1
P. pygmaeum	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D. rotundatus	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–
Arionidae		–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	
V. pellucida	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N. hammonis	–	3	–	1	–	1	–	–	–	–	–	–	–	–	–	–	
A. pura	–	–	–	–	–	–	–		–	–	–	–	–	–	1	–	–
Oxychilus sp.		–	–	–	–	–	1		–	–	–	–	–	–	–	–	
C. acicula	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
C. laminata	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	
C. bidentata	–	–	–	–	3	1	–	–	–	–	–	–	–	–	–	1	–
H. itala	1	–	–	3	–	–	1	–	–	–	1	–	–	–	–	–	–
T. hispida	–	–	1	5	1	–	4	6	–	–	–	1	–	–	–	–	1
T. striolata	–	–	–	–	–	–	–	–		–	–	–	–	–	–	2	–
Cepaea sp.	–	–	+	–	–	–	–	–	–	–	–	–	+	–	–	–	–
Cepaea/Arianta	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	-
Totals*	**9**	**6**	**15**	**50**	**18**	**5**	**37**	**29**	**1**	**1**	**5**	**1**	**1**	**0**	**3**	**13**	**5**
No. of Taxa*	4	3	7	8	7	7	8	7	1	1	3	1	2	0	4	5	5

* Excluding *C. acicula*

Table 3. Whitehawk molluscs: percentage frequencies of open-country species (based on the dry-ground taxocenes of Evans (1991): see text for explanation).

Sample No.	% open-country spp.	Sample No.	% open-country spp.
1	93.9	2	95.1
3	94.7	4	97.1
5	98.3	6	98.9
7	97.1	8	97.2
9	97.0	10	97.8
11	95.8	13	76.2
14	93.7	15	88.8
17–19	83.3	20	92.0
21–22	65.2	23	91.9
24	96.6	25–33	63.3

Table 4. Whitehawk molluscs: taxa* reported by Kennard and Woodward (1930) and Kennard (1934; 1936) which were not found in the present study.

Acicula fusca (Montagu):
'1 example' (1930); none (1934); 'very rare' (1936)
Vallonia pulchella (Müller):
'2 examples' (1930); none (1934 & 1936)
Acanthinula aculeata (Müller):
'3 examples' (1930); 'rare' (1934); 'very rare' (1936)
Vitrea crystallina (Müller):
'common' (1930); 'rare' (1934); none (1936)
Arianta arbustorum (Linn.):
'common' (1930); 'common' (1934); 'rare' (1936)
Helicigona lapicida (Linn.):
'1 example' (1930); none (1934 & 1936)

* Note: The molluscan nomenclature used by Kennard and Woodward has been updated to accord with modern taxonomic usage.

Kennard and Woodward (1930) and Kennard (1934; 1936) reported on the molluscs recovered during earlier excavations at Whitehawk by R. P. R. Williamson and E. C. Curwen. The samples studied by Kennard and Woodward were of both hand-picked shells and shells extracted from samples of soil, although the sizes of the soil samples and the methods of extraction are not given. They did not attempt to analyze their samples stratigraphically, although Kennard (1934, 130) confidently asserts that 'these shells are of the same age as the occupation of the Camp'. The shells were collected from various horizons in the fills of the inner ditches of the enclosure, and many were selected because of their large size (e.g. *Arianta arbustorum* and the *Cepaea* species). Smaller and very delicate species were, however, recovered from the soil samples, including *Acicula fusca*, which is often taken to be a good indicator of woodland. Many of the species found by Kennard and Woodward were also found in the present study, but some were not (*see* Table 4). The species listed in Table 4 are essentially those on which Kennard bases his environmental interpretations. In general, he suggested that his assemblages (or 'faunules', as he calls them) indicate that:

> ecological conditions were very different from those of the present day . . . rainfall must have been much heavier and the water table of the chalk much higher . . . [the] faunule is that of damp woodland or scrub, and these conditions must have existed on the Downs when the Camp was occupied (Kennard 1934, 130).

It is clear from Table 4 that the species on which the above interpretation largely rests were generally quite rare, and many occur in only a few of the samples from certain seasons of excavation. However, such data should not be lightly dismissed, either because they are not fully quantified, or have not been assigned to exact stratigraphic horizons. I have noted above that some shells of shade-loving species in the assemblages reported here were very worn, and that they are probably residual from earlier (possibly wooded) environments. Some of the shade-loving species reported by Kennard and Woodward are also probable relicts of that woodland. Indeed, it is possible that the inner ditches of the enclosure were dug first, soon after the woodland had been cleared, and that the outer tangential ditch (whose molluscs are reported here) was dug later, when the local mollusc community had adapted to the by then well-established open conditions. It is interesting to note here that the mollusc data from Offham (Thomas 1977) suggested that the inner ditch of that enclosure had been dug before the outer one.

Many of the causewayed enclosures in Sussex appear to have been constructed in what were recently-cleared areas of woodland (Thomas 1982). Some, such as the north-facing scarp-slope enclosures of Barkhale, Bury Hill, Offham and Combe Hill, appear to have been built in localized woodland clearings, which in most cases seem to have been temporary. The Trundle, and now Whitehawk, both appear to have been constructed in areas which had been recently, but extensively, cleared of woodland. These are both large south-facing enclosures with more evidence of occupation, or intense use, than the smaller ones mentioned above. The environment around the Whitehawk enclosure appears to have always remained open, but that around the Trundle became more shaded, possibly with the development of secondary woodland, before later (Iron Age?) clearance.

DISCUSSION

By Miles Russell

The artefactual data recorded from the tangential ditch excavated in 1991 is consistent with that recorded from enclosure circuit 4 (to which it is apparently joined: Fig. 2). It is, however, at odds with the material assemblage retrieved from excavations upon the inner circuits of the Whitehawk enclosure (ditches 1–3: Williamson 1930, 63–82; Curwen 1934, 107–12; 1936), as no human remains (articulated or disarticulated) or secondary Beaker sherds were recovered from either the circuit 4 ditch or the tangential ditch, and the quantity and range of Early Neolithic pottery, flint work and faunal remains were limited. This appears to mirror evidence retrieved from other Early Neolithic sites in Britain (notably Orsett: Hedges & Buckley 1978, 248; Abingdon: Avery 1982; Hambledon Hill: Mercer 1988; and Briar Hill: Bamford 1985, 60) where, especially in relation to human remains, changes in the quantity and range of artefactual data recovered from the various ditches of multi-circuited enclosures, have been taken to imply that there may have originally been discrete functional differences between inner and outer circuits (Bradley & Holgate 1984, 116; Evans 1988, 90).

It is possible that, at Whitehawk, the perceived distinction in recorded artefactual data from the inner to outer enclosures (circuits 1–3 and 4/the tangential ditch respectively) may be due in part to differential patterns of refuse/ritual artefact disposal. This, of course, depends on the assumption that the Whitehawk enclosure represents the remains of a single, 'monumental' phase of building activity. The dangers inherent in ignoring sequence within prehistoric constructs, however, especially with regard to reuse and redefinition, have already been noted (Bradley & Holgate 1984; Evans 1988; Thomas 1991; Russell 1995) and it is becoming increasingly clear that the final perceived form of most prehistoric monuments is the product of successive constructional activity (e.g. Dixon 1988; Evans 1988; Mercer 1988) and not deliberate 'preplanning'.

Thomas (this report) has suggested that the molluscan remains recorded from Whitehawk may indicate that the tangential ditch was constructed at some point after the construction of the inner circuits, when tree cover had been more thoroughly depleted. This appears to parallel data from the 1976 excavations at Offham where molluscan samples retrieved from the Neolithic enclosure suggested that a significant time had elapsed between the cutting of the inner and outer circuits (Thomas 1977, 238–9). The Whitehawk data, when combined with the recorded artefactual assemblages, may further indicate that the south-western tangential ditch and the southern portion of ditch circuit 4, are, in their final forms at least, constructionally 'out of phase' with the inner circuits.

The suggestion that the form of Early Neolithic multi-ditched enclosures was not 'given' but may represent any number of distinct constructional phases is not new, and has already been expounded at length, especially with regard to the site at Briar Hill, Northamptonshire. Here the published plan of a Neolithic 'causewayed' enclosure (Bamford 1985) was queried by Evans who suggested an alternative model whereby a defined inner enclosure may be viewed as a distinct entity, independent from the outer (later) double circuits (Evans 1988, 86–8). Although cautioning against the automatic assumption that the development of multi-ditched Neolithic enclosures would naturally have progressed outwards (as a series of 'ripples'), Evans has noted that it is also possible to suggest sequential 'phasing' from inner (earlier) to outer (later) circuits at a number of other Neolithic enclosures, namely Orsett and Windmill Hill (Evans 1988, 90).

At Whitehawk it is apparent from the feature plan, produced by Curwen in 1928 (Williamson 1930, 58), that, as with Briar Hill, Windmill Hill and Orsett, the inner circuit (in this case the innermost double circuit: Fig. 2) possesses an integrity not shared by any of the outer ditches. Indeed the third and fourth circuits at Whitehawk, though aligned independently from the inner ditches, appear to possess a mutual cohesion suggesting that here too it may be possible to distinguish at least two significant phases of construction/redefinition (Fig. 14, Phases 1 & 2).

An additional phase of enclosure definition at Whitehawk may further be postulated by the presence of the tangential ditch as excavated 1991. The ditch, as originally recorded from the 1928 percussion survey, appears to be directly joined to the ditch of the fourth circuit at the south-western margins of the main enclosure. The important point to note here is that both the tangential ditch and the southern portion of the fourth circuit are continuous in design, whereas the line of the fourth circuit to the north of the join with the tangential ditch is markedly causewayed.

A close examination of the original excavation report (Curwen 1934, 101–4) may help to explain this anomaly for it suggests that the fourth circuit of ditch, at its southern margin, was at some point recut, from a possible early causewayed design, to a more continuous, segmented, arrangement (*cf.* Darvill 1988, 4), with traces of the former alignment being detectable within Cuttings CV and CIV (Curwen 1934, pl. xiii), the new cut avoiding (intentionally or not) the earlier burial of an articulated roe-deer (Curwen 1934, 102, pl. xiii, fig. 1, iv). Circuit redefinition can, it should also be noted, be detected within the southern excavated segment of ditch 3 to the north (Curwen 1934, pl. xiv, 107), though here the causewayed design appears to have been maintained (*cf.* Mercer 1988, 96; Dixon 1988, 81).

The observation that circuits 3 and 4 of the main enclosure consist of at least two distinct phases, with circuit 4 apparently being recut to a more continuous pattern, would appear to indicate that Curwen's tangential ditch, in its present form, was contemporary with the redefining of the Phase 2 enclosure. This recutting has been identified in Figure 14 as 'Phase 3'. This period of redefinition may offer an explanation for the cut feature (Context 128) found in 1991 running parallel to the south-eastern margins of the tangential ditch. This feature may, in this interpretation, be viewed as representing the partial remains of an earlier causewayed tangential ditch, similar perhaps to the example recorded at the north-eastern fringes of the Neolithic enclosure (Fig. 2).

If this alternative sequential model for the development of Whitehawk is accepted, and it must be noted that the Carbon 14 chronology for the site is sadly inadequate with only two dates, 2750±130 BC (I-11846) and 2695±95 BC (I-11847), being so far recorded from two sections of primary silt within the third and fourth ditch circuits respectively (Drewett *et al.* 1988, 35), it would suggest that the site, in its primary phase, consisted of a double-ditched, rounded D-shaped enclosure (the flattened side facing north-west) with a north-east–south-west elongation. The total area enclosed by this proposed earthwork would have been around 0.76 hectares, making the primary phase site easily comparable in size (Evans 1988, 90) with the internal circuits of Neolithic enclosures at Windmill Hill (0.5 hectares: Smith 1965), Briar Hill (0.71 hectares: Bamford 1985) and Orsett (0.79 hectares: Hedges & Buckley 1978).

Once the postulated secondary phases of enclosure circuit (3–4) have been removed from Whitehawk, it is possible, from the recorded ditch configurations, to suggest the presence of at least two original points of entrance within the primary circuit (1–2): the western centre and the extreme north-eastern corner (Fig. 14, Phase 3). These are the only two areas within the inner enclosure circuit where gaps/causeways across the double ditch correspond (banks are unfortunately absent here) and where the ditch segments, at either side of this causeway, curve appreciably inwards (*cf.* Darvill 1988, 5; Evans 1988, 90–91, fig. 8.2). Of the two suggested entrances, that set within the western circuit would appear the more credible as it is positioned at the approximate centre of the longest, 'flattened' side of the enclosure circuit, although it must be noted that the second postulated point of entrance is aligned towards, and in the same general direction as the north-eastern tangential ditch (Fig. 14; Williamson 1930, pl. I).

Aside from Whitehawk, it is also possible to infer a sequential development for the Early Neolithic enclosures at Offham Hill and the Trundle (*see* Fig. 1 for locations of other Sussex Neolithic enclosures). At Offham, as already noted, the molluscan data suggested that a significant time had elapsed between the cutting of the inner and outer circuits (Thomas 1977, 234–9). The plan of the earthworks (Drewett 1977, 203) furthermore clearly shows that the two surviving areas of enclosure circuit follow divergent paths (the inner ditch being noticeably 'D-shaped', with the longer, flattened circuit facing north-west). It is possible that the original point of entrance for this suggested primary phase earthwork at Offham was set at some point along the north-west facing, flattened side.

The plan of the Trundle, compiled in the 1920s from an extensive percussion survey (Curwen 1929, pl. II) would appear to indicate that the inner ditch circuits, where they could be traced, possess a mutual cohesion distinct from that of the third ('spiral') and fourth ('outer') circuits. The 'spiral' ditch, as already noted, may represent either a later act of enclosure, partially recutting/realigning/extending from, the primary phase 'second ditch', or a form of tangential construct similar to the examples recorded from Whitehawk.

The two recorded Carbon 14 dates from Offham, 3710 BC and 3650–3540 BC, were both derived from material within the primary silts of the outer ditch (Drewett *et al.* 1988, 35). This would appear to indicate that the proposed secondary phase of enclosure here was constructed after the primary phase of the Trundle, but before Bury Hill, Combe Hill and the proposed secondary circuit at Whitehawk (Drewett *et al.* 1988, 35). At the Trundle, samples for Carbon 14 dating suggesting a date of between 4320 and 3900 BC were recovered from the primary silt of ditch 2 within the proposed inner enclosure. No samples have yet been collected from the divergent 'spiral' or outermost ditch circuits.

To conclude, the results of the 1991 excavations at Whitehawk would appear to indicate that the south-western 'tangential' ditch, as excavated, is

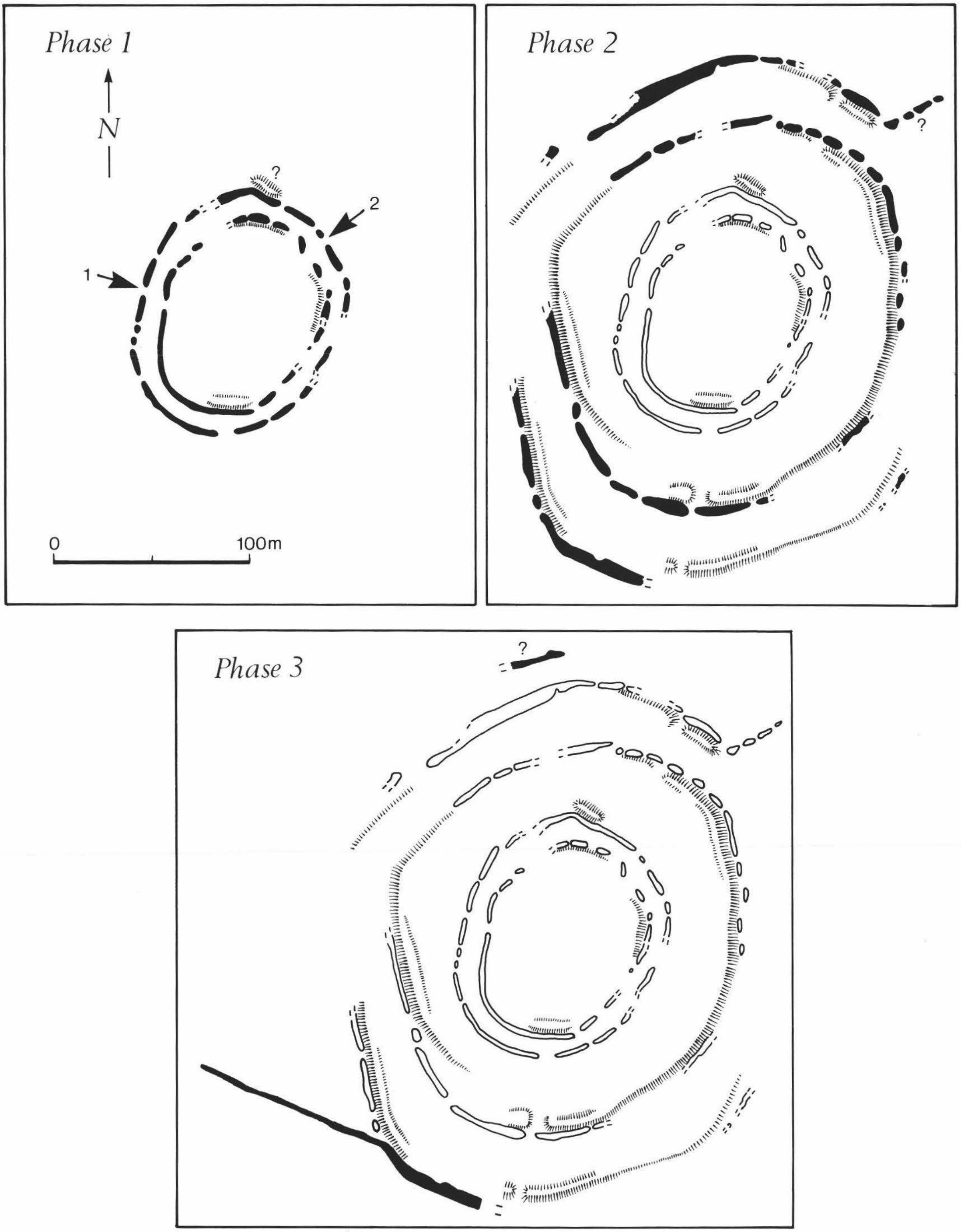

Fig. 14. Whitehawk Neolithic enclosure. Plans of Phases 1, 2 and 3.

both constructionally and artefactually 'out of phase' with the recorded inner earthwork circuits. An analysis of all earlier excavation and survey work, combined for the first time in Figure 2, further suggests that the continuous form of the tangential ditch belongs to a phase of extension/redefinition of the outer southern margins of the fourth enclosure circuit (Fig. 14, Phase 3). This phase of ditch construction is broadly defined as representing the last of at least three chronologically distinct phases of enclosure definition (Fig. 14).

In this respect the impressive size and perceived complexity of Neolithic ditch systems at Whitehawk, as well as those from the Trundle and, to some degree, Offham Hill, may have more to do with longevity of use, with successive acts of redefinition, expansion and development, rather than representing a single, deliberate act of pre-planned construction. If this is the case, the question we must be asking of the archaeological data is not 'why were some enclosures of the Neolithic constructed on such a monumental scale?', but 'why did the enclosures of Whitehawk, the Trundle, Briar Hill, Orsett and Windmill Hill develop over time to such an immense degree (Whitehawk possessing at least five earthwork circuits and two tangential ditches), whilst other enclosures of this period apparently possessed only limited definition.

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