English Heritage

HAZLETON NORTH

The excavation of a Neolithic long cairn of the Cotswold-Severn group

Alan Saville

Hazleton North, Gloucestershire, 1979–82:

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English Heritage

Archaeological Report no 13

Hazleton North, Gloucestershire, 1979–82:
The excavation of a Neolithic long cairn of the Cotswold-Severn group

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with the assistance of Elizabeth Hall and Jon Hoyle

and with specialist contributions by
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The finds illustrations are largely the work of S Banks (with J Richards and T Pearson); plans and other drawings are mainly by J Hoyle. Photographic processing and reduction were undertaken by G Kelsey and H Wingham respectively. The photographs published here are by the author, unless otherwise credited. Post-excavation work was assisted by M Hoyle during 1983–4, but has otherwise been the responsibility throughout of E Hall and J Hoyle; their contributions were indispensable to the preparation of the final report.

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1 Introduction

General location

The village of Hazleton, Gloucestershire, is situated on the Cotswold Hills, south of Birmingham and west of Oxford (Fig 1). The long mound of Hazleton North (National Grid Reference SP 0727 1889) was located north-west of Hazleton village and some 16km (8 miles) east of Cheltenham, in a field known as Barrow Ground (Fig 2) which contained two long mounds, Hazleton North and Hazleton South. The field has recently been predominantly arable.

Hazleton North was approximately 250m (820ft) above Ordnance Datum on the edge of an unpronounced local highpoint (268m OD). Barrow Ground Field has a bedrock of limestone, part of the Great Oolite series of the middle Jurassic. Sizeable springs issue at the edge of the oolite, a kilometre to the east of Hazleton North and water from these flows south-eastwards towards the Sherborne Brook and ultimately the River Thames.

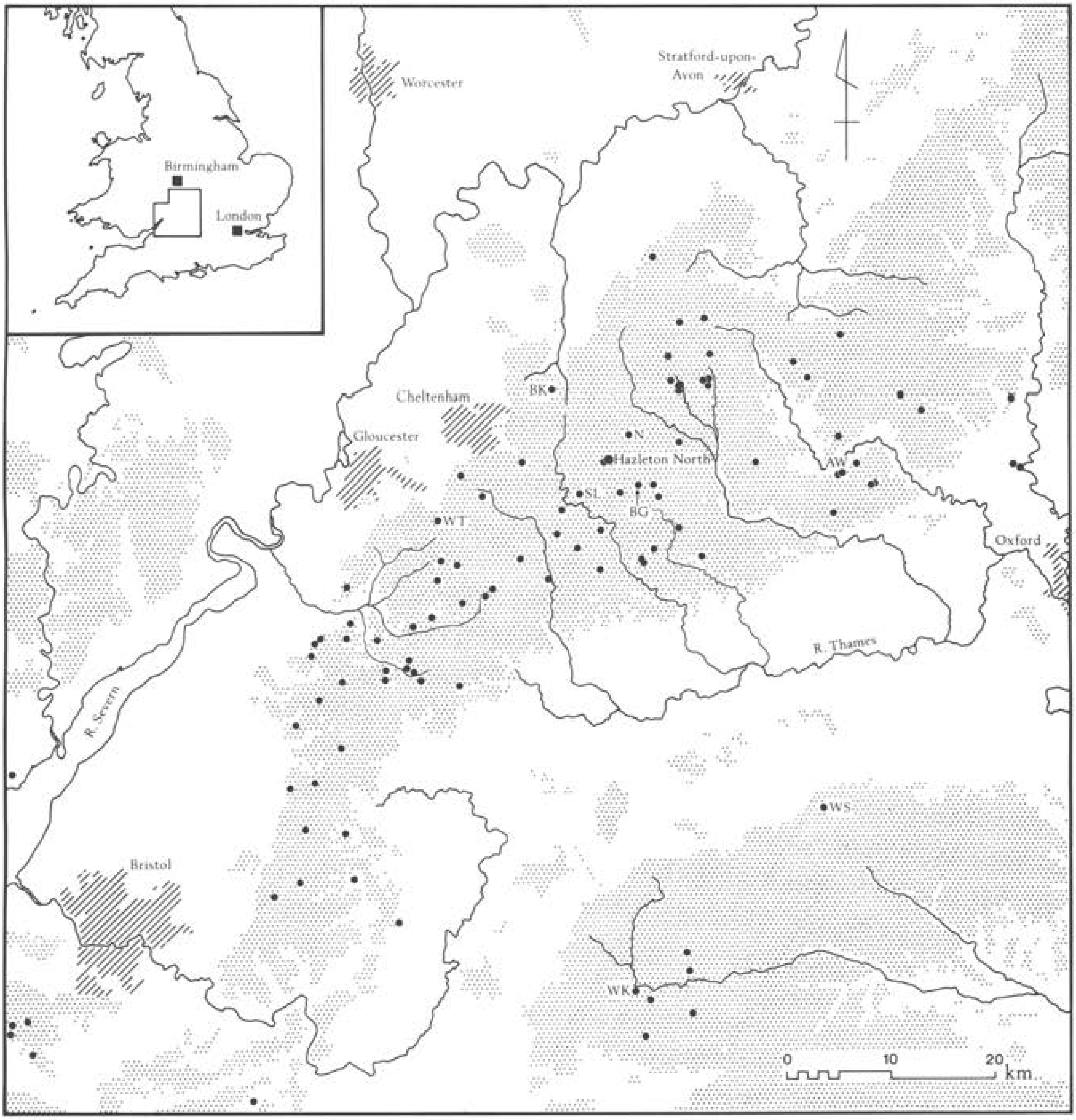


Fig 1 Location map: Hazleton in its national and regional setting; all land over 400ft (122m) above OD stippled; black dots represent the location of Cotswold-Severn tombs, of which the following are identified: AW = Ascott-under-Wychwood; BG = Burn Ground, Hampnett; BK = Belas Knap; N = Notgrove; SL = Sale's Lot, Withington; WK = West Kennet; WS = Wayland's Smithy; WT = West Tump, Brimpsfield

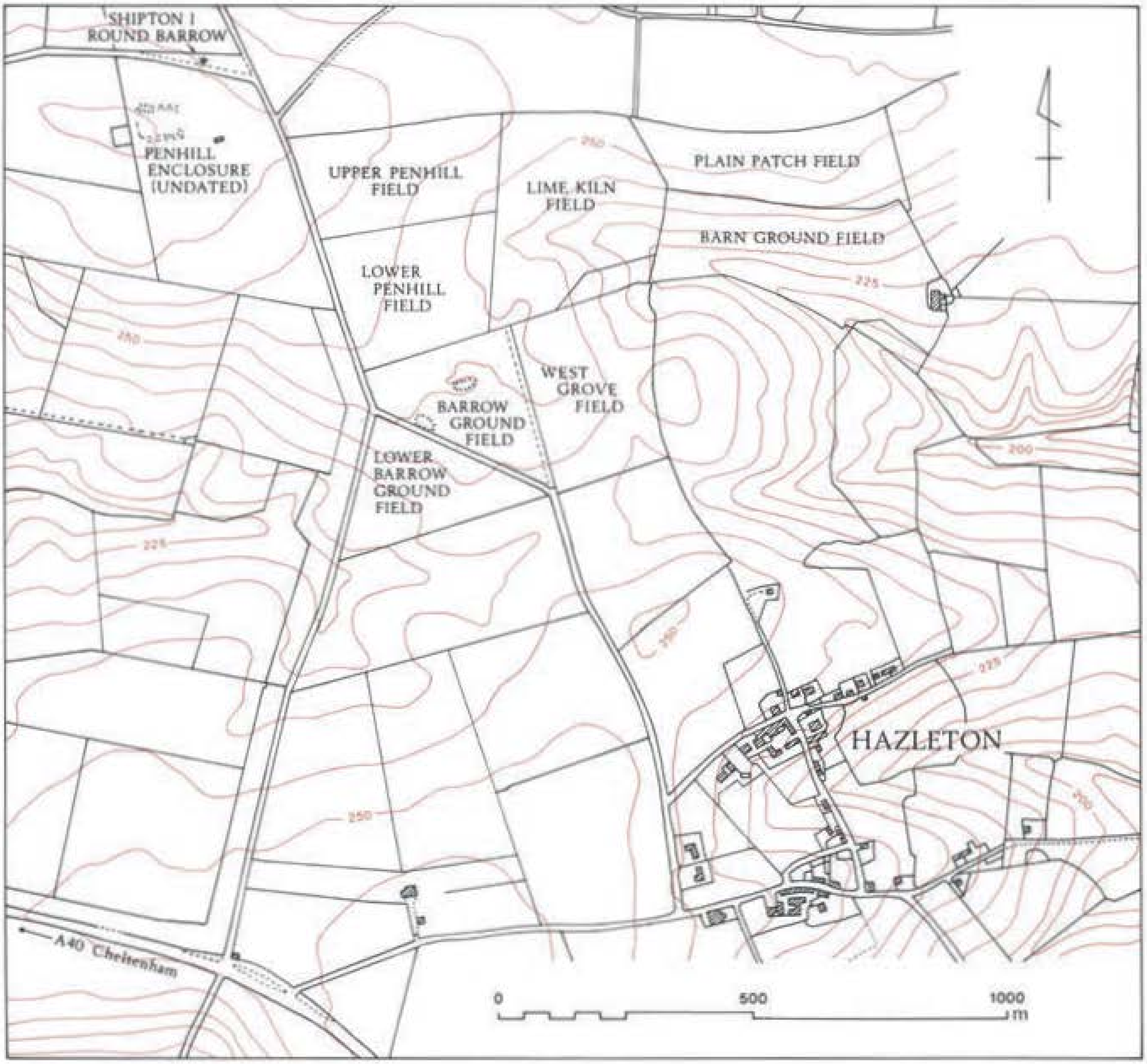


Fig 2 Location map: the Hazleton cairns in their local setting; contours in metres above OD at 5m vertical intervals (based on the Ordnance Survey map, Crown copyright reserved)

The only other prehistoric site within the immediate vicinity is a round barrow (Shipton 1: O'Neil and Grinsell 1960, 129) some 800m to the north-west (Fig 2). There is no record of excavation of this barrow. The Penhill sub-rectangular enclosure, south of the round barrow, has not been excavated, and suggestions of Roman origin are purely speculative (RCHM 1976, 101). The Hazleton site lies within the Gloucestershire heartland of long mounds of the Cotswold-Severn group (Corcoran 1969, 13). Hazleton North and South are in-between the two densest Gloucestershire concentrations in the Condicote/Swell and Avening areas (Crawford 1925, 5; Saville 1980a, map 2). Many of the best-known Cotswold-Severn tombs lie close to Hazleton, for example Notgrove (Clifford 1936); Burn Ground, Hampnett (Grimes 1960); Sale's Lot, Withington (O'Neil 1966); and Belas Knap, Sudeley (Berry 1929 and 1930); *see* Figure 1.

Site history

The earliest mention appears to be by Witts (1883, 80), who was the first antiquary to compile an extensive list of the long mounds of Gloucestershire. His description [his long barrow no 17 (Hasleton [sic] Barrow No 2)] is quoted in full:

> 'In the same field as the last, and only eighty yards from it, is another long barrow, the original length of which must have been about 174 feet; greatest width,

Fig 3 Hazleton North before excavation in September 1979, viewed from the north-east

> 78 feet; its present height being 9 feet. Its direction is east and west, the highest part being towards the east. The interior is composed of stone similar to the last. I found a well-worked flint flake on the surface. This barrow has never been thoroughly examined, though many stones have been removed for road making and wall building' (Witts 1883, 80).

No further information was published until Crawford's *The long barrows of the Cotswolds*. Hazleton North (his site no 30) was visited in 1920:

> 'It is in a fallow field and is being ploughed over, and therefore in danger of eventual destruction. The highest part is now to the WSW which would appear to be about 9 feet high. The rest of the barrow is very much lower. It stands 80 yards NE of W.16. There are otherwise no signs of disturbance' (Crawford 1925, 102).

The next significant mention comes in the Gloucestershire barrow survey of O'Neil and Grinsell (1960), where Hazleton North is given the designation Hazleton II. Grinsell inspected the site in 1959, recording the dimensions of the mound as 180ft long, 75ft wide, and 6ft high, with a ENE/WSW orientation, and added:

> 'Present height at WSW is 6 feet, and at ENE it is 3 feet; but the E end was the higher in Witts' time. Under grass 1959, but formerly on arable' (O'Neil and Grinsell 1960, 81).

Hazleton North was omitted from Daniel's inventory (1950), although Hazleton South was included because of Witts's mention of upright stones (*see* Chapter 8). The Hazleton cairns receive only a passing reference in Grimes's account of the Burn Ground cairn at Hampnett (Grimes 1960, 41). In Corcoran's inventory, Hazleton North is listed as GLO 54 and simply referred to as a 'denuded long mound' (Corcoran 1969, 283).

The site of Hazleton North was scheduled as an Ancient Monument in 1950 (Glos no 13 – the number refers to both the Hazleton barrows). Scheduling, however, had not safeguarded the Hazleton mounds from the effects of continued cultivation (Saville 1980a). Hazleton North has the primary record no 278 in the County Sites and Monuments Record.

Important considerations in the selection of Hazleton North were that there existed no record of any previous excavations, and no significant finds were known to have been made there. Nor was there any local tradition which might suggest a previous opening (O'Neil and Grinsell 1960, 50–3).

By 1979 (Fig 3), the mound had an artificially rectangular shape, 33m west–east by 18.5m north–south, produced by ploughing, with obvious extensions of the cairn continuing to the west and east.

Background to the project

In 1972, Drinkwater published his important review of the state of preservation of both long and round barrows in Gloucestershire, drawing attention to the threat posed to these sites by agricultural activity (Drinkwater 1972). Largely as a result of this, the Committee for Rescue Archaeology in Avon, Gloucestershire and Somerset (CRAAGS), established in late 1973, took as one of its initial priorities the formulation of a response to the situation facing Cotswold archaeological sites in general, and the prehistoric barrows in particular. An initial part of this response was the excavation of a ploughed round barrow at Swell, near Stow-on-the-Wold, in 1974–5 (Saville 1979a). This excavation demonstrated the extent to which ploughing could damage a prehistoric cairn, in this case virtually eliminating it. As a result, a general survey of Cotswold archaeological sites was instituted to record their current condition and make explicit recommendations for action. A full survey was eventually published (Saville 1980a), but it had been decided in the interim to regard the long barrows of the region as a special case, and to accord them priority in view of their outstanding national importance. A separate long-barrow survey was compiled as a consultative document (Drinkwater and Saville 1976), which made specific recommendations for preservation and excavation. Certain sites which were most threatened by agriculture and which were thought least suitable for preservation were regarded as priorities for total excavation and were ranked in a suggested excavation shortlist, based on their research potential. The two Hazleton barrows were placed at the top of the list (Drinkwater and Saville 1976, 11; Saville 1980a, 27).

Coincidentally with this local effort, the situation of the Cotswold long barrows was coming under scrutiny at national level, and, in the same year as the Gloucestershire long barrows report was issued, a consultative document on British Neolithic sites was produced under the auspices of The Prehistoric Society (Kinnes *et al* 1976). This document made direct reference to the Cotswold long barrows and concluded:

> 'We would regard the Cotswold-Severn tomb group as being a possible subject for detailed study either by DOE or CRAAGS – nominating rescue priorities within the group and detailing the present condition and land use of all the barrows. This could be followed by a deliberate campaign of negotiation with landowners by DOE in an endeavour to stabilise the condition of at least some of these tombs – the finest group of stone chambered tombs in England' (Kinnes *et al* 1976, 6).

An excavation project statement was prepared on behalf of CRAAGS, proposing the total excavation of Hazleton North and South, the excavation of large parts of Barrow Ground field, and intensive local survey. This proposal (Appendix 1) was adopted as a CRAAGS project following approval by the Area Advisory Committee, which recommended total excavation of both Hazleton barrows over a five-year period. Funding was obtained from the Department of the Environment for the financial year 1979–80. After a first season of excavation in 1979, the project was modified at the request of DoE officials to comprise the total excavation of Hazleton North and trial examination of Hazleton South.

The excavation

There were four excavation seasons in October–November 1979, September–October 1980, April–November 1981, and May–August 1982, with additional fieldwork in September and December 1979 and November–December 1980. All excavation was undertaken by hand, except for the trenches cut across the quarry areas.

A grid-system was established to cover Barrow Ground Field, with fixed station pegs (metal rods in concrete) in the side of the field (stations A–H, *see* Fig 4). The hypothetical zero point of the grid lay to the south-west of the field, and grid references were calculated as eastings and northings from the zero point (*see* Fig 5). For the excavation area covering Hazleton North, all eastings are in the 200s (metres), all northings in the 300s (metres). Site datum was initially established on the highest point of the barrow (251.71m OD) and subsequently transferred to the site edge when the central baulk was excavated.

Contour and geophysical surveys of Hazleton North were started in 1979 before any excavation had begun. The geophysical surveys are discussed in Chapter 17, while the contour surveys of Hazleton North are shown in Figures 4–5.

The excavation methodology was designed to follow the recommendations of Grimes (1960, 1–4), which it did insofar as horizontal stripping and recording were concerned, although the theoretical ideal of dismantling the cairn '... by reversing the processes of the builders' (Grimes 1960, 3) was found to be logistically, and on occasion conceptually, impractical.

The area of Hazleton North was divided into quadrants separated by baulks one metre wide, which carried the grid pegs at 5m intervals across the barrow. The north–south baulk across the highest part of the cairn was retained until the final stages of the excavation and provided the only standing section recorded from field surface to bedrock (Fig 56). The west–east baulk was simply a convenience for retaining grid pegs and was abandoned in segments as soon as recording requirements allowed.

The initial excavation procedure involved stripping the ploughsoil by hand until the surface of the cairn stonework was apparent. The stonework was then cleaned, removing as little rubble as possible, to allow a record to be made of the entire cairn stonework at its uppermost surviving level (Fig 6). Some of the internal constructional detail of the cairn was apparent at this stage. The overall shape of the cairn adhered to the normal Cotswold-Severn pattern of being a tapering long cairn, but confounded the norm by having the broader end of the cairn towards the west (cf Daniel 1950, 80).

A sieving programme, processing approximately 20% of the soil removed from each 5m square of the south-eastern quadrant, was operated in 1979. The

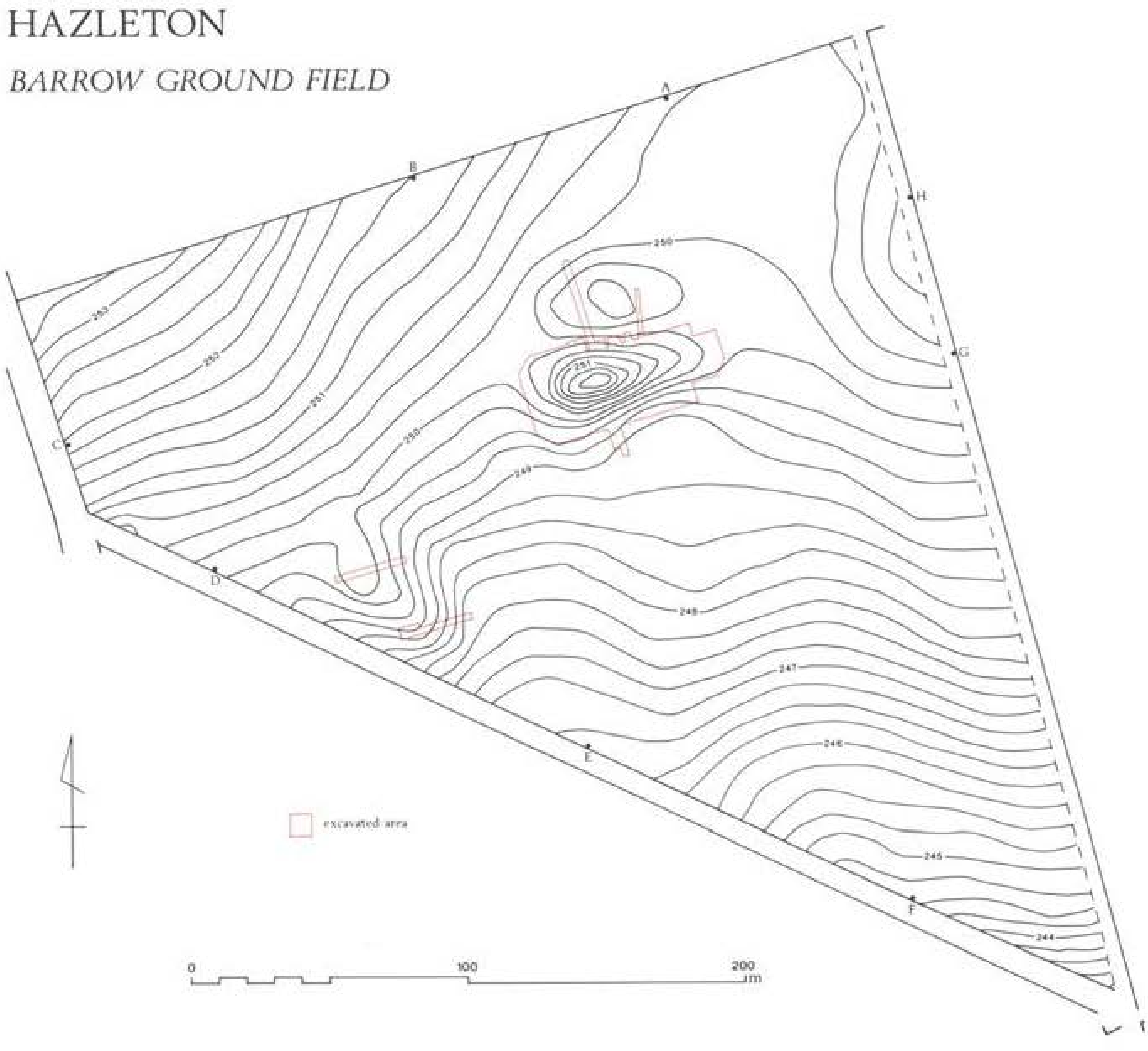


Fig 4 Contour survey : Barrow Ground Field; contours in metres above OD at 0.25m vertical intervals; A–H = the position of survey stations; the extent of the excavated areas is superimposed in red

exercise involved dry-sieving the soil through 1in (25mm) and 3⁄16in (5mm) meshes. The results suggested that there was a minimal presence of archaeological artefacts in the ploughsoil overlying the cairn – if anything a lower concentration than that present in the ploughsoil of the surrounding fields. In the course of ploughsoil removal, the existence of massive quarry areas either side of the cairn was discovered. Both quarries were investigated during the 1980 season by cutting trenches using a JCB (Fig 7). (Also during 1980 the limited exploration of the Hazleton South long mound took place.)

The whole cairn was planned, stone by stone, at 1:20 scale, to give a complete picture of the uppermost surviving level (Fig 57). Subsequent plans of the cairn, as stonework was progressively removed, concentrated on recording the internal structural detail (Figs 45–6), although the outer zone of the cairn was later replanned (Fig 139). During the later stages of excavation, three further north–south sections (Fig 42) and a west–east section (Fig 39) were also included.

Excavation of the burial chambers began in 1981 and continued in 1982, as the dismantling of the surrounding cairn continued. After removal of all the burial deposits, the chambers were recorded and demolished, allowing the complete examination of the buried soil preserved beneath the cairn. Some of the best-preserved of the orthostats and other stones from the chambered areas of Hazleton North were taken to the Corinium Museum, Cirencester, which now has a permanently-displayed reconstruction of the south chamber.

The Air Photographs Unit of the National Monuments Record (RCHME) included Hazleton on several sorties flown during 1981–2. The photographs

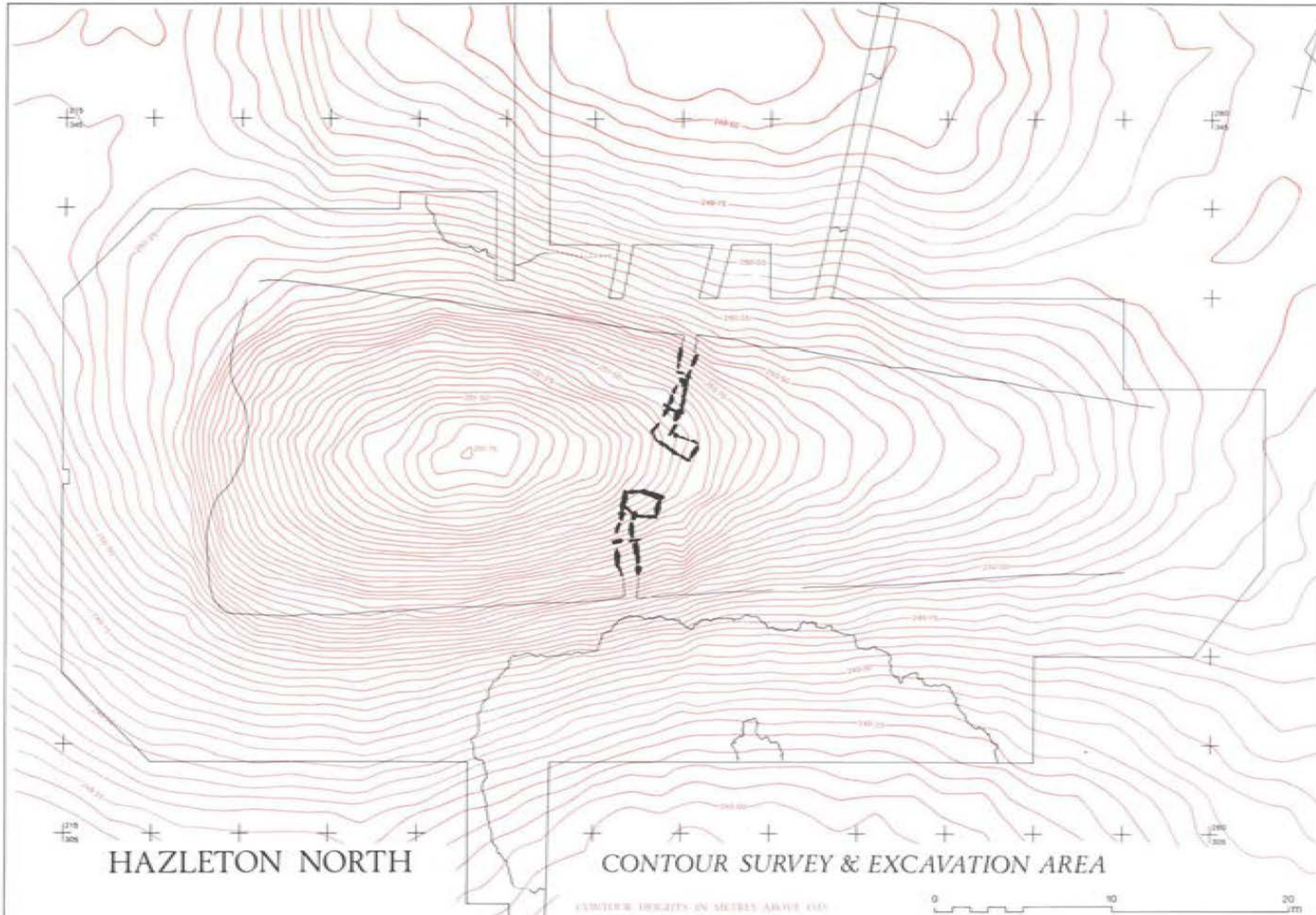


Fig 5 Contour survey: Hazleton North; contours in metres above OD at 50mm vertical intervals; the extent of the excavation area, and the locations of the cairn, chambers, and quarries are shown; the crosses provide a key to the site grid used for all horizontal recording

Fig 6 Hazleton North at the end of the 1980 season after the removal of ploughsoil to reveal the uppermost surviving cairn stonework, viewed from the west (photo: M Sharp)

Fig 7 Aerial view of Hazleton North after the removal of all ploughsoil, showing the extent of the trenches across the north quarry area, viewed from the west

taken form an invaluable additional record of the excavation, and two examples are reproduced here (Figs 8 and 9).

The total area of the Hazleton North excavation was approximately 1330sq m. Figure 10 provides a basic site plan of the excavated area. The north sign shown in all the site drawings relates to Ordnance Survey grid north, calculated from magnetic north as recorded in 1981. The excavation grid has a north alignment which is 16.5° west of OS grid north.

Site recording

Using the grid system described above, all items requiring a horizontal spot reference were identified by coordinates comprising an easting and a northing, expressed in metres to two decimal points. All finds, apart from those in the ploughsoil, were allocated horizontal coordinates and a vertical height expressed in relation to Ordnance Datum. The finds were recorded on site in a sequential series of finds books, in which they were not subdivided according to type or material. Everything removed from site for further study, whether soil sample or orthostat fragment, was treated as a 'find' and given its own unique number. The finds sequence (1-21541) was continued during post-excavation, so that items subsequently removed from samples were allocated a unique number in the system. Whenever practical, each find was marked with its number, the site code HBG (Hazleton Barrow Ground), and year.

Every feature, layer, or constructional element which required separate description was allocated an individual context number in a single continuous sequence (1–630; Appendix 19 gives a summary list of all the Hazleton contexts). No prefixes for pit, posthole, or wall were employed – everything recorded was regarded for the purposes of the record as a context. In the case of negative features, separate numbers were assigned to the cut and to the fill. The context record sheet is therefore the primary source of written information about the excavated site. This is complemented, where appropriate, by site drawings (plans and sections) at scales of either 1:20, 1:10, or 1:5, and by black-and-white photography and colour slides. The only other written site records comprise the director's notebooks (and for the first two seasons an assistant director's notebook) and levels books.

Post-excavation

The first stage of the post-excavation programme involved a lengthy analysis and cross-referencing of the site records. The finds information was subdivided into separate category lists for bone, flint, pottery, stone, etc. Detailed indices and other analyses of the finds data were prepared for the various specialists. In the case of the human bones, for example, an extremely laborious transcription process was required to rationalise all the site plans and produce amalgamated plots showing all the bones.

All contexts were reviewed with reference to the written, graphic, and photographic records, and in some cases were subdivided or otherwise revised.

Fig 8 Aerial view of Hazleton North, 17 August 1981; north is at the bottom (photo: Crown copyright, NMR SP0718/19/356)

Fig 9 Aerial view of Hazleton North, 4 June 1982; north is at the bottom (photo: Crown copyright, NMR SP0718/2/159)

Some entirely new contexts, which it had not been considered necessary to designate separately during the excavation, were identified during post-excavation, although it remains clear in the records which are the post-excavation additions. A context matrix was drawn up (arch drg 730) in the process of allocating the contexts to phases, and a narrative account of the constructional history of the site was compiled. Numerous additional plans and distribution plots were compiled during post-excavation and simply added to the existing single numerical sequence of site-drawings. All the post-excavation was undertaken manually, and no element of the site data is currently available in computerised form.

During post-excavation analysis, all the excavated contexts were subdivided into a basic phase sequence, to which the following terminology was applied: 1 Pre-monument (= pre-cairn, = sub-cairn, = below cairn); 2 Monument construction (= cairn construction); 3 Monument use (= cairn use, = burial deposition); 4 Monument decay (= cairn decay, = cairn collapse); and 5 Post-monument (= post-cairn, = modern).

Previous interim publications

Summaries of each season were published in *Glevensis*, the annual report of the Gloucester and District Archaeological Research Group (Saville 1980b; 1981a; 1982a; 1983a). A longer summary of the final season was issued by the Western Archaeological Trust (Saville 1982b). Interim accounts appeared in *Popular Archaeology* (Saville 1981b), the *Illustrated London News* (Saville 1983b), and *Current Archaeology* (Saville and Selkirk 1983), while an interim report was published in the *Antiquaries Journal* (Saville 1984a). Other accounts appeared in *The Times* (10 August 1982) and *Country Life* (23 September 1982), and in the BBC Radio 4 programme *Origins* (22 August 1982). Most of the Hazleton radiocarbon dates have been published (Saville 1986; Saville *et al* 1987), as has some of the Mesolithic evidence (Saville 1989). All of these publications are completely superseded by the present report.

The layout of this report

The basic archaeology of the monument and its constituent parts are presented first with descriptions of cultural material from the site, followed by discussions of the various scientific data, skeletal material, and dating evidence. The trial trenches across Hazleton South are discussed. The report is concluded with a synthesis and analysis of this combined information with a final discussion placing Hazleton in its Neolithic context as a tomb of the Cotswold-Severn group. A series of appendices on microfiche present the supplementary evidence from the excavation and the scientific analyses.

The archive

The site archive, in the Corinium Museum, Cirencester, is as follows:

1 The finds, boxed by type, according to the following category subdivisions: bone (human); bone (animal); flint;

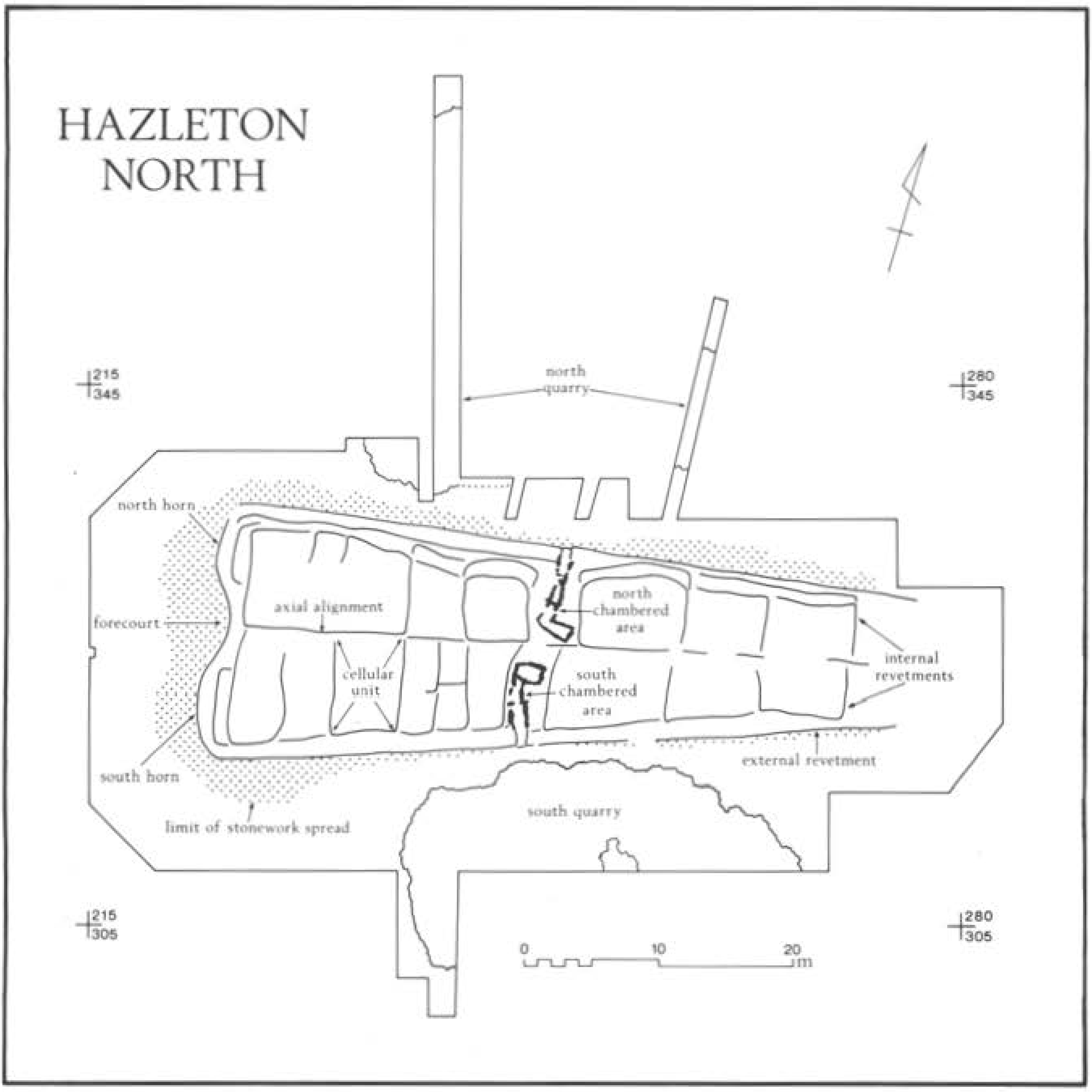


Fig 10 General site plan of the excavated area

pottery (prehistoric); pottery (Roman and later); stone; coins; metal; beads; glass; clay pipe; slag; fired clay; soil; seeds; plant remains; hazelnut shells; molluscs; and charcoal. The non-flint finds from the fieldwalking of Lower Penhill Field were not studied in detail and are therefore boxed together (by recovery square) without category subdivision.

2 Site records: context sheets, finds books, notebooks, drawings, black-and-white photographic negatives and prints, and colour slides.

3 Post-excavation records (mainly in the form of loose-leaf catalogues) and drawings (archive and publication originals).

4 Specialist reports and finds analyses, including all associated archive material such as data sheets, and copies of relevant Ancient Monuments Laboratory reports.

5 Records relating to the administration of the project in its excavation and post-excavation phases, and general correspondence.

6 Interim notes, preliminary drafts of the final report, and the complete archive report, of which this publication is an abbreviated version.

The key element in the archive is the context sheet, which also carries cross-references to relevant drawings and photographs. The context sheets are complemented by lists of all finds from each context, subdivided by type, and by catalogues of drawings, photographs, and finds.

Direct reference to the archive is established throughout this report by the use of context numbers in the text and on published plans and sections. A concordance of the illustration and find numbers is provided for the pottery and flint finds (Appendices 2 and 5), while any reference in the text to unillustrated finds quotes the actual find number. Reference to unpublished drawings is made by quoting the archive drawing (arch drg) number in the text, and similarly to unpublished photographs by quoting the archive number. Colour slides are numbered in a single numerical sequence 1–4017; black-and-white prints and negatives are numbered in four annual series (1979–82) by frame and film number, thus 1981/20/17 indicates 1981, film 20, frame 17.

The excavation archive may be consulted at the Corinium Museum, provided a prior appointment has been made in writing to The Curator, Corinium Museum, Park Street, Cirencester, Gloucestershire, GL7 2BX. It is anticipated that the paper and photographic archive will also be available on microfiche through the National Archaeological Record, RCHME, Fortress House, 23 Savile Row, London, W1X 1AB.

2 The pre-cairn phase

Summary

Mesolithic flints in the buried soil indicated the first human activity, possibly a temporary hunting camp. Neolithic finds were scattered within the pre-cairn soil, probably partly by cultivation over a Neolithic midden which produced radiocarbon dates centring on 2970±56 uncal bc (OxA–646/738/739). A few features underlay the cairn: their function was uncertain, but included an indeterminate Neolithic structure covering about 5 × 3m and comprising a hearth and postholes. There is no clear evidence of association between the settlement and the subsequent cairn.

Introduction

The buried soil, once exposed, was excavated by trowelling in arbitrary, vertical spits (*c* 10–20mm deep). All *in situ* finds were recorded by three-dimensional coordinates. General context number 211 was assigned to the sub-cairn soil, within which no archaeologically significant vertical distinction was observed. Around the edges of the cairn, the subsoil (context 4) represented, to some extent, the remains of the pre-cairn soil. Excavation was continued over the whole of the exposed area to a point where finds became extremely rare.

Only in front of the sections cut through the lower cairn was the excavation carried down right through the buried soil and into the underlying bedrock (Figs 42 and 56). The thickness of this soil varied (20mm to 0.4m, Figs 11 and 14), depending upon the undulations and the nature of the bedrock (solid limestone or marl).

The buried soil was also investigated by taking samples for wet-sieving, and for laboratory study. These were random samples and thus cannot be used for any statistical assessment of recovery (the location of all the samples analysed, on- or off-site, are shown in Fig 12; *see also* arch drg 669). Wet-sieving and laboratory analysis were crucial for the recovery of palaeobotanical remains, but, although the numbers of tiny bone, pottery, and flint fragments recovered were increased by fine sieving, this increase did not affect the interpretation of these assemblages.

A small proportion of the buried soil samples was examined by further sieving under laboratory conditions; this merely confirmed the data produced by on-site wet-sieving. Samples not processed in the laboratory were hand-sorted to remove any artefacts (flint and pottery) and visible bones and were then discarded. A small number were retained in the archive for possible future examination.

An argillic brown soil developed at Hazleton in the early post-glacial period, presumably under forest conditions. This soil was subsequently disrupted by tree-clearance and cultivation. The decalcified buried soil precluded any molluscan analysis, but sufficient pollen grains were isolated to give some information about the contemporary flora. These, combined with the evidence from charcoals and seeds, suggest that the Hazleton cairn was situated in hazel-dominated scrubland, which contained some areas cleared for cereal crops. There was no evidence to indicate any special treatment of the ground surface immediately prior to construction of the cairn.

Mesolithic activity

The first human activity at Hazleton is recognisable only by the presence of Mesolithic flints. These were scattered throughout the buried soil, with a marked concentration towards the western edge of the excavation (Fig 163). In this area, Mesolithic flints commonly occurred up to 100mm below the surface of the buried soil.

The Mesolithic activity cannot be dated, other than to say that the flintwork is of later Mesolithic

Fig 11 Buried soil in section near the northern edge of the cairn (see Fig 42, section 3), viewed from the west; scale in 0.5m divisions

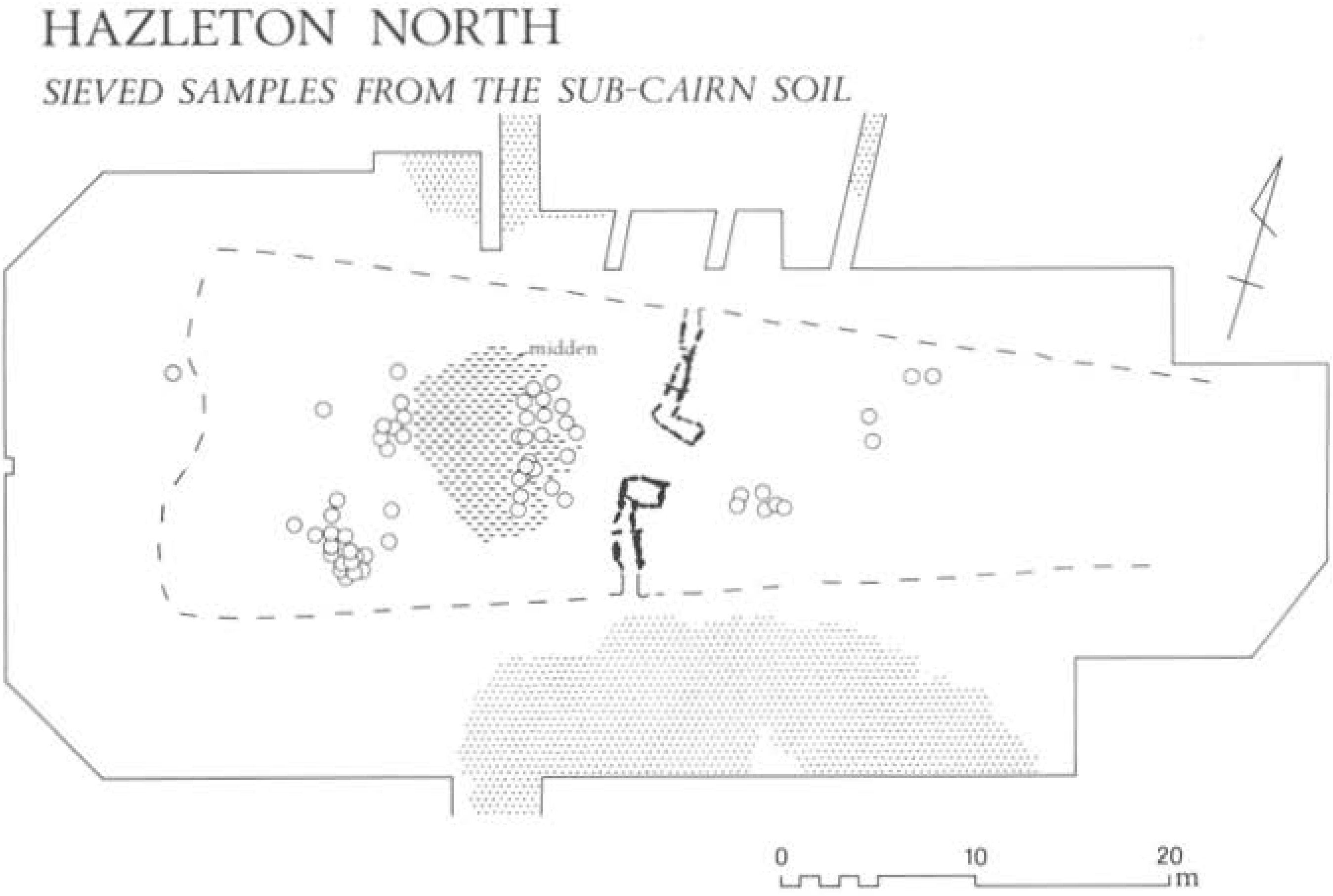


Fig 12 Location of samples from the sub-cairn soil examined by sieving

character and that it precedes the cairn construction. No features could be linked with the scatter of Mesolithic flintwork. Residual microliths and a microburin occurred within the area of the Neolithic midden (Fig 163). A similar residual explanation applies to the microlith from the south chamber (context 412). Proximity between the Mesolithic flint scatter and the two features 437 and 598 (Fig 13) might suggest contemporaneity, and similarly so with context 582, but this would remain circumstantial, especially in view of the ambiguity of these features (*see below*).

The flintwork involved the preparation of tools, among which microliths appear to predominate. The assemblage could imply a temporary camp for retooling of hunting equipment.

The distribution of the Mesolithic flintwork (Fig 163) had a spatial separation from the concentration of Neolithic pre-cairn activity (Chapter 10). This separation is assumed to signify a chronological gap between the Mesolithic and Neolithic activity.

Neolithic activity

Pre-cairn Neolithic activity was reflected in three principal ways. First, the buried soil contained a general distribution of typologically Neolithic artefacts and ecofacts. Second, a distinct concentration of these occurred in one area. Third, a variety of subsoil features were present, and some of these could be related to artefacts and hence were Neolithic by association.

The distributions within the buried soil of Neolithic flintwork (Fig 163), pottery (Fig 155), stone artefacts (Fig 175), domesticated animal bones (Fig 197), and cereal seeds (Fig 208) are discussed in the specialist reports. These distributions indicate a low-level scatter of putatively domestic debris across the whole excavation area, shown especially by identified cattle bones (Fig 197) and the fabric 1 pottery (Fig 155).

An area of the buried soil (context 561), approximately 9m east–west by 10m north–south, was distinctive during excavation because of its colour, a dark greyish-brown (Munsell 10YR 3/2–3/3; the normal buried soil was a lighter reddish-brown 5YR 3/4), and by concentrated organic matter (Fig 14). The area was planned during excavation with reference to the extent of soil discolouration, and it is this outline which appears as the 'midden' (Fig 13). On its north-west side, it was truncated by a deep section before planning. The coinciding pattern of finds distributions, however, suggests that the planned edge corresponds with the true extent of the deposit. Artefacts were not restricted to the surface of this context, being distributed throughout the buried soil, but with a definite concentration in the uppermost 30–50mm to which the main intensity of discolouration was also limited.

No vertical features were associated with the midden, and no distinctive horizontal patches were noted, although Neolithic cultivation may have

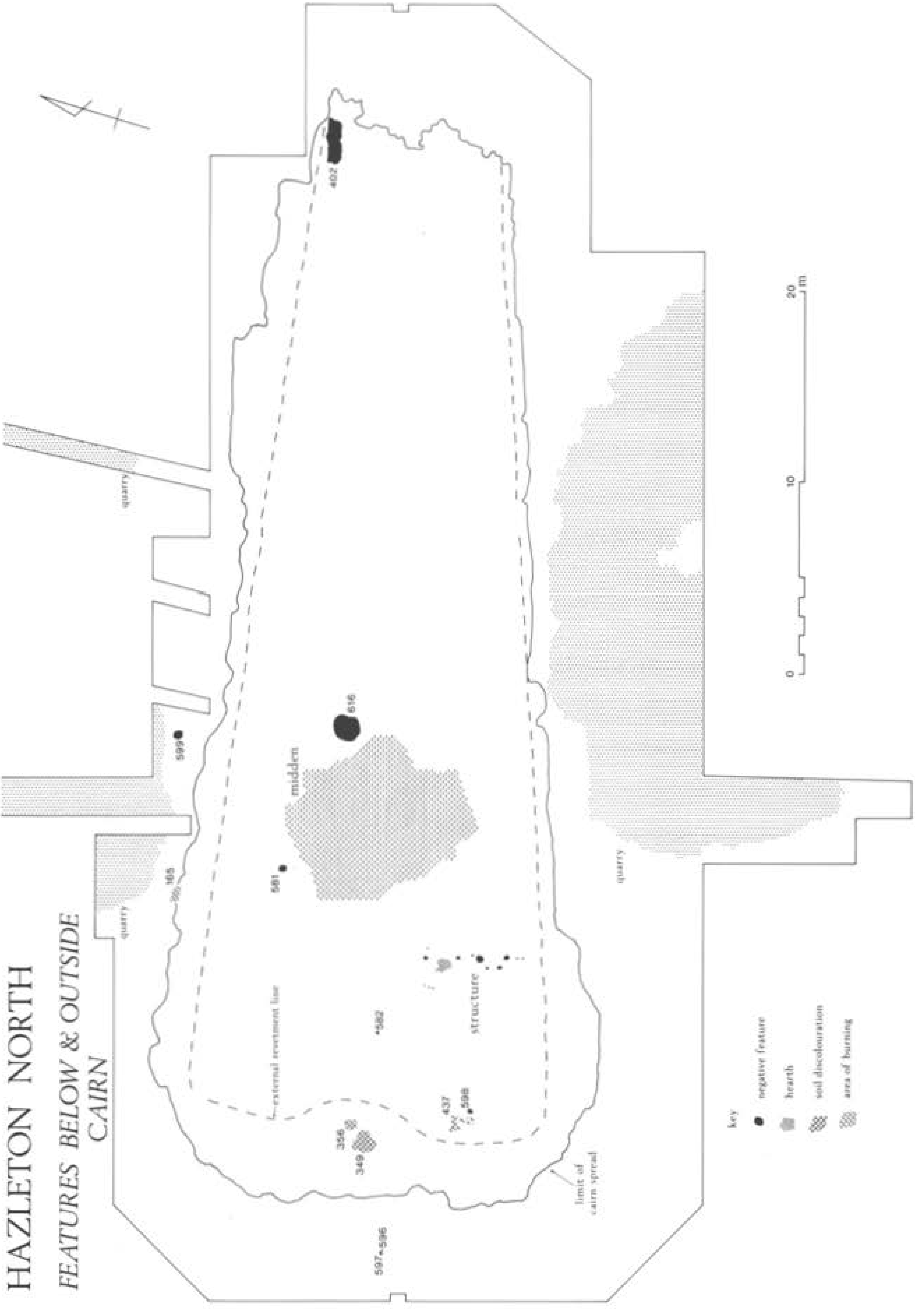


Fig 13 Location of features below and beyond the cairn

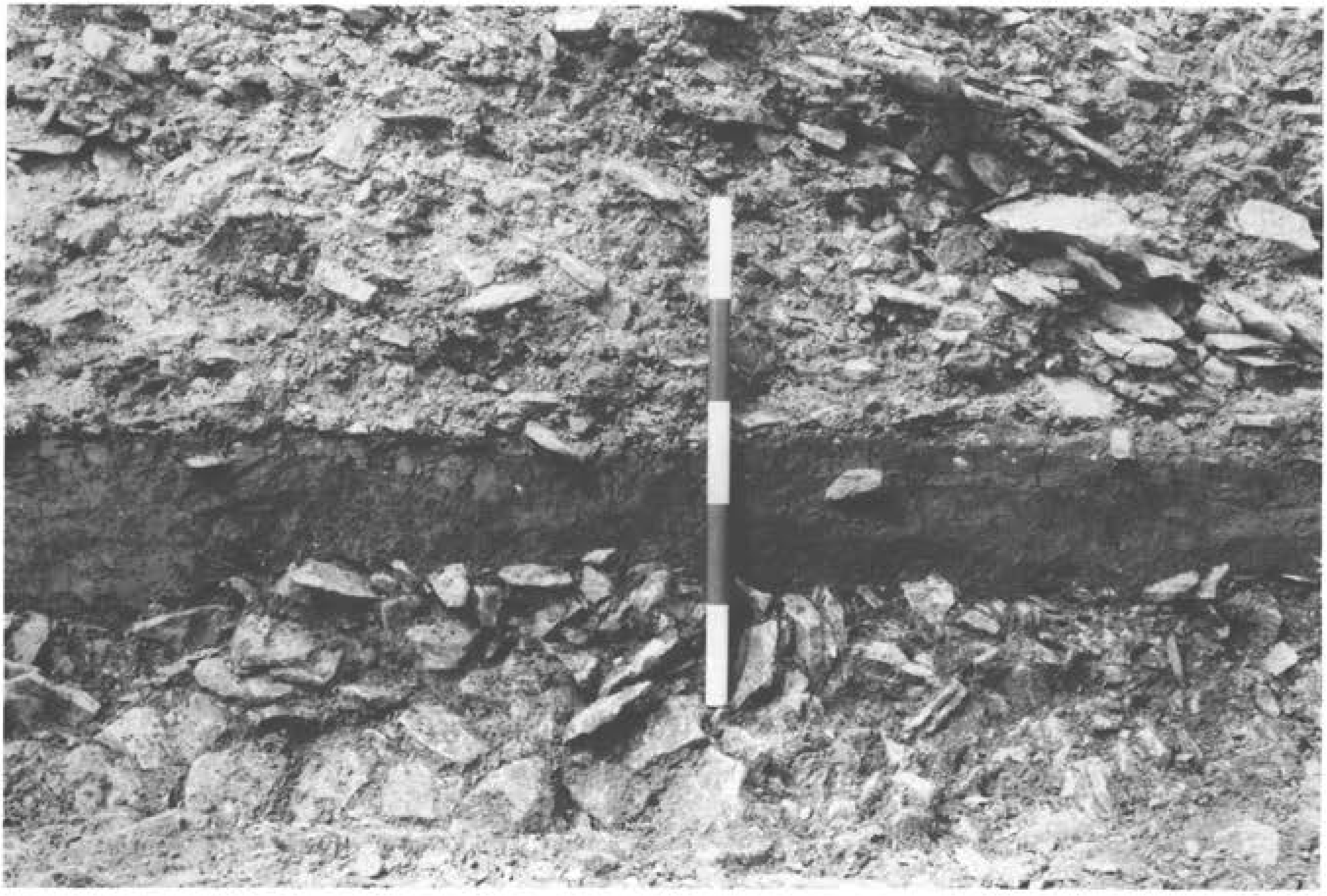


Fig 14 Buried soil in section in the midden area (see *Fig 56*)*, viewed from the east; scale in 0.1m divisions*

obscured the latter. Manganese/ferrous panning occurred, but could not be related either to distributions or to any obvious features. Context 561 represents a concentration of artefactual and ecofactual material. During excavation it was termed a 'midden' or 'midden-like deposit', and the term midden is retained here as a keyword for this context.

Human remains were found at or near the surface of the pre-cairn soil: three small groups of skull fragments (11276; 13151; 13181) and two teeth (11903; 14637).

There are three radiocarbon dates which relate to the pre-cairn phase (*see* Figs 20 and 223). Two are on animal bones from the midden, the other is on a human cranial fragment (13151). The results of these determinations are very close and suggest a date of 2970±56 uncal bc (OxA–646/738/739) for the pre-cairn Neolithic activity.

Sub-cairn features

The few features found beneath the cairn are shown in plan on Figure 13. One group of features probably represented a structure (*see below*). The other features were isolated and can be listed as a natural feature (402), an intrusive feature which postdated the cairn (616), a possible decayed burnt timber (437), and three possible post- or stakeholes (581, 582, and 598). Two of the possible post/stakeholes (582 and 598) were invisible at the surface of the buried soil and are unlikely to have been anything to do with the cairn construction, although the third, 581, could have been a part of constructional activity. These features can be described individually.

402 (Figs 13 and 15) A shallow, sub-rectangular linear depression, 2.6 × 0.8m, aligned west–east. The 150–200mm deep fill consisted of overlying cairn material and contained no finds. An unexplained feature, possibly natural.

437 (Fig 13) A concentration of charcoal fragments and charcoal staining on the surface of the buried soil (1.8 × 1.2m; *c* 10mm thick). Three flints and two sheep-size fragments of bone came from the same area. Other patches of discoloured soil and charcoal flecks occurred generally across the buried soil, but exhibited no pattern. This patch (437) was probably a better preserved example of the same phenomenon, which could in most cases be the result of the decay of pieces of burnt wood (*see especially* arch photo 1982/36/23), but there was no sign of *in situ* burning.

581 (Figs 13 and 15) A sub-circular, flat-bottomed hole cutting down just into the top of the bedrock (0.4m in diameter, with a depth of 280mm). The fill (context 544) was very loose, marly soil (10YR 5/8) with two stones, the larger being 250 × 100 × 100mm (Fig 16), possibly a displaced packing-stone. There were no finds. The ready visibility of the feature at the surface of the buried soil, the perfect preservation of its sides, and its loose, uncompacted fill suggest that it cannot belong wholly to the pre-cairn phase, since it had not been infilled and compacted prior to the cairn construction. It could represent an immediately pre-cairn socket for a post, removed either just before the overlying dump was deposited, or which remained in place while the overlying dump was constructed, after which it was removed. It might however be expected that much greater post-depositional compaction would have occurred during and since the Neolithic period. Another explanation

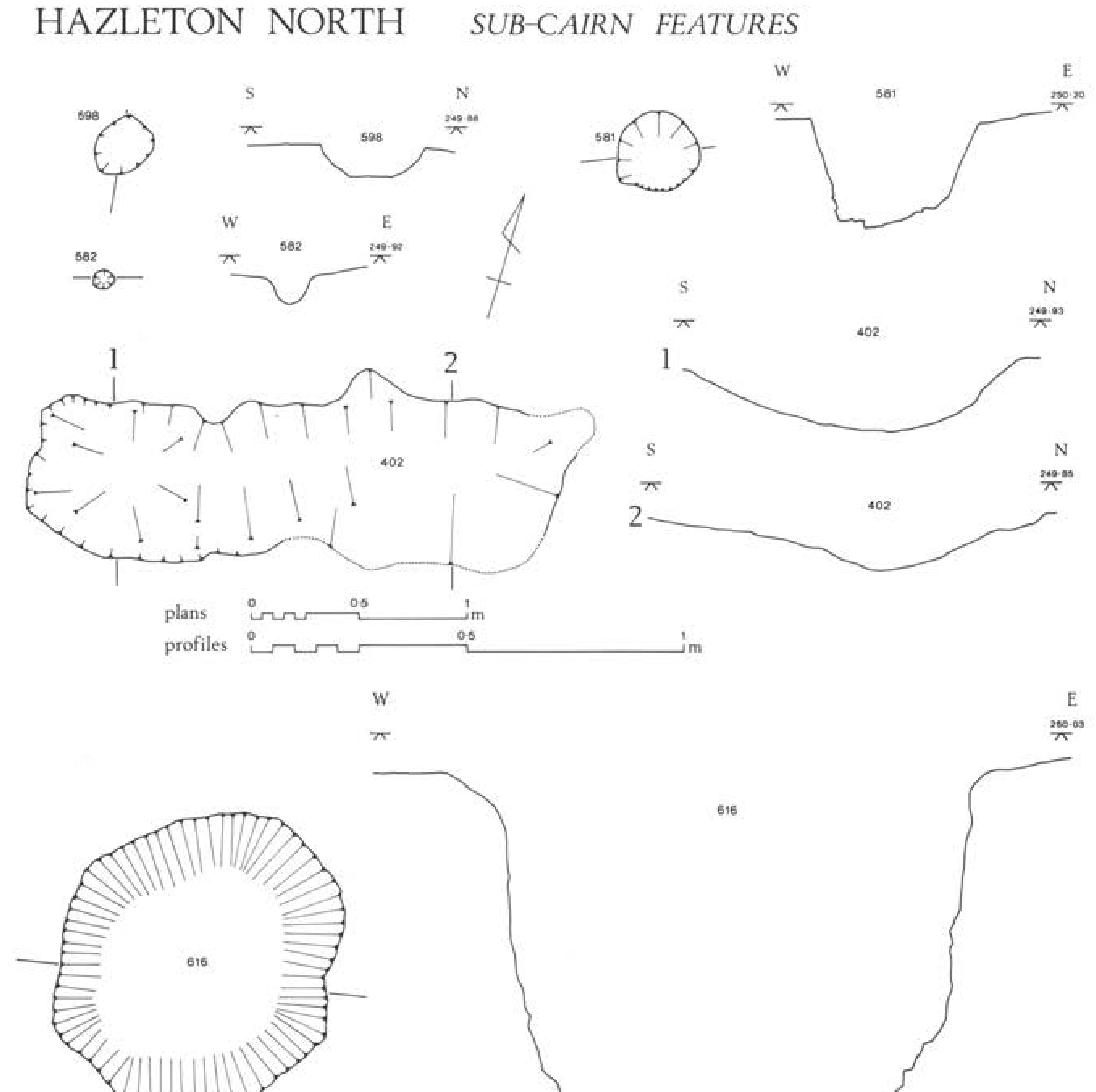


Fig 15 Sub-cairn features: plans and profiles

is the decay *in situ* of a post-stump (cf Atkinson 1965, 130–1 and 1985, 48). A final possibility is that of a post-cairn intrusion. A sub-rectangular irregularity in the upper cairn stonework overlay this point and was interpreted as a disturbance (context 606, *see* Fig 147). However, no such disturbance was recognised at the surface of the dump (context 543), which is against context 606 being connected with 581, as is the nature of the feature involved which could not have been dug from above without major disruption of the overlying deposits. The preferred explanation is that of a feature excavated and abandoned immediately before or during the construction of the cairn.

582 (Figs 13 and 15) A small, circular, V-shaped depression (90mm × 60mm deep). The fill (context 491), was a darker-stained version of the buried soil. No finds. Possibly a stakehole of limited credibility.

598 (Figs 13 and 15) A flat-bottomed, sub-circular scoop. Diameter 230–260mm × 80mm deep. No finds. The fill, context 473, was a densely charcoal-stained version of the buried soil, but this could be explained by the proximity of context 437. Possibly the base of a posthole, but doubtful.

616 (Figs 13 and 15) A feature intrusive into the buried soil through the overlying dump (*see* Chapter 7).

The sub-cairn structure

This comprised a hearth with 13 postholes and stakeholes (Figs 13 and 18; Table 1).

The fills were all compact, dark yellowish-brown

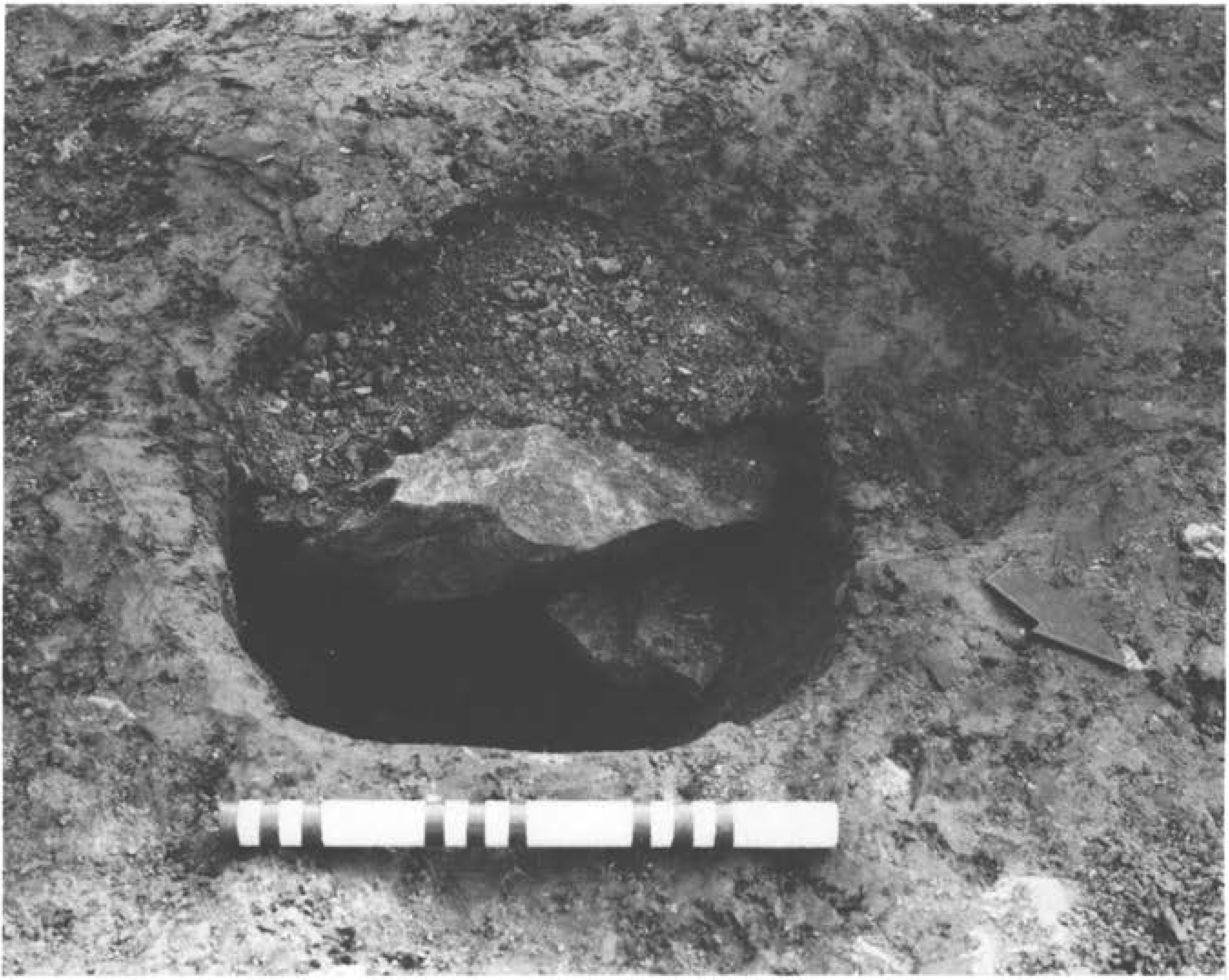


Fig 16 Sub-cairn feature 581, viewed from the north-east; scale in 10 and 50mm divisions

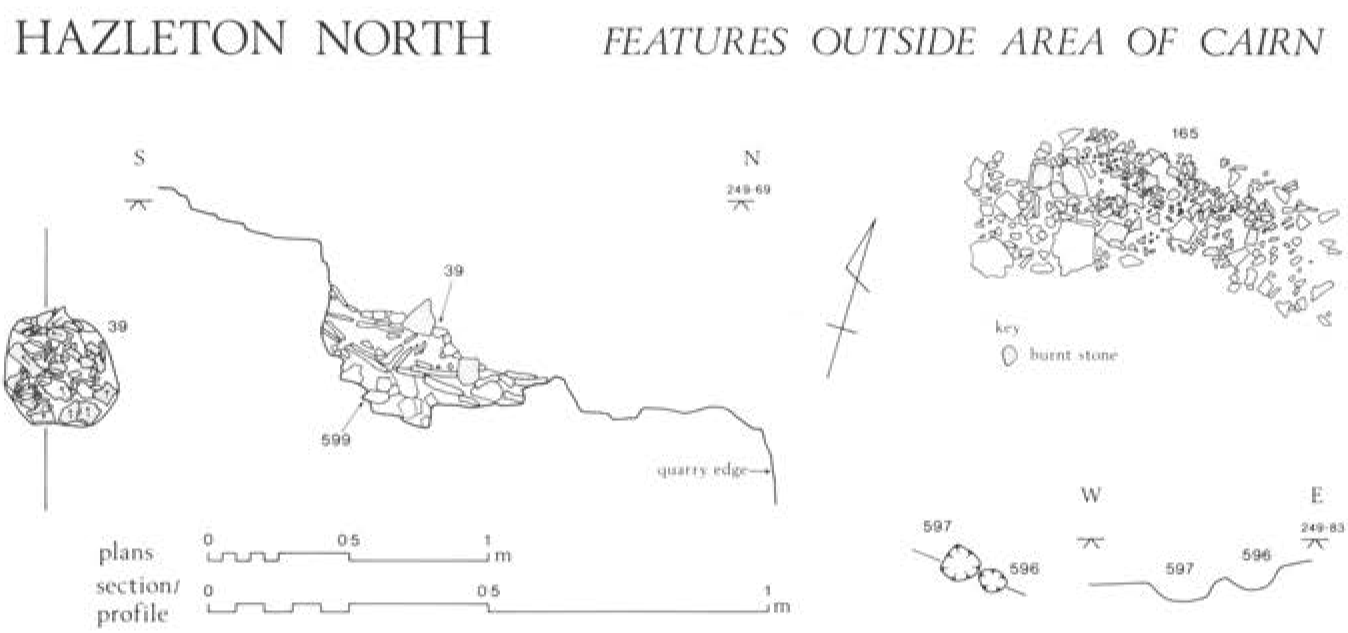


Fig 17 Features beyond the cairn limits: plans, section, and profiles

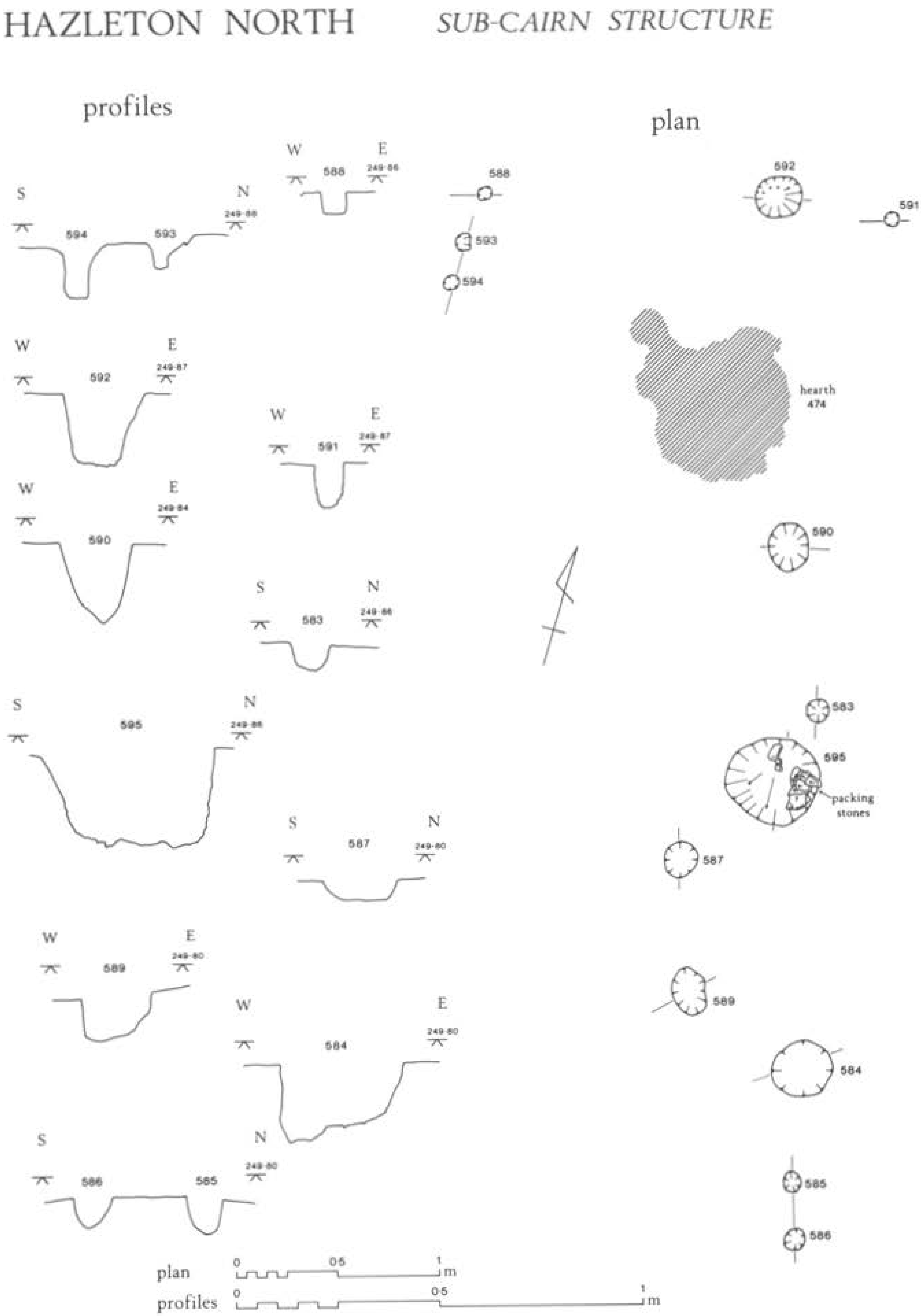


Fig 18 Sub-cairn structure: plan and profiles

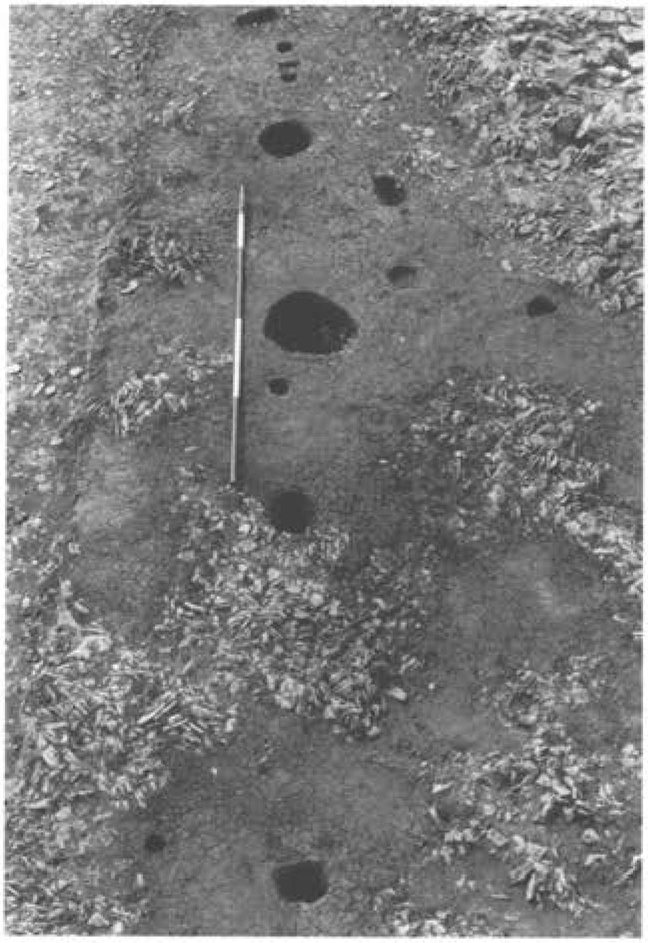


Fig 19 Alignment of postholes and stakeholes beneath the cairn, viewed from the north; scale in 0.5m divisions

soils (10YR 3/4–4/4), with varying amounts of charcoals and charcoal flecks. Only one feature, 595, had obvious posthole packing, although the absence of a post-pipe, both here and in the other features, may suggest later removal of the posts. The remaining larger features (584, 589, 590, and 592) were all regarded during excavation as convincing post-sockets, especially 592, since it penetrated the bedrock, while 587 was less convincing because of its very shallow depth. The smaller features can be regarded as possible stakeholes, especially given the virtual absence of other similar features elsewhere in the buried soil, and because 591, 593, and 594 penetrated the bedrock.

These features occupy an area *c* 5.3m north–south and 2m west–east. A straight north–south line passes through features 592, 590, 595, 584, 585, and 586, and another north–south line passes through 588, 593, and 594. A west–east straight line passes through 588, 592, and 591. Exhaustive examination of the surrounding subsoil failed to reveal any other features, although by the time the features were identified, the subsoil had been excavated to some depth (Fig 19). Thus, some features may not have survived sufficiently to be recognised.

The average depth at which these features were recognised was 100mm beneath the surface of the buried soil. The posts they contained had therefore decayed, or been removed, long enough before the construction of the cairn for their fills to become compacted and their surfaces obscured by soil processes. Thus, there is no evidence that any standing structure was apparent when the cairn was constructed.

The hearth (context 474) occupied an area *c* 0.75–0.8m × 0.7–0.9m. An intense reddening continued through the soil (*c* 60–80mm) to the underlying limestone. Within the reddened area were patches with a high charcoal content. Association between the hearth and the other features was provided by their general propinquity and adherence to the north–south alignment of the features. Finds comprised three flint flakes and two unidentified animal bone fragments.

Dating evidence was restricted to the finds associated directly with the features and to the general spread of finds in the same area, although these finds occurred at a generally higher level than that at which the features were identified. No Neolithic pottery was present in the features, but flint artefacts in the fill of several of them were of a Neolithic character. Moreover, a flake from 595/471 conjoined with another from the buried soil to the east, and a flake from 589/484 conjoined with one from the southern edge of the midden. The general finds distribution provided a clear link between the structure area and the midden (Fig 170). The structure therefore relates to pre-cairn Neolithic activity, probably associated with the midden, rather than to any earlier activity. The absence of Mesolithic flintwork from the area of the structure confirms this. A human cranial fragment from the buried soil near the hearth 474 gave a radiocarbon date of 2925±80 uncal bc (OxA–646), but there is no necessary association between this bone and the structure.

A plot of finds from the surrounding area (Fig 20) shows little correlation between finds and features, and gives no hint of any barrier to the finds distribution being provided by the feature alignments. There is, however, a concentration of findspots in the area around and between features 584 and 595. On the basis of their location and size, these two features could be the sockets for a door or gateposts for an entrance through the postulated north/south alignment, and features 587 and 589 could possibly relate to them in some kind of inset porch arrangement. Support for this interpretation of an entrance comes from the conjoinable flints which provide a link between the midden and the area between 584 and 595 (Fig 20; cf Fig 173).

Peripheral features

A few features, listed below, occurred on or in the subsoil, but lay outside the external cairn revetment. They are therefore not securely related to pre-cairn activity. These features are: a probable posthole (599), a hearth (165), two possible stakeholes (596 and 597), and an area of unspecific deposit (349 and 356) – the last feature is almost certainly contemporary with the construction or use of the cairn.

165, a hearth, undated (Figs 13 and 17) A spread of fire-reddened stones and frequent charcoal flecks (extent 1.2 × 0.4m; thickness 30mm), with no finds.

HAZLETON NORTH

DISTRIBUTION OF FINDS IN AREA OF SUB-CAIRN STRUCTURE

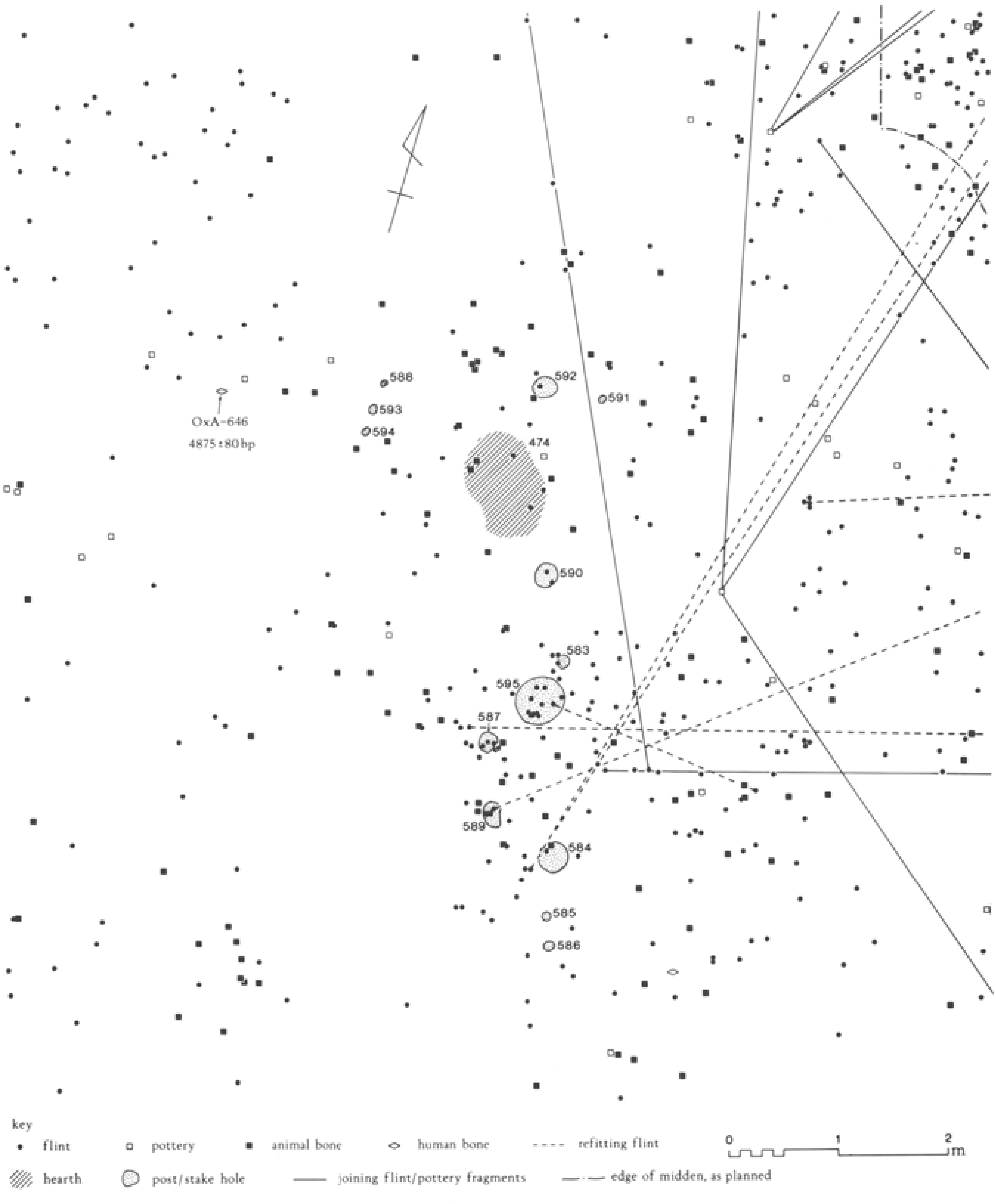


Fig 20 Distribution of finds in the area of the sub-cairn structure

Table 1 Features comprising the sub-cairn structure

Context no	*Diameter (mm)*	*Depth (mm)*	*Context no of fill*	*Finds*	*Main base shape*	*Type*
583	100	60	490		round	stakehole
584	280	180	489		flat	posthole
585	90	90	488		round	stakehole
586	100	90	487		round	stakehole
587	200	50	486		flat	posthole
588	60	50	485		flat	stakehole
589	240–180	110	484	4 flints	round	posthole
590	180	190	483	5 flints	pointed	posthole
591	70	110	482		flat	stakehole
592	210–200	180	481	1 flint	flat	posthole
593	60–40	70	476		flat	stakehole
594	80–60	130	475		flat	stakehole
595	340	320	471	(41 flints (8 animal bone frags (1 quartzitic sandstone frag	round	posthole

349 and 356, unspecific deposit (Figs 13 and 17) Sub-circular patches of dark soil with charcoal flecks. 349 (diameter 1m and thickness 50mm), contained animal bones (three pig teeth and one cattle pelvis fragment) and two flint flakes (at least one probably residual); 356 (diameter 0.6m and depth 40mm) contained no finds. These patches had no concentration of burnt stones, nor reddened soil, and cannot be areas of *in situ* burning. The vestigial stratigraphy was not clear, but the features appeared to sit over the buried soil and under or in a thin stony wash (context 272). They may relate to a pre-collapse phase, rather than to pre-cairn activity. This phasing would accord with their position in the centre of the forecourt, and with their not having been subjected to pre-cairn cultivation. They were probably part of a single deposit (*see* Chapter 7).

596 and 597 were possibly stakeholes (Figs 13 and 17) They comprised sub-circular depressions: 596 (diameter 80–100mm, depth 30mm) and 597 (diameter 120–130mm, depth 40mm). Their fills (450 and 449 respectively) comprised dark soil with some charcoal flecks and no finds.

599 A probable posthole, undated (Figs 13 and 17) A flat-bottomed, near-circular hole cut into the bedrock (diameter 0.4m; depth 0.25m). The fill (context 39) was largely of unweathered angular stones, mostly burnt, with some loose soil with charcoal flecks. No finds. Directly under the ploughsoil. This was not a fire-pit and is probably an undated posthole.

3 The quarries

Summary

Excavation revealed two extensive areas of quarrying to the north and south of the cairn. Most of the material for the construction of the monument is assumed to have come from these quarries. Extraction may have been carried out by exposing a working face and then prising out blocks, using antler picks forced into natural crevices. The quarries remained open during the use of the tomb, but were little used after quarrying had ceased.

Introduction

North and south of the cairn were quarries which had supplied the raw material for its construction. Their presence did not emerge clearly from the contour or geophysical surveys. Once identified, however, the excavation strategy was adjusted to include their partial examination (Fig 35). The east face section of the north–south cairn baulk was extended to include both quarried areas, using a JCB mechanical excavator to excavate trenches to either side of the cairn (Figs 7 and 10). The southern trench was subsequently enlarged by machine up to the line of section 2 (Fig 23), and then the rest of the south quarry excavation was undertaken by hand. A third trench was cut by the JCB towards the eastern edge of the north quarry, and the south-west corner of this latter quarry was excavated by hand.

Fig 21 South quarry: viewed from the east; scales in 0.5m divisions

Generally, the quarry fills matched the patterns found when large features are allowed to infill naturally (cf Limbrey 1975, 290–300). The primary fills were readily distinguishable from the overlying secondary and tertiary fills. Towards their centres, however, the primary fills were very shallow in places because of the large size of the quarries, while the subsequent upper silting had involved successive phases of secondary and tertiary infill, as stabilisation horizons became buried by further colluvial deposits. The eroding cairn provided a distinctive source of infill, marked by an increase in the stone content of the upper fills near the quarry edges adjacent to the monument.

Summaries of the infills are given below to accompany the section drawings. These latter are naturalistic, with two additional conventions: stippling to denote the primary fills and diagonal hatching to show the major stone-free stabilisation horizons; Figure 25 also uses solid black to indicate a hearth. The contextual keys to each section show the variable nature of the primary fills and employ solid lines where context interfaces were well-defined, broken lines where they were less certain. The south quarry was more extensively explored and is consequently described in more detail.

The south quarry

The south quarry was at least 29.8m west–east, and 13.2m north–south, with a maximum depth of 2.2m below the modern field surface. In plan, the exposed area had a curved outline (Figs 21–3). The uppermost *c* 0.5m of the limestone bedrock was distorted by involution formations of periglacial origin, and this formed an unstable upper edge to the quarry sides. A further *c* 0.4m of limestone had been less disrupted by weathering. Below this, the limestone was undisturbed and horizontally bedded, occurring in large angular blocks isolated by the bedding planes and vertical jointing.

The plan of the quarry floor (Fig 23) records all the main vertical steps in the bedrock, showing the depths at which quarrying stopped. These steps also related to the natural fractures of the limestone. The solid limestone was interrupted by horizontal bands of marl, normally only 20–30mm thick, but the whole of the floor at the west end of the quarry was formed by the surface of a major seam of marl at least 100mm deep. Near the centre of the limit of excavation on the south side of the quarry was an unexcavated block of bedrock, the top of which came within 0.7m of the field surface and was probably never exposed during the Neolithic quarrying (Fig 21).

Four sections were recorded through the fill of the south quarry (Figs 24–7). The primary fill (general context no 328) was much lighter in colour, having a high proportion of yellow/yellow-brown, marly material derived from weathering of the exposed limestone. Interspersed within the primary fill were distinct lenses of darker brown, virtually stone-free, clayey material, interpreted as the remains of lumps of topsoil eroded from the quarry edges (eg Fig 24, contexts 217–21; cf Crabtree 1971, fig 39), as well as much less distinct lenses of mixed marl and soil. The complexity of the primary fill arose not only from the interdigitation of material weathered from all horizons of the eroding quarry edge, but also because it included the debris of quarrying activity. Erosion into the quarry must have been taking place while the

Fig 22 South quarry: viewed from the west; scales in 0.5m divisions

quarry was still being worked, and debris from the working processes remained on the quarry floor.

Red deer antlers from the lower quarry fills were scattered across the area of the quarry with some concentration towards the edges (Fig 199). Few of the numerous antlers were directly on the bedrock of the quarry floor, but were usually in the lower portions of the primary fill, which contained virtually no other artefacts, except single Neolithic sherds from contexts 214/215 and 328. Two antlers came from the top of the primary fill, and a single example from the lower secondary fill (context 568). If the interpretation of the antlers as quarrying tools is correct (Chapter 13), they would most likely have been discarded into an exhausted part of the quarry, where silting was already in progress, to become incorporated into the primary fill. (An antler (8481) from the south quarry was submitted for radiocarbon dating at Harwell, but no result was obtained.)

Two small patches containing charcoal fragments, ashy material, and some burnt stones (context 427, *c* 0.6 × 0.3m; context 428, *c* 0.9 × 0.6m; both *c* 50mm deep) were noted within the primary fill (between 100–150mm above the floor) towards the eastern end of the south quarry (Fig 28). Associated with some scorching, these patches were assumed to represent *in situ* burning.

Also at the east end of the quarry a concentration of bones occurred within the primary fill (context 328). These finds (Fig 206) included cattle and pig bones, a cattle horncore, and eight human bones (and fragments). Some charcoal flecks were present, but these bones were not burnt. The concentration coincided with a cluster of antler finds (9771, 9791, 10058, and 10517: Fig 199) at a lower level within the primary fill, and also with the position of an antler (5421) in the overlying secondary fill. The antlers, and the bones stratified between them, had probably accumulated naturally in what was one of the lowest parts of the quarry infilling. The presence in the quarry of these isolated human bones, possibly from the same individual, is enigmatic.

Other cultural deposits or concentrations of finds near the base of the quarry were stratified at the surface of the primary fill and probably related to a phase when the quarrying was partially complete or finished. The most substantial was context 40 (Figs 25 and 28), with much charcoal, traces of a grey ashy substance, fragments of animal bone (mostly burnt), and pottery (over 100 pieces, all from the same vessel). This deposit had a maximum depth of 80mm and was spread over 0.5–0.7m north–south. On its west side, context 40 was truncated by the JCB, leaving a west–east extent of 0.4–0.6m. The northern edge had a marked concentration of burnt stones. Although there was little *in situ* evidence of burning, the deposit was probably the remains of a hearth.

Closely associated with context 40 was another deposit (context 166) of mostly burnt fragmentary bones of cattle and sheep (Figs 28 and 206). This deposit (0.52 × 0.65–1.05m) formed a lens within the stony soil of context 141 and also appeared to be an *in situ* deposit on the floor of the slightly silted-up quarry. The sherds (context 40) only represent some 30% of the vessel (Chapter 9); two other sherds, apparently from the same vessel, were found elsewhere within the secondary fill (context 563 and context 212). The mechanical disturbance of context 40 could have led to the loss of much of this vessel (Fig 157, 32). Animal bones from context 166 were used to obtain two radiocarbon determinations, resulting in a date of 2875±50 uncal bc (OxA–915/916). This confirms the suggestion that contexts 40 and 166 could relate to a phase of monument use or even construction. A further small area of probable burning (context 404) was recorded nearby (Fig 28).

Due to the large extent of the quarry, the thickness of the secondary fill varied greatly and in inverse proportion to the depth of the primary fill. Within the secondary fill was a stabilisation horizon of almost stone-free, worm-sorted loam (567). At the western edge of the quarry, context 212 must represent a compacted amalgam of the secondary deposits at that point. The exceptional Bronze Age arrowhead (Fig 166: 30) from context 212 could, typologically, postdate the cairn construction by over 1500 years.

Near the point where the quarry edge approached to within a metre of the entrance to the south burial chamber, a deposit of limestone slabs (context 45, *c* 2.5 × 2.5m; Figs 25, 28, and 29) overlay the primary fill. These were unweathered angular slabs up to 0.5m across, together with small broken fragments with vacuous interstices. The slabs spilled down fanwise into the quarry in a discrete group and at an angle of 30° to the horizontal, in a manner consistent with a single-phase deposit. A few fragments of

Fig 25 South quarry: section two

charcoal were present among the stones, as were a pig tooth, cattle cranial fragments and a tibia, two sheep/goat bone fragments, and a human humerus shaft (Fig 206). The slabs in context 45 resembled those used in the cairn construction and, from their position, were likely either to have slipped or been thrown down into the quarry from the nearest part of the cairn. The eroding quarry edge may have undermined the outermost stonework, thus creating a miniature landslide, or human interference with the south entrance could have involved the discard of slabs into the quarry. The presence of the animal bones is unexplained, but the human bone could have been derived from the outer burial deposits in the entrance, which were definitely disturbed (Chapter 6). Whatever their precise origin, the context 45 slabs were deposited prior to the later eighteenth century (dated by a shoe-buckle in overlying context 5; *see* Appendix 9) and at some time after the primary fill of the quarry had accumulated sufficiently to seal the quarry face.

The secondary fill towards the eastern end of the quarry contained evidence for further undatable human activity. Context 338 (Figs 27–8) consisted of a spread of charcoal-rich soil (50–100mm deep), containing four fragments of burnt animal bone and burnt fragments of limestone. Adjacent was a further spread of a very similar deposit, context 327 (up to 150mm deep), which contained a single fragment of animal bone. Contexts 327 and 338 may together represent some kind of transitory occupation of the sheltered hollow provided by the silted-up quarry, at a time when the cairn had long since fallen into disuse.

In the tertiary fills, two Iron Age sherds were found in contexts 3 and 566, while Romano-British pottery was most frequent in context 563 and above. Several Neolithic sherds also came from context 563, and included conjoins with sherds from the sub-cairn soil (Fig 155), suggesting that material from the subsoil adjacent to the cairn and quarries was at this date being redeposited as a result of cultivation.

The uppermost fill (context 3) was a fairly uniform ploughsoil, distinguished only by the increased density of limestone fragments towards its northern edge, undoubtedly due to the erosion of the adjacent cairn. There was a fairly precise division between the uppermost stabilisation horizon (5/222/570; possibly truncated in places because of deeper ploughing) and the modern ploughsoil. An approximate date could be attached to the deposition of the latter from the shoe-buckle of *c* AD 1750–70 in context 5. Before that, the existence of the underlying quarry would still have been obvious.

Only one feature (context 620) occurred in the uppermost fill: probably a modern posthole. The eighteenth-century shoe-buckle from context 5 was the stratigraphically lowest modern find; fragments of glass, clay-pipe, metal, and modern ceramics were restricted to context 3.

The succession of stabilisation horizons (567/568, 212/564, and 5/222/570) and tertiary ploughsoils (145/565/566, 6/563, and 3) is assumed to indicate major interruptions of the local agricultural regime through time. The finds offer only rough clues as to date. Probably by the Bronze Age the primary fill was covered by a substantial and stable secondary fill, the quarry having become an overgrown, but still very pronounced, depression. Possibly subsequent to the deposition of the Bronze Age arrowhead, and before or during the Iron Age, the earliest main phase of cultivation began. Following a period of stable conditions, in which a worm-sorted soil developed, another main phase of cultivation occurred, possibly Romano-British in date but certainly pre-eighteenth century. The final phase of arable landuse was post-eighteenth century and began before 1920, when Crawford made his observations (1925, 101), and probably before Witts's record of 1883. It was perhaps not until this final phase of cultivation that the cairn itself was ploughed over.

Two column samples through the south quarry fills were taken for mollusc analysis (Chapter 14). Their positions on the sections (Figs 24–5) show that both samples were close to the cairn-side quarry edges, where the deposits had a high limestone content and the stratigraphy comprised a thick primary fill overlaid by an apparently simple secondary and tertiary fill (within which no subdivisions could be defined, except context 222, probably correlating with 570). The presence of the mollusc species *Candidula intersecta*, introduced in medieval times, at the base of the tertiary fill in column 4 some 0.6–0.7m below the field surface, accords with the chronology of the later infills. Six spot pollen samples were taken from the south quarry (*see* arch drg 415), but initial examination revealed only sparse pollen survival.

The north quarry

The bedrock into which the north quarry was cut was the same as that on the south quarry, and the infill followed a similar pattern. The investigation of the north quarry was far less extensive, and the evidence from the three excavated areas (Fig 30) can be summarised.

The western trench

This trench (32 × 2m) provided a north–south section across the quarry (Figs 31–3), which had a maximum depth of 2.25m (below field surface). There was an unquarried step of bedrock in the centre of the trench. In contrast to the unquarried plinth in the south quarry, this bedrock step was lower relative to the quarry edges, it had an irregular surface created by the removal of some slabs, and it was covered by primary fill (context 88). This indicated that the step had been exposed, partially quarried, and then left proud. To the south of the bedrock step, the floor of the quarry was formed by the surface of a seam of yellow marl; to its north, the floor was solid limestone.

The primary fill in this trench behaved in a regularly ditch-like fashion, with a concave profile either side of the bedrock step. Stoneless, clayey lenses within the primary fill (contexts 53–5, 57, 60, 75, 86, and 101) were most frequent close to the south edge of the quarry. Confirmation of these lenses as eroded lumps of topsoil was provided by a soil sample from context 55 (Chapter 15). Eight finds of red deer antler came from the primary fill (2 in context 52; 1 in 55; 1 in 59; 1 in 85; 2 in 102; and 1 in 171), and a further antler came from each of contexts 48 and 96. The antler from context 85 was radiocarbon dated to 3000±60 uncal bc (HAR-8350).

The upper infill at the south end was dominated by stony deposits, which tended to obscure boundaries between the infilling episodes. Most of these stones had derived from the cairn as the result of weathering and cultivation, but context 73 (Fig 32), which comprised large angular slabs, is unlikely to have had a natural origin. A possible source for these slabs was the large disturbance, context 614, in an adjacent part of the cairn (Chapter 7 and Figs 56 and 147). Context 71 also contained some large angular slabs and could have represented a subsequent erosion phase of material from the same source as the stones in context 73. The tip-lines highlighted by these two contexts probably indicated the position of stabilisation horizons, which were otherwise obscured by the density of stones. Towards the bedrock step, however, a series of stabilisation horizons (82, 80, 78, and 70) with intervening derived ploughsoils (81, 79, 77, and 41) were manifest. Contexts 41 and 47 contained modern finds of fragments of glass and metal and were the equivalent of context 3 across the south quarry, representing the most recent phase(s) of agricultural activity for which a single Romano-British sherd in the top of context 48 provided a very crude *terminus post quem*.

The contrastingly stoneless secondary and tertiary fills at the north end of the quarry reflected their distance from the eroding cairn and the absence of immediately adjacent quarry edges, which also accounted for the relative shallowness of the primary fill. The most distinctive element of the fill was a very dark band (context 95) beneath the stabilisation horizon represented by context 90 (Fig 33), apparently a post-depositional effect resulting from a very long period of stability in the overlying fill.

The eastern trench

This test cutting (Fig 30) showed the quarry to be only 9.25m wide at this point. The quarry was again subdivided by an unexcavated pinnacle of bedrock, but the floor was of solid limestone

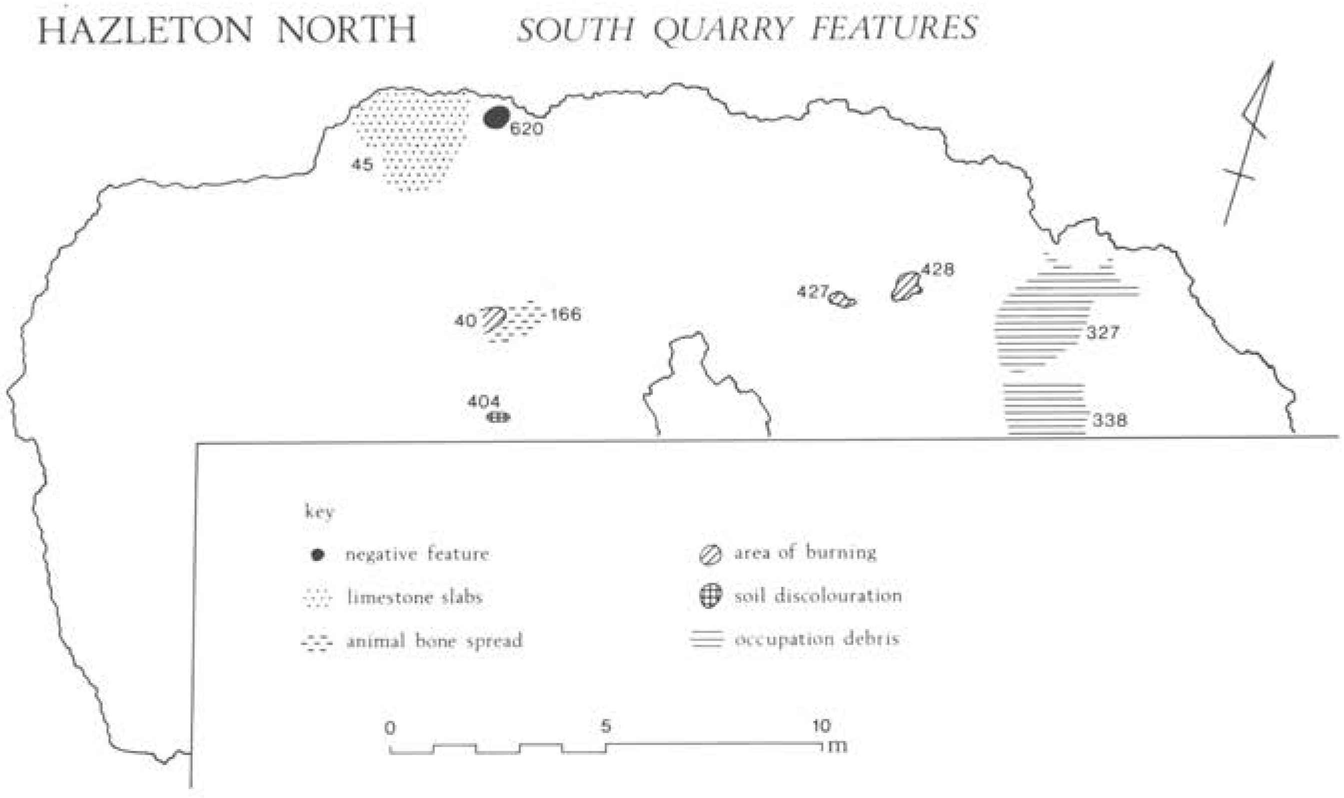


Fig 28 South quarry: location of features

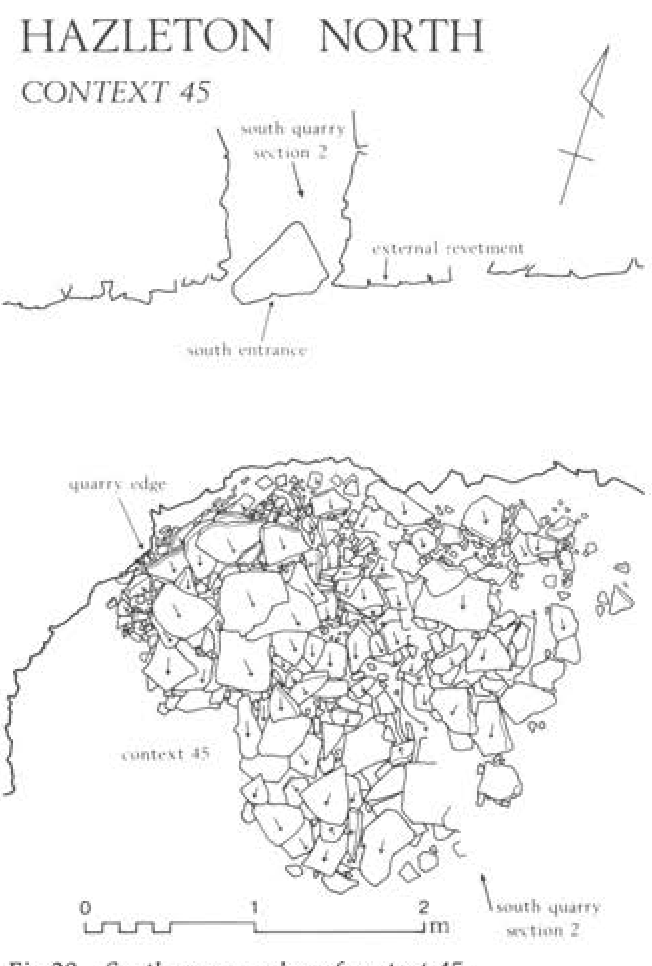


Fig 29 South quarry: plan of context 45

throughout. Three fragmentary red deer antlers were found in the primary fill, and a Neolithic sherd came from the secondary fill. The west face of this trench was recorded (arch drgs 53 and 695).

The south-western cutting

This cutting (Figs 30 and 34) was designed to investigate the plan of the quarry and confirmed that the quarry edge did turn northwards and did not continue towards the west end of the cairn. The stratigraphy was virtually identical to that in the west trench on the other side of the main baulk. A thick primary fill contained four red deer antlers; the secondary and tertiary infills were extremely stony. The north face section was recorded (arch drg 104).

The extent of the quarries

The outline of the south quarry

The full extent of this quarry remains unknown, although the character of the infills seen in section and the geophysical surveys provided indications, and a reconstruction of the outline has been attempted (Fig 35). At the west end of the quarry, the thickness of the primary fill suggested that in the whole of this area the section lines were very close to the limit of quarrying. The reconstruction, therefore, shows the quarry edge making a sharp northwards return from its south-western corner at point A on Figure 35.

On the west side of the unquarried bedrock plinth in the west–east section (Fig 35, C), the primary fill was only 0.25m beneath context 569 (Fig 26). This implied that at point B (Fig 35) the quarry face retreated southwards. The extreme southern extenuation of the

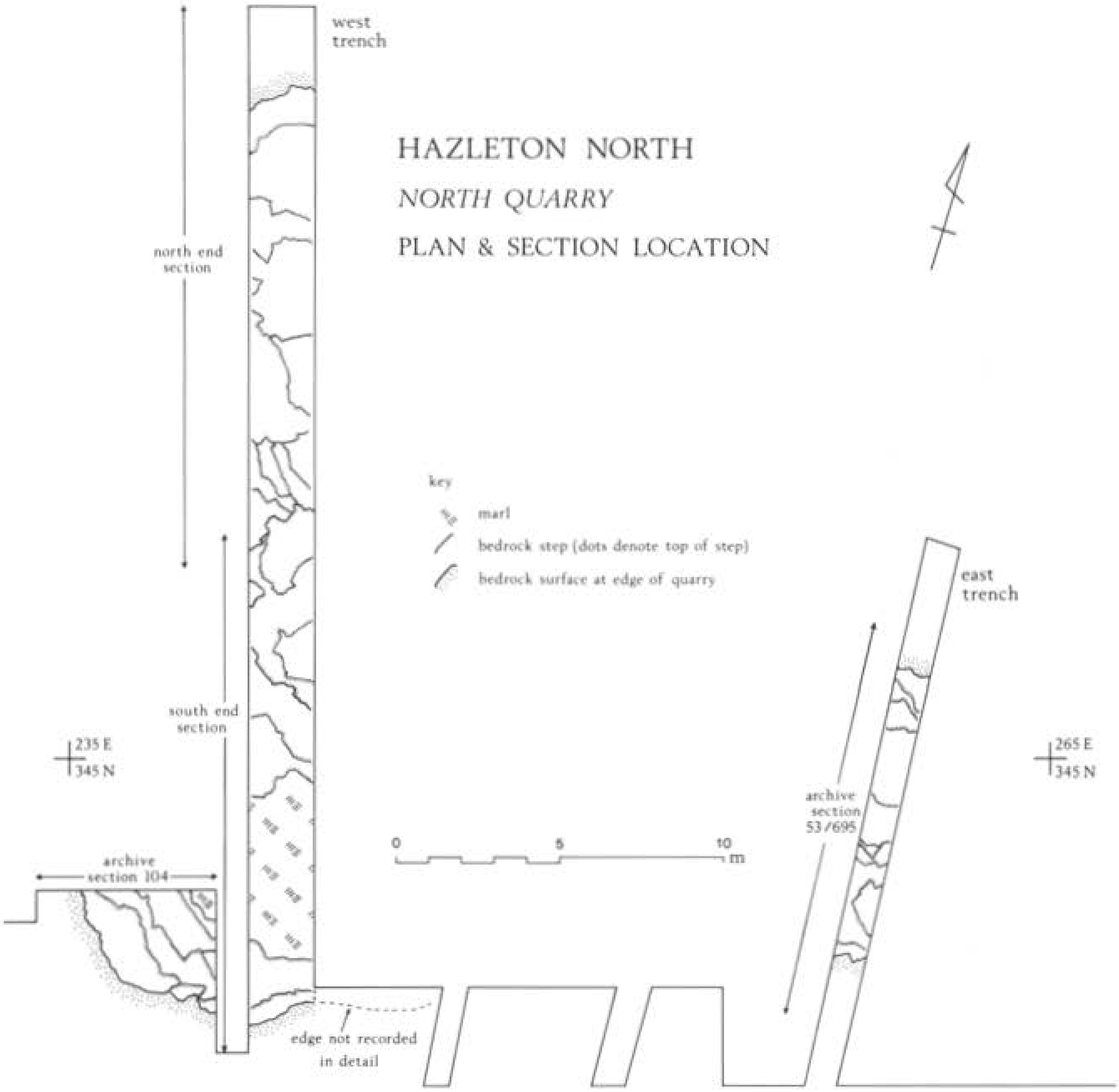


Fig 30 North quarry: plan of the excavated areas and location of drawn sections

quarry here, giving a maximum north–south extent for the quarry of 28m, is based entirely on hints from the geophysical surveys (Figs 221–2). East of the unquarried bedrock area the primary fill remained relatively thick for the rest of the section (Fig 27), implying that the quarry edge was not far to the south at point D (Fig 35), although slightly further away than was the case at the west end of the section. Again the magnetometer survey gave some support for the pronounced curve of the quarry edge at its easternmost point (Fig 221). This reconstruction of the southern limits of the quarry is highly conjectural, however, and the outline might have been less irregular, particularly if the unquarried bedrock area at point C was a freestanding plinth, rather than the quarry edge.

Both of the geophysical surveys suggested the possible existence of a further quarried area to the south-east of the limit shown in Figure 35. The implication is that there may have been a separate, oval quarry (*c* 18 × 8m) in this area. Such a quarry need not, however, be of Neolithic date.

The outline of the north quarry

The reconstruction of the north quarry is also very subjective. The supposition that a single north quarry was involved depends mainly upon the contour and geophysical surveys.

The unquarried bedrock step in the west trench, and the primary infill associated with it, suggested the proximity of a quarry edge. For this reason, the projected western edge of the quarry is shown with a pronounced curve inwards (E on Fig 35). This is not visible on the contour survey (Fig 5), nor on the geophysical surveys. A fairly close proximity for the quarry edge was also suggested by the amount of primary infill overlying the unquarried pinnacle in the centre of the east trench (at point F on Fig 35), but the projected quarry edge has here been extended eastwards to accommodate the curve shown on the magnetometer survey (Fig 221). On the

Fig 31 North quarry: west trench, viewed from the north; scales in 0.5 and 0.1m divisions

south side, the quarry edge immediately to the east of the west trench was partially exposed (Fig 30) and indicated a fairly straight line for the quarry edge between the west and east trenches.

The central unquarried steps in the bedrock floor of both west and east trenches could have been related, either because of some geological feature which influenced the extraction procedure, or because they represented a previous limit to the quarry, subsequently partially broken through by continued quarrying to the north or south.

The contour surveys suggested a single depression on the north side of the cairn: at the detailed level (Fig 5), an outline which approaches that shown in Figure 35. The geophysical surveys suggested a concave curve to the north-eastern edge of the north quarry, and that is the basis for the projected line linking the west and east trenches.

The sequence and method of quarrying

There was no clear evidence for the sequence in which the quarry areas were exploited, but there were some circumstantial indications. First, there appears to have been no quarrying further to the west of the exposed limits of both quarries. Economy of effort might dictate that quarrying would have begun near the central zone of the proposed cairn. Second, the floors of both quarries were of marl at their west ends and solid stone at the east ends: this might suggest that coming down to marl caused the expansion of the quarries eastwards (also north and southwards). This assumes that the marl continues and perhaps rises to the west and dips to the north and east. The sequence of quarrying may therefore have been from west to east, and outwards from the cairn. On the other hand, the maximum depth of

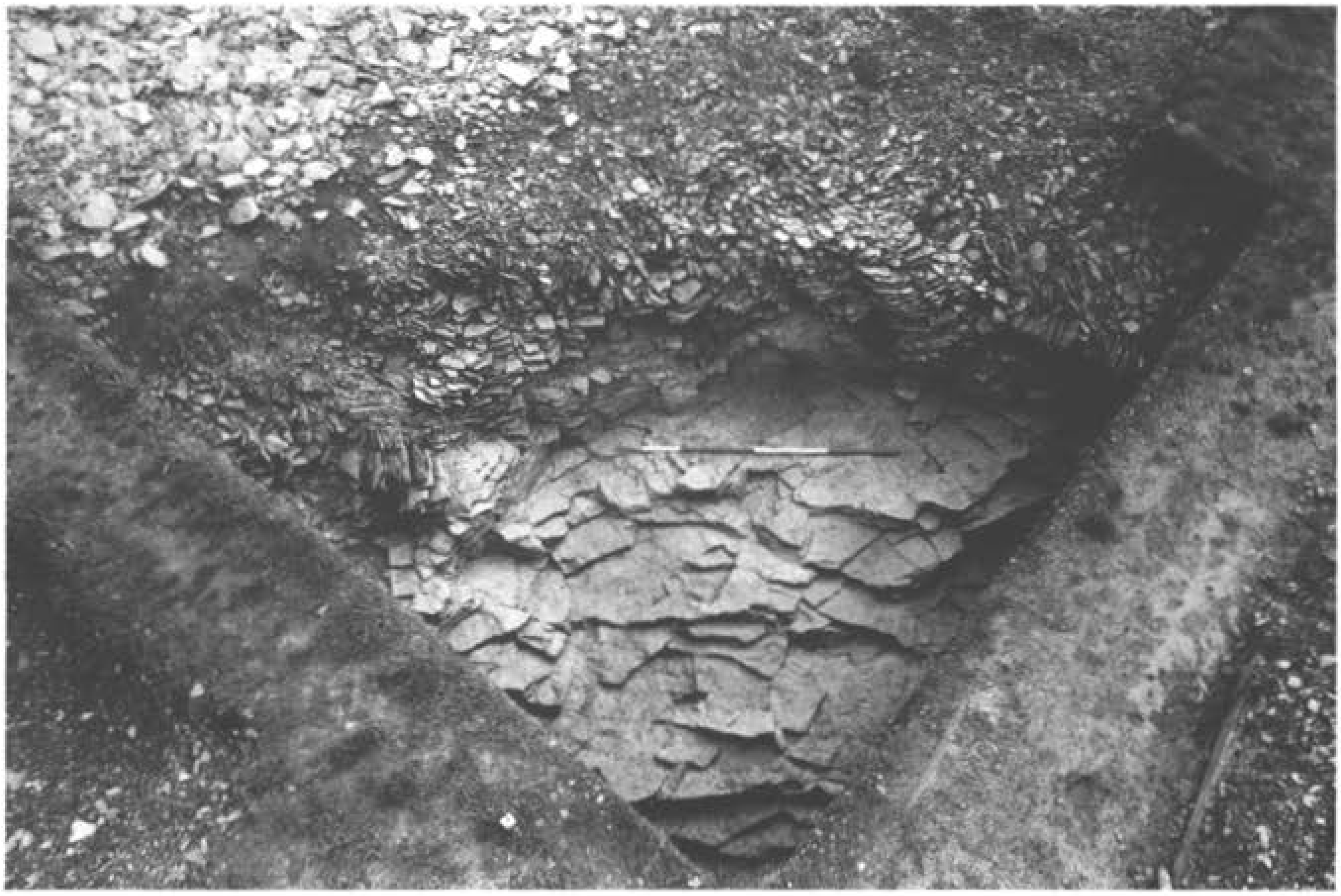


Fig 34 North quarry, south-western area, viewed from the north-east; scale in 0.5m divisions

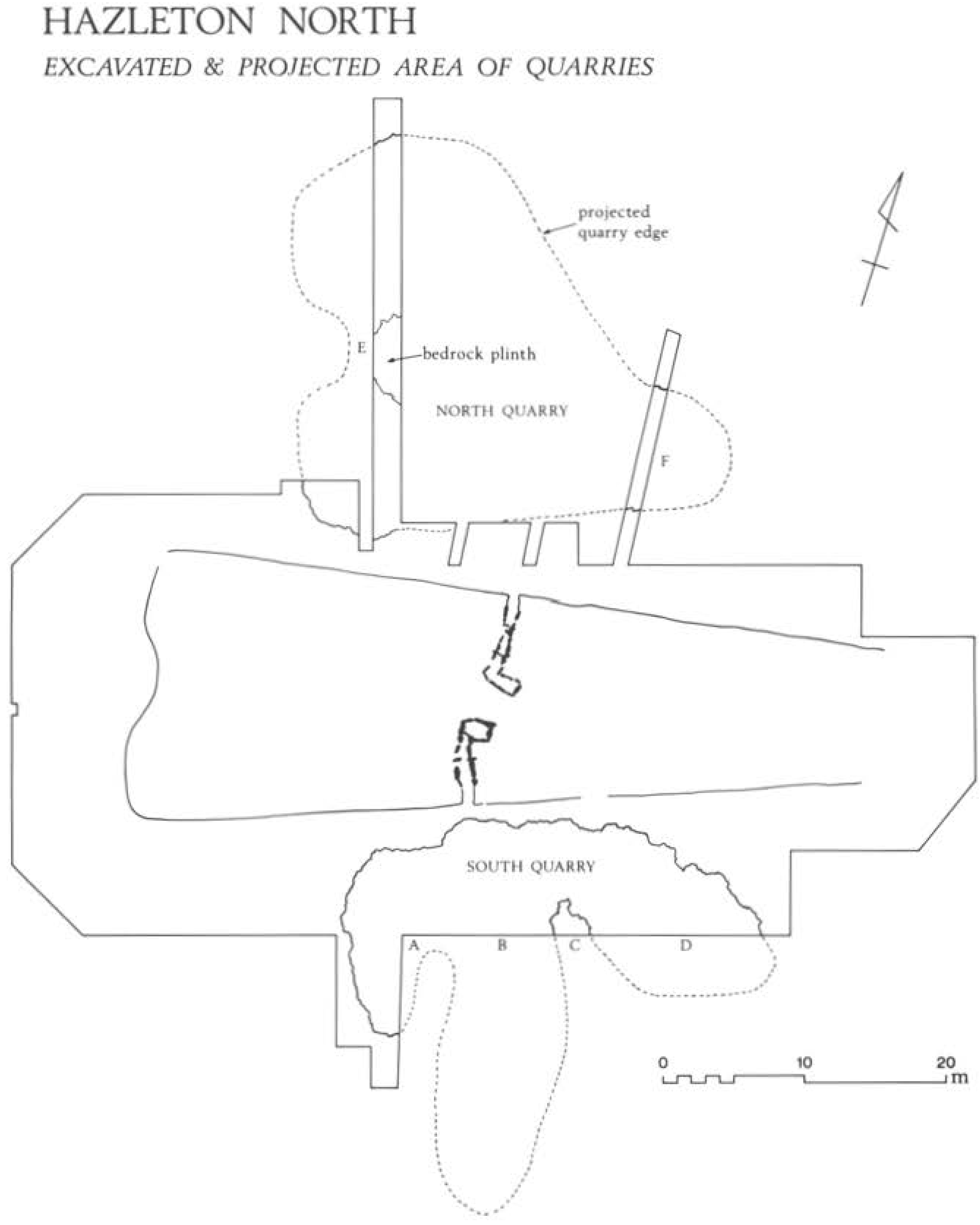


Fig 35 Suggested original extents of the north and south quarries

quarrying was approximately identical wherever investigated, and marl as well as stone was used in the construction of Hazleton North. Thus, for the above explanation of the quarry's expansion to hold good, it must be assumed that quarrying below a certain depth was not considered economic of labour.

Whether the exploitation of the quarries proceeded simultaneously is unknown. The presence of quarries on both sides of the cairn is presumably due to economy of effort, although it cannot be demonstrated that material from the respective quarries was used to construct the corresponding sides of the cairn. The relative equidistance of both quarries in a westerly direction may have been due to the practicalities of extracting appropriate construction material, but the absence of quarrying near the west end of the monument is likely to have been a deliberate design feature.

The presence of the projecting block of unquarried bedrock in the west–east section through the south quarry, which had a northwards continuation as a pronounced step in the bedrock of the quarry floor (Fig 23), was suggestive of a major subdivision to the south quarry at this point. There may originally have been two separate quarries here, one to the west, the other to the east, subdivided by a baulk of which the unexcavated block was the last remainder. If the reconstruction of the south quarry extent (Fig 35) is accepted, there might originally have been a further subdivision into two separate quarry areas at the west end. Indeed, the quarrying may have proceeded in a series of initially separate quarry pits, these subsequently becoming partially interlinked at a late stage. If this method of sequential quarrying was the case, then it may have been linked to a sequential method of cairn construction, with the start of each new quarry area reflecting the end of minor halts in the cairn construction.

The bedrock steps in the centre of both trenches across the north quarry could be an indication of an original limit to quarrying at that point, suggesting two separate quarries to north and south of it which were subsequently joined by its partial removal. As with the south quarry, the chief reasons for postulating that the southern part of the north quarry could have been exploited before the northern depend upon the presence of marl and the economies of effort. The latter argument is perhaps weaker, since it could be held that it would be more efficient to start quarrying at the furthest point northwards and then move south. This would assume, however, that the total quarrying requirement was known in advance and that the quarrying was precisely controlled.

Little can be said about Neolithic methods used to extract the stone. No markings of any kind were observed in the quarry. The discarded red deer antlers which littered the primary quarry fill must be presumed to have been tools used in the quarrying process: perhaps as general purpose levers, wedges, and rakes. Other possible tools of less durable materials, such as wooden levers, mallets, spades, and basketwork buckets, would not have survived. The extraction technique may have been to expose a face in the bedrock, possibly starting with a semicircular clearance (Brill 1977, 19), then to prise up blocks of stone using levers inserted into natural crevices and bedding planes.

4 Cairn construction

by Alan Saville and Jon Hoyle

Summary

Construction of the cairn began with the laying out of the east–west axial alignment and the placing of dumps of material to either side of it, directly over the old land surface. On top of these dumps, the cairn was built up by sequential cellular units, the revetments of which provided structural cohesion. The orthostats defining the chambered areas were probably in place at an early stage of construction. The outer cairn was completed by a carefully-built revetment, forming a blank drystone facade around the whole monument, except for narrow breaks at the two entrances.

Introduction

Prior to the construction of the Hazleton North cairn, there was no special preparation of the pre-existing land surface, which was, at least partially, a cultivated soil.

As soon as the cairn was exposed by excavation, numerous subdivisions were apparent, defined in plan by regular alignments within the general mass of stonework. These alignments formed a pattern of roughly rectangular units to the north and south of an axial east/west subdivision marked by a ridge of stones pitched against each other (eg Figs 68–9). This method of construction was used to form the entire core of the monument: a solid internal cairn to which an outer envelope of stonework, with a fine external face, was subsequently added. The method of construction dictated the method of excavation; an attempt was made to clarify each cellular unit in plan and to elucidate its components and its relationships to adjacent units (Fig 46). These units comprised masses of stones and other deposits bounded by vertical drystone revetments. Excavation proceeded by defining these revetments, then removing part or all of the internal mass of their fill to leave the revetments isolated. This method facilitated the recording of the units, but was 'anti-stratigraphic', in that the revetments in every case formed an integral part of the masses of stones they revetted and had never been freestanding (*see below*). The cellular plan of the cairn and the alphabetic designations (A to W) given to the units are shown in Figure 36, which also shows the location of the sections across the cairn (Figs 42 and 53). A longitudinal section through the south-west part of the cairn was also recorded (Figs 39 and 40).

The system of cellular units was not the initial part of the construction method: this began with dumps of material on the land surface. These dumps were usually only of soil and/or marl and were not normally revetted except on the axial west–east alignment, which was established as a basic subdivision at the beginning of construction. The individual dumps were rarely fully exposed in plan, because of the technique of excavation unit by unit, and their edges were later extrapolated where necessary. This is emphasised, because there were problems of reconciling the relationships of individual dump contexts and the plans of the dumps (Fig 41) are in part schematic. Some dumps are identified by a string of context numbers (the result of designating dump layers separately within each unit), because it was only realised later that the dumps were continuous deposits running beneath the cellular revetments. The dumps are thus de-

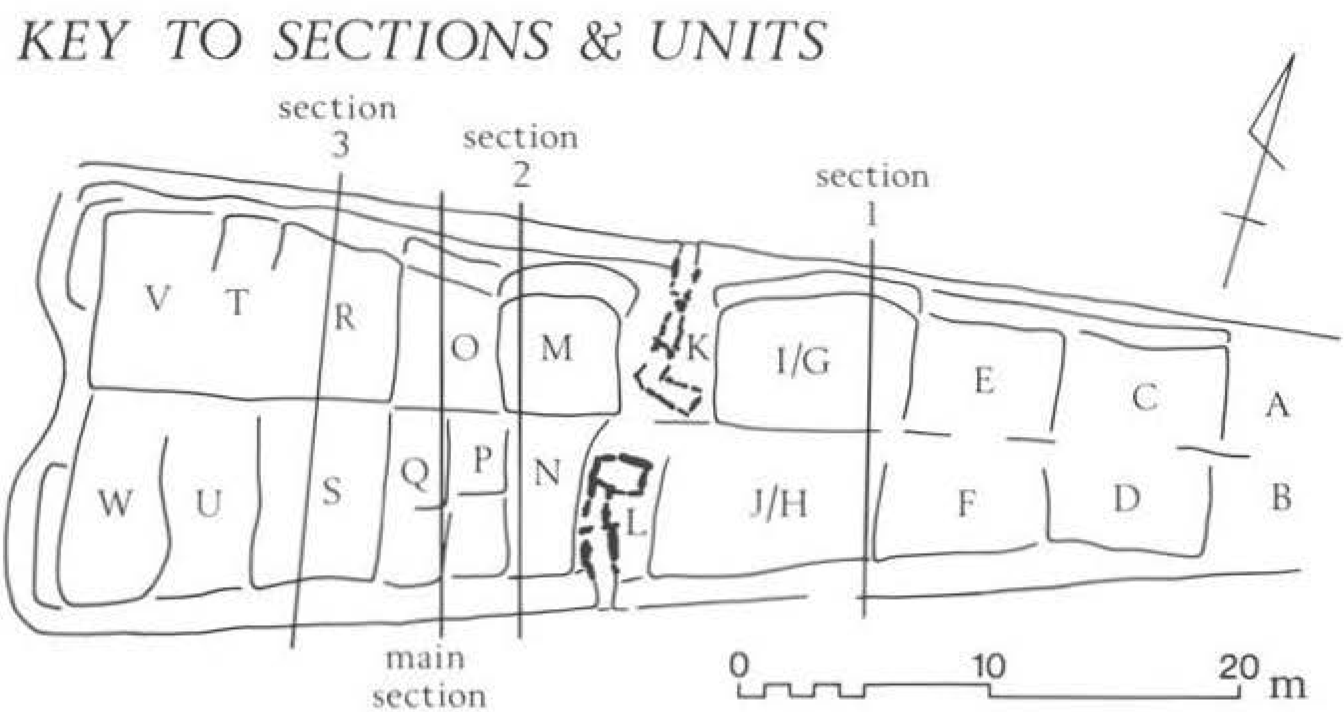


Fig 36 Key to the alphabetic designations of the internal cellular units, with the locations of the drawn north–south sections

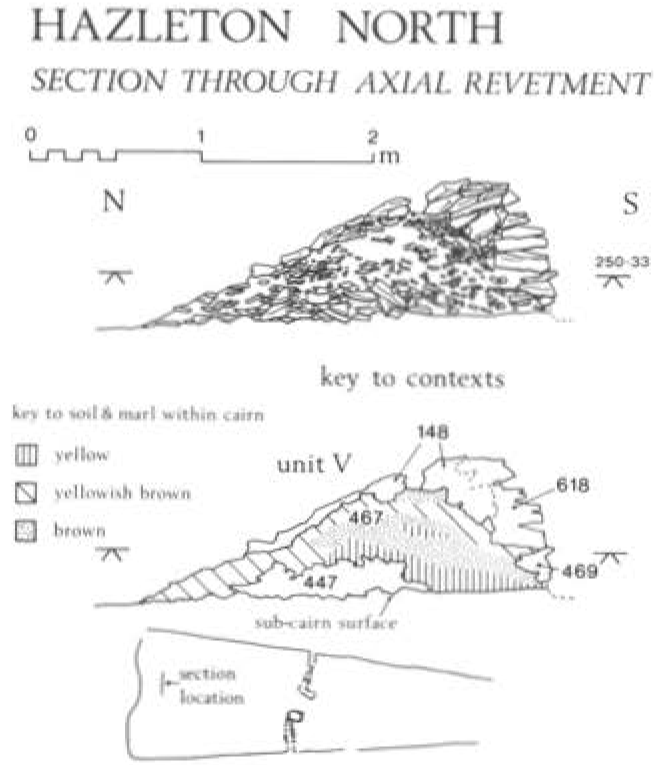


Fig 37 Section through the axial revetments and primary dumps beneath unit V

scribed in groups with reference to the overlying blocks of cellular units.

The primary dumps

Dumps beneath units R/T/V

The initial deposits in this area, directly overlying the pre-cairn soil, were the two dumps 447 and 269/293/543. The former was a dump of stone rubble, with some marl (*c* 2.5 × 5.5m and up to 0.25m thick), the latter was a larger dump (or several successive dumps) of mixed soil and marl (9 × 7m and up to 0.45m thick). The orientation of 447 was north–south, whereas 269/293/543 was oriented west–east and revetted along its southern edge at the axial alignment by a south-facing revetment (context 469) of two to three courses of rough angular slabs (Fig 42, section 3). Dumps 447 and 269/293/543 were both overlain by a third dump, 467 (5.5 × 2.5m and up to 0.5m thick), comprising lenses of stony soil and marl (Fig 37). This dump was also revetted by 469. There was a slight break in the alignment of revetment 469 at the point where the two revetted dumps met, and the west end associated with 467 may have postdated the eastern stretch. However, the more uneven edge of the eastern end of 469 (Fig 41) was due to some slipped stones at the base and also because the true line of 469 was obscured in places by the overhanging subsequent revetment 618. The character of these revetments, which were not drawn in elevation, is shown in Figure 38.

Dumps beneath units S/U/W

The initial dumps in this area were both of stone rubble. To the west, dump 455 (*c* 1.9m west–east, maximum thickness 0.2m) was an initial lens of the larger dump 446, which completely covered it. To the east, dump 330 (5 × 4.5m and up to 0.5m thick) was oriented north–south with its northern edge abutting the face of revetment 469. Both dumps 330 and 455 are visible on the west–east section (Figs 39–40, sections 1–3), and 330 is also on a north–south section (Fig 42, section 3), but only 330 was recorded in plan (Fig 41). Dump 330 was overlain by a subsequent dump of mixed soil and marl, 309 (8 × 4.5m and up to 0.65m thick), which did not extend as far north as the axial alignment. Dumps 309 and 455 were both overlain by a stony marl dump 446 (6.5 × 4m and up to 0.7m thick), which extended north to abut the face of revetment 467. Both dumps 309 and 446 are shown in section (Figs 39–40, sections 1–2), while dump 309 also appears on Figure 42, section 3. The eastern edge of 330 was overlain by a thin marl lens (552; maximum thickness 150mm, horizontal extent unknown) and regarded as a final element of the primary dumping in this area (Figs 39–40, sections 2–3).

Dump beneath units C/E/G/I

The initial deposit in this area comprised a single long dump, oriented west–east, of mixed soil and marl with limestone fragments, 210/225/278/291 (17.5 × 3–5m wide and up to *c* 0.3m thick). This dump represented several separate episodes of dumping, but as additions and extensions to a single dump, rather than involving discrete dumps as beneath units R/T/V or S/U/W. On its southern edge, at least in the area of unit I/G, this dump was revetted by a south-facing axial alignment (559) of at most three courses of horizontally-laid slabs. This dump appeared in section beneath units I/G (Fig 42, section 1). In the axial area, both 225 and the revetment 559 overlaid a pronounced (200mm thick) rise, composed of material interpreted as redeposited soil (624). This context was not observed in plan. The axial revetment 559 (Fig 41) was interrupted by the modern intrusion 613 and was terminated on the east by the modern intrusion 610 (*see* Fig 147), both intrusions penetrating through the cairn to the surface of the buried soil. Although the south side of the eastern extremity of the dump in this area was also absent because of intrusion 610, it was clear that the dump had not extended further east than the approximate centre of unit C. The axial alignment 559 presumably extended as far eastwards as the dump which it revetted and could conceivably have continued right to the tail of the cairn.

Dump beneath units F/H/J

The shallow primary dump 296/393 consisted of a deposit of mixed soil, marl, and small stones (*c* 12 × 5m and up to 0.2m thick) beneath unit J/H and terminating approximately halfway across the area of unit F. On its northern edge, this unitary dump abutted the external face of revetment 559, although in the only recorded section (Fig 42, section 1), 296 can be seen to stop short of 599 at a point where a stone from the overlying 461 has subsided (probably through 296) into the redeposited soil 624. At its north-west corner, this dump extended beyond the western limit of the dump to the north and its revetment 559. There is a possibility that at this point a further low axial revetment (462) of two to three courses of horizontal slabs, which had an external face to the north, acted as the revetment to the dump. This relationship does not emerge clearly from the excavation records, however, which implied that the dump was unrevetted at this point and its edge overlain by 462. For this reason, context 462 is shown on Figure 46, rather than the plan of the dumps. There was no indication of dumps continuing to the east in this area, the initial phases of building in unit D relating directly to the cellular construction.

Dump beneath units K/M/O

The primary dump in this area (377/379) was again a mixed deposit of soil and marl with stone fragments (*c* 9.5 × 5m and up to 0.6m thick). On its southern edge, this dump was partially revetted by 448, comprising two to three courses of horizontally-laid slabs and forming part of the initial south-facing axial alignment (Fig 43). Revetment 448 was not interdigitated with the earliest, lowest lens of the dump, nor did it continue along the whole length of units K/M/O, but was only present within unit M, the only part where the dump reached as far south as the axial line. On its western edge the relationship of this dump was not clearly recorded. Its base at this point was a small marly lens, 551, only 100mm thick (arch drg 496), which overlay the east edge of the dump 543 to the west. In section, 551 was overlain by 377/379 (Fig 56), which in

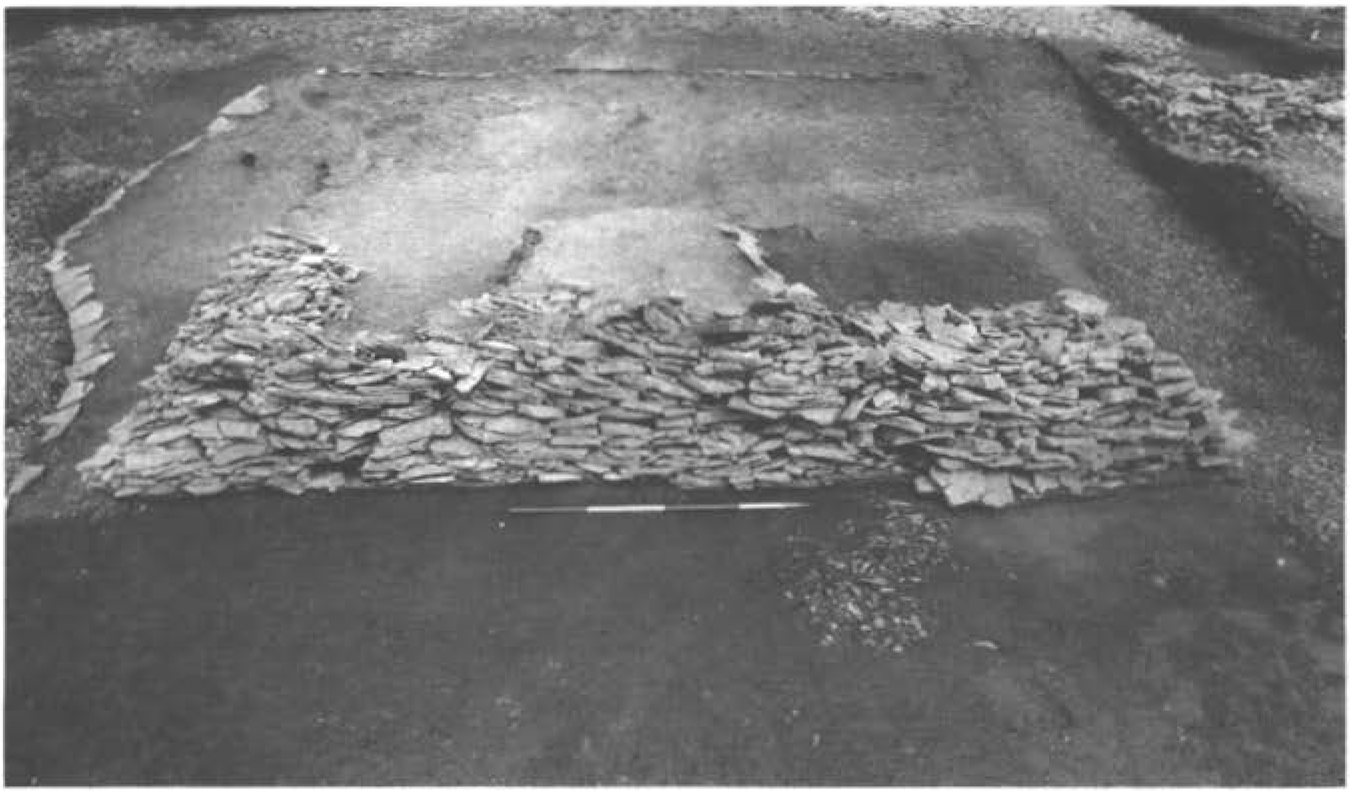


Fig 38 Face of superimposed axial revetments 469 and 618, viewed from the south; scale in 0.5m divisions

turn was assumed to postdate the dump to the west. To the east, this dump abutted the rear of north chamber orthostats 282, 408, and 409 (Fig 44) and the rear of the basal courses of intercalary revetment 415. The latter causes a slight interpretative problem, in that the upper courses of 415 (ie the incipient corbelling 274) were stratigraphically quite late in the construction sequence. Either the lower courses were laid independently at an early stage, perhaps relating to the stabilisation of the orthostats, or the signs of insertion of the revetment through the edge of the dump were not apparent. This does not affect the relationship between the dump and the orthostats, since, where the dump was at its thickest behind orthostats 408 and 409, it definitely postdated them.

The primary dumps: summary

Two of the primary dumps, 330 and 447, and the initial lens 455 of 446, were of slabs and rubble; the others were of varying mixtures of soil and marl with some stones. All of the material comprising these dumps could have been derived from the quarry areas to the north and south of the monument.

The dumps were deposited according to a definite plan, as indicated by their restricted extents and by the careful revetment of the northern dumps along their southern edges. The south-facing axial alignment formed by the revetments 448, 469, and 559 made a straight line running west-south-west/east-north-east on an orientation approximately 77° east of north. The irregularity of this alignment in plan (Fig 41) was due to slippage since the Neolithic and to variations in the level at which the revetment was planned. This alignment was presumably established prior to any constructional activity, although no evidence for any marking-out was noted (other than that context 624, Fig 42, section 1, could have been a turf marker). The outer edges of the dumps did not go beyond the limits of subsequent unit revetments, and thus the dumps presumably adhered to a predetermined design for the later cellular units.

The sequence of dump construction could be partly deciphered (Fig 41): dumps 269/293/543 and 447 preceded 467, and 269/293/543 also preceded dump 377/379; dump 330 preceded 309, which in turn preceded 446, these dumps being subsequent to the construction of the dumps revetted by 469; and dump 210/225/278/291, with its revetment 559, preceded 296/393. The northern dumps were in general deposited prior to those on the south, although there was no way of establishing a sequence between the northern dumps at either end of the cairn. Only one of the dumps (377/379) had any direct relationship with the chambered areas, postdating the erection of some north chamber orthostats. The westernmost edges of the two dumps immediately east of the chambers were staggered, which could imply deposition to respect the position of the chambers.

The finds from the primary dumps

The primary dumps contained three Neolithic sherds, 13 pieces of flint, and 15 animal bone fragments. The sherds were all wall sherds: one of fabric 2 (context 446), one of fabric 3 (from 210), and the third of fabric 4 (from 309). Identifiable animal bones were cattle (contexts 293 and 296) and pig and sheep/goat (309). Flints from 269, 278, 293, 309, and 377 were of non-diagnostic type. These finds can be correlated with the pre-cairn artefact assemblage from the buried soil and presumably derive from it.

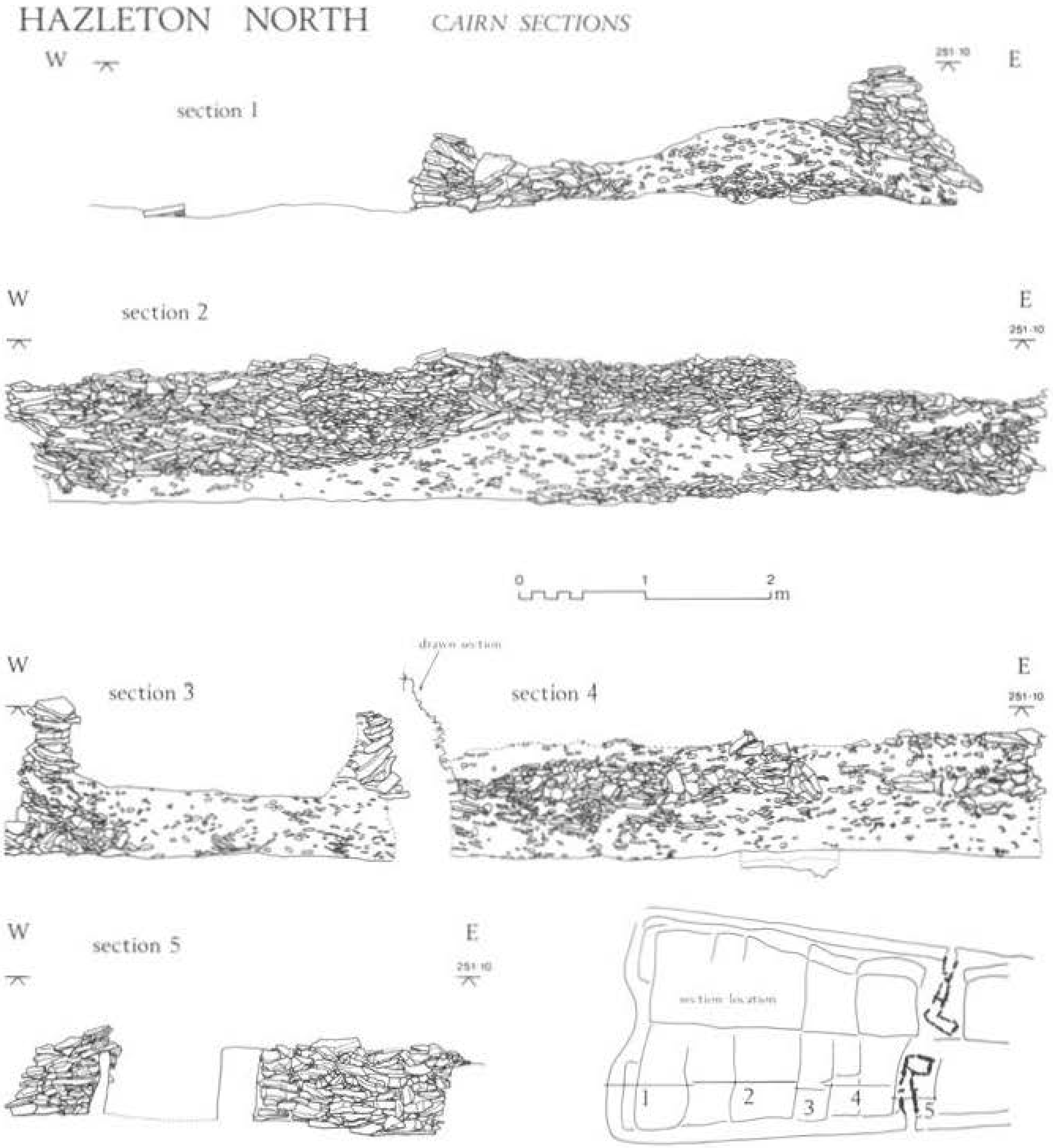


Fig 39 West–east sections through the cairn and dumps in the area between the south horn and the south entrance

Axial elements and cellular units

Introduction

Following the primary dumps, the next stage was the construction of wedges of pitched material (usually solid masses of stones) to either side of the axial alignment. These 'axial elements' formed the axial core of the cairn (Fig 45). In section, they often exhibited marked pitching from the axis down towards the high points of the primary dumps (Figs 42 and 54). Thus, the axial elements were built over the dumps and had their own axial revetments, which overlay the primary axial revetments (eg Fig 42, section 2). The separate north and south sectors of the axial alignment were discernible everywhere (except east of disturbance 613).

Next came the construction, over the axial elements and on top of any still-exposed areas of the primary dumps and the pre-cairn soil, of the cellular units A to W. These units and their revetments are discussed in groups following the same sequence as the description of the dumps. It should be stressed that

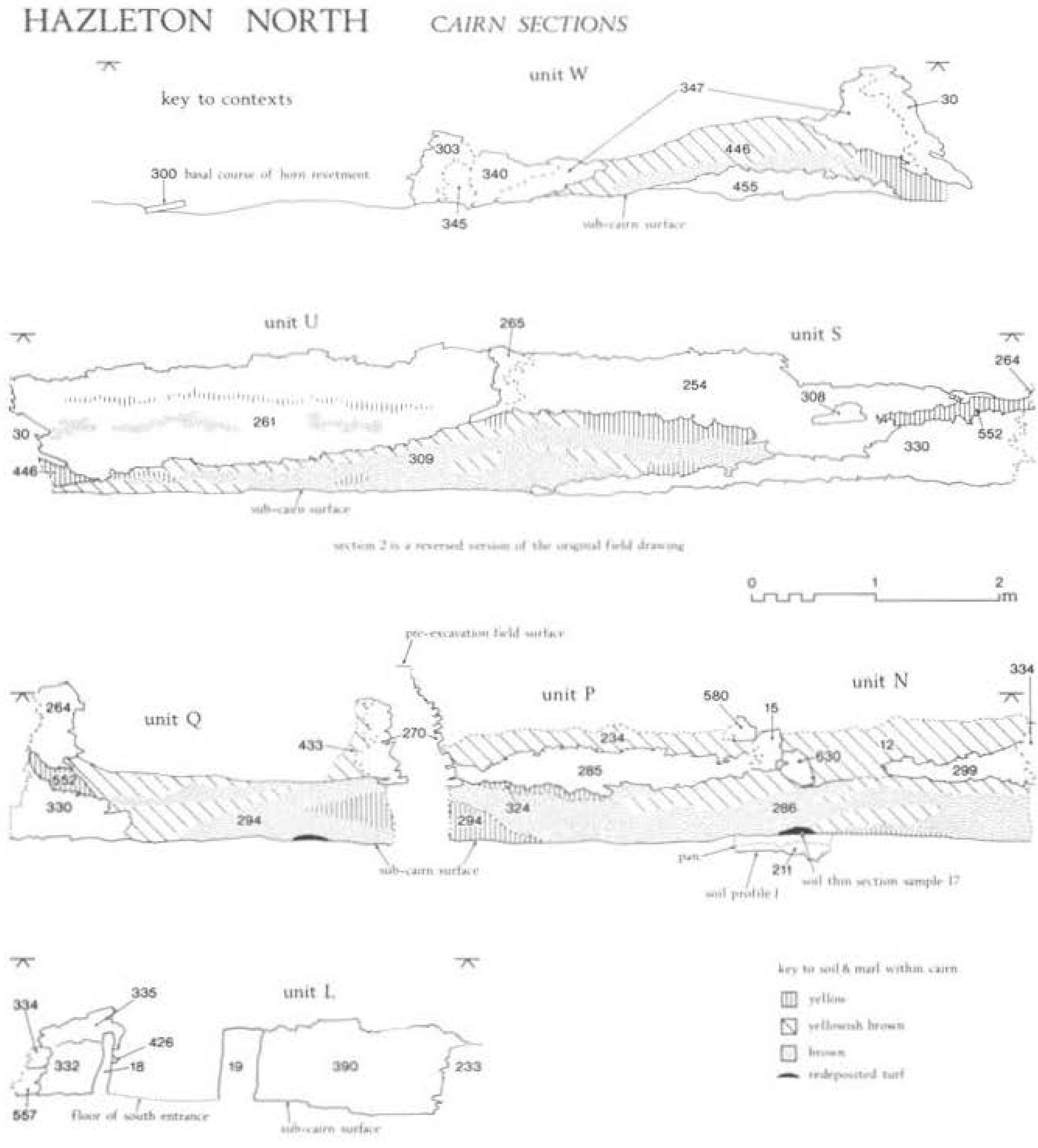


Fig 40 Key to contexts present in the west–east sections on Figure 39

'revetment' refers to alignments of horizontally-laid slabs. These were never freestanding walls (despite their appearance in plan in Fig 46), but were built at the same time as the deposits they served to revet; thus, they had only one external face, the inside of the revetment being fully interdigitated with the deposit being revetted. The exterior surfaces of these internal revetments were relatively rough in comparison with the smooth face of the external cairn revetment.

Another distinctive constructional device found in association with these revetments has been termed here a 'fin'. Fins were formed of steeply-pitched slabs set against the outer face of a revetment (Figs 55 and 69). A triangular cavity was often formed between the face of the revetment and the base of the fin, while the upper edge of the row of on-edge slabs sometimes projected through the overlying fill.

Units R/T/V

The three linked units R/T/V constituted a single sub-rectangular constructional block, with an effectively continuous outer face formed by the revet-

Fig 43 Area of unit M (on the left) showing primary dump 377/379 and axial revetment 448, viewed from the south-west (the pit in the surface of the dump is the excavated intrusion 616); scales in 0.5m divisions

ments 147 on the east, 618 on the south, 154 on the west, and 298/410/414 on the north. The uppermost deposits in these units formed the surface of the surviving monument on its north-west side, since the superficial context 8 was nothing more than the weathered surface of the cairn.

After the primary dumps, the axial element 148 was constructed (Figs 37 and 45), composed of large, carefully-positioned slabs, mainly tilted down towards the north, extending west–east to the limits of the underlying dumps 467 and 543. The southern edge of this substantial mass of stones had a south-facing revetment, 618, which continued, although with a batter towards the north, the axial alignment of 469 (Fig 38). The 148 deposit was thickest (c 1m) on its south side, tapering to the north in a wedge (Fig 42, section 3). At its highest point, 148 formed the surface of the surviving cairn, and 618 rose to the same height, although this was not obvious at the point recorded in section. The wedge profile of 148 continued throughout its length, the mass of stones being roughly 'squared-off' at both ends in line with the west and east edges of units V and R respectively. The somewhat irregular western limit to 148/618 (Figs 45–46), resulted from the pronounced projection of the stones at its base. The upper western levels were more in line with the western edge of 444 to the south (Fig 47).

Within the area of unit V, a deposit of soil, marl, and small stone fragments (411) was then laid over the northern edge of 148, over primary dumps 269/293/543 and 447, and over the remaining exposed soil. The exact limits of this deposit were uncertain, but to the north and west it terminated within unit V, while on the east it had its own low, east-facing revetment (464), running over and interlocking with the north edge of 148. The position of this revetment, which was not planned in detail, is shown by the dashed line on the east side of unit V in Figure 46.

Most of unit T was then formed by a deposit of large slabs pitched down to the north (229). This solid block of carefully laid stones (Fig 45) resembled a northwards extension of 148, but it could be defined as a separate and subsequent stage of building because its western edge overlay the revetment 464, which itself overlay 148. Stone mass 229 rose up to the surviving surface of the cairn, but tapered northwards, in a wedge similar to that of 148, to terminate on its northern edge at least a metre short of later revetment 414. The west and east edges of 229, like 148, were simply 'squared-off', in this case approximately on the lines of the edges of unit T as defined by the later revetments 202 and 263.

From this stage of construction onwards, the units were built from east to west in the sequence R–T–V. Unit R had an infill of rubble, 256, directly overlying the primary dump 269/293/543 and the axial element 148. On its eastern edge, 256 was terminated by east-facing 147. This revetment was founded upon the eastern edge of dump 543 and at its southern end overlay and intermeshed with the 'corner' of 148. On its northern edge, deposit 256 was revetted by north-facing 298 (Fig 42, section 3), which was founded partly on the northern edge of dump 543 and partly directly on soil. Revetment 298 was of the same build as 147, linked by a bonded, externally-curved corner at the north-eastern limit of unit R. The same situation obtained at the north-western corner of the unit, revetment 298 linking with west-facing 263 in a bonded curve. Revetment 263 rose up over the underlying dump but terminated at the north-eastern corner of stone mass 229, which it partly overlay. To the south of this point, the western edge of 256 overlay the rough edge of 229.

The construction of unit T was completed by the deposition of rubble similar to 256 to the east. This rubble, overlying 229, was revetted on its northern edge by the north-facing 414, which butted against the corner formed by revetments 263 and 298, just as the rubble itself abutted 263. Revetment 414 was founded directly on soil just beyond the northern limit of the primary dump. At its

Fig 44 Segment of dump 377/379 in section abutting the rear of orthostat 409 and underlying revetment 312, viewed from the north; scale in 0.1m divisions

western end, 414 turned a bonded corner to become west-facing revetment 202, again forming a revetment to the rubble infill on its western side. Like 263, 202 oversailed the primary dump beneath and overlay the north-west corner of stone-mass 229.

In unit V, steeply-pitched slabs were present against the face of revetment 202 and the north-west edge of 229. This fin (423) comprised a 2m (north–south) row of single slabs, the bases of which were embedded in the surface of the dump, 411. The main infill in unit V was a mixture of marl and angular stone fragments, 290, which overlay 423, 411, and 148, and butted against the western edge of 229. The northern limit of 290 was revetted by the north-facing 410, which abutted the corner formed by 202 and 414. Revetment 410 was mainly founded directly upon soil, but also just overlay the northern limit of deposit 411. The western side of 290 was revetted by the west-facing 154, which formed a bonded corner with 410 at the north-west of unit V. The northern end of 154 was founded on soil; further south it overlay the edge of the primary dump 447, being just beyond the western limit of the marl deposit 411. At its southern end 154 abutted, but in an interdigitated manner, the western corner of 148.

Units S/U/W

As with units R/T/V to the north, units S/U/W constituted a single constructional block. This block could not have been built until after the construction of R/T/V had begun, since the key components of S/U/W – 264, 303, and 444 – all abutted the south-facing axial alignment 618. Together, these two blocks of units formed a massive, potentially free-standing, sub-rectangular solid structure 12.5m long, 16m wide on the west tapering to 13m on the east, and surviving to *c* 1.5m high on the central axis and to a maximum height of 0.75m at its northern and southern edges. The upper levels of revetments 154 and 303 presented an almost straight face towards the west (Fig 47).

A stone mass (444) was erected along the northern edge of these units, consisting of large slabs pitched against the outer face of axial revetment 618 (Fig 45). This stone mass was an axial element which formed a counterbalance to 148 in units R/T/V, but, unlike it, was not freestanding and was not so carefully constructed, with some areas of rubble included among the slabs. In section (Fig 42, section 3), 444 had a similar north–south extent and wedge profile to its northern counterpart, also rising to the surviving surface of the cairn. Laterally, 444 extended eastwards to the limit of 618, but on the west side the base of 444 terminated some 0.4m short of the corner formed by the end of 618. Following the deposition of 444, the cellular subdivision of this area began, but in a different fashion to that on the north side, since the two outer units S and W were delineated first with unit U built between them.

In unit S, a rubble fill 254 overlay the primary dumps 309, 330, and 552, and the southern edge of 444. On its eastern edge, 254 was revetted by east-facing 264, which was founded upon dumps 330 and 552, and at its northern end built on the south-eastern edge of 444. On the south, 254 was revetted by south-facing 346, partly founded upon the southern edge of dump 309 and partly upon soil, and on the west 254 was revetted by west-facing 265, founded upon the eastern crest of dump 309, and which at its northern end overlay the southern edge of 444. Both revetments 264 and 265 formed bonded, curving corners with 346.

Infill 254 may have been further subdivided. Context 308 (Figs 39–40, section 2) was originally thought to have been a revetment, but could not be identified in plan and was perhaps just a fortuitous association of horizontal stones. In section, 265 did not look very convincing as an east-facing revetment, but its credibility depended on the clearly-defined northern return of revetment 346 at its western end, where the outer face was abutted by revetment 418, and upon the existence of a fin, 31, against the western edge of the upper levels of 265. This fin was recorded in plan (Fig 57; arch drgs 18 and 147), but did not appear in section.

The construction of unit W appeared to have been guided by the extent of the primary dump 446. The infill of rubble with some marly lenses, 347, overlay 446 and 444. On the east, 347 was revetted by the east-facing 30. At its north end, 30 overlay the southern edge of 444, at its centre, it overlay the eastern edge of dump 446, and, at its south end, it was founded directly on soil. The south-facing southern revetment (419) to 347 was also founded

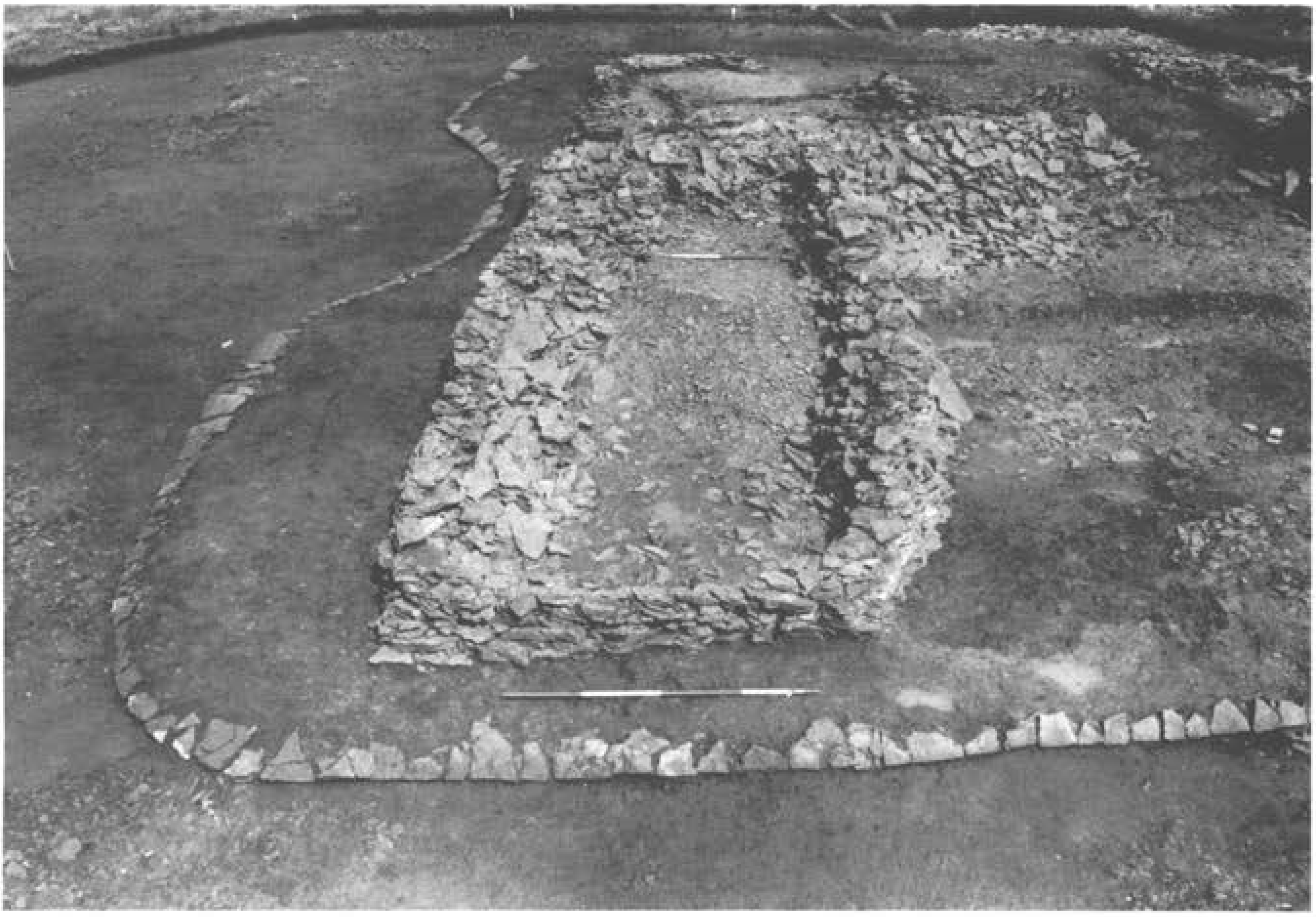


Fig 47 Unit W viewed from the south; scales in 0.5m divisions

directly on soil and formed a bonded corner with 30, as it did with the west-facing 303 to the west. Revetment 303 was sited just west of the extent of the dump 446, founded directly on soil, and appeared to have been constructed as a continuous alignment up to the external face of 618 which it abutted, thus forming a revetment face to the western edge of 444 at this point.

On the eastern side of the slabs forming revetment 303, the unit fill was of a more carefully and more massively constructed nature than the general fill 347, almost constituting a double revetment. Context 340, parallel to 303 and overlying the western edge of dump 446, was regarded as a crude initial revetment to 347 on its western side, with additional limestone rubble, 345, deposited against its outer face to be revetted by 303 (Figs 39, 40, and 47). Hence, on some interim plans (Saville 1984a, fig 3), unit W is shown as having a double western revetment. Fuller consideration suggested that, rather than 340 being a fully-fledged revetment, since it did not have a clear external face and since there was considerable interdigitation between 340 and 345, the sequence of 340, 345, and 303 was more probably just a method of constructing a robust backing for the subsequent south horn.

Following the construction of units S and W, unit U was built between them by the deposition of 261, rubble with some soil and marl, over the top of primary dump 309 and the southern slope of 444 and abutting the external faces of 30 and 265 to the west and east respectively. On its southern edge, 261 was revetted by 418 which was founded directly on soil and which abutted the bonded corners of 30/419 to the west and 265/346 to the east. As mentioned previously, a vestigial fin of pitched slabs (31) was noted at the surface of 261 against revetment 265.

Unit U was initially treated as possibly subdivided by a further north–south revetment, 337 (Saville 1984a, fig 3). This revetment was not apparent in section, however, where a marly lens was continuous across the supposed position (Figs 39–40, section 2), nor could it be defined in relation to revetment 418 on the south. Thus, 337 was subsequently regarded as either a fortuitous association of larger stones within 261, or as simply a working-stage at a high level within the construction.

Units C/E/G/I

Accepting alignments 174 and 190 as terminating in the manner implied by Figure 46, then units C/E/G/I would have been a single, potentially freestanding, block of construction, 21 × 5–6.5m, surviving to 0.75m high on the west and only 0.12m on the east. An interpretative problem was posed by the potential eastwards continuation of the axial element 460/175 beyond the end of unit C into unit A (Fig 45). It would be architecturally neater to see a definite corner at the junction between 174 and 460/175, with any eastwards continuation of the axial alignment butted on, but, at the level of the surviving basal courses, this could not be established.

After dump 210/225/etc and its axial revetment 559, the next constructional episode in this area involved an axial element of large slabs (460) with a revetment (456) which provided a vertical continuation of 559 (Figs 45 and 48). Like 148 further west, but of smaller proportions, this axial element formed a solid wedge, with its south-facing revetment battered back slightly to the north (Fig 42, section 1). The axial element was best defined in the area of unit I/G, where it formed a freestanding wedge of pitched stonework, terminating on the west above the most westerly extent of 559.

To the east in units E and C, the axial zone was disrupted by modern disturbances and was otherwise difficult to interpret because of the shallowness of the surviving cairn: effectively only two or three courses between ploughsoil and buried soil in places. Distinctively larger stones (originally designated context 175) did continue on the axial alignment, however, and in places a reasonably straight south-facing edge could be determined. On

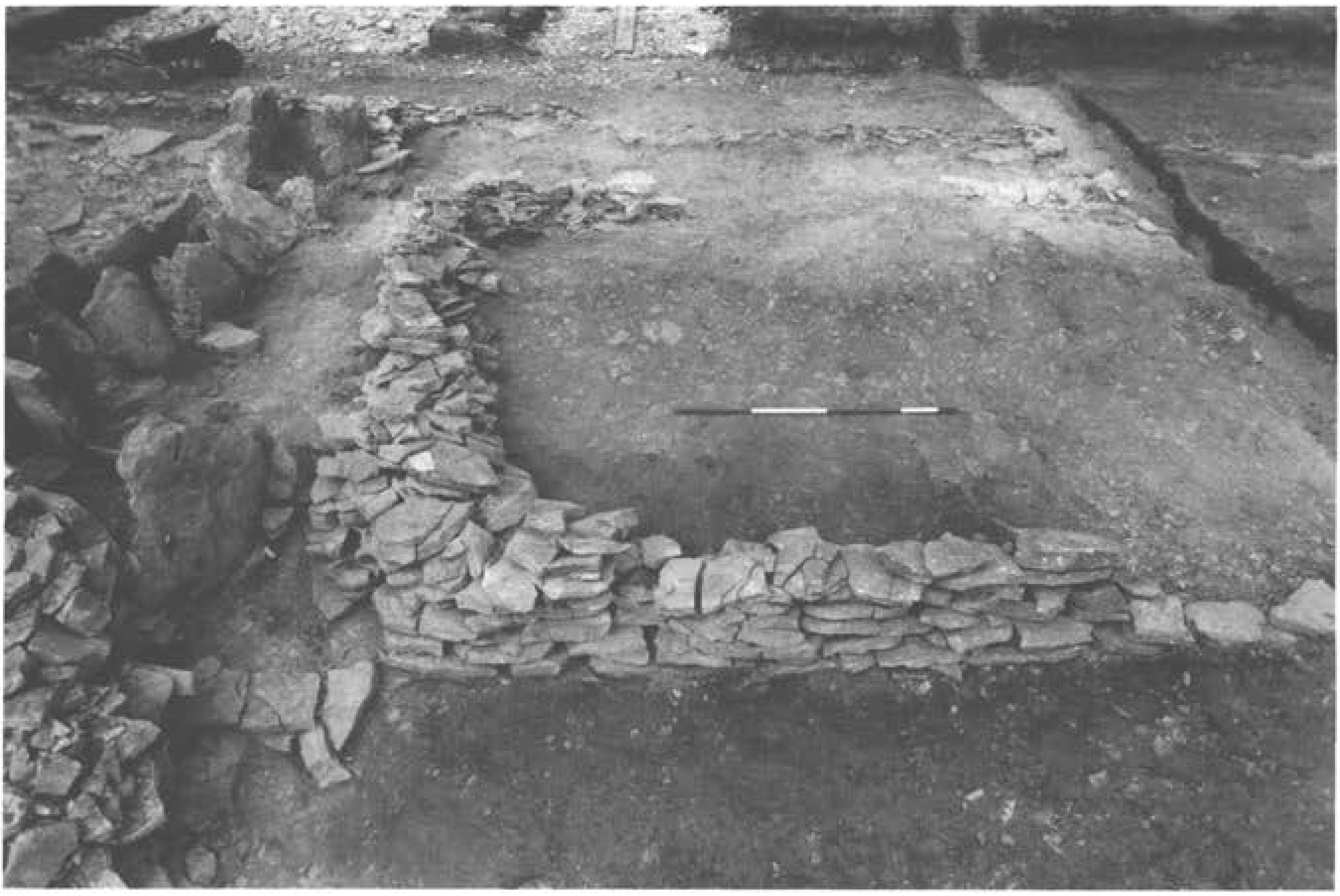


Fig 48 West end of unit I/G, showing axial revetment 456 and cellular revetment 195, viewed from the south; scale in 0.5m divisions

balance, it was assumed that axial element 460 originally continued at least as far east as unit C and may even have continued beyond it into unit A. To accomodate this uncertainty, the eastern sector of the axial element was designated 460/175 (Fig 45).

After axial element 460 was in place, the sequence of unit construction proceeded eastwards, from I/G to E to C, as shown by the relationships between revetments (Fig 46). The infill of unit I/G was composed of rubble (292) on the western side, overlain by a deposit of mixed soil, marl, and stone fragments (188) which infilled the rest of the area. This unit was initially treated as two separate units, G and I, subdivided by an apparent north–south revetment 232 defined at the uppermost level of the cairn. Subsequent excavation demonstrated 232 to be illusory as a discrete revetment and merely part of the fill of a single unit. The infill 188/292 overlay the dump 210/225/etc and the northern limit of axial element 460 and was revetted to the east, north, and west by 189, 191, and 195.

Revetment 195 overlay the north-west edge of axial element 460, but was carefully fitted to it so as to form the face of its western terminal (Fig 48). To the north of 460, 195 overlay the western edge of primary dump 291. The north-facing 191 was bonded to 195 at the curving north-west corner of the unit, at which point 191 overlay the northern limit of the primary dump (Fig 42, section 1), although to the east 191 was situated beyond the limit of the dump and was founded directly on soil. After the curving bonded corner at the north-east of this unit, the east-facing 189 oversailed the central hump of the primary dump to terminate on the south by abutting the north side of the axial element 460.

Thus, unit I/G represented a single, fully-revetted unit, 8 × 5.5m, with a maximum surviving height of 0.75m, except that it had no independent corner on its south-east side, the axial element already having been constructed to extend further to the east.

Before unit E was constructed, a northern extension was added to unit I/G. A rubble deposit (387) was dumped against revetment 191 and was revetted on its northern edge by 385/388 (Fig 42, section 1), abutting the corners formed by 191 and 195 on the west and 189 and 191 on the east. This extension, the same length as unit I/G and about one metre wide north–south, was founded directly upon the soil. The corners were rounded and well-built, especially on the west side where 388 rose to a height of 0.54m in about five or six courses.

The infill of unit E involved the initial deposition of large slabs (280) over the northern side of axial element 460 and a short stretch of fin (279) against the east face of 189. Further slabs, 443, were placed over the primary dump and the former land surface in the north-east part of this unit and interdigitated with the rear lower levels of revetments 176 and 384 at this point. An upper level of infill, 259, composed of a mixed deposit of soil, marl, and stone fragments, overlay 279, 280, and 443, as well as any otherwise uncovered areas of the axial element 460 and the primary dump, and was revetted on the east and north by 176 and 384. At its west end, 384 abutted 385, the revetment of the extension to unit I/G, not the earlier revetment 189. Built directly on soil, just outside the northern extent of the primary dump, 384 formed a bonded corner with east-facing 176, which, like 189, oversailed the primary dump and abutted the northern edge of axial element 460/175.

Unit C was constructed next, with an infill of slabs and rubble, 226, deposited over the eastern end of the primary dump and the former land surface and what parts of the axial element 460/175 had survived subsequent disturbances. To the north, 226 was revetted by north-facing 383, built directly on soil. The relationship between 383 and 176/384 was not conclusively established because of the frost-shattered nature of 383 at this point, but since it was revetting a deposit which was definitely dumped against the eastern face of 176, and since 176/384 was a bonded corner, it was assumed that 383 simply butted against 176/384.

The interpretation of the eastern side of unit C was hampered by the shallowness and disturbed nature of the cairn. The stone alignment 174, lying directly on soil and interpreted as a possible revetment, was only one course high, so no certainty was possible. It was, however, the only north–south alignment present east of 176. At its southern end, 174 appeared to overlie the north edge of the axial element 460/175, although this relationship was inconclusive, whereas at its northern end no direct relationship with 383 (itself only one course high at its eastern end) could be determined, other than that they were coterminous. It was concluded that 174 was the east-facing revetment to 226 and that it formed a bonded corner with 383, although other explanations were possible.

The final stage of internal cellular construction at the north-east end of the cairn was a northern extension to units C and E. A rubble infill (283), with stones lying mainly horizontally but with some pitched against the outer faces of 383 and 384, was revetted on the north by 190. This revetment, founded on soil, abutted the north-east corner of 385 and continued the same alignment eastwards, only surviving to a single course at its east end. While 190 did not seem to continue beyond 174 into the area of unit A, its actual eastern terminal could not be isolated. A few large stones suggested a continuation of the alignment of 174 northwards, and they could have represented the base of a southwards return of 190 to abutt the bonded corner of 174/383.

Units D/F/H/J

This block of units acted as a southern counterpart to units C/E/G/I in much the same way as units S/U/W related to R/T/V at the west end of the monument, but with a different sequence of cellular construction. The sequence here moved from east to west, beginning with unit D.

Units D/F/H/J formed a single block (Fig 46), some 22m long and tapering from 6m wide on the west to 4–4.5m on the east, built from east to west. The construction of units F/H/J, and probably D, began after the construction of units C/E/G/I, although the two blocks could have been constructed contemporaneously after completion of the complementary axial elements. The southern block was less complex than its wider northern counterpart, lacking the double line of east–west revetments. Like units R to W at the west end of the cairn, units C to J appear to have constituted a single constructional block, which could again have been a freestanding entity at some stage within the building of the whole monument. This eastern block would, however, have had a more ragged appearance with its staggered western end and would have been less monumental, with a maximum surviving height of *c* 0.8m at its western end, tapering to *c* 0.12m at the eastern end of units C/D.

The first deposit to overlie the primary dump 296/393 was 461, comprising large slabs pitched against the south-facing revetment (456) of the northern axial element 460 (Fig 45). Axial element 461 was wedge-shaped in profile (Fig 42, section 1), up to 1.3m wide north–south and 0.5m thick, with its southern limit coterminous with the highest point of the primary dump. At its western end, 461 continued for 2.5m beyond the point at which revetments 195 and 456 formed a corner on the north side of the axial alignment. This segment of 461 had its own north-facing axial revetment, 462, which continued the axial alignment. The south-westernmost part of 461, comprising at most two courses of large slabs overlying the western limit of the primary dump 296/393, abutted and therefore postdated the rear of south-chamber orthostat 317.

East of dump 296/393, where it directly overlay soil, axial element 461 definitely continued into unit F. Further eastwards, the disturbances and the shallowness of the cairn precluded definite disentanglement of this context, as it did of 460 to the north. The existence in the area of units B to F of a separate constructional element (175), comprising larger than average slabs on the line of the central axis, was obvious from the moment the

Fig 49 West end of unit J/H, viewed from the south-west, showing revetment 233 and its bonded junction with 396; scale in 0.5m divisions

Fig 50 Junction of units M and N viewed from the south-west, showing the unit M axial element 440 and its south-facing revetment 619; scale in 0.5m divisions

cairn was exposed. The difficulty of subdividing this 'spine' into its north and south elements has already been mentioned. A separate southern axial element (461/175) and revetment probably did continue eastwards into units D and B, but this could not be proven, and it is just possible that the 'spine' at this eastern end of the cairn could have been of unitary rather than bipartite construction.

Unit D was constructed entirely outside the limit of the primary dump. The infill (260) comprised slabs and rubble with some soil and marl, overlying the former land surface and axial element 461/175. This infill was delimited to the east, south, and west by a continuous revetment. The north–south revetments, 178 on the east and 231 on the west, were built out from the axial element 461/175, which they overlay, but for most of their lengths were founded directly on soil. At their southern ends, 178 and 231 were linked by the east–west revetment 394, similarly built up from the pre-cairn soil, and bonded to them in roughly right-angled corners.

The infill of unit F comprised rubble (266) partly overlain by and partly interfacing with a less stony fill (22). This material was dumped against the external face of revetment 231, and otherwise overlaid the southern edge of the axial element 461/175, the former land surface, and the eastern edge of dump 296/393. Infill 22/266 was terminated on the south by revetment 395, which abutted the bonded corner between revetments 231 and 394. The eastern end of 395 was founded on soil, the western end over the edge of the primary dump. Revetment 239 formed the western edge of unit F, overlying the south edge of the axial element 461, oversailing the primary dump, and joining revetment 395 in a bonded, approximately right-angled corner.

The final unit, J/H, of this constructional block had a marl and soil infill (297), distinguishable from the underlying dump by an intervening but discontinuous horizon of stones. Over most of the unit, 297 was overlain by an infill of flat slabs (295). These slabs were revetted on the south by 396, which abutted the face of the bonded corner formed by 239 and 395 to the east. At this point, 396 overlay the southern edge of primary dump 296/383 (Fig 42, section 1), but further west it was built beyond the limit of the dump and directly on soil. Similarly, the revetment forming the western edge of this unit (233) overlay soil at its southern end, then oversailed the north-west edge of the primary dump before terminating over the rear of the axial element 461, just to the east of its full extent. Revetments 233 and 396 formed a bonded corner at the south-west limit of this unit (Fig 49). It was anticipated, when the possible subdivision 232 to unit I/G was identified, that unit J/H would be similarly partitioned. No such subdivision was identified during excavation, however, and J/H appeared to be a single unit, despite its extreme length.

Units M/N/P/Q

The well-preserved nature of the revetments in this area (Fig 52) allowed precise definition of the sequence of construction, including the fact that revetment 375 of unit O postdated the building of the northern extension to unit M. The building of unit O postdated the erection of units M and R and their relevant revetments 184/376 and 147, so that a stage existed in the construction sequence when unit O was an open space between two revetted faces, apart from the presence of the western end of the primary dump 377/379. The infilling of unit O could not have taken place until at least some of the elements of units N/P/Q were in place to the south.

The primary dump in this area (377/379) postdated the dumps to the west and the erection of the north chamber orthostats to the east (Fig 41). Following this dump in the area of unit M, an axial element (440; Fig 45), composed of a wedge of slabs pitched downwards to the north and overlying the southern slope of the dump, was constructed with a south-facing revetment (619) which overlay and continued upwards the face of the axial revetment 448 (Figs 42, section 2; 43; 50; and 51). This 5m stretch of axial element terminated neatly to the west and east, where the subsequent north–south revetments 184 and 312 were built onto 440/619 in such a way as to provide well-finished corners (Fig 46).

The infill of unit M (310), a mixture of rubble and marl, overlay the north edge of the axial element and the primary dump and had a continuous revetment, 184/250/312, forming the boundary of an almost square constructional unit *c* 5m across. Both 184 and 312 oversailed the primary dump and formed bonded corners with 250, which overlay the northern edge of the dump. As with unit I/G to the east, unit M had a northern extension. Large slabs (253), some pitched, were placed against the face of 250 and contained by a curved revetment. This revetment comprised 313 and 376, which abutted the faces of the corners formed by 184/250 and 312/250, and the curved west–east element 199, which formed bonded corners with 313 and 376. The whole of this northern extension to unit M was built directly from the former land surface.

Units N/P/Q had a different method of construction which did not involve the same sequence, commencing with primary dumps, as the rest of the cairn. Parts of this area were among the first sectors of the cairn to be fully excavated in 1981, other parts were the very last to be removed in 1982, because the main section ran across the area from north to south, fortuitously falling on the line of the revetments 270 and 495 separating units P and Q. This accounts for the very solid appearance of the stonework in section in the upper part of the south side of the cairn (Figs 53 and 56).

In the area of units P/Q, and only recorded in section, the first constructional elements were a deposit of soil (625) and a thin lens of marl (629; Fig 56). Context 625, though less pronounced, had the same character (?redeposited topsoil/turf) as 624 to the east (Fig 42, section 1) and could also conceivably have been part of a system of axial marking. Context 629 seemed too insubstantial to have been a constructional dump and was possibly a lens of building debris.

Otherwise, the first phase of construction in units N/P/Q was a low axial element of stone (550) with a north-facing revetment 478 (Figs 63 and 65). On the west, 478/550 abutted the eastern edge of axial element 444 at the limit of unit S, while to the north-east 478/550 abutted the face of axial alignment 448 (Fig 42, section 2). At the interface between units P/Q and O, 478/550 was free-standing, with near-vertical pitched slabs (451) subsequently placed against it. The deposition of 478/550 could have predated unit M's axial element 440/619, as seemed to be indicated by the disposition of the particular stones recorded in the section (Fig 42, section 2). This relationship was by no means conclusive, however, and was on balance thought unlikely because all of the 550 stones were easily removed to leave 448/619 upstanding as a revetted face. Presumably some of the 550 stones had simply been pushed into gaps in the pre-existing face.

A further deposit of stones (439) was then added to 550 (Fig 56), possibly as part of a continuous constructional process. This deposit was dumped against the face of the south-facing axial revetment 619 in the area of unit M, while to the west it had a north-facing revetment 441 (Fig 46), continuing upwards the alignment of 478 in the area of units P/Q. In places the pitched slabs of 451 postdated the lower courses of revetment 441 rather than 478, emphasising the continuous nature of 478/441 and the primacy of the south-side construction at this point. Rubble 439 was followed by a deposit of mixed soil and marl (436), which also abutted the face of 619 or was revetted by 441. On its western edge, this deposit postdated axial element 444 in unit S and may also have abutted the north–south revetment 264, although this relationship was not conclusively established. To the east, 436 had a low revetment, 558, which subsequently acted as the basal part of the northern end of revetment 334 at the eastern edge of unit N.

Fig 51 Unit M viewed from the south, showing the external face of axial revetment 619 overlying primary axial revetment 448; scales in 0.5m divisions

Fig 52 Area of unit M viewed from the north after the removal of unit infill to leave the internal revetments proud (note the large pitched slabs of the axial revetment); scale in 0.5m divisions

Deposit 436 was overlain by a thin dump of rubble (492), which similarly abutted 440 and 444, and was revetted by a further course of 441. These deposits (439, 436, and 492) together formed a wedge-like axial element, highest on the north and sloping at an angle of approximately 45° to the south, extending west–east across the length of units N/P/Q. On the west, this wedge was effectively freestanding with a north-facing revetment 441, while on the east the wedge rested against the face of the south-facing revetment 619. This wedge was further reinforced by the deposition of some large slabs (186) and subsequently the rubble lens 554. Both of these deposits were angled steeply towards the south, 186 abutting 619 on the east and revetted by 441 on the west. To the west these deposits abutted 444, to the east they terminated above 558.

The southern edge of the axial element extending across units N/P/Q was then overlain by a substantial dump of mixed soil and marl (286/294/324), which otherwise was dumped directly upon the former land surface (Figs 39–40 and 42, section 2). On the west, this dump overlay dump contexts 330 and 552 and also abutted the base of revetment 264, and, on the east, it was revetted by the east-facing revetment 557, only two to three courses high. This revetment continued southwards the line of the earlier revetment 558 to deposit 436, but was separated from it by the intervening deposits 186 and 554. Like 558, 557 subsequently formed part of the base of 334, the eastern revetment to unit N. At its southern edge, at least in the area of unit Q, dump 286/294/324 had a low south-facing revetment (556) founded directly on soil. This revetment abutted contexts 264/346 at the south-east corner of unit S and was later overlain by 432, the southern revetment to unit Q. There was evidence that 556 continued into the area of unit P, where it underlay revetment 14, but its full extent towards the east was not recorded.

Subsequent to these dumps in units N/P/Q, a further deposit was added to the axial element. This comprised a series of large slabs (553; Fig 45) placed over the 554 rubble as a pitched lens, the south edge of which overlay the northern edge of the dump (Fig 56). At the interface between units O and P/Q, 553 formed a rough north-facing revetment (609) which continued upwards the alignment of axial revetment 441.

Cellular construction then began with the formation of unit Q. At its highest level, unit Q was subdivided into two approximately equal parts by a west–east revetment 494, somewhat after the manner of the extensions added to units M and I/G. Some doubt must attach to the completeness of this subdivision, however, because not only was the revetment 494 incompletely recorded (Fig 46), but also the junction between revetments 270, 494, and 495 was observed to overlie two courses of stones (560) rather than the surface of the dump 286/294/324, so that the subdivision of unit Q may not have existed at the very initial phase of cellular construction. There was, however, no doubt about the bonded corner formed by revetments 494 and 495.

At the northern end of unit Q, a fin of pitched stones (32) was placed against the outer face of revetment 264. The fin was overlain by the rubble infill 524, which also overlay the south side of axial element 553 and dump 286/294/324, and abutted revetment 264 (Fig 46). On the north-east, 524 was revetted by east-facing 495. Revetment 495 overlay the axial element 553/etc at its northern end and extended southwards across the dump 286/294/324 and 560 for 2.5m, before turning west to continue as revetment 494 built from the surface of dump 286/294/324. The west end of revetment 494 was not recorded during excavation, but was presumed to have abutted the face of revetment 264.

The southern end of unit Q comprised a marly rubble fill (433) overlying the dump 286/294/324, on the west abutting 264 and on the north abutting 494. Infill 433 was itself revetted on the east by 270 (Figs 39–40) and on the south by 432. Revetment 270 abutted the bonded corner of 494 and 495, overlying 286/294/324 and 560. At its southern end, 270 formed a bonded corner with 432, which continued westwards to abut the south-east corner of unit S formed by the bonded junction of revetments 264 and 346. Revetment 432 overlay the earlier 566, which formed the southern edge to dump 286.

To the east of unit Q, between it and the south chambered area, there were problems in ascertaining the phasing of units N and P because of uncertainty over the relationships of some of the revetments removed at an early stage of the excavation. The chief difficulty lay in the insufficient recording of revetments 14, 15, 577, 578, and 580. It seemed probable that unit P was constructed before unit N and subsequent to unit Q, but the following account of units P and N involves some post-excavation rationalisation.

During the initial stages of construction, unit P was not subdivided. It comprised a rubble and marl infill 285, which abutted the faces of revetments 270 and 495 and overlay dump 286 and the rear of the axial element 553. On its eastern side this infill was revetted by five to six courses of horizontal slabs (context 15; Figs 39–40), which directly overlay the dump 286/294/324 and 553, and on the south probably formed a bonded corner with the lower courses of revetment 14. This revetment directly overlay an eastwards continuation of 556, the southern revetment to 286/294/324, and abutted 270.

In its subsequent stages of construction, unit P appeared to have been divided into a north and south half similar to unit Q. The northern part was probably built first, comprising a rubble fill (380) over 285 and the southern part of axial element 553. On its eastern edge, 380 was revetted by two to three courses of slabs (578), which overlay the northern part of revetment 15. Approximately halfway along the length of revetment 15, 578 formed a bonded corner with the two to three courses of the south-facing revetment 258, which overlaid the rubble infill 285 and at its west end abutted the outer face of 495. At its southern end, unit P comprised a mixed infill of rubble and marl (234), which overlaid 285 and abutted the faces of 258 and 270. The southern limit of 234 was revetted by the upper courses of 14, but the eastern edge of this infill was not established with certainty because of the inadequate recording of context 580 (Figs 39–40). However, it seems most likely that 580 was an east-facing revetment of two to three courses of horizontal slabs overlying 15, abutting the bonded corner of 258/578, and forming a bonded corner on the south with 14.

In the area of unit N, the first stage of cellular construction was the placing of a fin (630; Figs 39–40) against the outer face of revetment 15 (below 578 and 580), followed by a rubble infill 299/381. This rubble, which overlay the dump 286 and the axial element 553, was restricted to the most easterly and southerly parts of the unit, as if it were purely a 'backing' to its revetments 334 and 577, which were particularly well-constructed. Revetment 334 overlay the axial element 553 and was constructed above 557, the eastern revetment of dump 286. On the south, 334 formed a bonded corner with 577, which was founded directly on soil. To the west, 577 was assumed to have abutted the south-east corner of unit P. Postdating the rubble 299/381 was an infill of marl with small stone fragments (12), which abutted the faces of revetments 15, 578, and 580. To the south and east, infill 12 was revetted by upper courses of 334 and 577. The units in this area were unusual in having predominantly marly deposits as their upper fills: a fact of some interest in view of the marl base to that part of the south quarry adjacent to these units.

Unit O

This unit was constructed not only subsequent to units R and M to either side, but also after the north-facing axial element of units P and Q, thus filling a gap occupied previously by nothing except the dump 377/379 (Figs 41 and 56).

The fin of pitched stones (451) placed against the north face of 478 and 441 (Figs 54 and 56) has already been mentioned, on the assumption that it was an integral part of the construction of those two revetments. It was possible, however, to see 451 as postdating these revetments, the pitched stones being slotted in as subsequent props to the vertical face prior to the infilling of unit O (arch photo 1982/18/26). Whatever the status of 451, the first real

Fig 53 Main section, general view from the east; scales in 0.5m divisions

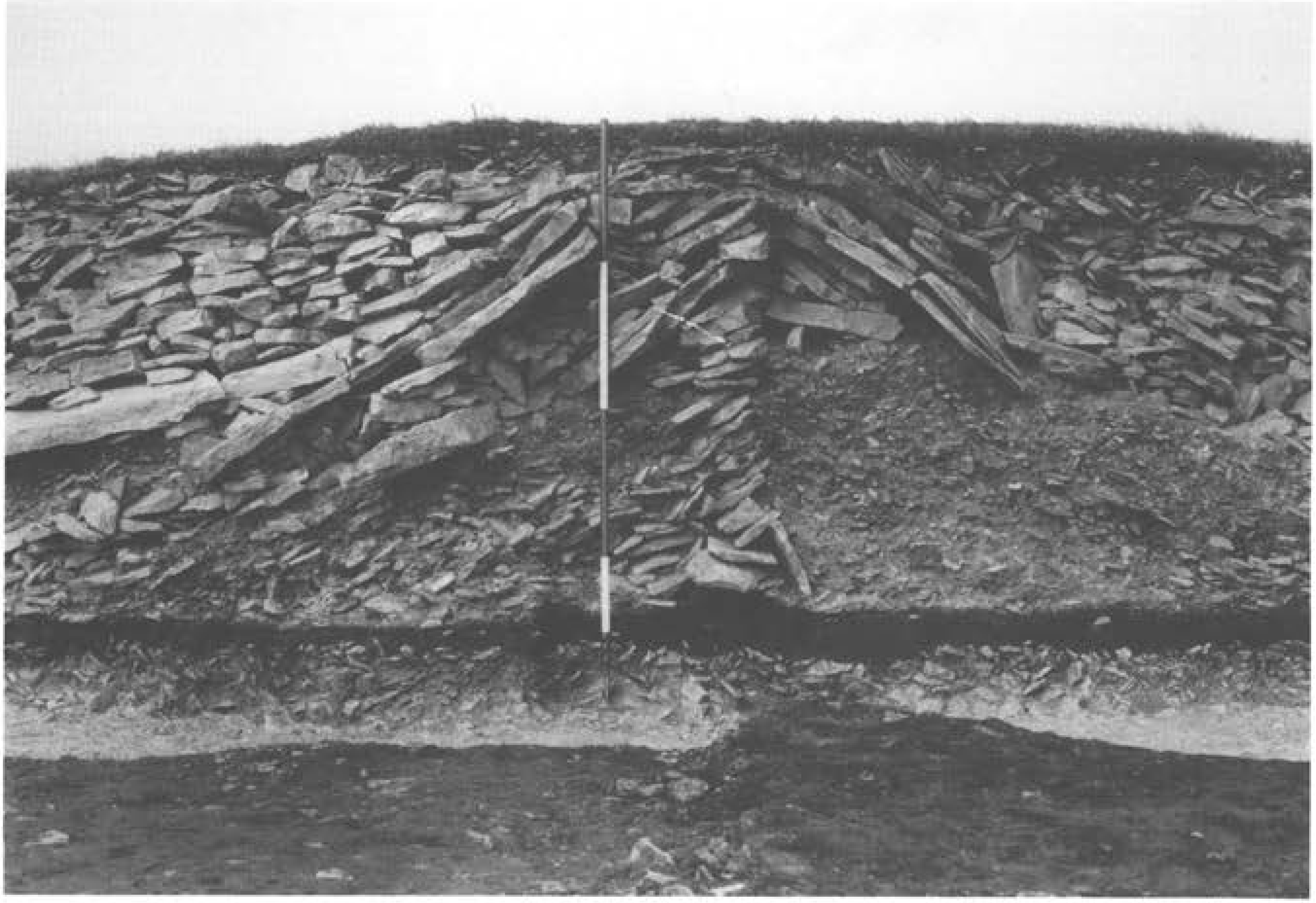


Fig 54 Main section: detail of the junction between units O and Q, viewed from the east; scale in 0.5m divisions

element in the construction of unit O involved the dumping of mixed soil and marl (442) against the face of 441 and the faces of revetments 147/148 and 184/440 to west and east. A lower, more marly lens of this triangular-sectioned axial element was separately designated as context 542, but was almost certainly part of the same uninterrupted episode of dumping.

The axial dump 442 was followed by a further axial element, this time consisting of large slabs (493; Fig 45) pitched down towards the north and abutting the face of 609 to the south. To the east, the 493 slabs overlay the fin of slabs pitched almost vertically against unit M's revetment 184/440, with their bases resting on 442. These pitched slabs were a part of context 185, a fin of large slabs pitched against the upper part of revetment 184, but it is probable that two phases of construction were involved: the first predating 493, while the second postdated 493 and predated the upper infill 288 (Fig 52). On its western edge, unit O had another fin (146) of large pitched slabs laid against revetment 147 with their bases on 442 (Fig 55). As with fin 185 to the east, this element was continued upwards to the top of 147, so that, while the lowest pitched slabs were overlain by infill 288, the upper ones were incorporated within it. It is presumed that 146 overlay 493, but no relationship was recorded.

The infill 288 was a thick deposit of rubble, which at its northern limit formed the whole content of this unit from pre-cairn soil to cairn surface, although it also overlay dump 377/379 and axial elements 442 and 493 and abutted revetments 147 and 184. On the north, 288 was itself revetted by 375 which partly overlay a lens of marly deposit, one of a series of lenses (625) which may have been building debris or make-up for a hollow. On the west, 375 abutted the face of revetment 147 at its bonded corner with 298, while on the east 375 clearly abutted the face of 376, not 184, demonstrating that the main construction of unit O postdated the northern extension to unit M.

Unit O had its own extension to the north (Fig 46), comprising a rubble infill (378) dumped against the faces of 375 and 376. To the north, this extension was revetted by 348 which partly overlay 625 and partly the former land surface. On the east, 348 abutted the bonded corner between revetments 199 and 376 of the unit M extension, but on the west the situation was unclear due to poor preservation at this point. It seemed most likely, however, that the stonework shown abutting the northern face of the junction between revetments 375 and 147/298, and which marks the western limit of the 378 infill, was a continuation of the 348 revetment. In the main section (Fig 56), revetment 348 was truncated by disturbance 183.

The internal horns

A continuation of the cellular construction process took place at the west end of the monument, where the shape and position of the projecting horns were prefigured by the addition of revetted blocks of stonework (Fig 46), very similar to the northern extensions of units I/G and M.

On the south side, a rubble deposit (344), with some soil content, was laid against the face of revetment 303 and was itself revetted by 302 (Fig 58), which abutted the face of the 303/419 corner on the south and the face of 303 on the north. Both 303 and 344 directly overlay the former land surface and were very solidly built; together with the reinforced revetment 303 they formed a formidable stonework bastion.

The infill deposit on the north (305) was similar to 344 in being composed of rubble with some soil, but also included larger slabs. This material was dumped against the face of 154 and was itself revetted by 304, with both 304 and 305 directly overlying the former land surface. At its southern end, 304 abutted the face of 154, but the relationships at the northern end were less clear because the cairn in this area was particularly shallow, surviving in only one or two courses (arch photo 1982/12/31). The northern end of 304 turned an angle to the east, but this continuation (406) became indistinct after 1.5m. It seemed probable, however, that 406 originally continued eastward to abut the face of 410, just east of its corner with 154.

Both of these extensions were about the same width, but the southern was a metre longer than the northern. This variation in the inner horn construction was matched by the asymmetric form of the subsequent outer hornwork.

Additional internal revetment on the north-west side

After the construction of the internal north horn, an additional strip of stonework with a west–east revetment was added to the north-west cellular units (Fig 46).

The way in which this revetment (203) and its backing (405) terminated was not resolved, because of the shallowness of the cairn here, although it was presumed that they abutted the outer face of revetment 304/406. From the north horn to the east end of unit T, this strip of stonework was very narrow; in places the revetment itself constituted the whole of the strip with no rubble fill. North of unit R, this zone widened to about a metre of rubble infill (405) between the two revetments 203 and 298.

East of unit R, this strip of stonework was separately designated as rubble infill 252 and revetment 198 because of the uncertainty over the precise relationship of deposits in the badly-preserved area just west of where revetment 348 appeared to fade. It was assumed, however, that 198 and 203 were parts of a continuous revetment, which was only about one slab thick at the point where it passed the west end of the unit O extension revetted by 348.

North of unit M, revetment 198 appeared to meet the most northerly bulge of 199, although its alignment continued eastwards to meet the rear of orthostat 204. This stretch (555) revetted the infill rubble 314, which was laid between unit M and the west side of the north chambered area. It was not resolved during excavation whether 198 and 555 formed a continuous revetment. Stratigraphically, the disposition of the few contiguous stones forming the west end of 555 and the east end of 198 suggested that 555 was earlier, but this would not preclude an essentially single phase of construction for the two. A single phase is suggested by the uniform alignment, especially since 555 avoided the shortest gap between the corner of 199/313 and the orthostats. On balance, it was concluded that the revetting of rubble infill 314 adjacent to the chambered area was part of the same stage of construction as 198 and 203.

Summary of the inner cairn construction

Various factors complicated the structural history of the inner cairn. Building sequences could not be reconstructed in every part of the cairn (for example, it was impossible to obtain a sequence for the inner horns with reference to any part of the cairn east of the units R/T/V and S/U/W), and different parts of the monument may have been erected simultaneously. Even where an individual sequence of construction was clear, it need not have represented a significant period of time, but merely an episode within a continuous process of construction. Certain relationships were either not adequately preserved or were inadequately observed and recorded, hence guesses have had to be made in the reconstruction of some

Fig 55 Unit O viewed from the north-east showing the slabs of fin 146 pitched against revetment 147 and resting on the dumped deposit 442; scale in 0.5m divisions

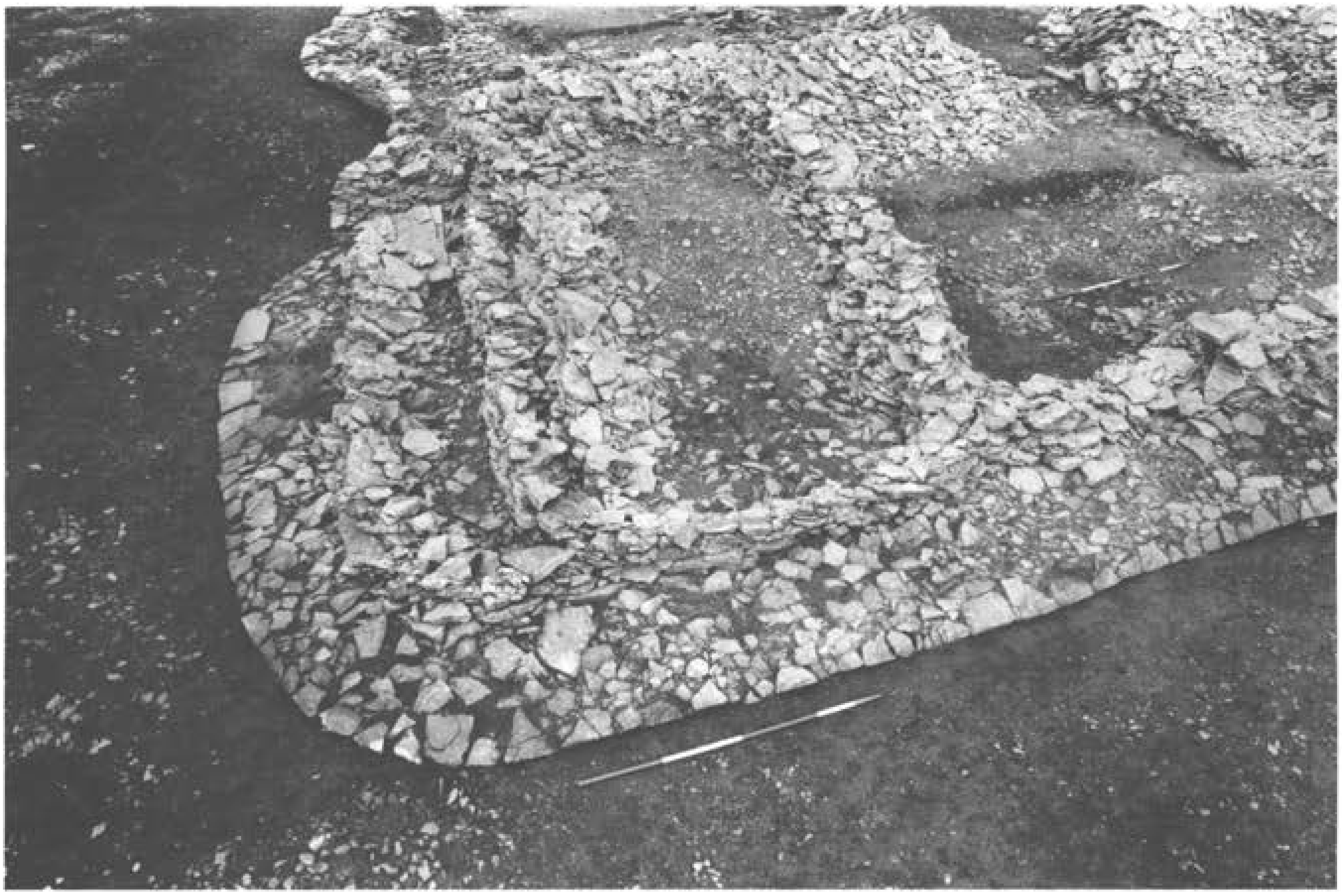


Fig 58 South horn viewed from the south, showing the internal extension added to revetment 303 on the west side of unit W (the outer cairn and horn facade have been removed down to their lowest courses to expose the internal revetments); scale in 0.5m divisions

of the units and their interrelationships. Finally, the chambered areas and their surrounding units (Chapter 5) are omitted from this discussion, although the only original gap in the axial alignment occurred between the chambers. This gap is an early feature and is discussed below.

The placing and shape of the primary dumps, in relation to the eventual monument, were significant. These dumps were always within the limits of the inner cairn, and they were laid out according to a predetermined axial alignment. The basal construction of this axis was contemporary with the dumps to the north of it, indicating that generally northern primary dumps were constructed before the southern ones. More important, perhaps, were the dump profiles which normally had a bank-like aspect with their long axes mostly parallel to the axial alignment of the cairn (Figs 43 and 55). This suggested that a key function of the primary dumps was to provide support for the axial construction. The axial elements involved an opposed pitched design throughout their height, the broad base of the triangular axial 'spine' being founded against the ridge of the dumps, which thus provided underpinning.

There was no evidence for any connection between the cairn and the pre-cairn features. A spatial correspondence, however, both in position and orientation, existed between the line of postholes and stakeholes of the pre-cairn structure and the western edge of a primary dump (330) and its subsequent cellular revetment (265). The western limit of dump 330 lay about a metre east of the hearth and postholes 590 and 592, while revetment 265 coincided with the position of postholes 584 and 595 and stakeholes 583 and 591. However, all the features of the structure, except the southernmost postholes 584 and 589 and stakeholes 585 and 586, were overlain by the primary dump 309, which contained no indication of features within it and must have postdated the removal of any timber uprights in the underlying features. The midden was irregularly criss-crossed by overlying primary dumps 330, 377/379, and 269/293/543, which exhibited no correspondence with its limits, although the axial alignment did bisect the midden location, running centrally across it from west to east.

Fundamental to the construction of the inner cairn were the axial elements. These had a bipartite nature throughout their length and height, comprising two triangular-sectioned dry stone structures butted against each other. It was against the axial elements that the cellular construction took place. The unit infills and their east and west revetments in each case overlay the axial elements.

Certain cellular units, or blocks of units, and the axial elements, to which they were attached, were capable of being freestanding constructional entities. On the north-west of the cairn, the block formed by units R/T/V, plus the inner horn extension to the west, could have stood independently, as could units M and I/G with their northern extensions.

Other units and blocks of units were dependent upon the pre-existence of others; units S and W could have been built independently of each other, but must have postdated block R/T/V to the north; unit U must have postdated both R/T/V and S and W; unit E must have predated C, but both must have postdated I/G and its northern extension; unit F postdated D, and unit J/H postdated F, but all three must have postdated the construction of block C/E/G/I to the north; unit Q must have postdated S and probably M, but probably predated P and N; unit N must have postdated M, and probably postdated P; unit O must have postdated R, M, Q, and P. These sequential relationships give a basis for reconstructing the overall pattern of inner cairn construction (Chapter 19).

The outer cairn

Introduction

The construction of the outer cairn was very similar to that of the cellular units and was no doubt undertaken as part of an almost continuous sequence of building. The main difference was that the outer revetment, in effect the facade of the monument, was built with a carefully constructed, horizontally-coursed, and flush-finished outer face, using selected and often substantial slabs.

The outer cairn construction involved the deposition of rubble and larger blocks against the faces of the internal revetments, forming the limits of the cellular units. In most areas, this infill was laid directly over the existing ground surface (eg Fig 42, section 1: contexts 284 and 392; section 3: 405). Sometimes large slabs were pitched against the internal revetments (Fig 11); elsewhere, slabs were more carefully positioned in a horizontal fashion. For example, immediately to the south of unit S, a substantial block of horizontally-laid slabs (416: Fig 42, section 3) was built, partly revetting small amounts of rubble and partly directly abutting the face of revetment 346. This feature is interpreted as a reinforced section of the facade-backing in this area, perhaps due to suspected weakness in revetment 346 (Fig 139 and arch drg 147).

South of units S and Q was one of the few sectors of the outer cairn which (contexts 325 and 420) overlay a thin marly lens, in turn overlying the former land surface. This lens (628) was visible in two of the north–south sections (Figs 42, section 3 and 56), but its west–east extent is unknown. It was definitely restricted to the zone between the facade and internal west–east cellular revetment and was not continuous with, or derived from, the primary dumps. To the north of unit O, only recorded in section (Fig 56), was another instance of marly deposits intervening between the outer cairn and the buried soil. Here, however, there were two separate lenses, 626 and 627, both of them more extensive than 628. The earlier (626) terminated on the north beneath the northern revetment (375) of unit O, and so must have related to or predated the cellular phase of construction. The later (627) abutted the final internal revetment (198) on the north-west side, but, like 626, continued northwards to a point beyond the position of the external revetment, which it underlaid. This deposit must have been of restricted occurrence. It is possible that 626 and 627 were in fact a single deposit relating to the cellular construction phase. Both 626/627 and 628 seem to have been construction debris rather than deliberate elements of the cairn construction. That these deposits were only recorded in section, testifies to their localised nature. It is possible that similar deposits elsewhere on the site could have gone unrecorded.

Normally, the infill between inner and outer revetments was fully interdigitated with the latter, which like all the other revetments had only one face, being built at the same time as the infill (Figs 59 and 62). The outer revetment and its backing formed an external 'skin' to the monument, varying in width (excluding units A and B) from *c* 1.5m to *c* 0.3m. This external construction was of an integral, continuous build, interrupted only by the two entrances to the chambered areas, and even then it was continuous at the base of the revetment (Chapter 5).

To the west of the chambered areas, the outer revetment was given separate context numbers (Fig 46), but there was no reason to suppose that 13 west, 151 west, 152, 153, and 300 or their backing infills (251, 306, 325, 341, 407, and 420) were not part of a single build. At the north-west corner, stones were absent as a result of plough-erosion, but they (151 west and 152) must have been linked in a continuous curve. Similar short breaks in the facade to the east (13 east, south of unit J/H, and 151 east, north of units A and E) could also be attributed to disturbance.

The chambered area entrances are discussed in detail in the next chapter. Breaks in the outer facade occurred at both entrances, which were lined in their outer portions by revetments (369–372) delimiting the facade backing. The construction of unit L followed the general pattern of the other cellular units. The south-west limit was defined by revetment 333, placed between the orthostats and the bonded corner of revetments 334/577; the south-east limit was similarly defined by revetment 425. Thus, unit L was infilled to the same southerly point as the adjacent units J/H and N, prior to the addition of the outer cairn on either side of the entrance (*see* arch photos 1982/7/14 and 1982/9/27).

The situation in unit K was not so clear. The arrangements on the north-west limit of this unit have already been described, with revetment 555, whether or not it was continuous with 198, effectively separating the unit infill (314) from the outer cairn (251). The north-east sector of unit K was different, however, in that it had no obvious internal revetment linking the orthostats and the unit I/G revetments, and thus no actual division between the infill rubble (389) of the east side of unit K and the backing (284) of 151 east.

On practical grounds, and because it would have been atypical compared with the rest of the cairn, it

Fig 59 Section through the outer cairn west of the south chambered area, showing internal revetment 14 and external revetment 13 west, viewed from the east; scale in 0.5m divisions

seems unlikely that unit K was left open until the construction of the north-eastern section of the facade and its backing.

Units A and B

To the east, the outer cairn appeared to have been part of the same building phase as the construction of units A and B (Fig 46). Strictly speaking, A and B were not cellular units of the same form as the other units. Some uncertainty remained about the construction of A and B because of the poor preservation of the cairn in this area (Figs 57 and 60).

Units A and B were located beyond the primary dump deposits. The infill of unit A consisted of stone slabs in a slightly marly matrix (276), placed directly over the land surface, and revetted on the north by an external revetment (151 east). At its north-west corner, there was no obvious division between 276 and the very narrow strip of backing (284) between revetments 151 east and 190. To the west, 276 was interpreted as abutting the outer, eastern face of revetment 174, while to the east, 276 simply terminated in an eroded edge.

The infill (277) of unit B was similar to that of A. It also directly overlay the soil and had no revetment (other than 13 east on the south). To the west, 277 abutted revetment 178, and at its south-west corner it merged without any obvious division into 392, the backing rubble between revetments 394 and 13 east. To the east, a single stone (373) marked the possible line of an external north–south revetment and hence also the tail end of the cairn (Fig 46).

In the area of the central axis here, both infills (276 and 277) postdated a poorly-preserved spinal element (Fig 45). Although there was a double-pitched, ridged effect in the axial slabs between units A and B, it proved impossible to determine whether the northern or the southern element was constructed first, or whether the whole axial element here was of single construction.

The poor preservation at the eastern end of the monument affects any consideration of the constructional methods used or the sequence in units A and B.

The external revetment

The external revetment was built directly from the original land surface without any prior preparation of the ground. Gradually, the basal courses had sunk into the pre-cairn soil. This sinking had occurred differentially, depending upon the underlying subsoil and bedrock. Numerous sections demonstrated this subsidence or the converse (Figs 42 and 56). The phenomenon was most clearly demonstrated south of unit U, where a hump in the facade elevation matched a hump in the bedrock surface (Fig 66: c–d).

Where differential sinking occurred from front to rear of the facade (Fig 61), it was always the leading, outer edge of the revetment which had sunk deeper into the soil, and here various factors, such as erosion, earthworm activity, animal burrowing, or the presence of external stone debris, must have been the cause. As a result of this, the upper surviving courses of the facade often had a pronounced outward lean. These aspects are more properly part of the decay of the monument (Chapter 7), but they are noted here, because they explain slight deviations in the facade alignment (Fig 46). Originally, the two lateral stretches of external revetment formed absolutely straight lines (Figs 8–9).

It was assumed that the stone 373 marked the line of the terminal revetment at the east end of the monument (Fig 46). Curved corners were the norm in the cairn construction, and therefore curved corners and a straight (or slightly-curved) revetment are postulated for the eastern terminal.

On the north side of the cairn, the length of the surviving revetment (151 west, 151 east, and 273) was 51m; on the south side, the length (13 west, 13 east, and 237) was 0.5m less. Taking stone 373 as the original limit of the monument, then the total length of each side would have been approximately 53m. The width at the tail, at right-angles to the alignment of the axial revetment and on the line of stone 373, would have been approximately 8.6m.

The maximum width, north to south, of the horns at the west end was just under 19m. The shape of the horns varied slightly. The north horn was flatter and less pronounced, projecting about 1.2m beyond the forecourt recess, while the more curving south horn projected some 2m. If the size and shape of the forecourt recess are defined by a straight line drawn between the westernmost projections of the horns, then this shallow concave area had a width of 8m and a depth of 1.5m.

The maximum surviving height of the external revetment was 0.8m (on the south side of the forecourt: Figs 62, 64, and 65). Elsewhere, the surviving height was variable, but never exceeded about 0.4m along the lateral edges (Figs 63 and 66). Reconstruction of the height of the external revetment could be achieved very approximately from consideration of the extra-cairn sections (Figs 140–3). For example, it can be suggested that the minimum heights at sections 5 and 14 on the north side were 0.85m and 1.0m respectively, at section 23 in the forecourt 1.0m, and at sections 33 and 37 on the south side 0.45m and 0.6m respectively. Generally, the external revetment appeared to taper in height from the centre of the forecourt, across the horns, to the lateral edges, and from west of the entrances down towards the tail end of the cairn.

The revetment in the forecourt was identical to that elsewhere around the facade (Figs 64–5). No upright stones were present, nor could any have existed formerly; the drystone work was uninterrupted, and the underlying soil contained no indication of postholes or stone-sockets. There were, therefore, no 'false entrance' indicators as present in the forecourt revetments of some other laterally-chambered Cotswold-Severn tombs. On Figures 64–5, the revetment in the centre of the forecourt shows a gap where it survives to only 0.3m in height. When first exposed during excavation, however, the revetment here was still intact up to the same level as on either side.

The quality of the external revetment facing cannot be overstated. Large slabs with at least one perfectly straight edge were carefully selected for the facade. The original proportions and quality of these slabs, however, had often been obscured by subsequent thermal fracturing. The coursing appeared to have been exclusively horizontal, with no vertical or diagonal work, but as with all drystone construction the courses were not uniform (*see* eg Fig 65). A study of some of the slabs from the external revetment (Chapter 16) suggested that not all the stone used derived from

Fig 60 Tail end of the cairn as first exposed, viewed from the east; the original extent of the cairn is perhaps marked by the pitched stone visible at the bottom left of the picture; parallel scores in the subsoil surface are recent ploughmarks; scale in 0.5m divisions

Fig 61 External revetment (151 east) and underlying soil in section (cf Fig 42, section 1), viewed from the east; scale in 0.1m divisions

the flanking quarries. If so, this implies even greater concern over the original appearance of the facade.

The upper cairn

A general context (8) applied to the whole cairn surface beneath the modern soil horizon. The cairn was first planned at this level (Fig 57). The records of the cairn at this stage provide the basis for assessing the nature of the upper cairn. As the contour survey (Fig 5), the profiles (Fig 67), and the main section (Fig 56) make clear, the surviving cairn profile had been artificially smoothed by the processes of collapse, erosion, and agriculture. The height loss over five-and-a-half millennia is a crucial, but unknown, factor, and one which cannot be assessed from the amount of surrounding stone debris, since this will have undergone similar erosion.

At the cairn surface, there was only one feature which did not become clarified during excavation. This was a spread of some 14 pieces of shelly limestone (similar to the coarse-grained orthostats), lying mainly horizontally within the surface of the south-west part of the cairn above unit U. The largest of these was a sizeable slab 0.75 × 0.50 × 0.10m. There was no obvious relationship between the separate pieces in this scatter (arch drg 131; photo 1979/14/14a). Subsequent clearance did not reveal any associated features in the cairn around or below these stones, hence their presence remains unexplained.

Some sections of the upper cairn were less stony and had more marl or soil than others. All of these proved to be areas of post-monument disturbance, except in the case of the surfaces of units P and N, where the upper unit infill deposits comprised marly lenses (*see* arch photo 1981/16/9). This mixture of marl and stone could originally have been covered by a layer of slabs, subsequently lost by erosion.

At the level of context 8, a number of features of the inner cairn construction were visible (Fig 57). These included 11 of the chambered area orthostats, which must originally have been concealed by roof-stones. Thus, it cannot be assumed that any of the other features, the internal revetments, and the pitched axial construction were necessarily visible originally, and at least 0.5m depth of cover must have been lost from over the chambered areas. On the other hand, height loss in the chambered area will have been increased by the disintegration of the roofing stones and need not have been so pronounced elsewhere.

If the internal revetments were visible at the uppermost level of the cairn, then a case could be made for the cairn having had a stepped appearance with an elevated internal section, as far as the limits of the cellular construction, and a lower surrounding platform formed by the outer cairn. Several factors can be used to argue against a stepped appearance, however. For example, there would have been a marked contrast between the regular ground plan of the outer cairn delimited by the facade and the irregular plan of the inner cairn. The assumption was made that the final appearance of the Hazleton North cairn was not stepped. This leaves a choice as to how pitched or flat the upper stonework appeared. Taking the north–south transverse profile first, the opposingly-pitched, ridge-like nature of the axial elements has been stressed, and this emerges clearly from all the recorded north–south sections. This pitched aspect to the west–east axis was apparent, especially at the west end, at the very highest surviving level (Figs 57 and 68) and was likely to have been a feature of the original surface of the monument. It has also been shown, however, that within the cellular construction the use of steeply-pitched slabs placed against the faces of north–south revetments was common (Fig 69), these 'fins' creating a counter-effect of pitching to the east or west over the top of the edges of the axial ridge. Nevertheless, the strongest case against a rectangular, box-like north–south profile to the cairn is that this would have necessitated the outer revetment rising to the same height as the axis of the cairn throughout. This appeared not to apply in the area of the chambers, where all the signs are that a decrease in overall height occurred from the chambers outwards to the entrances and, if so, is unlikely to have applied elsewhere. Thus, the suggested conclusion is that the transverse profile was a ridged one, with symmetrical pitching from a longitudinal axial ridge.

The original longitudinal profile probably tapered from west to east in that part of the monument to the east of the chambers, but it was more difficult to suggest a reconstruction of the profile to the west. Figure 67 shows the west–east profile (from the contour survey) along the line of the axial revetments. The highest surviving part of the cairn was at the main section, rather than above the chambers. West of the main section, the slope towards the forecourt was gradual and could have been a product of erosion. Moreover, the amount of collapsed debris in the forecourt was considerable (Fig 57) and could be sufficient to postulate a revetment rising to at least the height of the cairn at the main section. The collapse of this revetment would have encouraged an erosion slope back on to the cairn from the forecourt. Whether the original profile sloped from the forecourt area to the main section is a matter for speculation.

Finds from the cairn

Finds from the cairn likely to be contemporary with its construction were extremely few. (Artefacts from around the chambered areas in units K and L are discussed in Chapter 5). Prehistoric finds from context 8 are more probably related to the monument decay phase as redeposited items.

A single human bone (left distal phalanx) was found in the lower stonework of the axial element 461, over 3m south-east of the nearest orthostat (208). This bone was almost certainly not derived from the chambered areas and remains enigmatic. From context 444 (below unit U), a fragment of a child's vertebra and a longbone fragment were recorded. Fragments of adult ribs also came from contexts 375 and 378 in unit O.

Some 14 animal bones (Table 80) were associated with the cairn construction. Cattle, sheep/goat, and pig came from the primary dumps 269, 293, 296, and 309. These bones were presumably from the same assemblage as in the buried soil and probably resulted from its disturbance during the early phases of quarrying. Two red deer antlers came from cairn contexts around the chambered areas (*see* Chapter 5).

The bones of small mammals from lower cairn contexts (Table 81) were mostly from loose stony deposits into which animals could have penetrated.

A total of five small sherds of prehistoric pottery was found in the lower parts of the cairn. Three were from primary dumps (210, 309, and 446), a fourth from a slab construction (390) adjacent to the south chamber, and the fifth from the axial element (444). The three sherds from dump contexts could have been derived from the pre-cairn occupation, and the same may have applied to the other two sherds above.

Twenty-five flints and one chert artefact came from cairn contexts, comprising 21 unretouched flakes, 2 unclassifiable burnt fragments, 2 edge-trimmed flakes, and 1 ?burin. They were

Fig 62 External revetment in the forecourt in partial section, viewed from the north; scales in 0.1 and 0.5m divisions

Fig 63 External revetment 151 west in the area north of unit T, viewed from the north; scale in 0.1m divisions

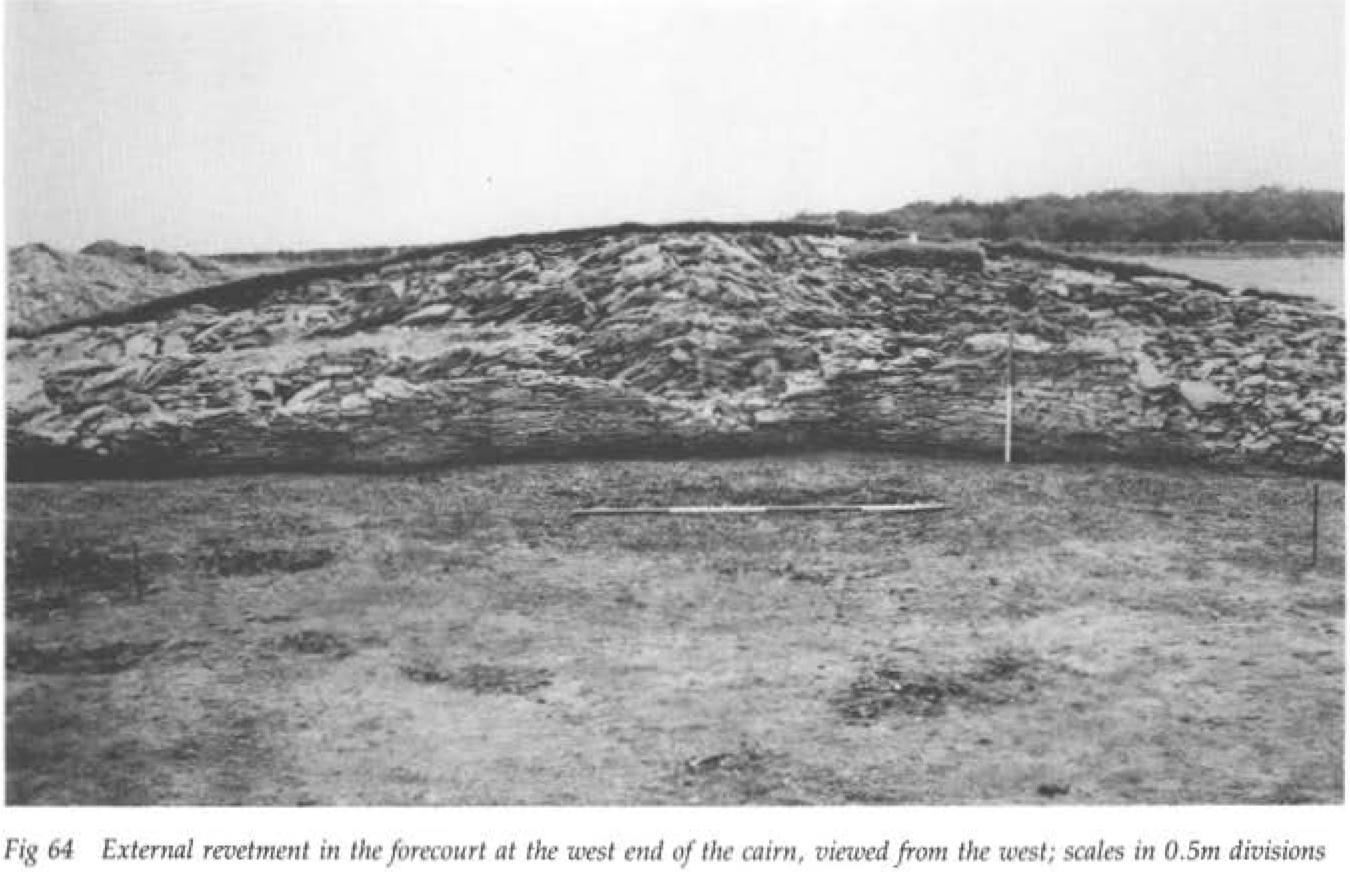


Fig 64 External revetment in the forecourt at the west end of the cairn, viewed from the west; scales in 0.5m divisions

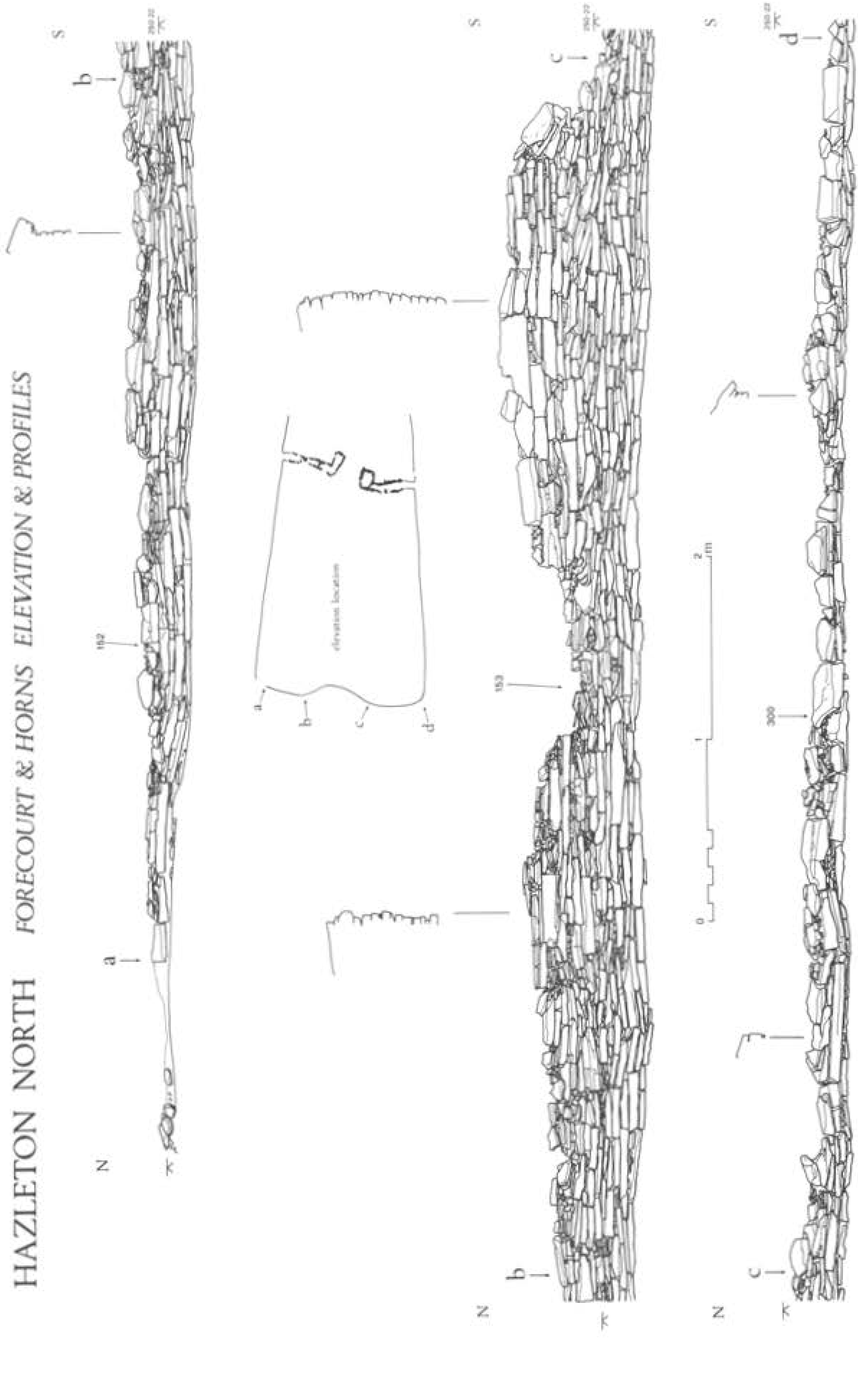


Fig 65 Elevations and profiles of the external revetment at the west end of the cairn

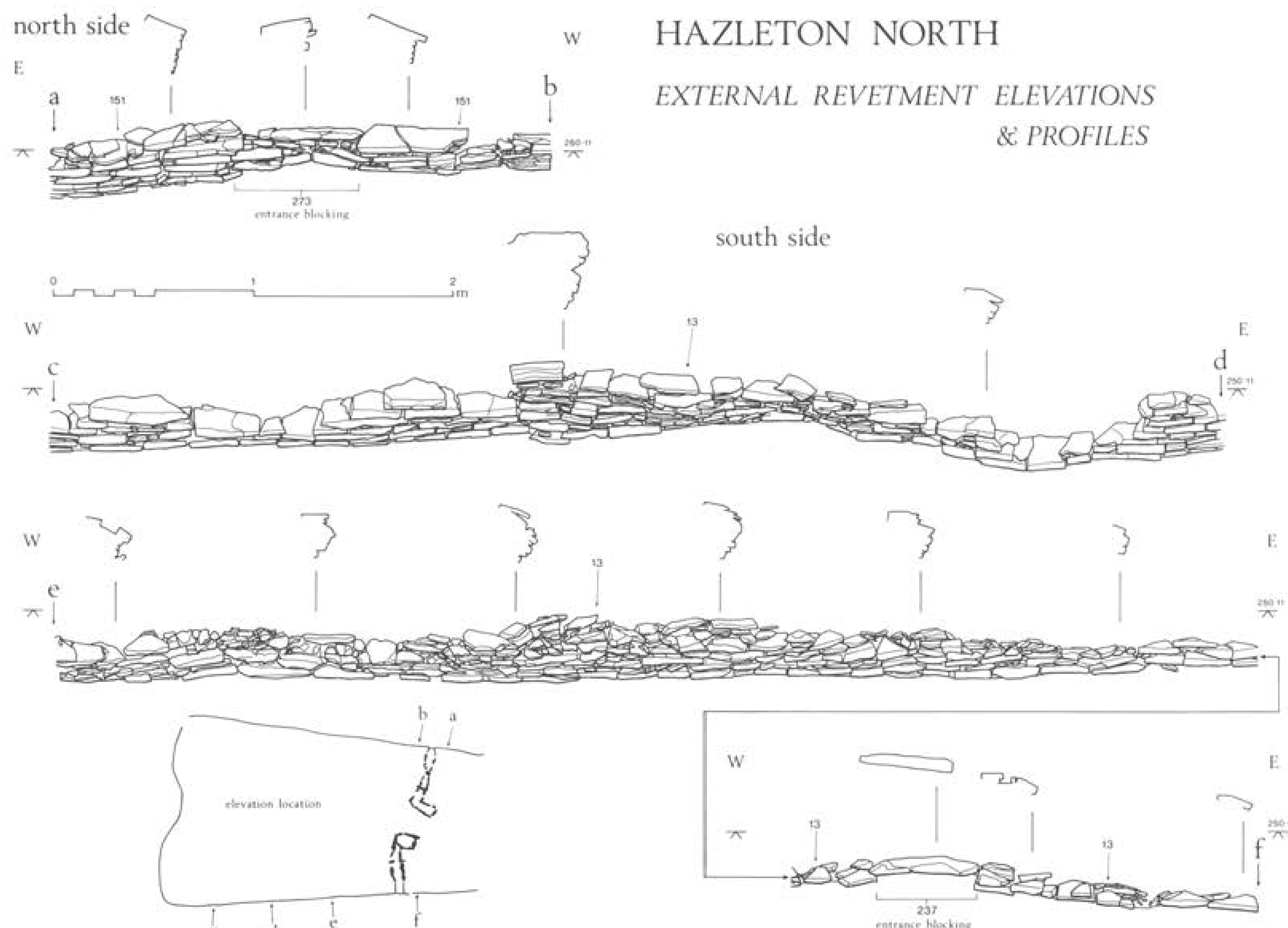


Fig 66 Elevations and profiles of the external revetment at the entrances to the chambered areas and at points along the south-west side of the cairn

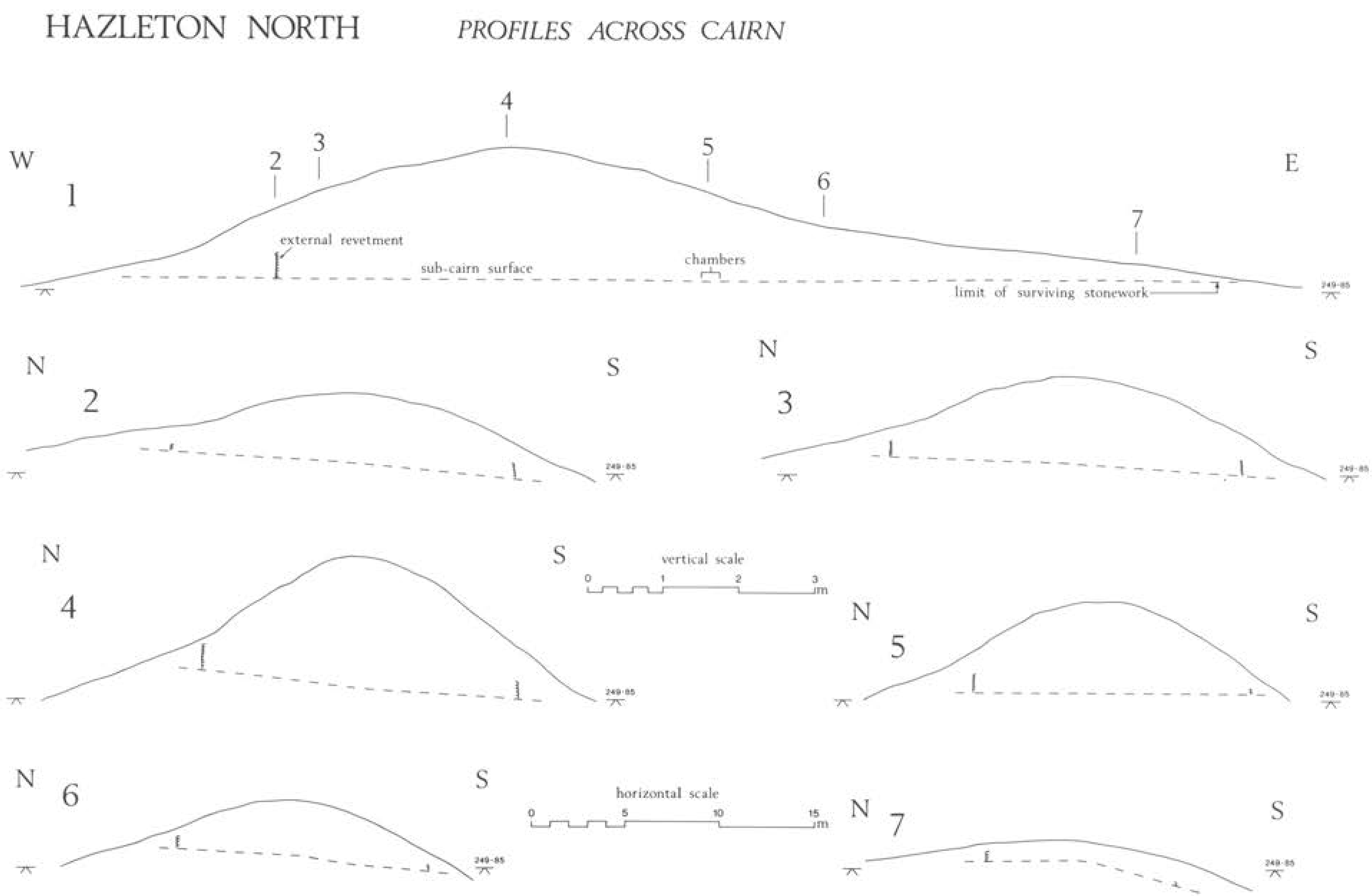


Fig 67 Profiles of the cairn before excavation, derived from the contour survey; the longitudinal profile is along the axial alignment, the lateral profiles are at right angles to the axial alignment

Fig 68 Cairn stonework on the north-west side of the monument, viewed from the west, after the final cleaning, showing the pitched nature of the axial stonework; scales in 0.5m divisions

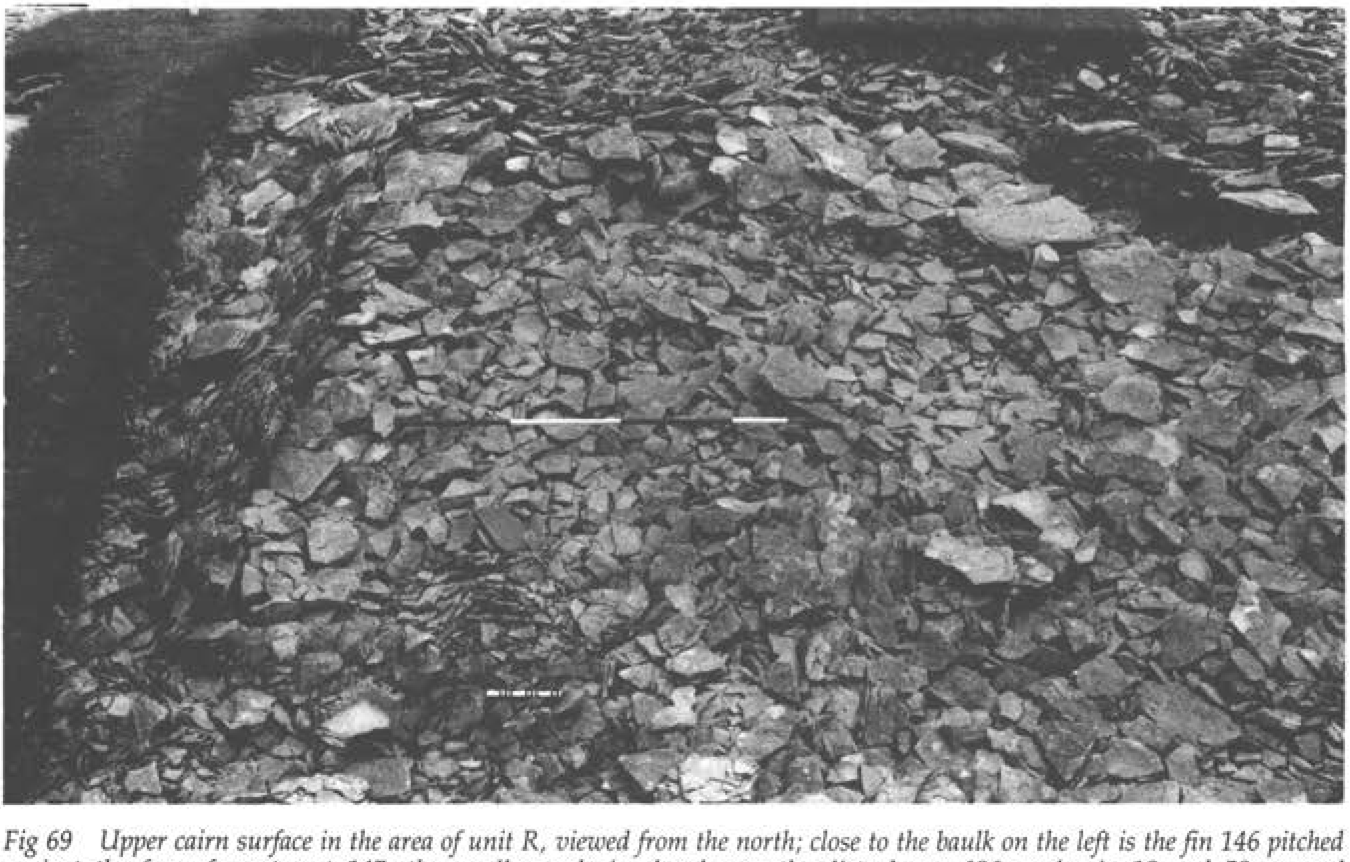


Fig 69 Upper cairn surface in the area of unit R, viewed from the north; close to the baulk on the left is the fin 146 pitched against the face of revetment 147; the smaller scale is placed over the disturbance 606; scales in 10 and 50mm and 0.5m divisions

provenanced as follows: 1 from an orthostat socket; 15 from primary dumps; 3 from axial elements; 6 from unit infills; and 1 from the facade-backing of the outer cairn. A positive link between one of these pieces (from the interface between a unit infill and the surface of a primary dump) and the pre-cairn flint assemblage was established by refitting (Chapter 10). All of these, of a nondescript character, were probably fortuitously redeposited during cairn construction.

Virtually all the finds from the cairn can be regarded as chance redepositions during construction or as subsequent intrusions. It is clear that the cairn was not treated as a location for artefact deposition, ritual or otherwise.

5 The chambered areas

by Alan Saville and Jon Hoyle

Summary

The two chambered areas, constructed as integral parts of the cairn, each comprised an entrance, passage, and chamber laid out in an L-shape. They were built up with coarse- and fine-grained limestone orthostats topped with corbelling. The areas were paved in part with limestone slabs, and there were various blocking devices, dividing chambers from passages and passages from entrances.

Introduction

The construction of the chambered areas was an integral part of building the cairn. Their roofing depended on the presence of the cellular units to either side; at Hazleton, the chambered areas had never been freestanding as 'small cairns'. The term 'chambered area' refers to the whole of each area demarcated by orthostats and the associated revetments (Fig 10).

In plan, both chambered areas were L-shaped (Figs 70–1) with an angled turn to the east. For descriptive purposes, each chambered area was subdivided into three zones: entrance, passage, and chamber. The entrance is the area from the external revetment to the first transverse slabs; the chamber is the zone from the easternmost orthostat back to the sillstone; and the passage is the section between the entrance and chamber. These terms were used for convenience from an early stage of the excavation, and they do not have any specific implications as to status or function. 'Throughway' is thus used to describe the access space defined by the orthostats, rather than entrance or passage.

The chambered areas were recorded in plan to show the orthostats, the paving, and the sockets, stone impressions, and packing stones (Figs 74 and 79). The individual orthostats are referred to by their original context numbers. Elevations record the orthostats and any intercalated revetments, viewed from the interior (Figs 75, 76, 80, and 81). Profiles across the chambered areas show the internal spaces (Figs 77 and 82). In addition, plans of the chambered areas before excavation (Fig 93), sections through the fills (Fig 95), and isometric reconstructions (Figs 230–1) are included in subsequent chapters.

The orthostats

The orthostats were of two varieties of limestone, readily distinguishable during excavation. Subsequent analysis (Chapter 16) showed that one was a fine-grained limestone (Fig 72), similar to the stone in the cairnside quarries (Hampen Marly Beds), while the other was a coarser-grained limestone (Fig 73; Farmington Freestone), which had been imported, possibly from several kilometres away. The two types of orthostat limestone used are referred to as 'fine-grained' and 'coarse-grained' (Figs 74 and 79).

Orthostats of coarse-grained stone were usually larger than the others. Their outlines were rounded, their shapes very variable, and their surfaces frequently displayed very marked weathering (Figs 73 and 86). This weathering had taken place before their use as orthostats. The coarse-grained orthostats were very shelly. The surface of one (204) was closely covered with brachiopods, while orthostat 21 had the largest visible fossil, a bivalve over 50mm across (arch photo 1982/35/24), located at its base and buried below ground level.

The fine-grained orthostats were angular in outline, with relatively smooth surfaces, and could be quite regular in shape (Fig 72). Features, such as a pronounced angular step on the rear face of orthostat 281 (Fig 72), made clear the quarried origin of these slabs. When used orthostatically, this stone was not as durable as the coarser stone and tended to laminate vertically and shatter. In some cases, the shattered orthostats had still retained their shapes and positions (eg 249: Fig 70), in other cases fragmentation was

Fig 70 South chambered area orthostats, viewed from the west; scale in 0.5m divisions

Fig 71 North chambered area orthostats, viewed from the north; scales in 0.5m divisions

Table 2 South chambered area orthostats

Context no	Height (m)	Max dimension (m)	Max width (m)	Max thickness (m)	F/C	Stance
Entrance						
16	0.55–0.61	0.85	0.62	0.16	C	upright
17*	0.44–0.56	0.75	0.46	0.25	C	slight lean inwards
18	0.66–0.72	1.10	1.04	0.24	C	upright
19	0.49–0.58	1.30	1.24	0.32	C	upright
Transverse slabs at junction of entrance and passage						
20	0.72–0.82	0.90	0.68	0.17	C	upright
244	0.81–0.85	1.05	0.62	0.21	C	upright
Passage						
248*	0.77–0.90	1.05	0.50	0.11	C	slight lean outwards
249	0.55–0.65	?	0.65	0.15	F	slight lean inwards
316	0.59–0.62	?	0.71	0.12	F	slight lean inwards
355	0.59	?	0.98	0.17	F	slight lean inwards
Chamber						
21	1.15	1.30	1.00	0.25	C	upright
245*	0.94	1.10	1.10	0.14	C	slight lean inwards
246	1.03	1.05	0.80	0.17	C	upright
247	0.93	0.93	0.62	0.11	C	upright
317	1.07	1.47	1.42	0.28	C	upright
318	0.84	?	0.77	0.12	C	upright

Notes: F/C = Fine- or coarse-grained limestone. The height measurement is from floor level to the highest point of the stone, not necessarily in a plane perpendicular to the ground but measured along the face of the stone. The range given reflects uncertainty about the floor level and that in certain instances there was considerable unevenness in that level along the base of an individual orthostat. The width measurement is the maximum width, parallel to the floor, of the orthostat in its erect position. *These orthostats were possibly leaning intentionally (ie they had been erected in that position), as opposed to the other leaning orthostats which had moved inwards since erection.

Table 3 North chambered area orthostats

Context no	Height (m)	Max dimension (m)	Max width (m)	Max thickness (m)	F/C	Stance
Entrance						
204	0.73–0.74	0.90	0.86	0.24	C	upright
205	0.74–0.75	0.90	0.70	0.27	C	upright
358	0.50+	?	0.50	0.14	F	major lean inwards
359	stump only		0.43	0.08+	F	disintegrated
Transverse slabs at junction of entrance and passage						
206	0.66–0.74	0.90	0.43	0.13	C	upright
360	0.42+	?	0.40–0.50	0.11	F	upper part collapsed inwards
Passage						
361	0.70	0.80	0.47	0.16	C	major lean inwards
362	0.66	?	0.66	0.10	F	lean inwards
363	0.61	0.75	0.70	0.12	C	slight lean inwards
364	0.62	0.80	0.74	0.10	C	slight lean inwards
365	0.61	0.65	0.57	0.11	C	slight lean inwards
Transverse slabs at junction of passage and chamber						
399*	0.72–0.73	0.85	0.42	0.07	F	lean to south
400*	0.62+–0.65+	?	0.40	0.08	F	lean to south
Chamber						
207	1.02–1.24	1.30	0.76	0.23	C	upright
208	1.03–1.09	1.20	1.00	0.21	C	upright
281	0.74–0.80	0.83	0.64	0.10	F	upright
282	0.85–0.89	1.00	0.48	0.14	F	upright
319	0.77–0.86	0.89	0.28	0.11	F	slight lean inwards
320	0.87–0.91	1.00	0.73	0.15	C	upright
342	*c* 0.80	?	0.71	0.08+	F	upper part collapsed
343	0.77–0.83	?	0.78	0.09+	F	part leans inwards
367	0.66–0.77	0.90	0.62	0.14	C	upright
368	0.63–0.80	0.86	0.54	0.12	C	lean inwards
403	0.77–0.86	1.10	0.33	0.09	F	slight lean inwards
408	0.76	0.85	0.62	0.08	F	upright
409	0.66–0.70	?	0.78	0.12	F	slight lean inwards

Notes as Table 2

more complete and had occurred while the tomb was still in use (eg 358: Fig 118).

None of the orthostats bore decoration in any form. Several of the coarse-grained orthostats had natural perforations (Fig 73), but these had not been artificially modified. Most of the orthostats visible at the surface of the cairn were scored by plough-damage (orthostats 16, 17, 18, 20, 21, 204, 205, 207, and 208: *see* Fig 87). None of the coarse-grained orthostats had been dressed, and their often irregular upper surfaces had not been levelled; the fine-grained orthostats were quarried blocks, but otherwise unshaped.

The sizes of the orthostats are compared in Tables 2 and 3. The coarse-grained orthostats tended to be larger and more massive than the fine-grained ones, and in both categories of stone the south-side orthostats were more massive than the north-side ones. The chamber orthostats tended to be larger and taller than those in the passage and entrance (on both sides). Average heights of the entrance and passage orthostats were about the same on both sides (0.65m south side, 0.68m north side); the south-side chamber orthostats, however, were slightly taller. Even the largest of these orthostats (19, south entrance) would have posed no great mechanical problems for the tomb builders, since it was found by experiment that three people could manoeuvre this and the other larger stones by rolling and pivoting them.

Fig 72 North chambered area: external aspect of orthostats forming the south side of the north chamber, viewed from the south; scale in 0.5m divisions

The orthostat sockets

The way in which the orthostats were erected varied. Their stone-holes and packing stones are shown in Figures 74 and 79 and the dimensions in Tables 4 and 5. The maximum excavated depth and an estimate for the original depth below floor level are provided (this latter calculation is uncertain because the orthostats must have sunk into the subsoil). Since the maximum depth postulated is only 0.25m, this shows an absence of substantial sockets.

Nine of the 16 southern orthostats, and 3 of the 26 on the north side, appeared to have genuine sockets, although barely wider than the orthostats which they received, the orthostats being placed flush against one side of the socket and wedged with packing stones on the other. An exception was the socket 541 for south entrance orthostat 17 (Fig 78), which extended well beyond the base of the orthostat and had tightly-wedged packing stones on all sides. In other cases, a rudimentary hollow to suit the base was made, then stones were wedged around the base to keep the orthostat upright. The irregularities in the bases of some orthostats were compensated for by packing slabs (most notably beneath the raised end of orthostat 317). A possible interlinking of stone-holes on the west side of the south passage occurred, where 528, 529, and 530 formed a shallow gully. If so, this would be evidence for the contemporaneous erection of both fine- and coarse-grained orthostats: this was not otherwise demonstrable.

In a few cases, there was no socket whatsoever, the orthostat balancing upright on the existing ground surface, supported by stone wedges. For the well-balanced orthostat 18, for example, only stabilisation, by placing slabs under the concave northern end, was required; the 'socket' 526 was simply the impression of the base of the orthostat in the buried soil (arch photo 1982/35/7).

Finds from the orthostat sockets

The total number of items recorded from the sockets was small.

In the northern sockets, bone fragments were the only finds. These were all judged to be human except for three fragments from 504 and further fragments from 517, which are unidentifiable animal bone and presumably derived from the buried soil. In the north entrance, sockets 497/498 yielded two toe bones, while socket 499 contained six small burnt fragments, including cranial pieces, matching the scatter of cremated bones elsewhere in the entrance. In the chamber, a rib bone came from 513, a toe bone from 516, a tooth from 519, a metatarsal from 520, a vertebra from 522, and a rib and manubrium from 520/521. Many more human bone fragments were recorded from the southern orthostat sockets (*see* Table 6). All of these human bones from both north and south sides were either very small bones or small fragments. Their presence in these sockets can be explained by post-depositional processes. The relatively large numbers of bones from the sockets at the west side of the south chamber and its junction with the passage are somewhat problematic, since not only were these sockets shallow, but burial deposits in these areas were noticeably sparse (Fig 112).

It was concluded that none of the human bones and bone fragments recorded from sockets were contemporary with the erection of the orthostats, nor was the bone bead (Fig 177: 14879), found in socket 535 (south chamber). The flint flake from socket 538 was also almost certainly derived from the buried soil.

Table 4 South chambered area orthostat sockets

Context no Stone	Socket	*Excavated* size (m)	depth (m)	*Estimated* depth (m)	*Stone jamming/ packing*	*Socket?*⋆
Entrance						
16	525	0.35×0.30	0.19	0.25	yes	true socket
17	541	0.45×0.15	0.20	0.25	yes	true socket
18	526	0.80×0.25	0.03	?	no*	no socket
19	540	0.60×0.20	0.09	0.15	yes	no socket
Transverse slabs at junction of entrance and passage						
20	539	0.40×0.15	0.10	0.25	yes	true socket
244	528	0.40×0.18	0.19	0.25	yes	true socket
Passage						
248	537	0.40×0.20	0.16	0.20–0.25	no	no socket
249	530	0.35×0.15	0.14	0.25	yes	?true socket
316	529	0.40×0.20	0.15	0.20	yes	?true socket
355	538	0.74×0.22	0.19	0.20–0.25	yes	?true socket
Chamber						
21	534	0.60×0.30	0.16	0.25	yes	true socket
245	531	0.60×0.12	0.10	0.15	?yes	no socket
246	532	0.90×0.20	0.04	?	yes	no socket
247	536	0.50×0.12	0.11	0.15	yes	?true socket
317	533	0.60×0.20	0.10	?	yes	no socket
318	535	0.40×0.15	0.03	?	yes	no socket

Notes: *No on-edge stones, but some placed flat under concavity at base of stone as wedging. ⋆The distinction between 'true socket' and 'no socket' was that the former appeared to have an excavated stone-hole larger than the base of the orthostat, whereas the latter did not, although that did not necessarily mean no preparation of the ground prior to orthostat erection.

The south chambered area

The south chambered area (Figs 74–7) comprised 16 orthostats (13 coarse-grained, 3 fine-grained), which were arranged in an L-shaped plan, with the entrance and passage on a long axis *c* 20° west of north. The long axis of the south chamber was *c* 10° south of west, involving a turn to the east of *c* 70° from the passage axis. The total length of the chambered area, from the external revetment to the inner face of orthostat 246, was 5.9m.

The entrance was 3.2m long from the external revetment to a point between the transverse slabs. The entrance had a pair of orthostats on either side. The two pairs were matched, with two smaller stones (16 and 17) preceding two massive blocks (18 and 19). The width of the entrance at floor level between each pair of orthostats was *c* 0.9m. A substantial piece of coarse-grained limestone (0.24m high × 0.45m wide × 0.44m thick) was positioned to the south of orthostat 17. This block (326) was placed directly on the former land surface, not upright but in a prone position on its side, with a freshly exposed break-surface lining the throughway (all the other surfaces being weathered; Fig 78). Block 326 was part of the entrance revetment rather than an orthostat, although it is probable that 326 was from a larger block of orthostat type and that it was placed in position at the same time as the orthostats, predating the adjacent revetment slabs. Including 326, the revetments flanking the outer entrance extended for 1.1m on the west and 1.2m on the east. The gap between the revetments narrowed towards the actual entrance, progressively reducing the width of the base level throughway from 0.8m to only 0.6m at the break in the external revetment.

The two transverse slabs (20 and 244), set at right-angles to the throughway, were positioned so as to constrict its width evenly to 0.50–0.55m (Fig 75). Slab 244 intruded much further into the throughway than slab 20. Beyond the transverse slabs, the width of the throughway expanded in the passage to a maximum of 0.7m at the south end, then tapered again to the north. The northern terminal of the passage was marked by a sillstone (454), a single slab set on edge, diagonally to the throughway axis (0.61m long × 0.09m thick with a maximum height of 0.3m); the maximum projection above the original floor level was estimated as

Table 5 North chambered area orthostat sockets

Context no Stone	Socket	*Excavated* size (m)	depth (m)	*Estimated* depth (m)	*Stone jamming/ packing*	*Socket?**
Entrance						
204	496	0.60×0.08	0.14	0.15–0.20	yes	no socket
205	497	0.50×0.26	0.14	0.15–0.20	yes	no socket
358	498	0.16×0.06	0.09	0.10–0.15	yes	no socket
359	499	0.40×0.16	0.09	0.15	yes	no socket
Transverse slabs at junction of entrance and passage						
206	501	0.14×0.14	0.09	0.15	yes	no socket
360	500	0.28×0.06	0.08	0.10	no	no socket
Passage						
361	502	0.40×0.26	0.08	0.10–0.15	no	no socket
362	504	0.44×0.20	0.12	0.10–0.15	yes	no socket
363	506	0.58×0.15	0.15	0.20	yes	no socket
364	507	0.60×0.15	0.12	0.15	yes	no socket
365	505	0.30×0.15	0.10	0.10–0.15	yes	no socket
Transverse slabs at junction of passage and chamber						
399	510	0.24×0.04	0.12	0.20	yes	no socket
400	508	0.22×0.08	0.09	0.10–0.15	no	no socket
Chamber						
207	513	0.50×0.40	0.16	0.20	yes	true socket
208	519	0.70×0.22	0.16	0.25	yes	true socket
281	521	0.35×0.18	0.06	0.15	yes	?true socket
282	523	0.38×0.18	0.09	0.10–0.15	yes	no socket
319	516	0.20×0.15	0.06	?	yes	no socket
320	520	0.45×0.20	0.07	0.20	yes	true socket
342	517	0.40×0.10	0.08	0.10–0.15	yes	no socket
343	518	0.60×0.15	0.07	0.15	yes	no socket
367	512	0.20×0.16	0.09	0.20	yes	no socket
368	511	0.30×0.18	0.06	0.10	yes	no socket
403	522	0.30×0.08	0.03	0.10–0.15	yes	no socket
408	515	0.16×0.10	0.09	0.15	yes	no socket
409	514	?×0.16	0.02	?	yes	no socket

Note: *The distinction between 'true socket' and 'no socket' was that the former appeared to have an excavated stone-hole larger than the base of the orthostat, whereas the latter did not, although that did not necessarily mean no preparation of the ground prior to orthostat erection.

Table 6 Human bones from south chambered area orthostat sockets

Socket no	*Bones*
525	1 metatarsal
529	1 rib, 1 calcaneum
530	1 phalanx (foot)
531	1 rib, 1 phalanx (unspecified)
530/531	2 vertebrae, 1 axis, 2 ribs, 1 metacarpal, 1 phalanx (hand), 1 phalanx (foot)
531/532	1 metatarsal/carpal, 1 rib, 1 femoral head, 1 pelvic fragment, 1 vertebra, 1 phalanx (unspecified), 1 cuneiform, 1 sacral fragment, 3 unidentified fragments
532	1 metacarpal, 3 vertebrae, 2 unidentified fragments, 1 cuboid
533	1 rib, 1 shaft fragment
534	1 phalanx
539	1 rib, 1 phalanx, 1 unidentified fragment
540	1 tooth, 2 unidentified fragments

Fig 73 North chamber: internal aspect of orthostat 208, viewed from the west; scale in 0.1m divisions

0.10–0.15m. The sillstone leant towards the north and had packing stones against its northern face. The sillstone had been rammed into the subsoil, not placed in a prepared socket. There were no associated ancillary slabs. It abutted both orthostats 245 and 248. The length of the passage from the sillstone to between the transverse slabs was 1.8–2.0m.

The three fine-grained passage orthostats had laminated markedly. To the west, 249 and 316 were leaning inwards and, although both retained most of their original shape, part of the inner face of 316 had flaked away. On the east, 355 had laminated vertically into three separate parts, so that the upper part of the stone 'fanned' outwards, but had otherwise stayed upright. The (coarse-grained) orthostat 248 was intact and leaned outwards slightly, in what was probably its original stance.

The chamber was barrel-shaped, 1.8m long with a maximum width of 1.2m. All of the chamber orthostats remained intact and upright, except for 245 which was split. However, the inward lean of 245 was thought to be original. Some flakes had fallen off the inner face of the large terminal orthostat 21 since its erection.

There was no clear sequence of erection for the orthostats, but the disposition of each stone relative to its neighbours did suggest that 21 was erected before 317 and 318, 247 before 248, and 20 before 19 and/or 355. The grouping of the three fine-grained orthostats in the passage was conspicuous and could indicate that the passage was the last part of the south chambered area to have been constructed.

The north chambered area

The north chambered area comprised 26 wholly or partially surviving orthostats (14 fine-grained, 12 coarse-grained), which were arranged in an L-shaped plan (Figs 79–82).

The long axis through the entrance and passage was just a few degrees west of north. The entrance and passage had slightly divergent alignments, the entrance being *c* 10° west of north, and the passage approximately north–south. The first part of the chamber beyond the sillstone had an axis *c* 15° east of north, before changing direction through slightly more than a right-angle to an axis 80° west of north. The throughway on the north side was, therefore, somewhat curved towards the west before it had a major change of orientation towards the east. The overall distance from the external revetment to the inner face of orthostat 282 was *c* 6m.

The entrance was 2m long from the external revetment to between transverse slabs 206 and 360. The outer pair of entrance orthostats (204 and 205) were substantial coarse-grained blocks and remained in an upright position (Fig 71). The inner pair of entrance orthostats (358 and 359) were both fine-grained and had shattered extensively. Orthostat 358 had laminated and tilted into the entrance, the upper part being still largely intact in shape when first excavated (Fig 116). It had collapsed during the life of the tomb and had not been re-erected. Orthostat 359 only survived as a laminated stump, the upper portion having collapsed before 358 and disintegrated completely. A shattered limestone slab observed beneath 358 could originally have been part of 359 (arch photos 1981/43/12–14). This orthostat had presumably snapped off towards the base. The width of the entrance between these orthostats varied from 0.6m to 0.5m. The outer entrance was flanked by revetments from 0.7m to 0.9m in length. The basal width between the revetments narrowed to 0.6m at the entrance.

The transverse orthostats at the rear of the entrance survived differently. The coarse-grained 206 was intact and upright; fine-grained 360 opposite had laminated vertically, shattered, and collapsed. The upper section of 360 had broken off and fallen inwards to lean against 206, while the stump remained upright. The width of the gap at the base of these slabs was about 0.4m, and this would almost certainly have originally narrowed upwards.

The east side of the passage was lined by three orthostats, all leaning into the passage; especially 361, which was 50° from the vertical, the stone having tilted inwards from its base. The collapse of this stone had been halted by an adjacent paving stone

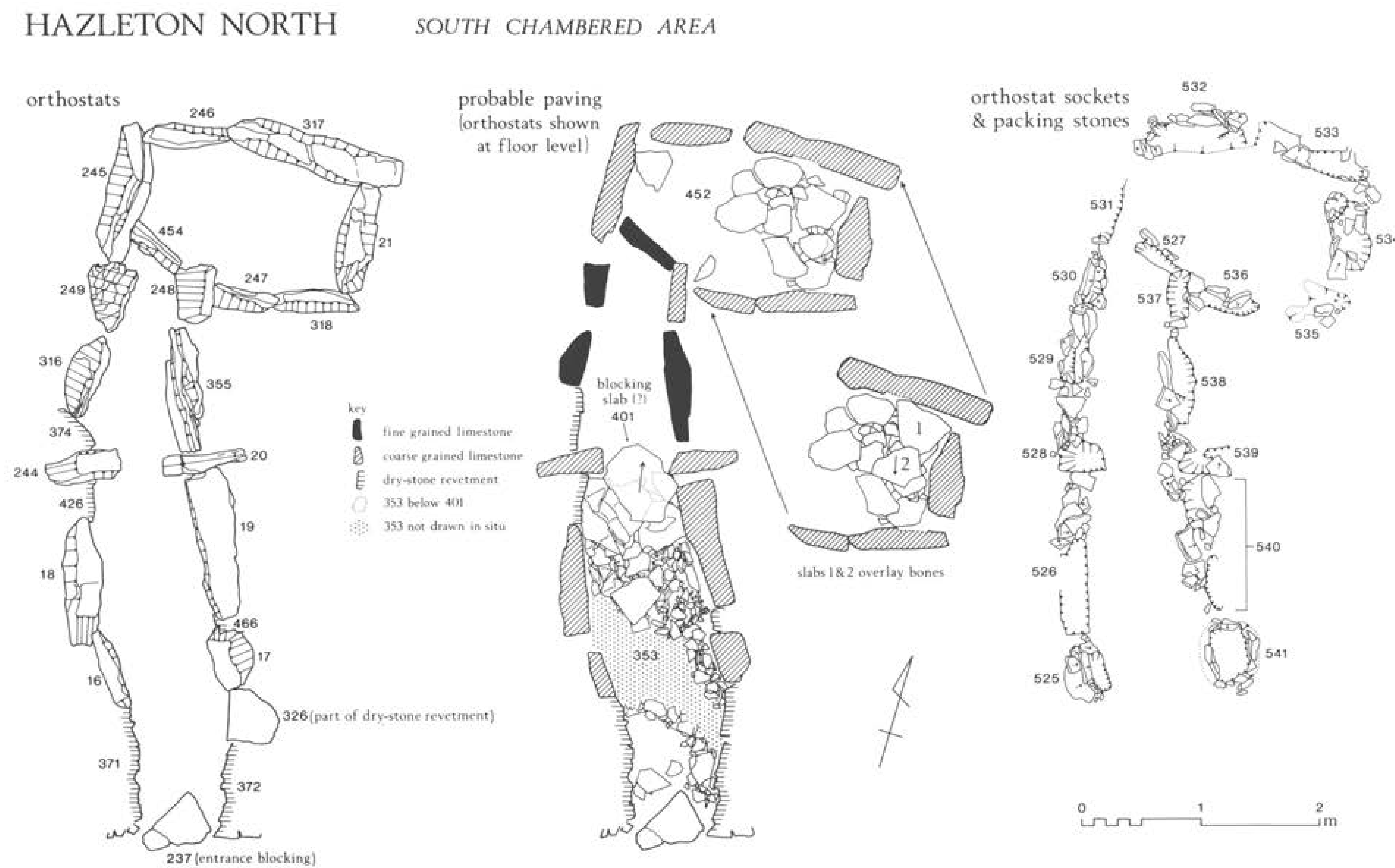


Fig 74 *South chambered area: plans of orthostats, paving, and sockets*

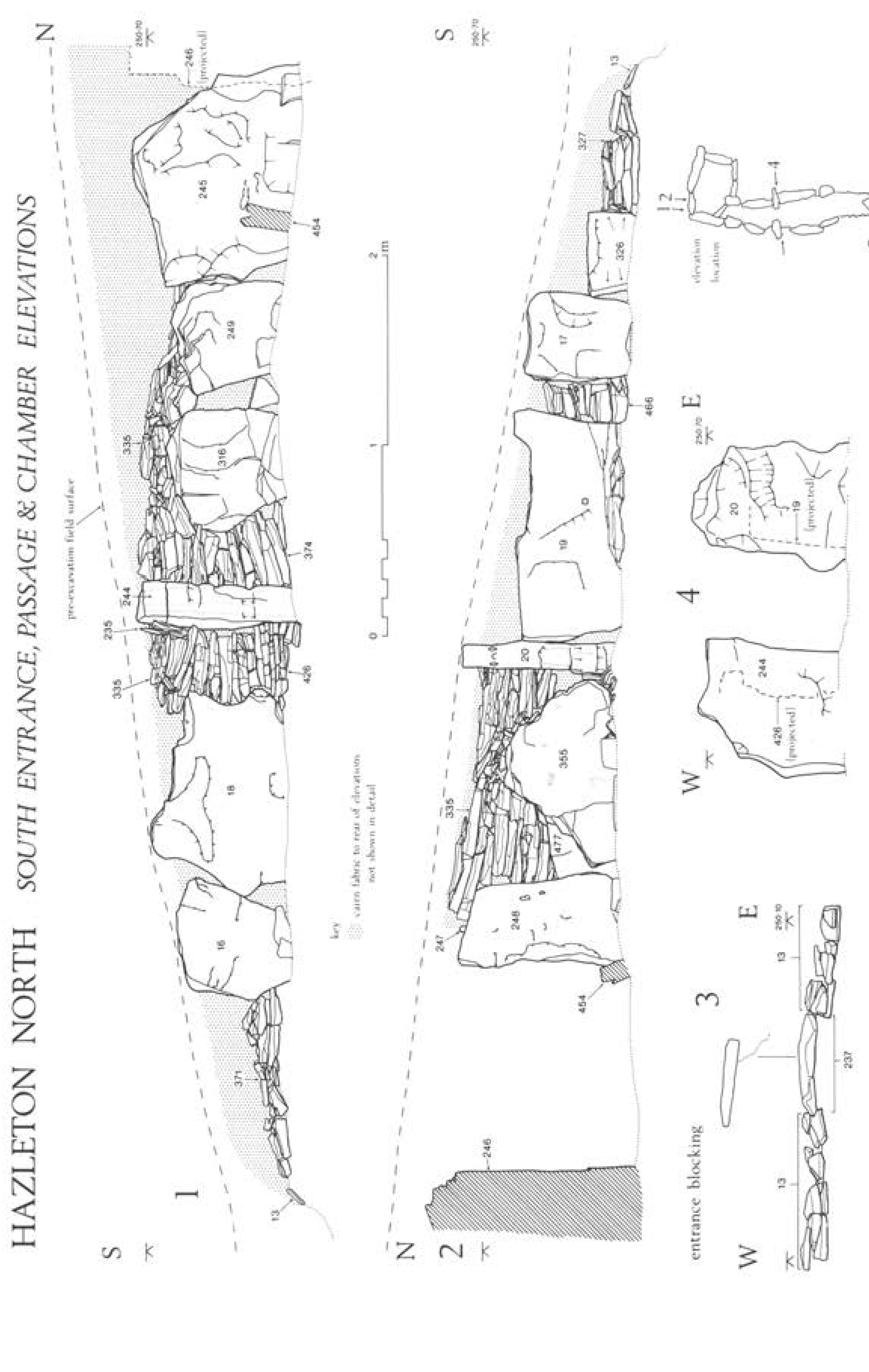


Fig 75 South chambered area: internal elevations of entrance, passage, and chamber, and external elevation of entrance

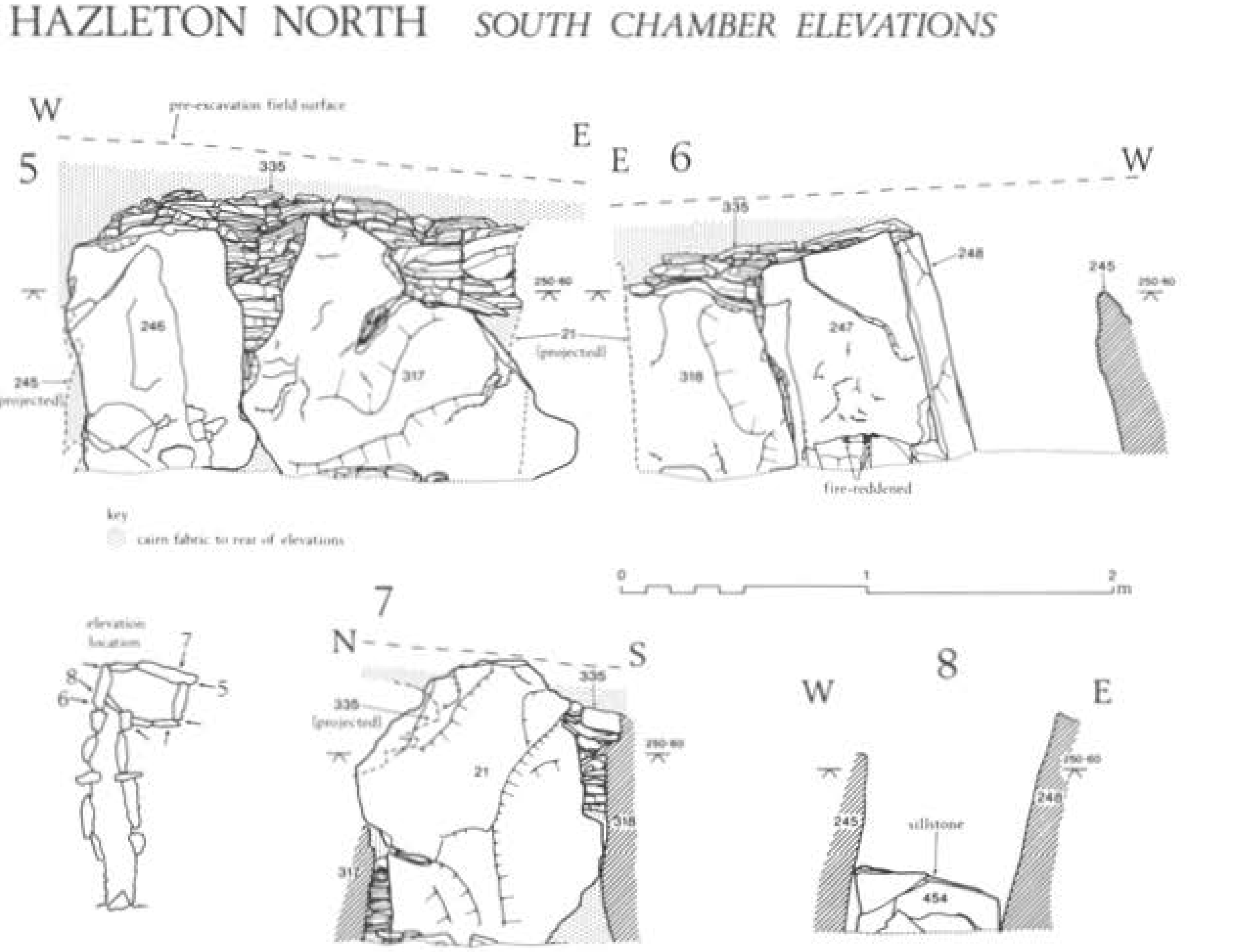


Fig 76 South chambered area: internal elevations of chamber

becoming trapped beneath the orthostat. Orthostat 362 had a less-pronounced lean, but had laminated, while 363 was relatively intact and upright. On the west, orthostats 364 and 365 also leant into the passage. Between 365 and 206 was a 0.7m gap. The subsoil showed a possible stone-hole (503), *c* 50mm deep, with some jammed-in stones, one of which could have been a vestige of a fine-grained orthostat. An orthostat probably originally stood in this space, but had decayed to the extent of being unrecognisable.

The south end of the passage was marked by sillstone 398 (0.89m long, 0.08m thick, and 0.23m high; Fig 83). The original height above floor level would have been 0.09–0.12m. Its stone-hole (509) indicated that it had been rammed into the subsoil and wedged in place. Associated with the sillstone were two thin slabs (399 and 400), set between the sillstone and the adjacent orthostats. Both of these transverse slabs had a southward lean. The middle part of 399 leant against 367 and this slab also touched 364, indicating that the angle was intentional. The same was true for 400, since it was wedged in position by intercalary revetment. The transverse slabs had laminated, 399 remaining intact, but 400 was so shattered that it disintegrated to a stump during excavation. The gap between 399 and 400 was 0.38m at the level of the sillstone, but expanded upwards, reaching 0.47m at the highest remaining point. The length of the passage from sillstone to between the northern transverse slabs was *c* 2m, and the width varied from 0.6m to 0.5m.

The chamber orthostats (8 of the 13 being fine-grained) were relatively intact and upright, except 342 (Fig 101). This orthostat had snapped off near its base and collapsed inwards directly onto the burial deposits, prior to the presence of any infill. The collapse of 342 had affected the adjacent orthostat 343, the west side of which had fractured and tilted into the chamber. The elevation records the original outline of 343 before it collapsed during excavation (Fig 81).

From the sillstone to the inner face of orthostat 408 was a distance of 1.8m, while the length of the chamber (409 to 208) was 2.6m. The width of the chamber was 0.75m at floor level between 367 and 368, and 0.8m between 207 and the opposite revetment. A constriction was formed by orthostat 207. The distance between it and 282 at floor level was 0.7m, but this tapered upwards to 0.5m. Thereafter, the width of the chamber at floor level expanded slightly to a maximum of about 1m at the east end.

There was no clear overall sequence of orthostat erection in the north chambered area. Relationships of various stones suggested that orthostats 367 and 368 were followed by the sillstone, then the transverse slabs 399 and 400, followed by orthostats 363 and 364. Orthostat 208 was probably erected before 320 and 343. Flush contacts between orthostats on the south side of the chamber (Fig 72) implied sequential erection, probably from east to west (ie 281 to 408) in view of the slight lean in that direction. The fine-grained orthostats occurred in every section of the chambered area and their distribution may indicate infilling between existing coarse-grained orthostats. The unusually wide stretch of intercalary revetment (415) between 367 and 409 might have substituted for an orthostat in the absence of further suitable fine-grained slabs; the last available one was perhaps orthostat 409. The concept of the larger coarse-grained orthostats being 'markers', erected first, is feasible in both chambered areas.

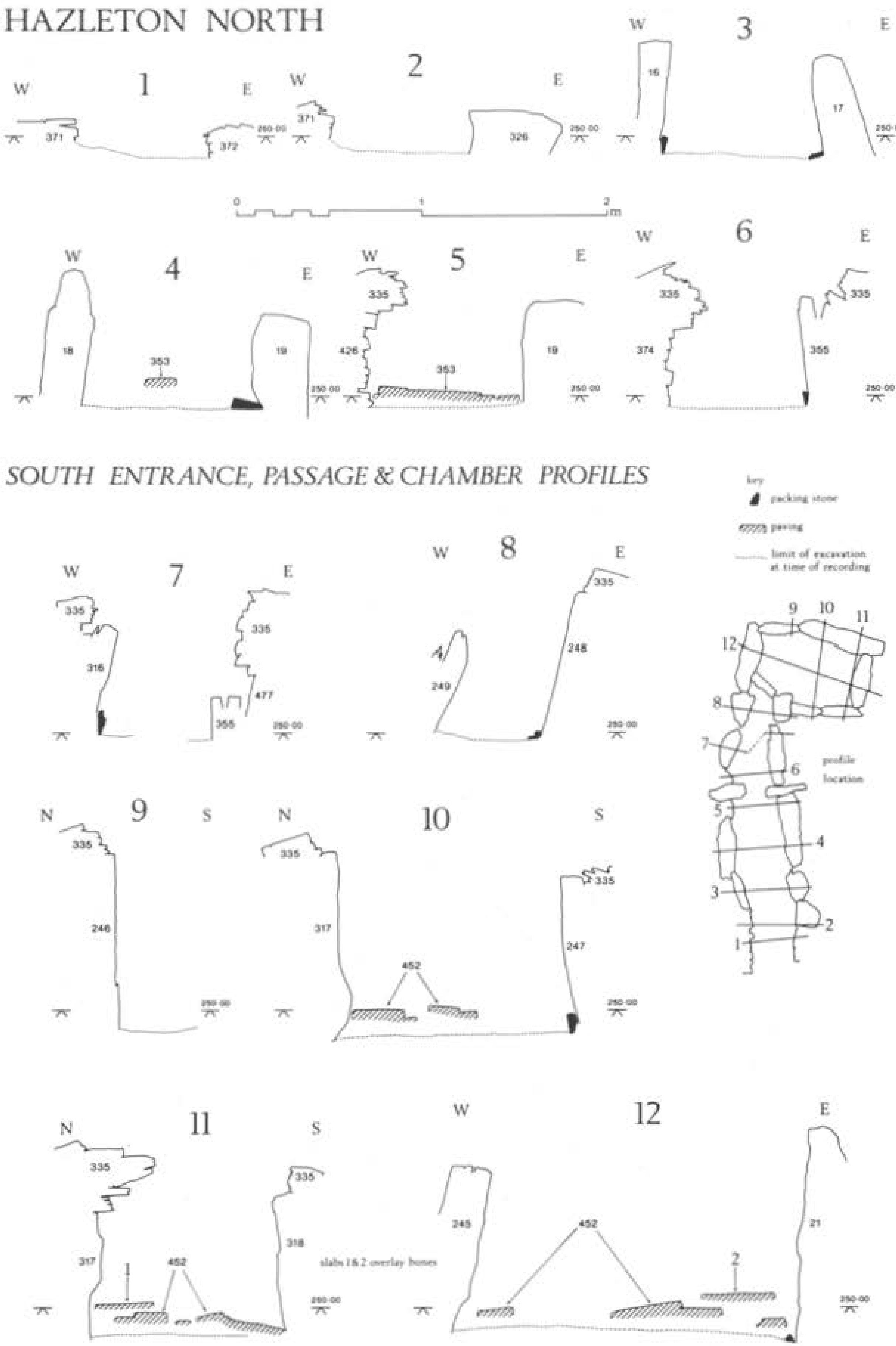


Fig 77 South chambered area: internal profiles

Fig 78 South entrance: internal aspects of orthostat 17 and block 326, viewed from the west; scale in 0.1m divisions

Paving within the chambered areas

After the erection of the orthostats and prior to the burial deposits, the floor of the north chambered area was roughly paved with slabs (Figs 79 and 83). The paving slabs were laid horizontally, either abutting or slightly overlapping each other, and lying directly on the former land surface. The south chambered area had no surviving extensive stretches of paving, but there were two areas of probable paving, one in the chamber and the other at the north end of the entrance (Fig 74).

The slabs of the north chamber lay directly on the former land surface except in two areas – the north entrance, and the space delimited by orthostats 207, 408, and 409 and revetment 415 – where thin lenses of stony, redeposited soil (contexts 435 and 445) intervened. These lenses were most probably patches of construction debris. The paving occurred throughout the north chambered area and was continuous, apart from a 0.7 × 0.6m gap immediately north of the sillstone and smaller patches just south of the sillstone and in the south-west corner of the chamber. Separate context designations were given to two large slabs, 350 in the north entrance and 457 in the north chamber, which thus subdivided the zones of smaller paving stones into four: 351, 357, 386, and 429 (Fig 79).

Almost wherever the presence of burial deposits coincided with the junctions of paving slabs, human bones were found in the gaps between them. (Small bones were often present beneath the edges of slabs and underlay paving stones more extensively where there were cavities). In every case, however, the way in which the paving stones were lying explained the presence of any underlying bones as post-depositional. Any activity within the chambered area, after disarticulated bones were present, would have encouraged these redistribution processes.

At the eastern end of the south chambered area (Figs 91–2), a group of large slabs (452) overlay some smaller fragments of limestone (459) and the former land surface, and similar slabs occurred in the north-west corner and the middle of the south side. These slabs were more irregularly placed than those in the north chambered area, and they involved more overlapping and layering, but they only overlay small bones which could have filtered between and beneath them. Two large coarse-grained slabs (slabs 1 and 2 on the inset in Fig 74) overlay both other slabs and also rather more substantial bones and must have reached their present position after the onset of burial deposition. Possibly the paving of the south chamber was originally more extensive, and at some stage those paving stones from the western side of the chamber were removed, some of them being redeposited over the existing paving on the east side.

At the north end of the south entrance, another patch of mainly horizontal slabs occurred (353). The larger slabs in the area just south of the transverse orthostats were continuous with the smaller stones between the outer portal orthostats and, despite the contrast in size, formed part of the same feature. A large slab (401), which trapped numerous bones between it and 353, was interpreted as a former blocking stone. The larger 353 slabs did have small bones between them and beneath their edges, but, as described, these bones could all have been deposited subsequent to the placing of the stones.

The correspondence between the extents of 353 and the burial deposits in the south entrance was such that it was assumed that the absence of the stones from the southern part of the entrance related to disturbance (context 603). (Some of the slabs found in the quarry, context 45, could have derived from the southern end of 353). Thus, it is possible that before burial deposition in the south chambered area began, both the entrance and the chamber were fully paved. Paving never seems to have existed in the south passage.

Several of the paving stones from both chambered areas were of coarse-grained limestone and therefore cannot have originated from the cairnside quarries.

Blocking features within the chambered areas

At the junction between the north passage and chamber, an intact slab (366) was leaning against the projecting edges of the transverse stones 399 and 400 (Figs 79, 84, and 85). Slab 366 was a blocking slab *in situ*, which sealed the throughway into the chamber.

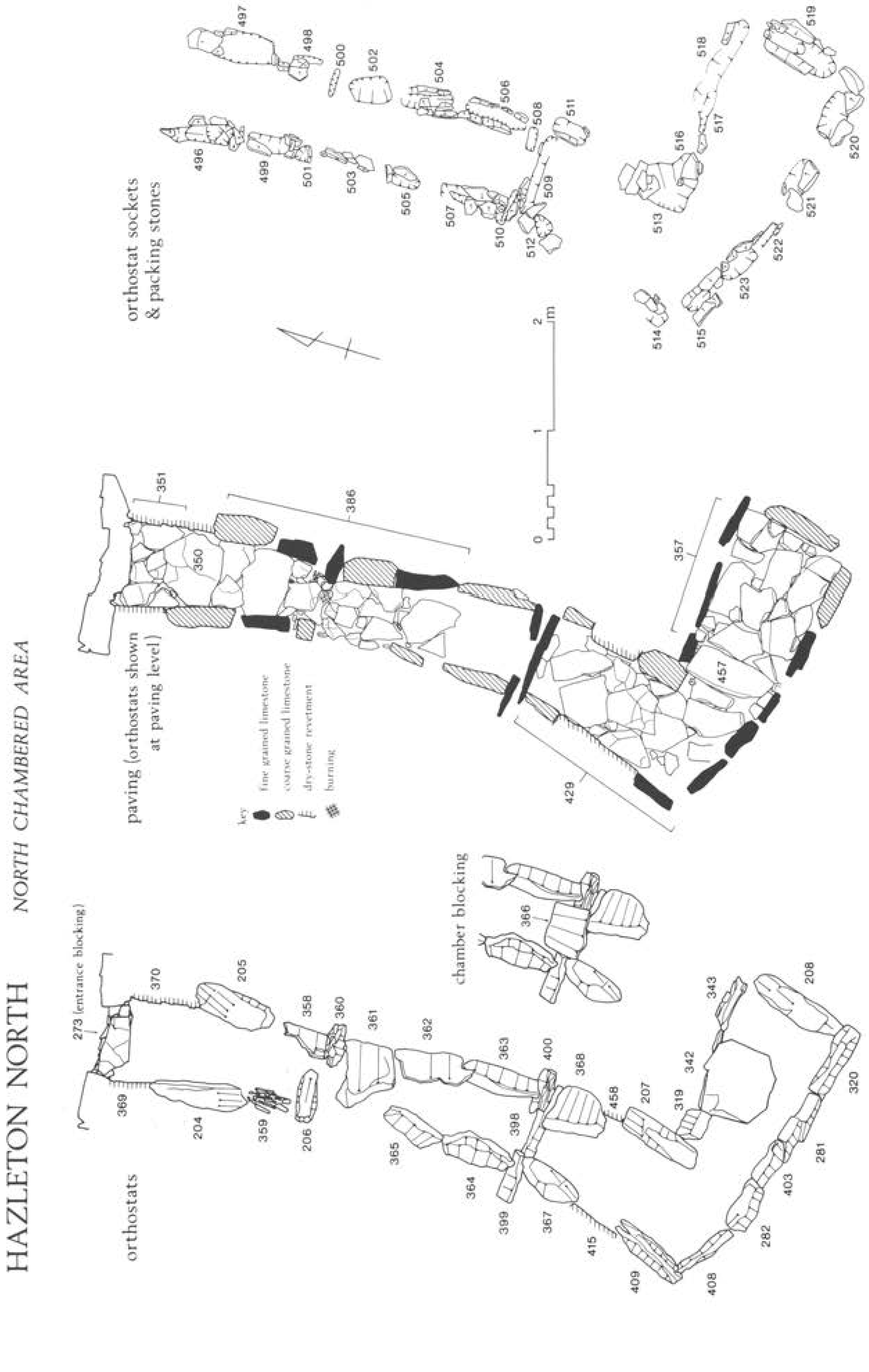


Fig 79 North chambered area: plans of orthostats, paving, and sockets

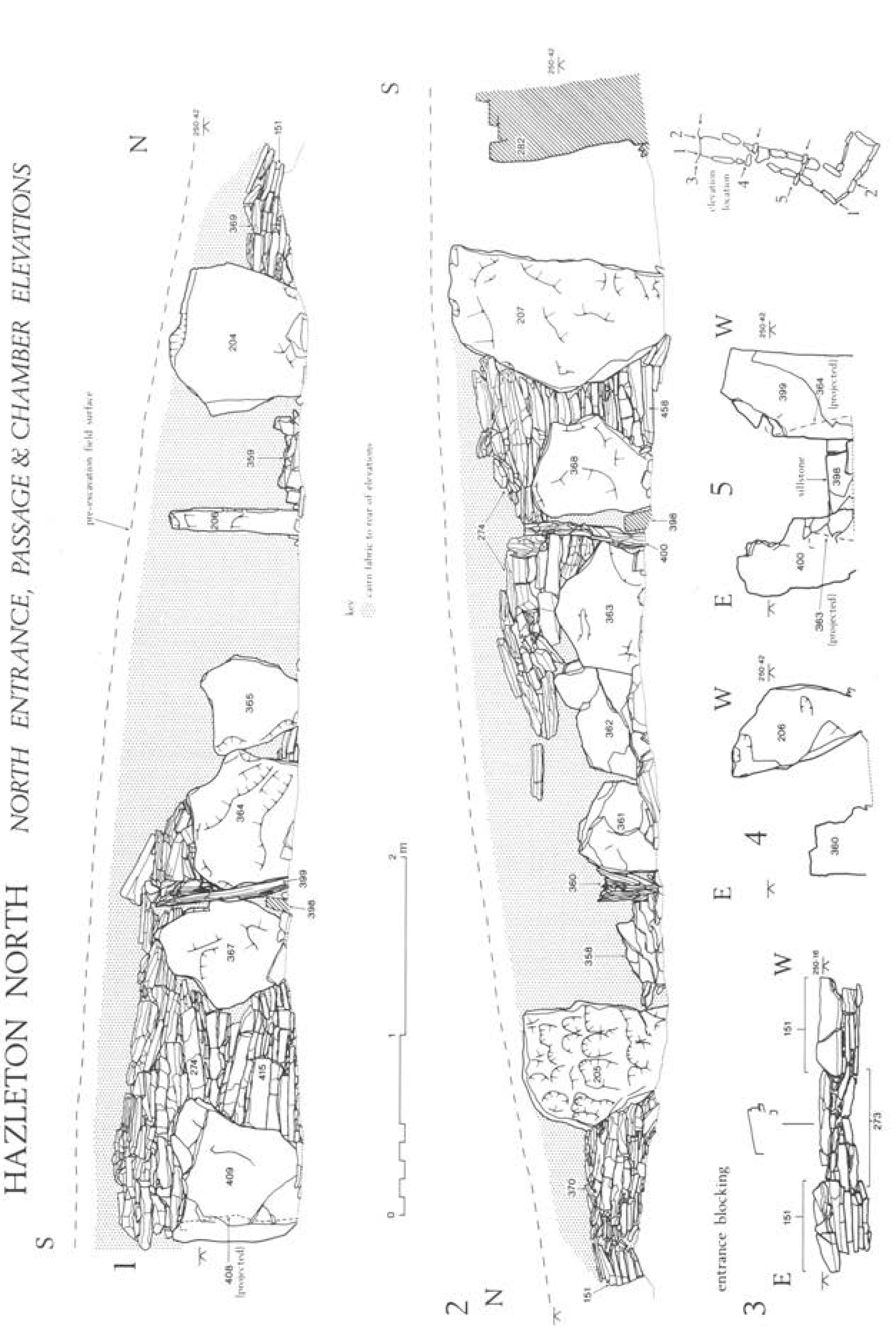


Fig 80 North chambered area: internal elevations of entrance, passage, and chamber, and external elevation of entrance

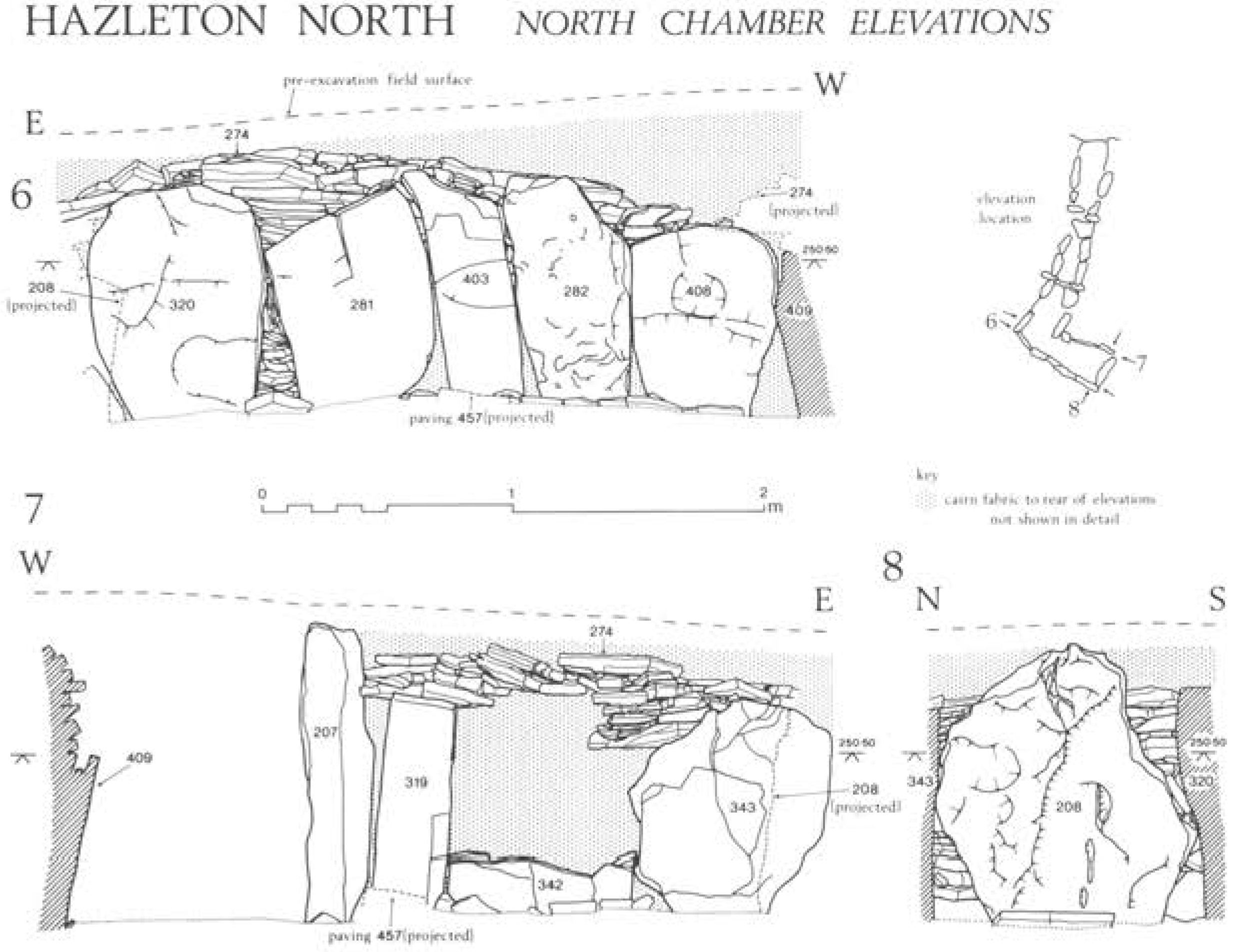


Fig 81 North chambered area: internal elevations of chamber

The collapse of orthostats at the junction of the north entrance and passage had occurred during the life of the tomb and predated the final burial deposits in the entrance. This collapse had prevented further access beyond the entrance, leaving the passage and chamber as they were while the tomb was still in use for burials. The blocking slab is therefore likely to have been a movable device, which was put in place between burial episodes, but which could be taken down when it was necessary to re-enter the chamber. In the south chambered area, at the junction of the entrance and passage, a large stone (401) was another potential blocking slab (Fig 74).

The fine-grained slab 366, 0.80m high, 0.51m wide, and up to 90mm thick, had its lowest 40mm embedded in the soil of the chamber floor. The slab was tilted to the south at an angle of *c* 33° from upright, only the upper portion resting against the transverse stones. There was no contact between 366 and the sillstone.

It has already been noted that the only substantial gap in the paving of the north chambered area occurred immediately north of the sillstone. This gap would have been filled quite neatly by 366, if simply pulled forward and laid flat. Approaching 366 from the north when in place, the top of the slab could have been pulled forward, pivoting on its base in the soil. Slab 366 was assumed to have been an original design feature, incorporated within the paving in front of the sillstone for use as a blocking device.

The coarse-grained slab 401 in the south chambered area had a length of 0.71m, a width of 0.52m, and a thickness of 40–70mm. Its surfaces were laminated, and its uneven edges resulted from post-depositional fragmentation. Originally, it would have been wider and straight-sided. The slab lay at a slight angle to the horizontal. In its recumbent position, 401 abutted 244 and 19 and ran beneath an overhang at the base of transverse stone 20. It is possible that 401 was a blocking slab, but in this instance in a recumbent state. This was tested by erecting the slab, after excavation, and standing it against orthostats 20 and 244 (Fig 84).

Burial deposits extended without interruption over the top of 401 and also underlaid its uppermost, southern edge. Burial deposition therefore postdated the laying down of this slab. It was concluded that some of the bones beneath 401 had been in position on top of 353 before 401 overlay them. If 401 was a blocking slab, then at some stage in the use of the south chambered area, after the deposition of burials, it was abandoned as a blocking device prior to further burial activity in the entrance.

Revetments and crosspieces associated with the orthostats

After the erection of the orthostats, various stretches of revetment were built between and above them. This drystone work was laid, mainly in horizontal courses, with a neatly finished face on the inside of the chambered areas. At the rear, the revetments were mainly bonded into (and contemporary with)

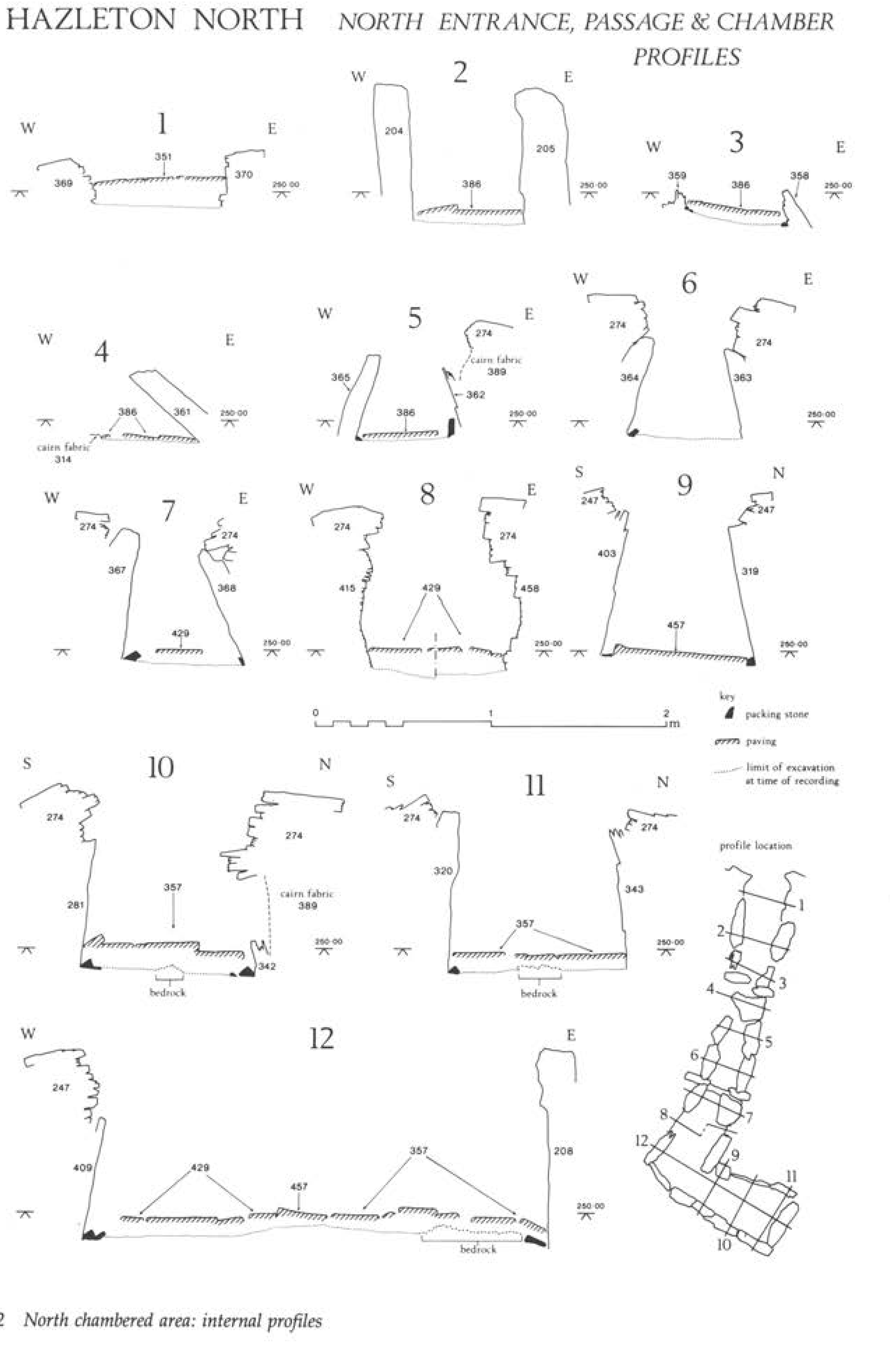


Fig 82 North chambered area: internal profiles

Fig 83 North chambered area: excavated to the level of the paving, viewed from the south; scales in 0.1 and 0.5m divisions

the infill of units K and L – hence the designation as revetting rather than walling – although it is probable that the lower courses of some of these revetments were in place before the unit infills (and in one case before primary dump 377/379).

Post-depositional lamination of the stones used in the revetments tended to obscure the fact that some of them were substantial slabs of limestone, with dimensions of 0.4 × 0.4 × 0.1m not uncommon. Generally, the precedence between the revetting and the paving could not be determined. In one spot, however, near the orthostats 281 and 320, a paving slab underlay the revetting.

The function of the revetting was twofold. First, it served to infill gaps between orthostats, thus effecting a continuous sealed lining to the chambered areas, and second, it facilitated the roofing. In several instances these functions were combined, the interlocking revetment being built from the land surface and continuing uninterrupted into incipient corbelling.

The latter occurred either side of orthostat 244 in the south entrance and passage (contexts 374 and 426; Figs 75 and 86) and between orthostats 17 and 19 in the south entrance (context 466). In the north chamber (Fig 80), it occurred between orthostats 367 and 409 (context 415), and between 207 and 368 (context 458). A further instance may have occurred between orthostats 205 and 358 in the north entrance. The widest gap (0.55–0.90m) filled in this way was the one between orthostats 367 and 409, where the absence of an intermediary orthostat was surprising.

Intercalary revetting, which was founded upon the former land surface but merely filling in the gap created by irregularities in the lower edges of adjacent orthostats, occurred in the south chamber between 21 and 317 and in the north passage and chamber between 364 and 365, 281 and 320, and 208 and 343. A stone was wedged vertically into the gap between orthostats 281 and 403 (Fig 72), and a single stone was wedged into the natural gap in the upper surface of 317 in the south chamber, although the perforations in 208 in the north chamber were apparently left open (Fig 73). Horizontally-coursed revetting was not the only method used to seal the gap between adjacent orthostats, as shown by the upright slab 477 placed flush to the rear of orthostats 248 and 355

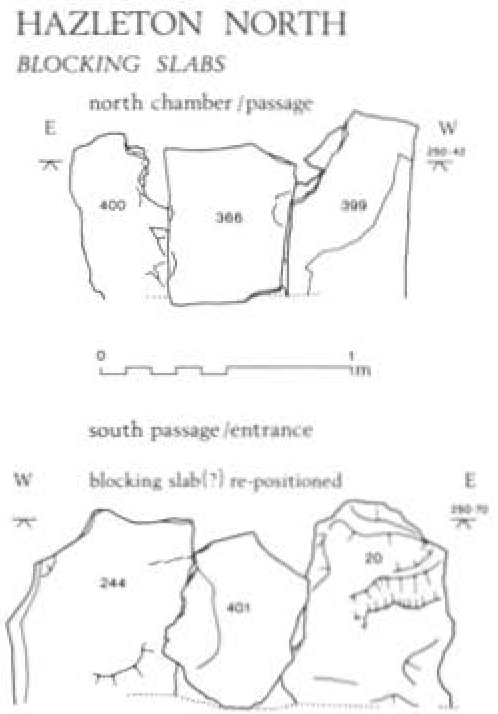


Fig 84 Elevations: blocking slab 366 (as found) in the north passage and possible blocking slab 401 (repositioned) in the south entrance

(Fig 75), itself serving as the base for a revetment. A similar instance occurred between orthostats 249 and 316 (Fig 75), but in this case there was a gap between the on-edge slab and the revetment above, possibly due to the collapse of intercalary stones into the passage.

At the upper level of the orthostats the drystone work was meticulous, successfully eliminating the constructional problems created by even the most irregular surfaces (eg orthostats 317 and 367: Figs 76 and 80).

The functional quality of the revetting was clear in the north chamber between orthostats 319 and 343, where part of the incipient corbelling, bonded at the rear into the unit infill, was still in place above the gap left by the collapsed orthostat 342 (Fig 81). Traces of these upper revetment levels were extensive, more so than recorded on the elevations, having in places disintegrated during earlier stages of excavation.

An incipient corbelling effect can be seen in the profiles and sections of the chambered areas (Figs 77, 82, and 95; *see also* Fig 86). A single context number was allotted to the upper revetments on each side of the chambered areas (274 north; 335 south), because these were single entities relating to the corbelling and roofing. The distinction between the upper and lower revetments was made at the point where the courses began to project inwards.

A few anomalies did occur within the generally horizontal pattern of the upper revetting. In most cases, these were adaptations to counter particular irregularities in the orthostat surfaces or the result of post-constructional movement. Flush with the upper south face of the transverse orthostat 244 in the south entrance, however, were the laminated remains of a slab (235) set vertically between the orthostat and the upper revetting (Figs 75 and 86). The fragmentary remains of this slab could be traced quite clearly within the upper infill of the throughway (Fig 93; arch photo 1981/18/8a), continuing across the width of the entrance to rest directly on top of the north end of orthostat 19. Part of the

Fig 85 North passage: blocking slab 366, viewed from the north; scale in 10 and 50mm divisions

lower western side of this slab survived intact when first exposed (arch photos 1981/30/21–2; 31/3–4 and 8), and the whole slab must have remained intact long enough for its form to be preserved by the support of the surrounding infill after it fragmented. There seemed little doubt that there had been a substantial slab here, set across the entrance/passage junction. With such a crosspiece in place, the opening from the entrance through to the passage would have been roughly 0.5m square. The effect of the crosspiece would have resembled that of a sillstone, only in this case projecting downwards rather than upwards. An impression of the crosspiece slab in position is given in the reconstruction drawing (Fig 230).

It is possible that a similar crosspiece existed at the junction of the north passage and chamber. Evidence of this consisted only of the vertical stones flush against the upper north faces of transverse slabs 399 and 400 on either side of the passage (Fig 80).

Insufficient evidence survived at the junction of the north entrance and passage for any assessment of the former presence of a crosspiece.

Roofing of the chambered areas

Incipient corbelling was present over the top of the orthostats and the interlocking revetments (Figs 77, 82, and 86), and its remains around the edges of the chambered areas were also visible in plan (Fig 93).

The corbel stones seem to have been very substantial slabs, up to 1.4m long, although invariably split and/or shattered when uncovered. In several instances, these slabs had cracked over the top of an orthostat, leaving a broken edge parallel to the sides of the chambered areas. The size of these stones allowed them to be keyed back into the unit infill, making the incipient corbelling extremely rigid when built.

On the northern side, the only orthostats not covered, at least to a certain extent, by the incipient corbelling (274) were 204, 205, 206, 207, and 282, while on the southern side only 16, 17, and 245

Fig 86 South entrance: intercalated revetment 426, underlying incipient corbelling 335, and stub of crosspiece 235, all between orthostats 18 and 244, viewed from the east; scale in 10 and 50mm divisions

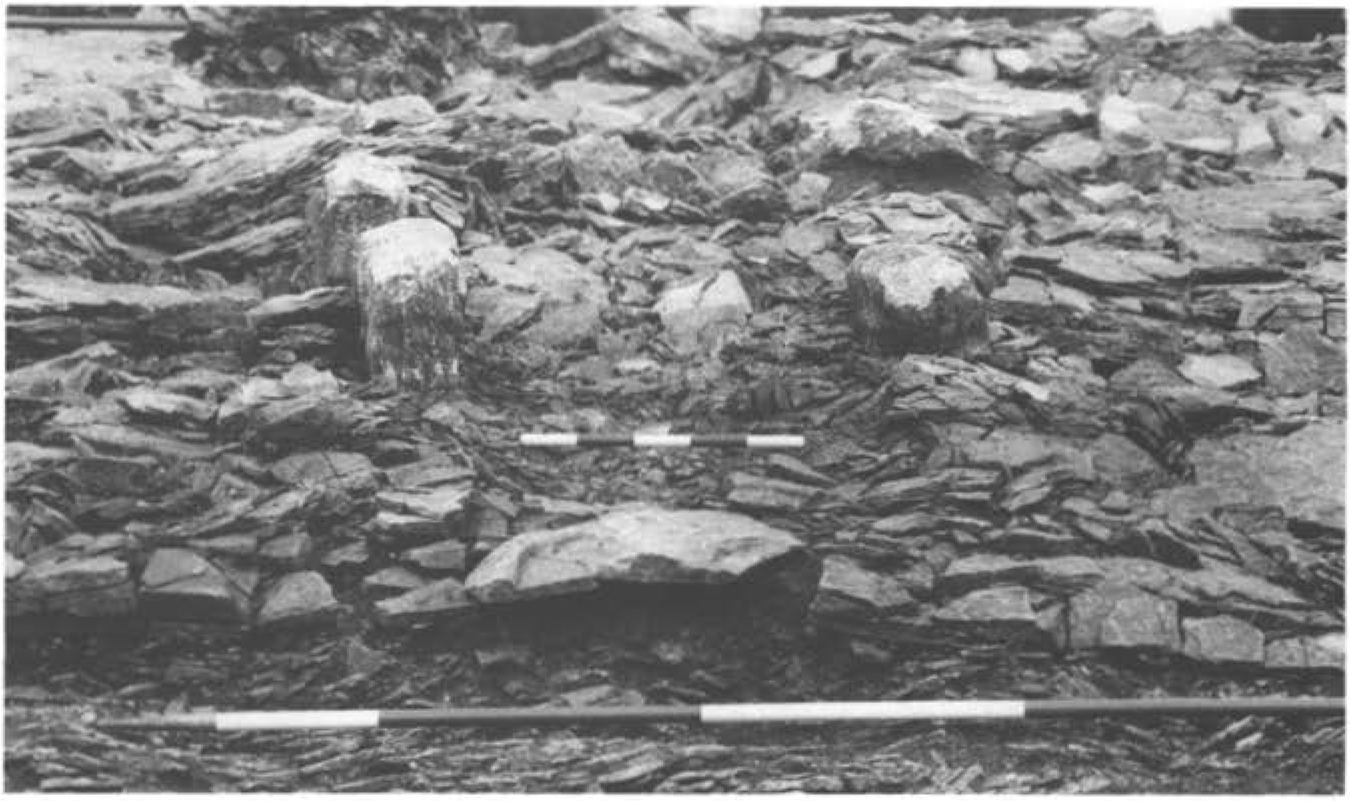


Fig 87 South entrance: external blocking slab 237, viewed from the south; scales in 0.1 and 0.5m divisions

lacked traces of covering stonework (335). At one point near the junction of the north passage and chamber, the gap between the surviving incipient corbelling across the chambered area was only 0.1m. Otherwise, the minimum gaps across the chambered areas were in the region of 0.3–0.5m, the maximum gaps about 1m.

No intact roofing survived, hence the method by which these gaps were closed is speculative. No evidence suggested the existence of capstones of coarse-grained slabs. The roofing material was therefore assumed to have comprised pieces of the same stone used for the incipient corbelling. Corbelling, with slabs of similar size to those used for the incipient corbelling, could easily have spanned the chambered areas (*see* the isometric reconstructions, Figs 230–1), with or without larger fine-grained capping slabs. The remains of this roofing, after its collapse, must have been present within the fill of the chambered areas. Suitably-sized material did indeed exist in horizons overlying the burial deposits (*see* Chapter 6).

The height of the internal ceiling would have varied. Such variation is reflected in the relative heights of the orthostats and in their maximum heights above floor level (Tables 2 and 3), while the maximum heights of the intact incipient corbelling give some indication of approximate minimum heights for the ceilings. In the chambers, the minimum ceiling height could have been 1.1m, in the passages perhaps 0.8m, and in the inner entrances about 0.7m. These estimates would apply to the edges of the chambered area roofs, and the heights of the ceilings would increase in proportion to the widths being bridged. These widths were not great, however, and the estimated maximum heights of the ceilings in the chambers could have been *c* 1.3–1.5m, in the passages 1.0m, and in the inner entrances 0.8–0.9m. (For entrance roofing, *see below*).

The profiles (Figs 77 and 82) give an indication of the spaces involved within the chambered areas. The widths of the chambered areas did not fall below 0.6m at any point, other than where there were transverse slabs. At the junction of the south entrance and passage, with a crosspiece in place, the throughway has been estimated as about 0.5m square. At the junction of the north passage and chamber the gap between uprights was about 0.45m, the height perhaps 0.6m (or as little as 0.45m, if a crosspiece as well as the sillstone is envisaged). The constriction at the junction of the north entrance and passage may have been as little as 0.30–0.35m, but this pair were set slightly staggered. The dimensions for these internal spaces ignore any later constrictions provided by fallen stones, burial deposits, or other obstacles, while the throughways were in use.

The external entrances

The outer entrances to the chambered areas were completed at a late stage in the cairn construction, when the flanking revetments (327, 369, 370, and 371) and the outer cairn were built. These latter revetments linked the outer entrance orthostats with the external facade and were built contemporaneously with the facade, with which they formed bonded corners. The revetments normally directly overlay the former land surface. The large coarse-grained block (326, south side) was regarded as part of the revetment, although it may have been positioned at the same time as the orthostats.

The closure of these entrances appeared to involve the construction of separate segments of drystone blocking across the outermost gap, continuing the facade across the entrance. On the south side, this blocking survived only in the form of its basal course (237; Fig 87). Thus, the blocking of the south side entrance could only be reconstructed from the evidence on the north side.

The physical evidence for roofing over the entrances relates exclusively to their inner zones, where they were flanked by orthostats. The existence of roofing in the outer zones flanked by revetments depends upon the circumstantial evidence of the preserved burial deposits and the interpretation of the function of the revetments as the supports for roofing. There is, therefore, an absence of conclusive

Fig 88 North entrance: external blocking 273, viewed from the north; scale in 0.1m divisions

evidence for the manner of roofing the entrances (*see* Chapter 19).

In the north entrance, a blocking wall (273) survived to a maximum height of 200mm in about four courses (Figs 79, 80, 88, and 116). The lower two courses of 273 were contiguous with the northernmost section of the entrance paving (351). These lower courses were also very neatly bonded into the external revetment 151 and were probably laid at the same time as the general facade. The upper two courses were not so neatly bonded and were interpreted as a separate phase of construction, relating to the blocking of the entrance. The surviving evidence simply did not permit an unequivocal conclusion about the missing upper entrance blocking. The remaining courses of 273 could all have been in place throughout the use of the north chambered area for burial, since they did not constitute any hindrance to access. That they were in place during the final episode of burial deposition is perhaps indicated by the skull of skeleton 1 having rested against the inner edge of 273 (*see* Chapter 6).

It is assumed that, after the final burial in the north entrance, the blocking wall 273 was built up to create the appearance of continuous drystone work across the entrance. The flat slabs (163) found immediately to the north of 273 (Figs 93 and 99) were interpreted as a collapsed part of this former blocking, as were some of the stones overlying the skull of skeleton 1.

The physical evidence for the presence of roofing in the entrances was restricted. First, the inner south entrance orthostats were partially covered by the remains of slabs identical to the revetting overlying other orthostats, where such revetting clearly formed the base of incipient corbelling. Second, the intercalary revetment (426/335), in the south entrance rose into unequivocal corbelling (Fig 86). Also, some of the fill of the entrances (especially contexts 354 and 612; for the latter *see* Fig 99) resembled the infill interpreted as roof collapse in the chambers and passages.

The circumstantial evidence for roofing comprised the burial deposits in the entrances, especially in the north entrance where an intact inhumation extended right to the limit of the entrance opening. The condition of the bones in the entrances on both sides was such that some covering was implied, since there was no widespread deterioration or animal disturbance.

On the east side of the north entrance, the revetment (370) was comparatively well-preserved (Fig 80; 0.3m high). The entrance revetments probably originally rose to the height of the entrance orthostats (*c* 0.7m; *see* isometric reconstructions, Figs 230–1).

The chambered areas and the cairn construction sequence

It is presumed that most of the orthostats were accumulated in advance of building, the chambered area plans already having been decided and perhaps marked out upon the ground. The first phase of the construction of the chambered areas involved the erection of the orthostats. Whether a phase comprising the orthostats only (Figs 70 and 71) should be envisaged is debatable; some backing deposits may have been put in place at the same time as a support for the uprights.

There was no evidence to indicate which chambered area orthostats were erected first. On the basis of the relative proportions of coarse to fine-grained stones, it might be argued that the south chambered area, with its more prevalent coarse-grained orthostats, had precedence.

The position of the above early phase of the chambered areas within the overall sequence of cairn construction was uncertain. The only direct relationship between the orthostats and another early structural element was that the primary dump 377 beneath units O and M abutted the rear of three orthostats on the west side of the north chamber (Figs 41 and 44). This dump, therefore, postdated the erection of these orthostats, although 377 was itself predated by primary dumps to the west and could have postdated the construction of much of the west end of the cairn. There was also a less clearly defined relationship between orthostat 317 at the north-east corner of the south chamber and the axial element (461)

Fig 89 Unit L and south chambered area: infill 390 between orthostats and revetment 233 (beneath scale), viewed from the east; scale in 0.5m divisions

to its north-east (Fig 45), which implied the latter postdated the erection of the orthostat (arch photo 1982/27/18).

An indirect relationship may be provided by the orthostats themselves. If the fine-grained examples were derived from the cairnside quarries, then a considerable amount of quarrying would have taken place before stone suitable for the orthostats was obtained. Rather than the resultant spoil being temporarily heaped on one side, it would be logical for the cairn building to have taken place in phase with the quarrying. Even if the orthostats did not derive from the cairnside quarries, then the orthostat packing stones almost certainly did, and some quarrying must therefore predate the chambered area construction.

Indeed, it would be feasible for the block of units R/S/T/U/V/W to have been erected before the chambered areas were begun. This in turn prompts consideration of the positioning of the chambered areas in relation to the adjacent cellular units. At least one of these relationships is highly suggestive. Revetment 334 on the east side of unit N was unusual among the cellular revetments, in that it was markedly concave and set diagonally to the axial revetment (Fig 46), and this form may have been determined by the pre-existence of orthostats immediately to the east. Unit N was one of the last to be built within the overall cairn construction sequence, but it can be coupled with the fact that revetment 312 to the west of the north chambered area must also postdate at least some of the adjacent orthostats, since they predated the primary dump underlying revetment 312. Also, if the axial element 461 did postdate orthostat 317, this would mean that revetment 233 on the west side of unit J/H must have postdated that orthostat and thus probably the whole of the south chambered area.

It could be proposed that all of the adjacent revetments, and hence the adjacent units, postdated the erection of the orthostats. This sequence might be preferable on practical grounds, since the erection of the orthostats could have been easier in an open space.

Construction of units K and L, surrounding the chambered areas

These were the only units in the inner cairn which lacked a continuous boundary along the axial alignment. (The axial revetment 462 on the north-west side of unit J/H was not linked to revetment 619 at the south-west corner of unit M.) The infilling of units K and L could have been a single process. That this infilling postdated the construction of the adjacent units on either side was shown by the way the fill of units K and L uniformly abutted the surrounding unit revetments (Fig 46).

One of the first elements of infill was a small dump (maximum thickness 0.25m) of mixed stony soil and marl (463/470) deposited across the axial zone (arch drg 464). This dump overlaid the south-eastern edge of primary dump 377 and abutted the faces of axial revetments 448 and 462, the western terminal of axial revetment 460, and the lowest courses (558) of revetment 334. The position of the edges of 463/470 was not always recorded, but it seems to have abutted the rear of orthostats in the north chamber without impinging upon those of the south chamber.

Subsequent to this dump, the stone infill of the units began, directly overlying the former land surface where dumps 377 and 463/470 were absent, and separate context designations were given to various areas of fill, even though boundaries were lacking between them. The infill, which in places was begun by the positioning of large horizontal slabs to the rear of the orthostats, was deposited simultaneously with the building of the drystone revetments between and above the orthostats. The upper revetting in the chambered area, forming the base of the roofing, was dependent upon the stability of the surrounding unit infill with which it interdigitated.

Around the north and east sides of the south chambered area, the infill (390) comprised large slabs which had been placed with obvious care as a solid mass of horizontal stonework (Fig 89). To the west of the south chambered area, the infill (332) was much the same, except that where the gap between the orthostats and the face of revetment 334 was very narrow, the fill was tipped in on-edge and the space left partly vacuous. In general, the infill of unit K was less regular in appearance than that of unit L, with the use of more rubble and stones pitched at irregular angles.

The southern limit of unit L was defined by two revetments built from the former ground surface, on the west side 333 linked unit N with the rear southern edge of orthostat 18, and on the east 425 linked unit J/H with the rear of the non-orthostatic block 326 (Fig 46). On the north side, the northern limit of unit K's western infill was revetted by 555, linking unit M's outer extension with the rear of entrance orthostat 204, while the eastern infill had no obvious delimitation from the outer cairn construction, although a revetment linking the corner of revetments 385 and 388 with orthostat 205 has been postulated.

Although no axial element existed between units L and K (apart from 462 and the associated continuation of 461; Fig 45), nevertheless the upper infill stones in the axial area were laid in such a way as to create a ridge-effect. Presumably, this was intended to continue the axial construction of the units to either side.

Finds from cairn contexts around the chambered areas

Most of the finds comprised human bone. These fell into two clusters: the first in context 390 (east of the south entrance/passage), the second in context 389 (north of the north chamber).

The *c* 18 pieces from context 389 had penetrated into the unit infill through the gap created by the absence of orthostat 342; it is assumed that they derived from the chamber by chance. Similarly, the *c* 16 fragments from context 390 had come from the burial deposits in the south entrance/passage.

Context 390 also produced two small flint flakes and an abraded Neolithic sherd (fabric 1), which probably related to the context 10 sherd group (*see* Chapter 6).

One of the worked bone points (Fig 177: 13736) was found close to the base of 390 (behind orthostat 355) and could have been derived from the buried soil.

The area around the chambers also produced two red deer antlers. One (13042, context 314) was adjacent to orthostat 408, the other (13926) was lying in the base of dump 463 between the north and south chambers. The latter yielded a radiocarbon determination of 2880±60 uncal bc (HAR-8349), which is the only date for a cairn construction context. Although these were the only antlers from the cairn, there was nothing to suggest that they were other than casual discards.

6 The burials and other contents of the chambered areas

Summary

Both chambered areas were used for burials, which were probably all successive interments, although disarticulation of much of the remains obscured the burial rites. In the south chambered area were the remains of 14 separate adults, between 6 and 11 pre-adults, and a foetus, disposed in two groups: one in the chamber and passage, the other in the entrance; there was some evidence of the absence of longbones from the deposit, and skulls had been placed in groups against the edges of the chambered areas. The north chamber contained the remains of four adults, between four and six pre-adults, and a foetus, while the north entrance contained one complete, extended adult male inhumation and remains of two more adults and two pre-adults, along with cremated bone of at least one adult and one pre-adult; again, there was evidence for the ordering of the remains. Relationships within the bone deposits are discussed.

Excavation method

After the clearance of the cairn surface, the location of the chambered areas was defined by the visible orthostats (Figs 93 and 94). The initial strategy was to section the chamber infill deposits longitudinally, but this was modified as excavation proceeded.

In the case of the south chambered area, the upper fill of the west side of the entrance and passage was removed first, before excavating the east-side upper fill, and then the lower fill of the west side, thus allowing a cumulative section to be recorded (Fig 95). This section was halted at the junction with the chamber because of the different excavation method used for the lower chamber fill. The upper fill was removed from the east end of the chamber, permitting a transverse section to be recorded (Fig 95), then the west end of the upper fill was removed. The infill was recorded in plan at this level (Fig 96), before the lower chamber fill was removed without further sectioning, because of the density of the burial remains.

On the north side, excavation began with the removal of the upper part of the west side of the entrance infill (Fig 98), with the intention of recording a longitudinal section as on the south. This section was abandoned (after preliminary records: arch drgs 144 and 177) in favour of horizontal excavation, because of the presence of an intact inhumation and collapsed orthostats. A longitudinal section begun in the north passage was abandoned because the space proved too constricted. In the north chamber, a strategy of transverse sections was adopted (Fig 95). The east end of the chamber was emptied first and progressively removed up to section-lines 5, 4, 3, and 2. These sections were not, except in the case of no 2, retained as standing sections, but were completed cumulatively. Section 1 was recorded as a single section after clearance of the blocking slab 366.

The vertical recording of the chamber fills was by no means ideal, and the final sections (Fig 95) left some deposits and relationships unrecorded. However, the overriding necessity was perceived to be a record of the horizontal distribution of the human

Fig 90 South chamber: burial deposits as first exposed, viewed from the north; scale in 10 and 50mm divisions

bones. When set against the difficulties of excavating burial deposits in such confined spaces (and given limitations on available time), some sacrifices in the drawn record were inevitable.

Within each zone of the chambered areas, bones were exposed by the removal of overlying and surrounding deposits, mostly stones, but with varying amounts of soil. Once as many bones as possible had been exposed in each area, these were photographed and drawn at a scale of 1:5. The bones were then lifted and assigned numbers, the numbers being recorded on an overlay to each plan to mark their position. As a vertical control, the absolute height of each bone was recorded. The process was continued in each zone in an approximately vertical fashion, until all the bones had been removed. As the excavation progressed, all the spoil (including many tiny bone fragments and other small bones, like distal phalanges) was retained for sieving.

During post-excavation, the overlay drawings were discarded, after the find numbers had been transferred to the inked field plots. Seriation diagrams (arch drgs 578 and 600) were made for the sets of plots of the burial deposits from the south chambered area and the north chamber (47 and 35 drawings respectively), recording the plans in sequence of the vertical height range of the bones plotted. With the help of these diagrams, the numerous excavation plans of the bones (including a further 16 drawings of bones in the north entrance) were first amalgamated into plots of bones within each chambered area at approximately coeval vertical horizons, after which all the plots were amalgamated to give the total picture of the bone spreads (Figs 105 and 113). The finished plots do not show absolutely every bone that was planned, since some bones are overlain by others, although this applies to surprisingly few of the the larger, well-preserved bones. The larger-scale plots of the bones in each zone (Figs 110–12 and 114–15) amplify the overall plans. On the south side, where the bones formed a near continuous deposit, these larger-scale plots are drawn to overlap at the boundaries between the various zones.

The inclusion of all bones on the plots was justified because the bone spreads represented essentially single archaeological layers. Clearly, there was superimposition of bones, but not straightforward stratigraphic separation, except in the north chamber where some disturbance had occurred. This lack of obvious stratigraphy was confirmed by the analysis of conjoining and pairing bones, which showed that parts of the same bone, or bones from the same individual, occurred at both the top and bottom of the burial deposits; the bone spreads were palimpsests, within which it was only possible to reconstruct a sequence of deposition in exceptional circumstances (Figs 135–6). The bone plots are artificial, not only in that they compress the vertical dimension, but also in that they record only the bones and not any of the accompanying stones, for which it is necessary to refer to the photographs for the nature of the burial deposits when exposed. Figures 90–92, for example, record successive stages in the excavation of the south chamber burial deposits, and the bone plot (Fig 112) requires consideration with reference to these.

The condition of the bones varied from solid and well preserved to fragile and eroded; as the photographs show, breakage of the bones was common. In some cases, the post-excavation analysis demonstrated a substantial separation of conjoining fragments of the same bone, suggesting breakage during the Neolithic use of the tomb, while in other cases, as in the north chamber, such separation could be related to later disturbance. Other breaks had clearly resulted from natural post-depositional movement, for example falling roof and revetment slabs, and from the pressure of overlying fill. Numerous breaks also occurred during excavation, either along incipient cracks or in areas of weak preservation, especially at bone terminals. The possibility of some movement and breakage of bones by animals, when the chambered areas were still accessible, must be allowed, although the restricted evidence of gnawing on the bones suggests that this factor was of limited significance.

Fill of the south chambered area

The uppermost infill of the passage and chamber comprised mainly large, broken slabs (contexts 9 and

Fig 91 South chamber: burial deposits at second clearance level, viewed from the north; scale in 10 and 50mm divisions

Fig 92 South chamber: burial deposits at third clearance level, viewed from the south-west; scale in 10 and 50mm divisions

187: Figs 93–5), which in many cases were fragments of much larger slabs broken *in situ*. Spaces between the slabs were normally free of soil. The infill of the northern end of the entrance comprised smaller slabs (context 11), including steeply-pitched examples, mainly with soil between the stones. Some of the stones were almost vertical where they rested against the shattered crosspiece 235, others to the south of this were pitched downwards from either side of the entrance.

In contrast to these contexts, which appeared to be natural infills, there were two areas of potential disturbance. At the junction of the chamber and passage, extending some 0.7m to the west of orthostat 245, was an irregular area (611) filled with small stone fragments, some of them burnt, in a matrix of soil. This feature was excavated at an early stage of the excavation, and Figure 93 only records the base of 611 after the removal of its fill (10). Context 611 truncated the fills 9 and 187 to east and south and also removed part of the cairn fabric to the west of orthostat 245. The maximum depth of this context varied between 0.4–1.0m, but within the area defined by the orthostats it did not appear to penetrate through contexts 187 and 352 to the burial deposits (323 and 412) below. Within the fill of this disturbed area were numerous burnt stones, not burnt *in situ*, and at the southernmost end at the top of the passage fill was a small area (0.6 × 0.3m) of local burning, comprising a concentration of burnt stones with both blackened and reddened exteriors.

At the south end of the entrance, a deposit of soil and small, shattered fragments of stone represented the infill (236) of a further disturbance (603), which truncated contexts 11 and 354 through to the former ground surface. The precise southern edge of this disturbance was not established, since the surviving cairn at this point was so low, but it probably ran up to and overlay the foundation slab 237, which was all that remained of a blocking wall in the south entrance (Fig 87).

In the chamber (Fig 95), context 9, which included at least 13 burnt stones, overlay a thin horizon (*c* 50mm) of much smaller, angular stones, many of them burnt, in marly loam (context 268). This in turn overlay a similar deposit, 150–200mm thick, of slabs with a yellow/brown loamy matrix (context 287). Below 287, which contained only three burnt stones, was an horizon of soil-free slabs (context 352), none of which were burnt. The section (Fig 95) stopped at the top of this context, but it is shown in plan in Figure 96 (and arch drg 178). Context 352 directly overlay the burial deposits on the floor of the south chamber. While the slabs of 352 formed a continuous horizon across the chamber area and were disposed in a predominantly horizontal plane, the deposit did vary in thickness from one to three slabs deep, shelving downwards from the west side to its thinnest part on the east side of the chamber.

Post-excavation analysis suggested that context 187 in the passage should have been subdivided. The uppermost part of the passage fill, comprising smaller stones in a soil matrix, had been mostly removed before Figure 93 was recorded, leaving the lower, largely soil-free slabs exposed. These slabs correlated with context 352 in the chamber and also directly overlaid the burial deposits. Thus, the upper part of 187 correlated with 268 and 287 in the chamber, there being no equivalent in the passage section to the chamber's context 9.

Context 354 in the entrance (Fig 95), comprising mostly soil-free stones, directly overlay the entrance paving (353) and was the deposit which covered and contained most of the burial deposits in this area, without any obvious subdivision between an horizon of covering material and a burial horizon. Both 354 and 353 were truncated by the disturbance 603. In the passage, where there was no paving, the primary deposit was 323, an horizon with a much higher soil content with extensive charcoal flecking and far fewer slabs or fragments than the surrounding layers. Human remains were both embedded in this deposit and lay on the surface of it at the interface with 187. Context 323 was thickest and most humic on the north-west side of the passage as far as the section-line,

HAZLETON NORTH *CHAMBERED AREAS BEFORE EXCAVATION*

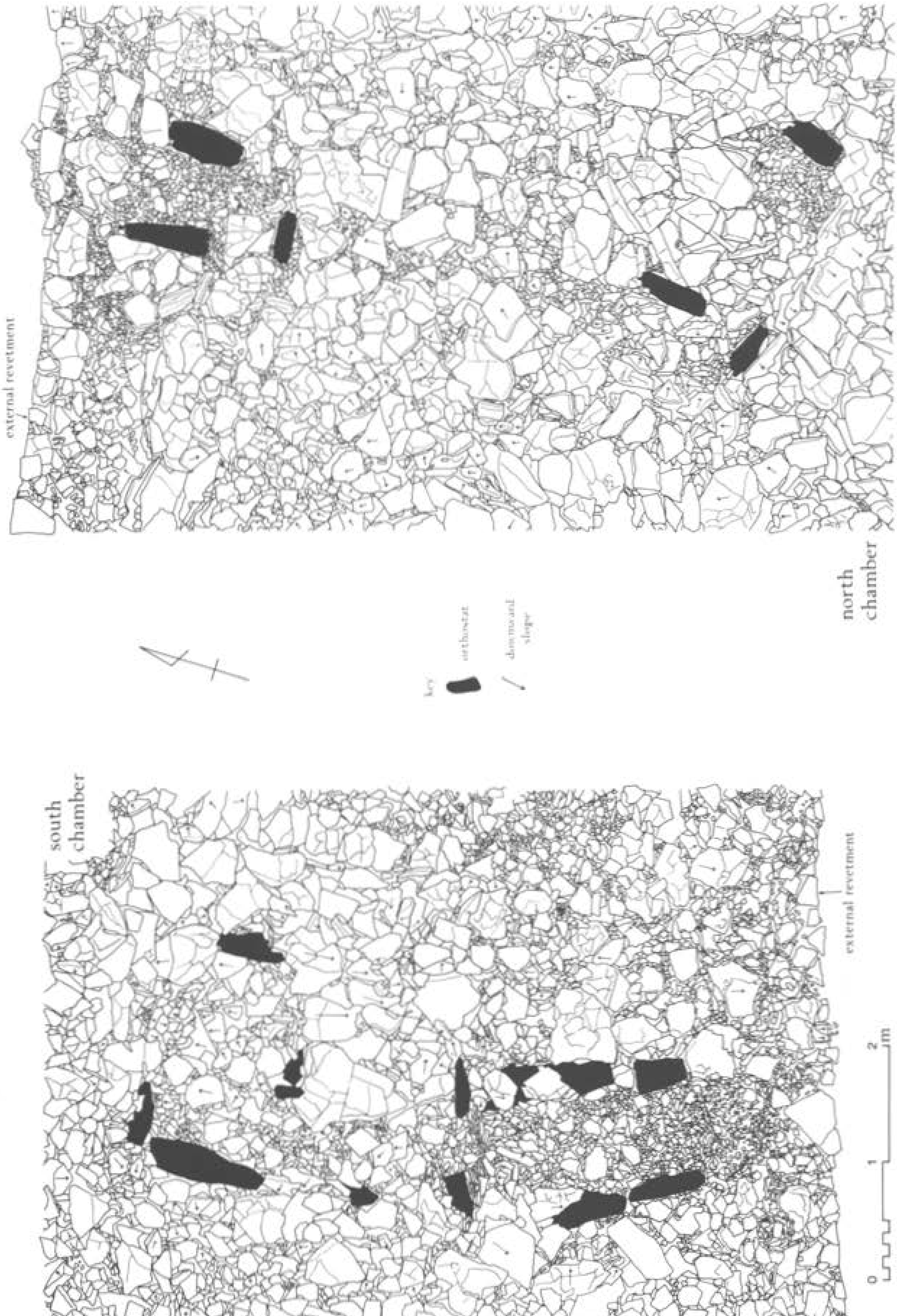


Fig 93 North and south chambered areas: plans at the uppermost surviving level of the cairn

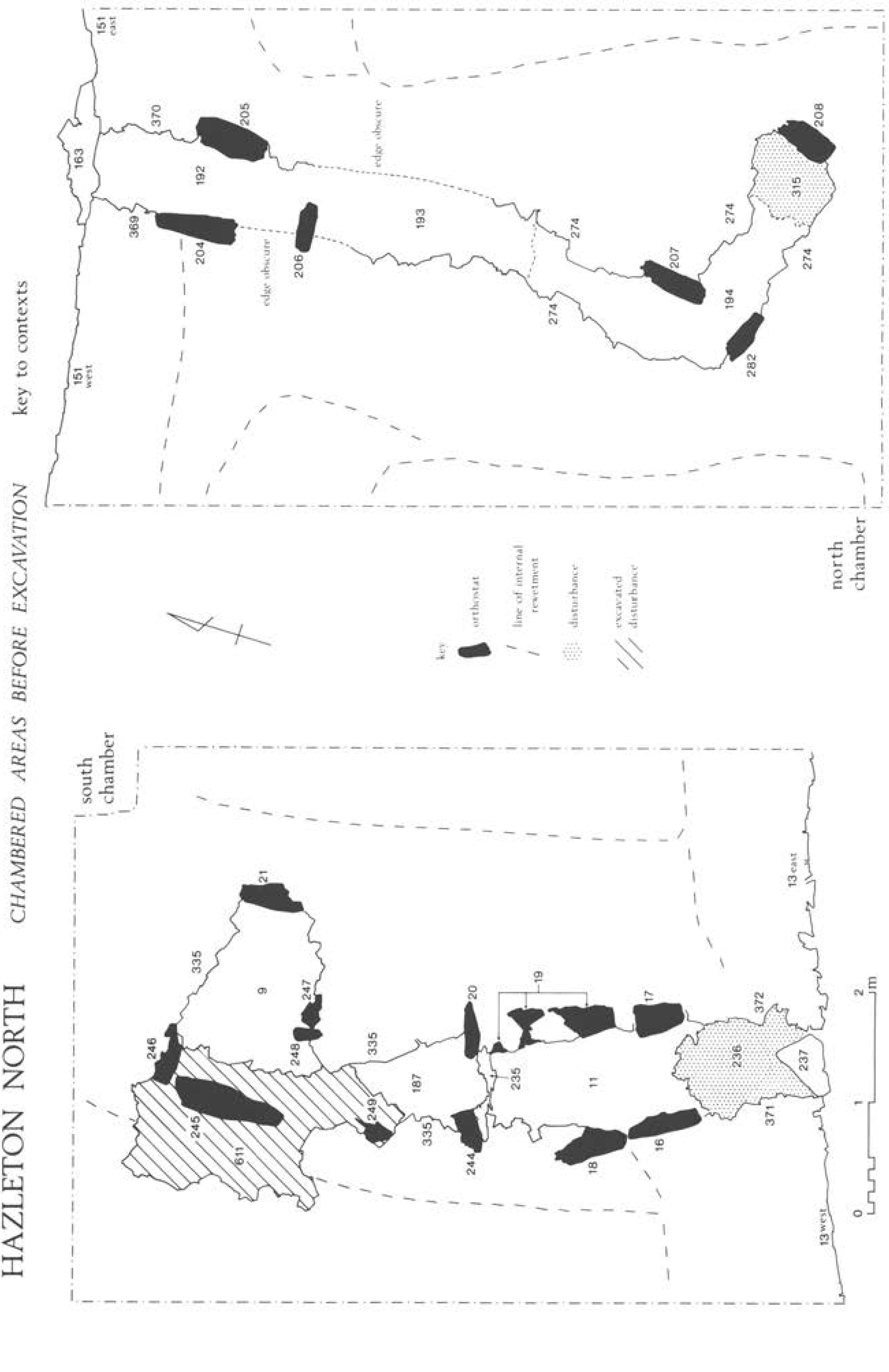


Fig 94 Key to the chambered area contexts visible in Figure 93

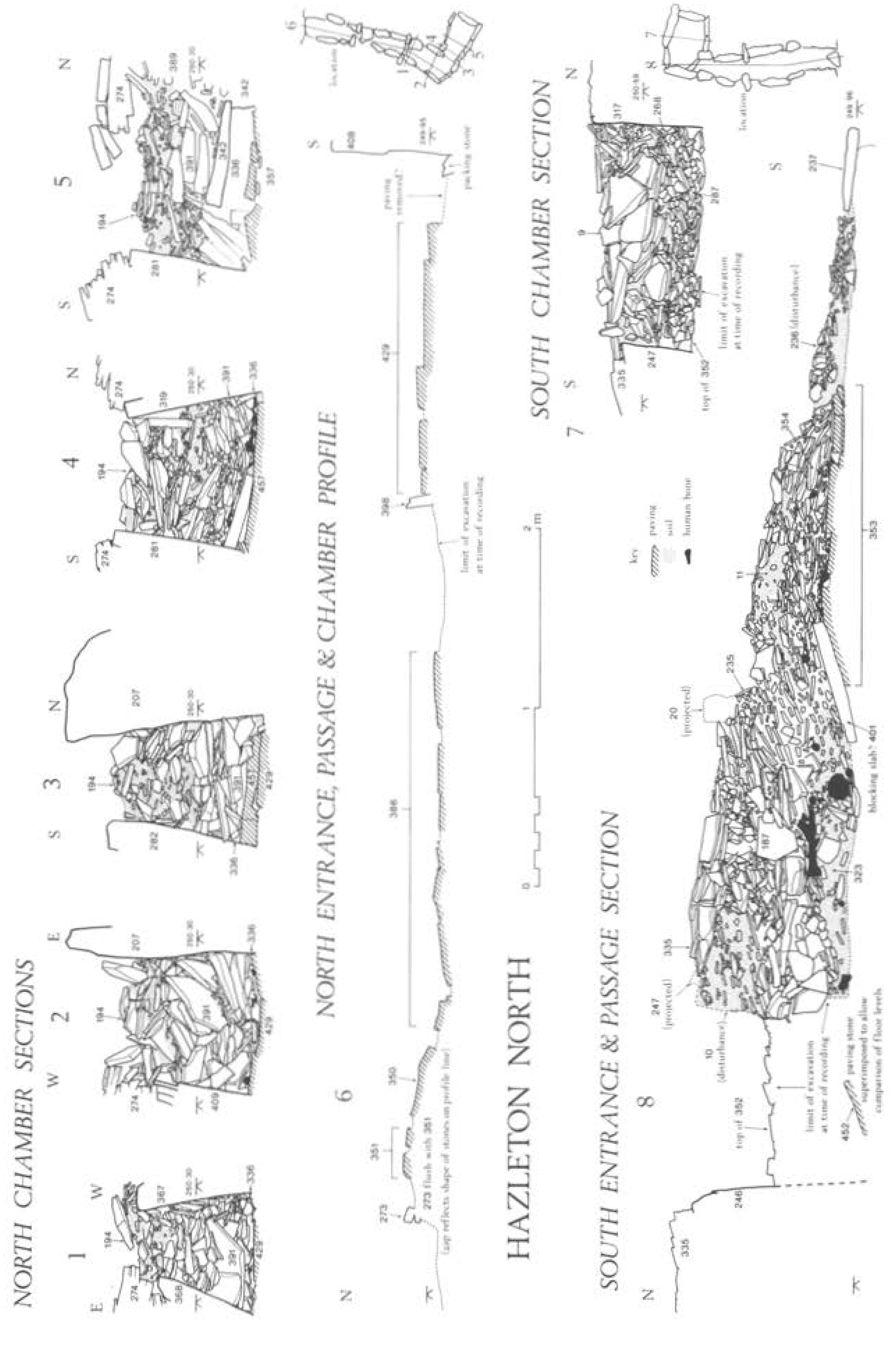


Fig 95 North and south chambered areas: sections through infill deposits

Fig 96 South chamber: surface of infill context 352, viewed from the east; scale in 0.1m divisions

after which it tapered off to the east and south of the passage where context 187 had a commensurately greater thickness. In the chamber, the context 352 slabs overlay 412, which was composed of stone slabs and fragments, human remains, and soil, and varied between 90–170mm in depth. The burial deposits in 412 overlay either the paving 452 (where it was present) or the remains of the former land surface (separately designated as context 453 within the south chamber).

The artefacts and animal bones from the upper fills are summarised in Tables 7 and 8, those from the lower fills in association with the burial deposits are listed in Table 10 and in Tables 43 and 84. Where possible, the horizontal and vertical occurrence of burnt stones, bones, and artefacts in the south chamber fill is indicated on Figure 97, on which these items are projected against the north/south profile across the centre of the chamber (Fig 77: 10), with the tops of contexts 9 and 352 added from the section (Fig 95). This projection is schematic, since the objects are plotted according to their absolute heights without reference to the changes in level of the various deposits across the chamber; the variation in chamber profile accounts for those objects which appear to fall outside the chamber edges. Few of the small animal bones from the upper fills could be plotted, because they were recovered by sieving. The Neolithic sherds shown from the lower fill are part of the pottery cup from the burial deposits in the area of the sillstone.

Table 7 Artefacts from the upper fills of the south chambered area

Context	*Flint*	*Neolithic pottery*	*Roman pottery*	*Pebble grinder*	*Bone bead*
9	–	3	–	–	–
10	3	19	–	–	–
10/187	2	–	–	–	–
11/354	1	1	–	–	–
187/323	–	–	–	1	1
268	2	12	–	–	–
287	–	1	1	–	–

Table 8 Summary of animal bones and fragments (including human) from the upper fills of the south chambered area

Type	*Entrance*	*Passage (Context no in brackets)*	*Chamber*
human	1(11)	11(10/187)	?2(9/268)
	many(11/354)	?3(187)	?19(268)
	7(236)	many(187/323)	?3(287)
	18(236/354)		
cattle		1(10)	
sheep/goat	2(11/354)		1(268)
sheep-size frags	1(11)		1(287)
vole	18(11)		25(9/268)
	5(11/354)		109(268)
	1(236/354)		7(287)
mouse			3(9/268)
			25(268)
			4(287)
mouse/vole			40(9/268)
			71(268)
			3(287)
shrew			5(268)
			1(287)
rabbit			3(268)
			46(287)
bird			1(9/268)
			15(268)
bat			1(268)
frog	4(11)		
amphibian			2(9/268)
			14(268)
			1(287)
fish			1(268)
unidentified small animals			15(9/268)
			94(268)
			3(287)

Note: The site notebook records that other small animal/rodent bones were present in context 11 in the south entrance, but these were not retained. The human bones from 9/268 and 268 are all small unidentified bone fragments, only tentatively regarded as human. The three human bones from 287 are a vertebra fragment, a rib fragment, and another unidentified spicule.

Discussion

The upper infills (contexts 9, 11, and 187 upper) and the stones between them and the burial deposits were all assumed to result from collapse of the original corbelling and roofing and, to a lesser extent, the lateral lining of the chambered area. At the north end of the entrance, this impression was bolstered by the disposition of some of the infilled stones, which appeared to have simply slumped inwards from both sides of the entrance. Similarly, in the passage just to the north of the transverse orthostats, the uppermost level comprised what appeared to be corbelling spilling into the passage from both sides. In the chamber, the uppermost fill (9) also appeared to represent collapsed roofing, although in stratigraphic terms it was the lower horizon (352) which correlated with context 187.

This stratigraphic inconsistency may be more apparent than real, since 187 possibly incorporated more than one phase of collapse, which was obscured at its northern end by disturbance 611, but there are, nevertheless, obvious problems of interpretation, hinging on the classification of the chamber infill below context 9. The finds distribution is directly relevant to this. Figure 159 shows the context 10 Neolithic sherds, part of a general spread of abraded pottery in the overlying topsoil (Fig 148), but also present in contexts 9, 268, and 287 of the south chamber (Fig 97). The specialist report (Chapter 10) concluded that these sherds were identical to those from the pre-cairn soil and that they were likely to have been somehow derived from it. This Neolithic pottery appears to have been introduced into the

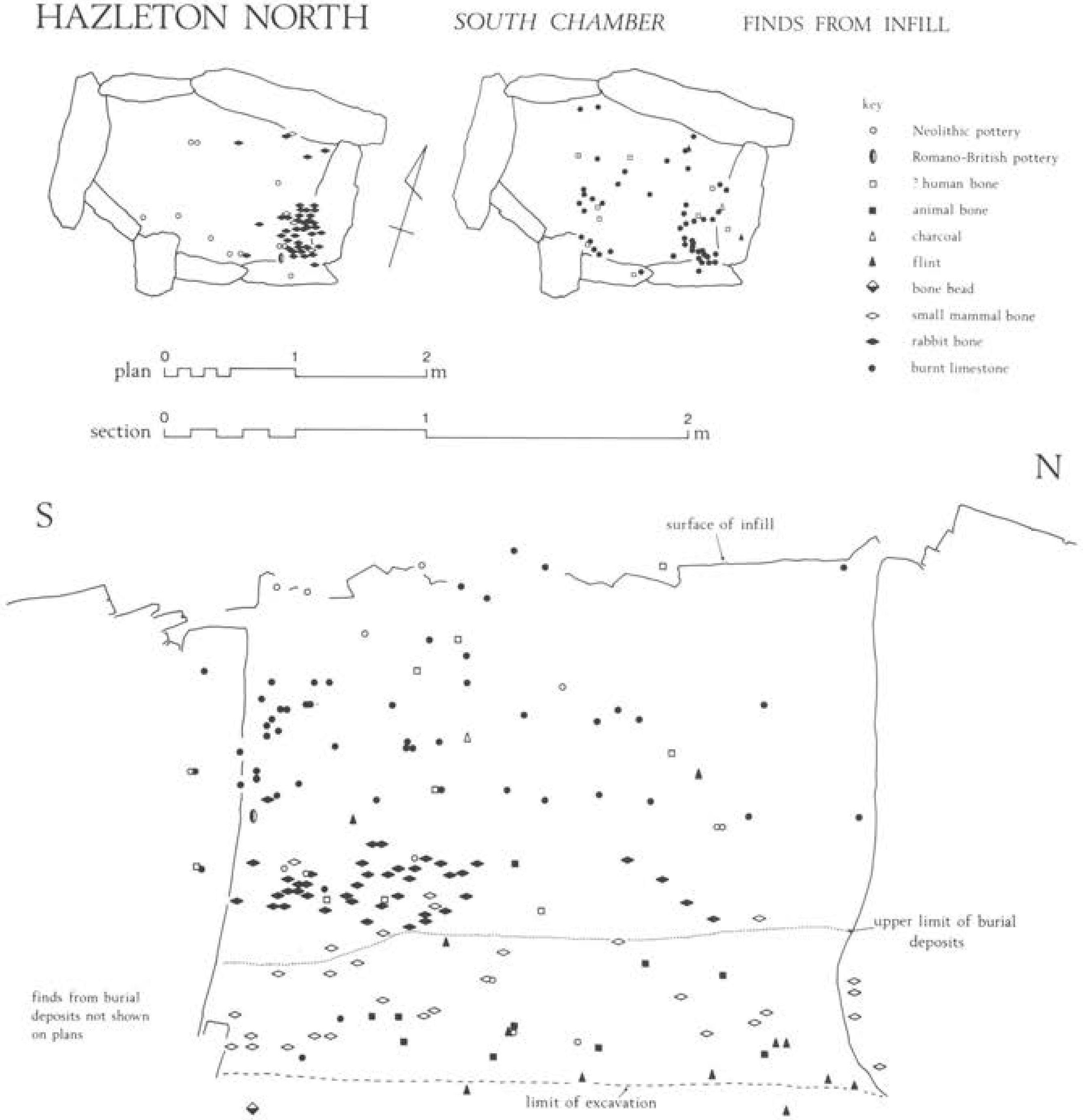


Fig 97 South chamber: the location of artefacts, animal bones, and burnt stones in plan and projected against a north–south profile across the central chamber

chambered area subsequent to the burials, to become a component of the infill of context 611. By contrast, the human bones from context 10/187 on the southern side of 611, which are mostly fragments (including two fragments of the same clavicle and three fragments of the same humerus), were almost certainly all derived from the burial deposits below – definitely so in the case of a glabella fragment, which conjoined with other fragments of a juvenile skull from the south passage (context 187/323).

In the chamber, context 287 contained some 46 rabbit bones and a large, unabraded base sherd of Romano-British Severn Valley ware (Fig 97). The rabbit bones were from the south-east corner of the chamber, in the same spot as the Romano-British sherd which was slightly higher than them in the fill, indicating disturbance either through the overlying deposits or before they assumed their present collapsed state. The latter is possible, because of the absence of any visible disturbance, and because of the similarity of the animal bone assemblage from the upper chamber levels to that from the lower chamber in association with the burial deposits (Tables 84 and 108). The south chamber perhaps remained wholly or partly empty, serving as a refuge for predatory birds and other animals for a significant period. It was somehow possible for animals to gain access to the interior of the chamber after the deposition of 352 and before the later collapse completely filled the chamber.

Whether the presence of the Severn Valley ware base indicates human disturbance or not is a moot point. An unabraded sherd of this size must reflect human activity at the cairn in the Roman period, but it is just conceivable that it found its way into the chamber as a result of animal, rather than human, action. If the sherd was introduced by human action, then it was associated with an intrusion which did not appear to disturb the burial deposits in the chamber. The rabbit (if the bones do belong to a single skeleton) cannot predate the twelfth century AD (Appendix 11), and these bones may suggest that all or part of the roof was intact at this stage. Rabbit bones were also found in context 379/493, towards the base of the cairn in the area of unit O, at least 0.6m below the cairn surface, and a Romano-British sherd was present in context 444 within the axial south-west part of the cairn. In both cases, these finds point to otherwise unrecognised disturbance of the cairn in much more solid stonework than that of the chambered area.

Thus, the upper infill of the chamber was obviously more disturbed than was apparent during excavation, and context 611 may not have been as discrete an entity as the record suggests. It could be that only in the area of 611 was the roofing disturbed (and removed?), the adjacent disturbance in the chamber involving burrowing beneath still intact roofing, but over the top of previous collapse represented by context 352. The presence of human bones in 10/187 indicates some disturbance of the burial deposits in the passage, even though this was not recognised during excavation; there can have been no extensive disturbance of burials associated with 611, however, because there was no widespread occurrence of bone fragments in the upper fill of this area, in contrast to the situation in the north chamber (*see below*).

The date of any such disturbance would remain problematic, as would its nature, especially in view of all the burnt stones included in the upper fill of the chamber as well as in 10 and because of the Neolithic pottery. The burnt stones did not reflect *in situ* burning, the only possible indication of which was the small patch at the southern edge of 611 (*see above*). In context 268, for example, two large pieces of the same coarse-grained slab, reddened right through, were found separately and must have been introduced from a hearth elsewhere. The abraded sherds cannot have been derived from the burial deposits, which otherwise contained nothing similar, nor from the pre-cairn soil within the chambered area, since this was well away from the concentration of Neolithic pottery in the midden area. The Neolithic sherds in the topsoil in the vicinity of context 611 (Fig 159) could be derived from the fill of 611 by ploughing and/or animal activity.

If contexts 187, 268, 287, and 352 represented mainly natural infill deposits, then it must be envisaged that roofing and associated stonework at the north end of the passage collapsed or was intentionally disturbed, resulting in a cavity into which was incorporated material containing burnt stones and Neolithic pottery fragments, either deliberately or fortuitously. Such an occurrence is enigmatic, if indeed only one episode of disturbance was involved, but a source for the Neolithic pottery fragments could just possibly have been the disturbance (context 616) in the area of unit M (*see* p134), which did penetrate the buried soil in the vicinity of the pre-cairn midden.

The major alternative would require the classification of contexts 352 and 187 (lower) as deliberate blocking, introduced from within the chambered area as a covering for the burial deposits at the close of burial activity and while the roof was still intact. Contexts 268 and 287 could then be regarded as deliberate introductions also, forming a second layer or phase of blocking incorporating cultural debris and burnt stones, while context 9 would represent the initial collapse of the chamber roof. In this case, the context 10 fill of intrusion 611 would represent a disturbed version of the secondary blocking, and the Neolithic sherds in the overlying topsoil could be derived from the cultural debris within the blocking. This interpretation more convincingly explains the presence of Neolithic pottery in and around the upper fills of the south chamber and is the most satisfactory explanation for the context 352 slabs, but it has to be admitted that the excavated evidence is not wholly conclusive, largely because of the complication of the poorly understood disturbance 10/611.

The deposit regarded as most clearly disturbed was context 236. This shallow deposit must represent only the base of the 603 intrusion and was probably an overturned and redeposited version of contexts 11 and 354. The seven human bones in this context (one proximal phalanx, one skull fragment, one innominate fragment, one rib fragment, and three unidentified fragments) presumably formed the residue of the burial deposits disturbed from the outer entrance when 603 was created. A further 18 fragments of human bone were recorded as from context 236/354, that is from the northern end of 236 where it merged with the intact burial deposit 354, and the few substantial longbone fragments in this group were probably still *in situ* at the surface of 353. Only one animal bone, that of a vole, survived from this area and, in the absence of any other, more diagnostic finds, it is impossible to suggest a date for this disturbance. If the fan-like spread of stones in the south quarry just outside the south entrance (Fig 29) is accepted, however, as composed of stones from the south entrance and its revetments, a date prior to the later eighteenth century AD would be indicated (*see* p26).

Subsequent to any disturbances or collapses, the onset of overploughing of the cairn, especially in a mechanised form by the later nineteenth century AD, must have had a significant effect. Overploughing would have induced the infilling and compaction of any subsurface cavities, including the collapse of any remaining stonework bridging vacuous spaces, and would have created a seal against further intrusion by any animals other than burrowing ones. Before overploughing took place, the monument was probably completely overgrown, with the partially-collapsed chambered areas, particularly the upper parts of the chambers themselves, offering numerous accessible cavities and hollows attractive to small animals.

Fill of the north chambered area

As on the south side, much of the uppermost fill comprised medium to large, tile-like slabs with irregular pitching, but including near-horizontal pieces (Figs 93–5 and 100). Some of these slabs,

Fig 98 North entrance: upper infill context 192 sectioned, viewed from the north; scale in 10 and 50mm divisions

especially over the passage and west side of the chamber, were of considerable size. As on the south, the presence of soil among the stones varied. The upper fill was subdivided (193 and 194) for recording purposes at the turn between passage and chamber (rationalised during post-excavation as occurring at the sillstone), although the infill was otherwise identical. The uppermost entrance infill (192) was composed of rather smaller, shattered stones with more soil among them (Fig 98), but the subdivision at the junction between entrance and passage was again somewhat arbitrary.

No further distinction was made in the passage infill, since there were no burial deposits whatsoever in this zone (Fig 113). Thus, 193 designated all the passage infill from the uppermost level down to the floor. Throughout its depth, 193 comprised mainly large slabs, which, because of the narrow, bell-shaped cross-section of the passage, had often jammed in positions leaving large cavities between stones.

In the entrance, 192 was only 50–100mm thick (Fig 98) and overlay a horizon of more substantial, but otherwise similar, stones with a predominant pitch on the south side of the entrance down towards the north (Fig 99). Human bones underlay a single thickness of these stones at the north end of the entrance. This lower fill was initially all designated 267, but it was subsequently subdivided into an upper horizon (612) of stones with virtually no bones present and 267, which contained most of the burial deposits, immediately overlying the entrance paving. Both of these contexts averaged only 100–150mm in thickness, but they each tapered towards the north, in line with the general profile of the cairn, their wedge-shape exaggerated by the reverse slope of the entrance floor (Fig 95).

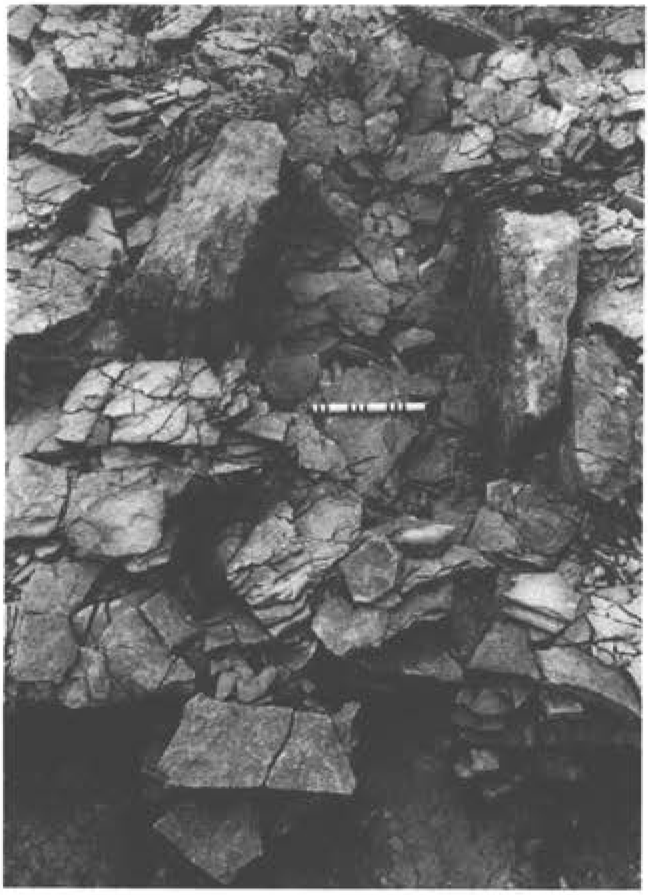


Fig 99 North entrance: surface of context 612 (the skull and femora of skeleton 1 are visible beneath), viewed from the north; scale in 10 and 50mm divisions

The upper infill in the chamber was interrupted at the east end by a deposit of soil and small stones extending for some 0.6m west of orthostat 208 (Figs 93, 94, and 100). The surface of this disturbed area, which contained a human parietal fragment against the inner face of orthostat 320 beneath the broken edge of an overhanging corbel stone, was initially designated context 209. Subsequently, the majority of the upper fill of the disturbance (604) was designated 315. This upper fill was generally about 0.2m thick, but over 0.3m in the south-east corner of the chamber against orthostat 320. Beneath 315 was an horizon of larger stones (322) superficially less disturbed, forming the lower fill of 604, which at least in the south-east corner of the chamber went down as far as the paving.

Elsewhere in the chamber, the upper infill 194 overlay 0.3–0.4m of similar infill (391) of variously-sized stones mixed with soil but with numerous soil-free gaps, in turn overlying the burial deposits, 336. The latter context, directly overlying the paving, was up to 150mm thick, comprising human bones mixed with soil and small stones or sometimes without any matrix (Fig 95). A satisfactory lower western edge for disturbance 604 was never defined, although it terminated before the first recorded section (Fig 95).

The fallen orthostat 342, which had snapped off at its base (Fig 101), directly overlay the burial deposits (Fig 95) which at this point had virtually no stone or soil admixture (Fig 102), so 342 obviously collapsed into a chamber empty apart from the burials. The status of another large slab (0.6 × 0.35m; arch photo 1981/40/34) at the base of the fill between orthostats 342 and 208 was more problematic. This slab both overlay, and was partially overlain by, human bones.

Immediately south of the sillstone 398, the lower fill of the chamber was composed of a particularly solid mass of large slabs (Fig 103), which only overlay burial deposits at their southernmost edge and otherwise were directly overlying the paving 429.

Discussion

The passage infill (193) appeared entirely natural, resulting from the collapse of walling and roofing stones into an otherwise completely void space. This space was sealed at both ends, on the south by the placed blocking slab 366, on the north by the collapsed orthostats.

In the entrance, there was no indication of disturbance subsequent to the deposition of the final burial, the bones of which were intact (apart from minor damage and movement), and there were no artefacts in the upper infill, nor any significant animal bones present. The small number of potentially human bones from levels above the burial deposits (Table 9) comprised a metacarpal fragment from 193/612, a cranial fragment from 267/612, and two skull fragments and a vertebra fragment from 612; otherwise, all were unidentifiable fragments, not necessarily human.

The entrance infill deposits 612 and 192, therefore, must either be seen as *in situ* blocking or as natural collapse. The situation at the north end of the entrance, where slabs from the blocking wall 273 had slipped inwards to overlie the skull of skeleton 1 (Fig 99), suggested that this was an open space at that time. The same might be implied by the occurrence of several examples of frost-spalled flakes of coarse-grained limestone, which were derived from the inner face of orthostat 205 and overlying human bones near the base of the infill; it was also observed that the bones of the right foot of skeleton 1 had reached their final resting place as a result of tumbling downwards, subsequent to the foot becoming skeletal, presumably through a void. The character and orientation of the context 612 stones at the south end of the entrance suggested that they were part of a natural infill (Fig 99), spilling into a vacant hollow rather than respecting the internal edges of the entrance. This would imply that roofing in that area survived the collapse of the orthostats at least long enough for the sequence of entrance burials to take place. On the other hand, some of the relatively flat slabs over skeleton 1, particularly in the torso region (Fig 99), could

Fig 100 North chamber: upper infill 194, with disturbance context 604 on the right (after the removal of the surface layer 209), viewed from the south; scale in 0.1m divisions

Fig 101 North chamber: collapsed orthostat 342, viewed from the south; scale in 0.1m divisions

Fig 102 North chamber: human bones beneath the fallen orthostat 342, viewed from the south, total length of scale 0.1m

have been placed there after burial as a covering. The relatively small size of the 192 and 612 stones, compared with those in the rest of the north chambered area infill, remains unexplained, unless this was simply a result of differential weathering.

The burials in the north chamber had been sealed by the erection of the blocking slab (366), and subsequently collapse of the orthostats at the entrance/passage junction had blocked the passage and prevented any further access to the chamber. The heap of slabs immediately south of the sillstone (Figs 95 and 103) could also have been a deliberate blocking device. While the burial deposits did continue around the angle from the terminal part of the chamber into that part aligned with the passage, they stopped short of the sillstone by approximately the same margin as was covered by the heap of slabs; the slabs also constituted a more compact mass of stonework than was observed elsewhere in either chambered area. The heap included a group of four overlapping slabs arranged like a collapsed pack of cards. Three of these stones refitted to make a single slab, 780 × 360 × 100mm in size, but the pieces were not lying with matching faces adjacent and could not have arrived in their final position as a result of natural fragmentation and collapse.

At the east end of the chamber, however, context 604 and its fills 209, 315, and 322 showed intrusion through the roof of the chamber. The disturbed appearance of the fill was confirmed not only by the contained artefacts – a fragment of glass in 209 and a scored (?plough-scored) slab and an iron nail (Fig 237: 4936) in 315 – but also by the human bones (Table 9). The position of those human bones recorded in plan is shown on Figure 104, which serves to emphasise their fragmentary nature.

Subsequent analysis indicated that these bones were derived from the burial deposits below. The skull fragment from 209 (3536), which conjoined the fragments from 315 (4760 and 4761), also conjoined with fragments from context 336 (5140 and 5468) from the chamber floor just to the west of the fallen orthostat 362. A femur fragment (4734) from 315 conjoined with a similar fragment (8373) from 336 on the chamber floor between orthostats 207 and 409; another femur fragment (4746) joined other fragments (5874, 5890, and 8136) from 336 between orthostats 319 and 403 and orthostats 342 and 281. Two fibula fragments (4747 and 4749) from 315 conjoined with a fragment (8776) from 336 between orthostat 207 and revetment 415; another fibula fragment (4931) from 315 joined a piece (8817) from 336 in the same location; and a tibia fragment (4929) joined another (8330 etc) from 336 between orthostats 207 and 415. Conjoining radius fragments (4937 and 4959) from 315 represented the pair to a radius (9846) from 336 between orthostats 207 and 282.

This evidence of the conjoining bone fragments plus the generally sparse and disturbed nature of the north chamber burial

Table 9 Summary of animal bones and fragments (including human) from the upper fills of the north chambered area

Type	*Entrance*	*Passage*	*Chamber*
		(Context no in brackets)	
human	2(193/612) 2(267/612) ?13(612)	–	1(209) 49+(315) 36+(322)
vole	19(267/612) 10(612)	23(193)	5(315) 8(322)
mouse	1(267/612)	35(193)	2(322)
mouse/vole	4(267/612)	11(193)	2(315) 3(322)
shrew	–	2(193)	1(322)
bat	–	4(193)	–
frog	1(192)	–	–
amphibian	6(267/612) 1(612)	3(193)	1(315) 2(322)
unidentified small animals	74(267/612)	87(193)	1(209) 10(315) 11(322)

Fig 103 North chamber: compact heap of slabs at the base of context 336 south of the sillstone, viewed from the south; scale in 10 and 50mm divisions

Fig 104 North chamber: human bones in the fill of disturbance 604, above the main level of burial deposits

deposits (except those beneath orthostat 342) implied that disturbance was considerably more extensive than the recorded limits of 604. This was confirmed by the presence of four rabbit bones from context 336 (*see* Table 107). As with disturbance 611 on the south side, therefore, the definition of the disturbed area proved problematic. Almost certainly this was because most of the disturbance took place inside the chamber beneath intact roofing and corbelling, which only subsequently collapsed. The recorded extent of context 209/315 represented simply that part of the chamber where the roof was broken through (or had previously collapsed) and via which entry and exit took place. Thus, the infills recorded in sections 2–5 (Fig 95) reflect accumulations which largely took place after disturbance of the deposits on the chamber floor.

That orthostat 342 had collapsed before this disturbance took place is inescapable. The orthostat snapped at its base and fell forward into the chamber, which was empty other than for the burial deposits on the paving. The underlying bones were not crushed, because the orthostat came to rest supported by a piece of stone which had presumably fallen from the roof or sides of the chamber. At what date this collapse occurred is unknown, but, remarkably, it did not bring about a general collapse of the surrounding cairn, although it may have been the cause of some roof collapse and local subsidence of the cairn surface.

The slab lying between 342 and the east end of the chamber is also likely to predate the disturbance, since the bones beneath it, though not as prolific as those beneath 342, seemed undisturbed. The origin of this slab was not definitely established, but it could have been part of orthostat 343, detached perhaps at the same time as the fall of 342. Alternatively, this slab could originally have been part of the paving – it would quite neatly have filled the gap in the paving at the south-west corner of the chamber – and have been moved during the course of burial activities, in the same way that some of the paving on the floor of the south chamber appears to have been moved.

Burial deposits in the south chambered area

Human remains occurred throughout the south chambered area from the entrance to the chamber (Fig 105). In the chamber and the entrance, the human skeletal remains were lying chiefly within the lowest fill (contexts 412 and 354 respectively), or at the interfaces of those contexts. Numerous bones, mainly small bones and fragments, were found in the cracks between paving stones or under their edges and in the gaps between or under the leading edges of orthostats, while isolated bones were found in some of the more superficial fill contexts (*see below*). Both of these contexts (354 and 412) comprised a mixture of human bones, slabs, and fragments with varying proportions of soil, stone chips, and bone and stone dust. In the passage, the situation was different, since the primary context (323) contained more soil, and the bones, fewer in number, were often completely embedded in soil, although others lay at the interface with the overlying context (187) or were incorporated within its lower horizon. The contrast between the primary deposits in the chamber and entrance and those in the passage was related to the absence of paving in the latter (Fig 74). The greatest vertical separation of human bones within the burial deposits occurred in the south passage, where a very few bones were found up to 0.3m apart (Fig 95). Elsewhere, the maximum vertical range was normally about 0.15m, but again reached 0.3m in the middle north side of the chamber, at a point where three skulls overlapped each other.

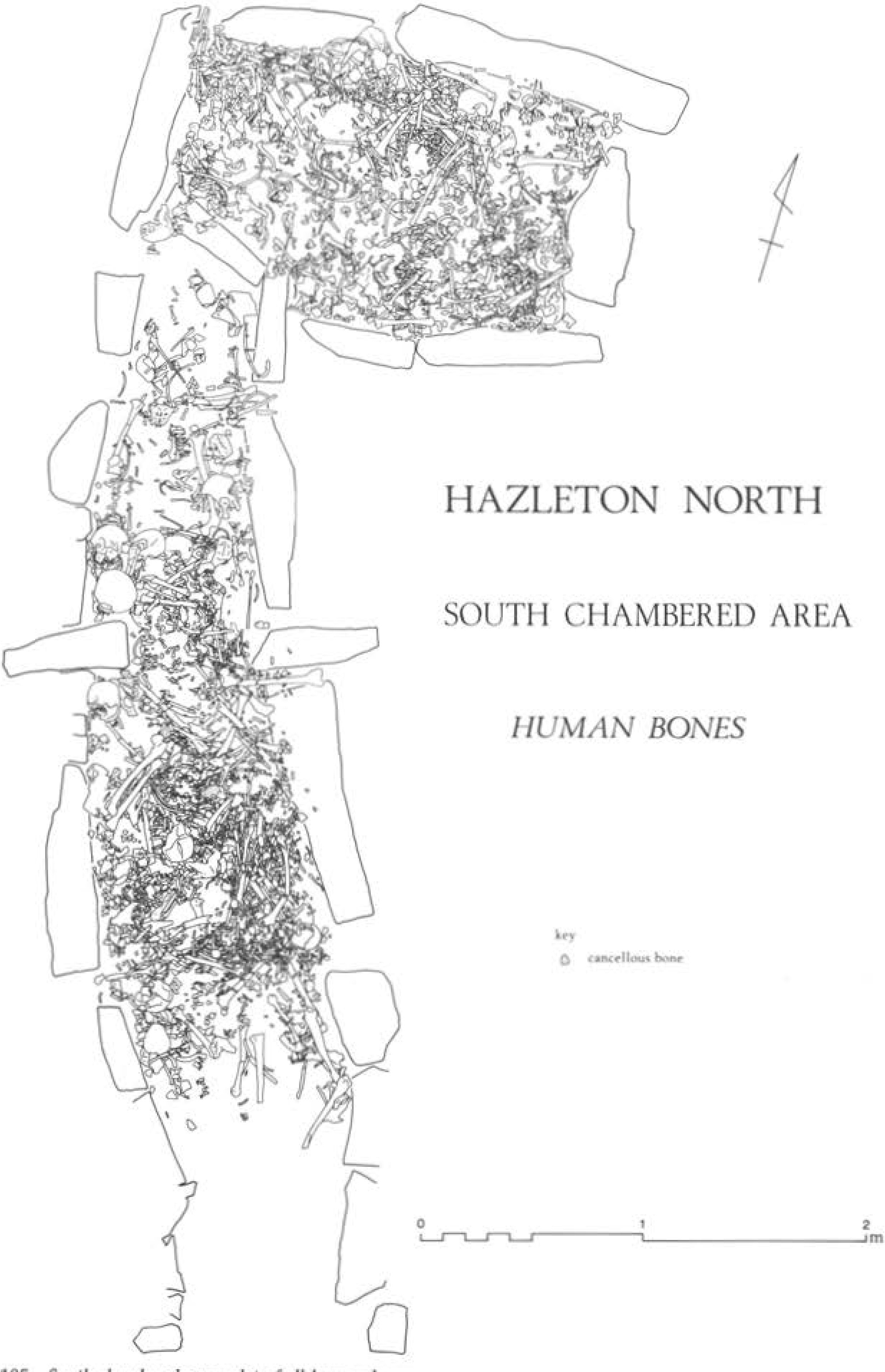


Fig 105 South chambered area: plot of all human bones

Fig 106 South entrance: human bones on the north-west side, viewed from the south; scale in 10 and 50mm divisions

Most of the human bones were unencumbered by any stones or soil (Figs 90–92, 106–7). In places, contexts (323, 354, and 412) consisted only of bones, and there was no doubt that they represented human remains placed directly upon the floor of the chambered area. In other places, this was clearly not the case, since the bones were lying within a matrix of soil and stones or surrounded by stones with bones sometimes sandwiched between stones, so that the bones were in a sense stratified within the fill. The situation of these bones could not be explained by post-depositional processes, but it was difficult to assign any absolute vertical subdivision to the primary burial contexts, even at the north end of the entrance, where there was superficially the most apparent separation of bone deposits (Fig 108). On the contrary, the evidence obtained from conjoining the fragments of single bones, or from the pairing of bones from the same skeletons, established that pieces of the same bones, or bones from the same individuals, were frequently widely spread horizontally and vertically within the primary fills. This admixture of stones or soil with the human remains, and the intermingling of bones within this matrix, must have resulted either from human activity during the use of the chambered areas or from subsequent disturbance.

The only exception to the normal deposition of burial deposits on the floor of the chambered area was a skull (12527), which was embedded in the pre-cairn soil between the base of the adjacent orthostats on the north side of the south chamber (Fig 109). This belonged to a child, six to nine years old. The skull was positioned on its side, left side downwards, with the mandible adjacent to it, but placed with the left condyle and coronoid process of the mandible in the right eye socket. Thus, the skull and its mandible had been put into this position together, but after the mandible had become detached. In the same position as this skull were other small bones and fragments (including a metatarsal, some juvenile rib fragments, a vertebra, and a metapodial diaphysis). Adjacent (within 10mm), and probably directly associated with this skull, was a serrated-edge flint tool (Fig 168: 98) made on a flake from a polished axehead, lying flat with the polished surface uppermost. No edge to any disturbance of the buried soil was noted, and the skull was not in a stone socket. The associated bones suggested that the skull related to the general burials rather than being an isolated foundation deposit. It might be that a depression was formed in the soil between the two orthostats, the skull was jammed in together with some other loose bones, the mandible

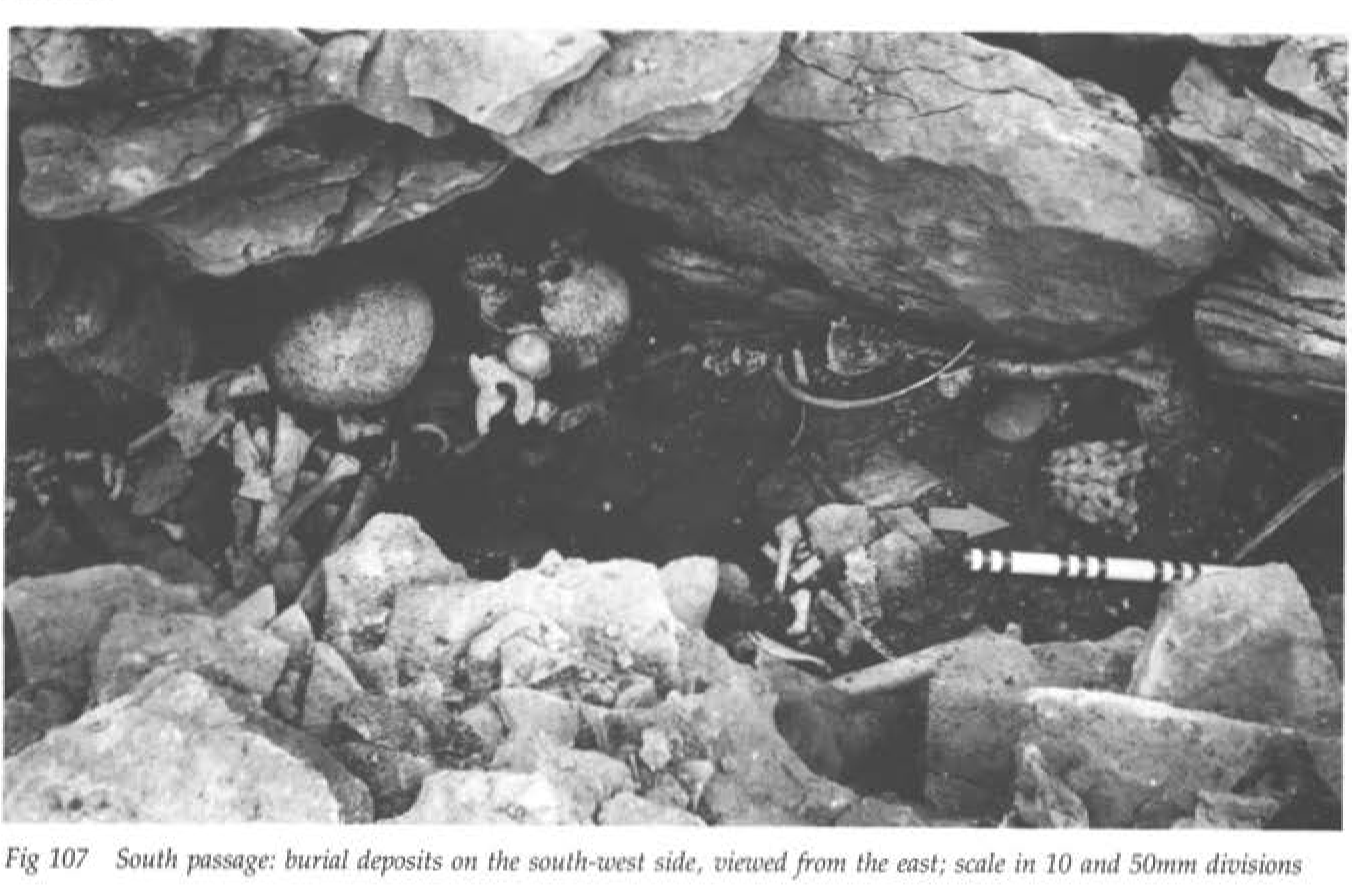


Fig 107 South passage: burial deposits on the south-west side, viewed from the east; scale in 10 and 50mm divisions

Fig 108 South entrance: lower burial deposits on the east side, viewed from the north; scale in 10 and 50mm divisions

was placed against the face and the flint by its side, and then the soil from the depression replaced.

In the outer entrance (Fig 110), bones were absent from the first metre, the burials having been truncated by a disturbance (context 603, discussed above). At the junction of the entrance and passage, the recumbent blocking slab 401 was both over- and underlain by human bones (Fig 108), from which it was concluded that activity in the burial zones continued after 401 had been set in its present position. At the junction of the passage and chamber, bones overlay the sillstone (Fig 90), although the possibility of some disturbance at this point, which would account for the lack of bones at the north-west end of the passage (Fig 111), is considered below.

The skeletal remains were almost wholly disarticulated. The exceptions included the following:

1 An articulated group of five cervical and one thoracic vertebrae (5865) in the centre of the south passage (context 323; arch drg 232), visible on Figure 111
2 An articulated group of five lumbar vertebrae (7549) in the south entrance (context 354; arch drg 284; Fig 108)
3 An articulated right fibula and tibia (7820–1) in the south entrance (context 354; arch drg 287), with an articulating right femur (7835) in correct juxtaposition but slightly to one side, and an articulating right calcaneum (7953) and talus (7954; these two foot bones on arch drg 290) and all the other articulating bones of the right foot in the same area
4 An articulated mandible (4077) and maxilla (4169) in the south entrance adjacent to the fragmentary remains of the associated skull (4228; context 354; arch drg 153)
5 A correctly juxtaposed mandible (4839/4966) and skull (4788) at the south end of the passage next to transverse orthostat 244 (context 187/323; arch drg 194)
6 A correctly juxtaposed right tibia and fibula (11031–2) in the chamber (context 412; arch drg 380)
7 A correctly juxtaposed left radius (11159) and ulna (11158) in the chamber (context 412; arch drg 403)
8 A correctly juxtaposed skull and mandible (10213) in the chamber (context 412; arch drg 380).

Other bones apparently in their correct anatomical relationship included two groups of ribs, one in the north-west area of the south entrance (4176, 4235–40; context 354; arch drg 153; Fig 106),

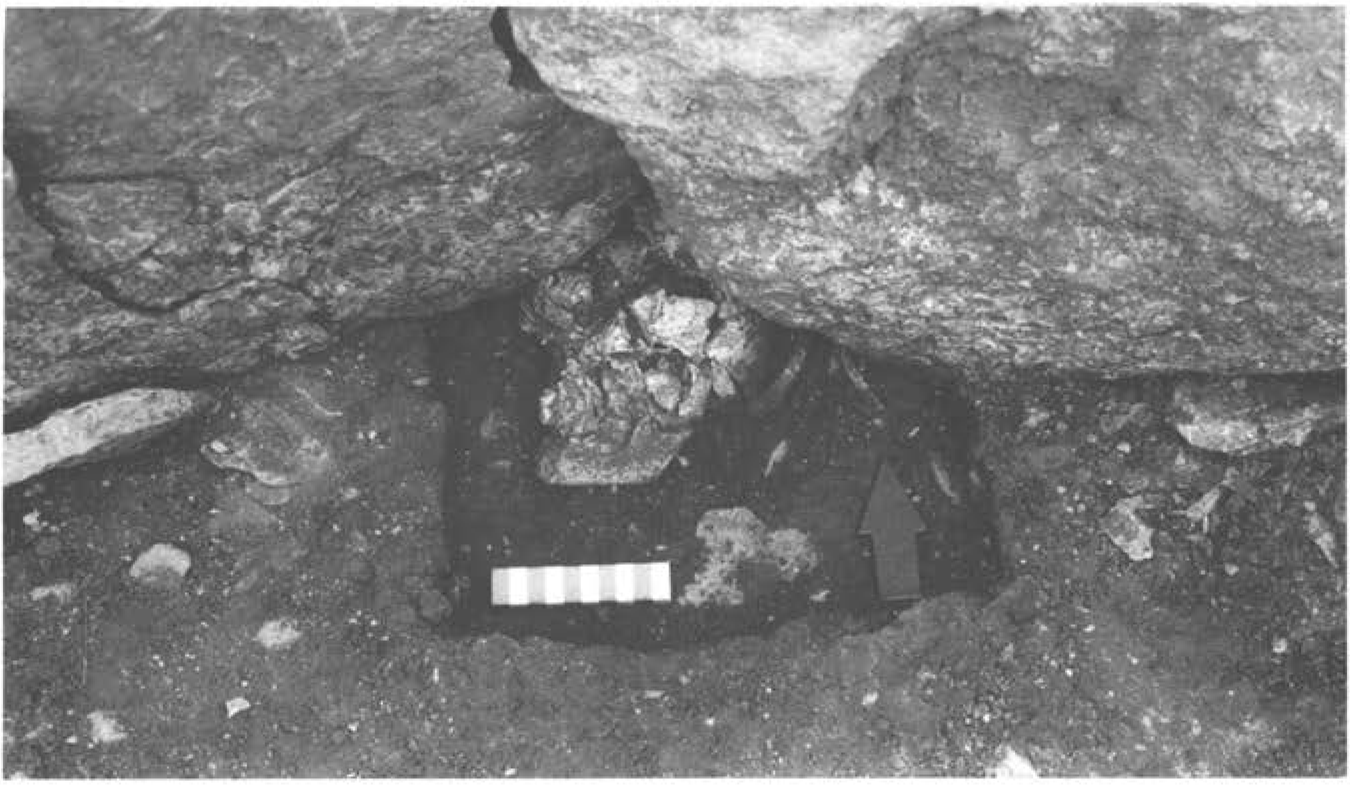


Fig 109 South chamber: skull between the bases of orthostats 246 and 317, viewed from the south, scale in 10mm divisions

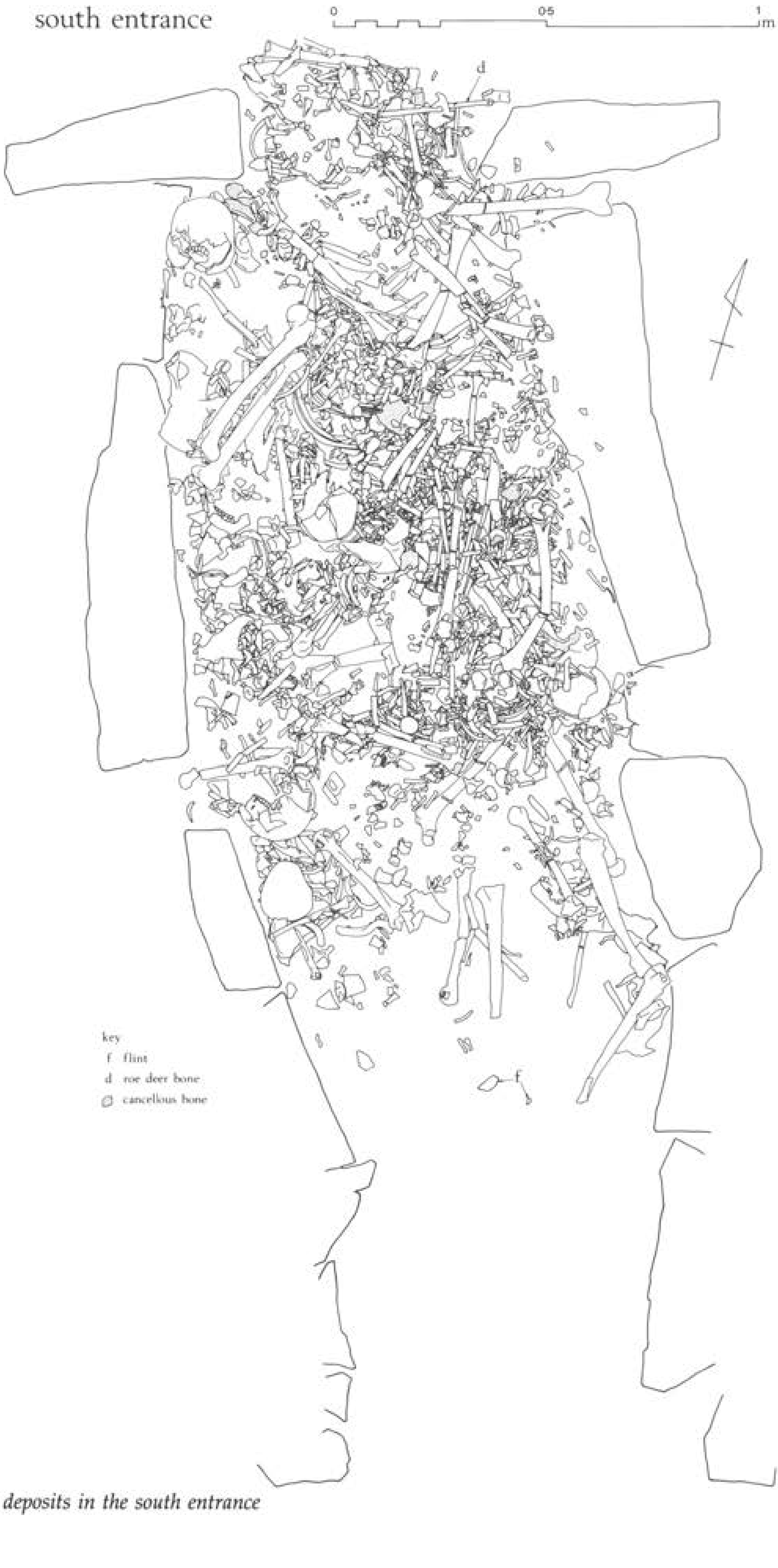


Fig 110 Burial deposits in the south entrance

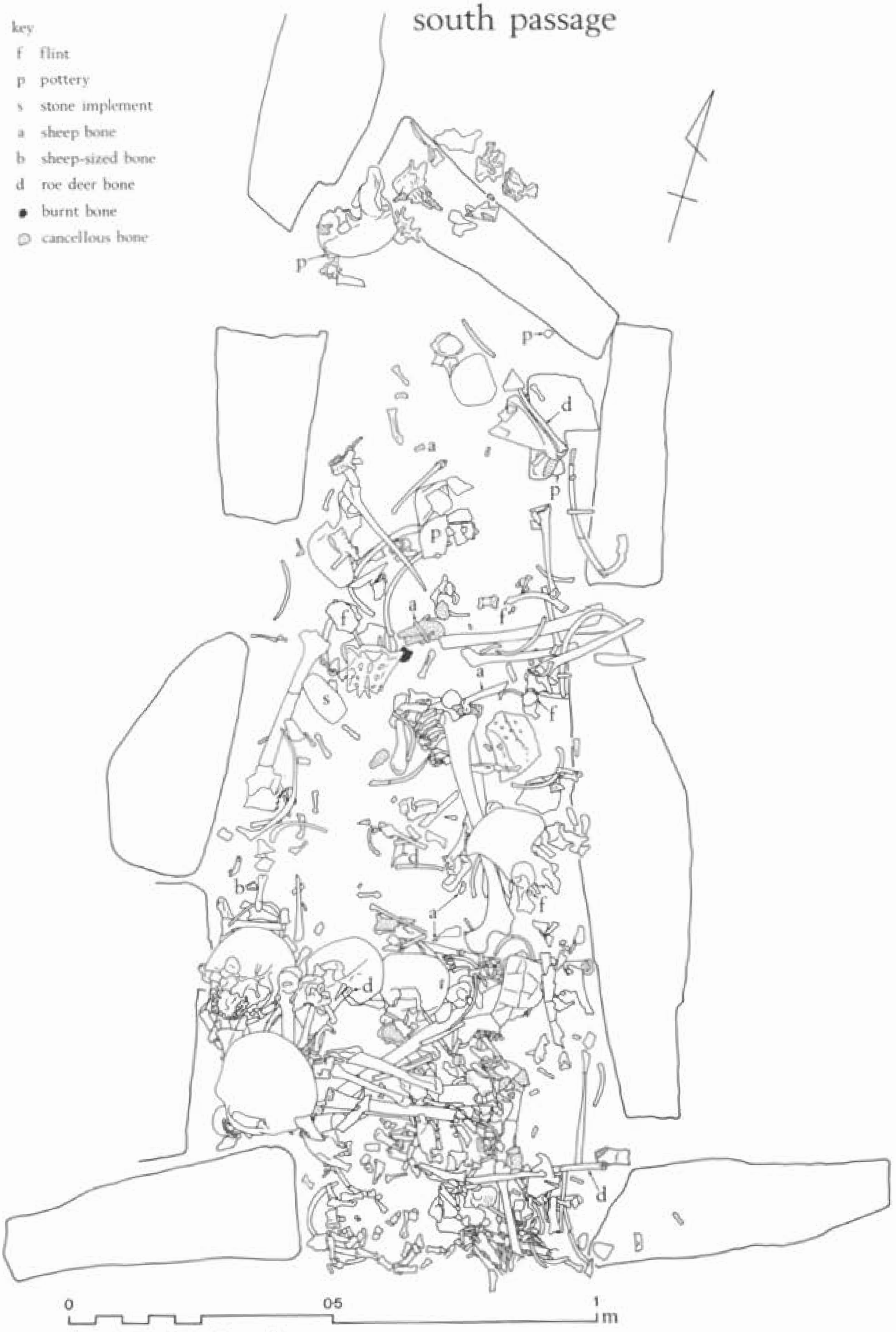


Fig 111 Burial deposits in the south passage

Fig 112 Burial deposits in the south chamber

and another on the northern side of the chamber (11182–9; context 412; arch drg 403).

Examples of paired bones (ie the left and right skeletal part from the same individual) found in adjacent positions, for example the two femora (4183 and 4184) in the north-west part of the entrance (context 354; arch drg 153; *see* Figs 106 and 111), were rarely suggestive of *in situ* articulation. In this case, the two bones were correctly orientated with both the femoral heads to the north, but the bones were not juxtaposed as in life, nor were the associated lower leg or pelvic bones adjacent.

The skulls (Fig 123) were situated mainly on the west side of the entrance and passage and to the north and south-east of the chamber, hard against the orthostats. The most complete examples survived where they had been in a protected position on either side of the transverse orthostat 244 (Figs 106–7). One of these skulls, in the corner formed by orthostat 244 and the drystone revetment 426, overlay two right ilia, one of which matched a left ilium lying next to orthostat 18. Similarly, the grouping of bones in some locations, for example the concentration of longbones, skulls, and other bones in the centre of the north side of the chamber (Fig 112), stood out from the general scatter.

An overall contrast existed between the density of bones in the entrance and in all other zones (particularly the central eastern side of the entrance where the bones at the lowest level of the deposit formed a concentrated mass; Fig 108). This contrast resulted from a greater number of smaller skeletal parts occurring in the entrance in a less dispersed fashion; the remains of at least two individuals were present, in part relatively undisturbed. In general, the bone spread in the chamber gave the impression of a greater degree of disarticulation and dispersal than in the entrance. There was no definite indication from the chamber of any potentially intact inhumation that had subsequently been disturbed, whereas this was the situation in the south entrance (*see below*).

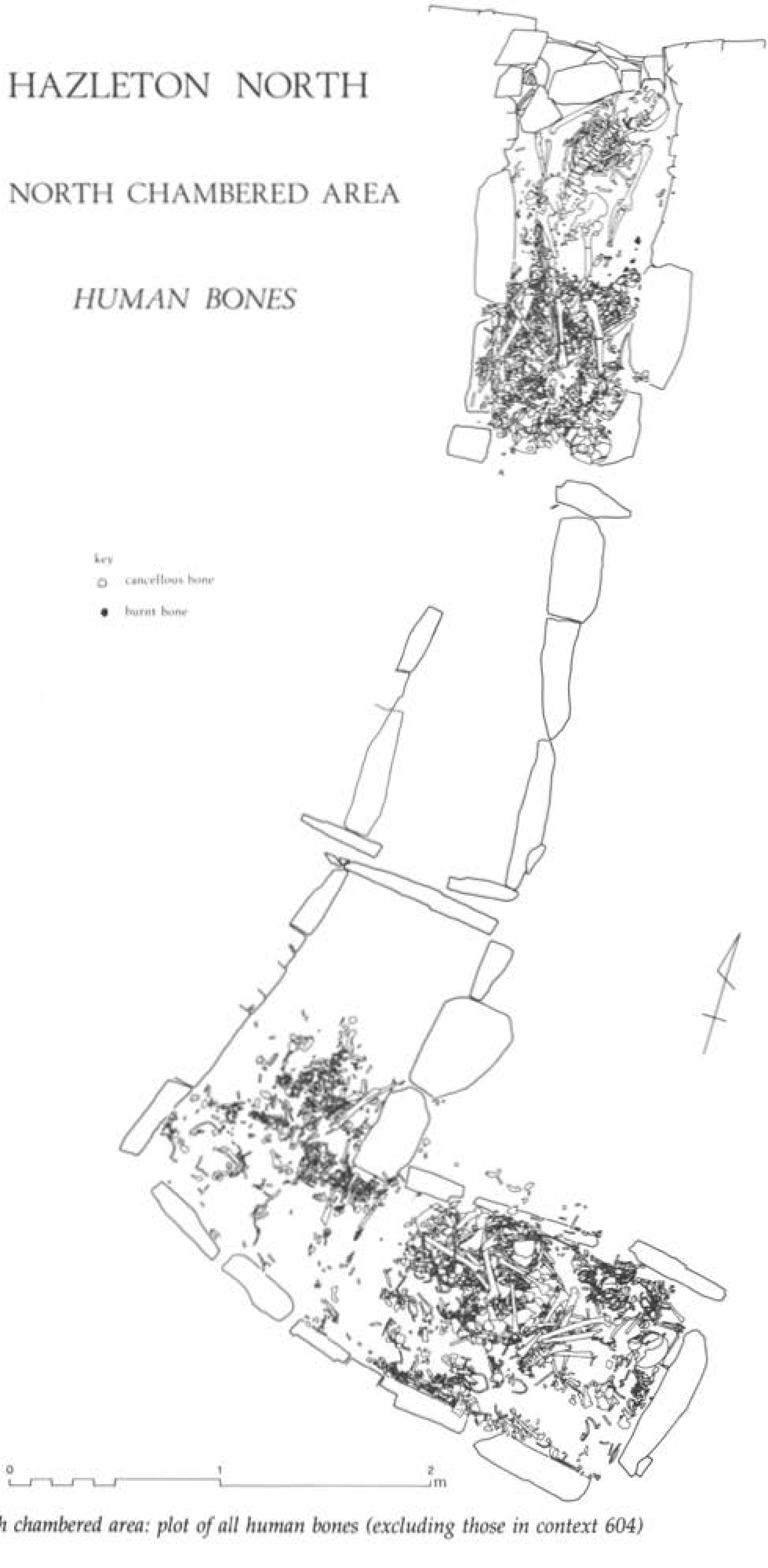


Fig 113 North chambered area: plot of all human bones (excluding those in context 604)

Fig 114 Burial deposits in the north chamber (excluding those in context 604)

Fig 115 Burial deposits in the north entrance

Fig 116 North entrance and passage: skeleton 1 fully exposed, but before the removal of passage infill 193, viewed from the north; scale in 0.1m divisions

Burial deposits in the north chambered area

Burials occurred only in the entrance and chamber (Fig 113). In the chamber, the human remains were sparse (Fig 114), composed mainly of small bones and fragments (except in the area beneath the fallen orthostat 342 and to a lesser extent in the north-east corner, beneath another large slab). The well-preserved deposit beneath 342, where the bones were largely free of stones or soil, gave the best indication of what the burial deposits had looked like without admixture from falling debris (Fig 102). This bone heap contained little visible articulation, apart from three thoracic vertebrae, three grouped left ribs (ribs and vertebrae 6068; arch drg 240), and a skull (5880; arch drg 251) with its mandible (5880; arch drg 254) in a correct, but slightly separated, juxtaposition. On the contrary, several of the longbones had a similar, roughly east–west orientation, as though deliberately placed in a bundle (for example, a fibula and femur, 6202–3, and two tibiae, 6100–1; arch drgs 240 and 246). Thus, the character of this heap was that of a placed deposit, reminiscent of the bone concentration on the central north side of the south chamber.

A juvenile cranium (5501; arch drg 225), lacking facial bones or teeth, lay against the face of orthostat 208, otherwise the picture in the north chamber was one of fortuitous alignments of small bones where they had fallen down cracks. The burials stopped approximately 0.8m short of the sillstone in an undisturbed area.

The small human bones found behind orthostat 342 could relate to entirely natural processes set in motion by the collapse of the orthostat, or they could be the result of post-depositional disturbance. Either way, they must have assumed their present position after the collapse of 342. (The few fragments of bone, including a tooth, behind orthostat 207 were not in a socket and were assumed to have percolated through gaps between 207 and its neighbours.) A single bone (8762; tibia fragment) was found on a projecting course of revetment 415, 160mm above the chamber floor.

Numerous bones also occurred higher up in the chamber fill in contexts 315 and 322, in situations of post-depositional disturbance (Fig 104). Several of the incomplete bones in these contexts had old breaks which joined with fragments from the chamber floor (*see above*).

In the north entrance, the burial deposits were of a different character again (Fig 115). This was most apparent in the presence of a virtually intact, extended inhumation, skeleton 1, fitted into the available space by arranging the lower legs and feet over the top of the collapsed orthostat 358, and by bending the upper body so that the head rested against the rear of the base of the entrance blocking wall (273, Figs 116–17, and 135). Due to the angle at which the right leg was placed, with the heel on the highest part of the northern edge of orthostat 358, the foot bones, other than the calcaneum, had eventually fallen downwards and to the north-west. Nor were the bones of the left foot found fully articulated, but were scattered on the sloping upper face of context 358. The left hand of skeleton 1 had been crushed and scattered by overlying stones. The broken portion of the lower radius was separated from the rest of the bone by a gap of 70mm and was correctly aligned, but in the wrong direction. The hand bones were further adrift, between and to the east of the knees. The right hand was positioned under the right pelvis, but the hand bones were scattered rather than articulated. The upper right side of the skull

Fig 117 North entrance: skeleton 1 fully exposed, viewed from the west; scale in 10 and 50mm divisions

Fig 118 North entrance: burial deposits removed except for skeleton 2, showing paving and collapsed orthostats, viewed from the north; scale in 10 and 50mm divisions

had been crushed by overlying stones (Figs 99 and 117), and the left scapula had largely decayed. Otherwise, the bones of this skeleton were basically still articulated and well preserved, although frequently cracked. Skeleton 1 was directly associated with one gravegood, a large flint core directly underlying the right elbow, and circumstantially associated with the quartzitic pebble hammerstone lying to the east of the left knee (Figs 115, 117, and 234).

At the northern end of the entrance, the upper body, pelvis, and upper legs of skeleton 1 directly overlay the paving (350 and 351). Few extraneous bones not associated with skeleton 1 were present in this zone (in contrast to the situation at the south end of the entrance, which was packed with bones; Figs 115 and 117). The lower legs of skeleton 1 overlay a mass of other bones, and this skeleton was thus stratigraphically late, if not last, in the burial sequence in the entrance. Probably contemporary with skeleton 1 was the placing of the two skulls immediately to the south of its left foot, overlying orthostat 358. The more northerly of the two skulls overlay the bones of the left foot of skeleton 1. Both skulls were in fragments but apparently complete, although they lacked associated mandibles.

Initially, the mass of bones at the south end of the entrance appeared completely disarticulated, but progressive removal showed the presence of the intact lower portion of a crouched inhumation (skeleton 2), lying on its left side (Figs 118–19 and 135). The knees were against orthostat 205, the feet tucked under the northern edge of collapsed orthostat 358, and the spine intact up to the ninth thoracic vertebra, some 90mm short of the southern edge of paving slab 350. The right pelvis was separated and underlay the south-west edge of orthostat 358. The lower arms (radii and ulnae) and hand bones were correctly associated and essentially articulated, the arms lying parallel with the spine immediately to the west. The hands lay at the base of the spine, but the left humerus was completely disarticulated, lying over the base of the spine, while the right humerus had been moved into an alignment parallel with the south edge of paving slab 350.

No other articulated bones were noted during excavation, except a right radius and ulna which were correctly juxtaposed and aligned, beneath the lower left leg of skeleton 1.

In addition to all the articulated and disarticulated bones, a scatter of burnt (cremated) bone fragments occurred in the entrance, mainly in the zone from the hips to just below the knees of skeleton 1. Some of the burnt fragments underlay bones belonging to skeleton 1, while none underlay the intact parts of skeleton 2, and an association appeared to exist between the deposition of the burnt bones and the extended inhumation.

Burning and burnt bones

The only evidence for the burning of any stones *in situ* in the south chambered area involved two packing stones at the base of orthostat 247 on the south side of the chamber. Only the upper surfaces of the two adjacent edges of these separate packing stones were reddened, obviously from exposure to heat *in situ*. There were no other traces of burning in association with the packing stones, which were overlaid by the burial deposits. This burning seems therefore to have been of a minor nature and was related to an early phase of the use of the chamber.

The distribution of burnt bones within the burial deposits is shown in Figure 120 and the bones separately tabulated (Table 50). Their occurrence was insignificant except in the north entrance, where the cremated remains of at least one adult and one pre-adult were scattered in the central part of the entrance (Fig 136). These cremations must have taken place outside the tomb.

The patch of burnt stones in the upper fill of the south end of disturbance 611 in the south passage comprised both blackened and reddened stones (*see above*). These could have resulted from burning *in situ*, but they were associated with later disturbance and had nothing to do with the primary use of the south chambered area for burials.

At the junction of the north entrance and passage, there was a small patch of blue-grey staining (*c* 70 × 60mm) on the surface of a slab forming part of paving 386 (Fig 79). This stain probably resulted from burning, although no charcoals, burnt soil, or burnt bone were present to suggest that any burning had occurred *in situ*, and the staining could have happened before the stone was used for paving.

Other evidence for burning was restricted to burnt stone and bone in the fills of the chambered areas. From the south side, burnt pieces of stone were most common in context 268 of the upper chamber fill, which contained at least 61 pieces, and in context 10 (number not recorded), with a further 13 pieces in context 9, three in context 287, and two in context 412 (Fig 97). The south passage infill contained three burnt stones in context 187 and a further three in context 323. On the north side, two burnt stones were recorded from context 209, two from context 322, and seven from context 336, all in the chamber; one from context 193 in the passage; and one from context 267 in the entrance. The majority of these burnt pieces, therefore, were associated with secondary and/or disturbed contexts and were introduced into the fills subsequent to the use of the monument for burial. At least 12 of the context 268 burnt pieces were of limestone similar to that of the coarse-grained orthostats.

The only definitely human burnt bones from the south side comprised a tooth from the passage and two parts of the same femur from the chamber and passage. The femur, represented by the femoral head only, was only charred, not calcined, and was probably not part of a cremation. Other pieces of burnt bone, recovered from sieving and therefore not plotted on Figure 120, were too small to identify.

Fig 119 North entrance: the articulated remains of skeleton 2, viewed from the west; scale in 10 and 50mm divisons

Artefacts and faunal remains from the burial deposits

The artefacts found in the same contexts as the human bones are summarised in Table 10. The only gravegoods definitely associated with an individual burial were the flint core and pebble hammerstone with skeleton 1 in the north entrance (Fig 234). However, the serrated-edge tool on a flake from a polished flint axehead (Fig 168: 98), found with a skull wedged between the bases of orthostats (Fig 109), was another possible association.

The only pottery from the burial deposits was a broken plain cup (Fig 157: 33). It was found scattered at the junction between the south passage and chamber (Fig 121). This cup was probably introduced into the chambered area as a personal gravegood accompanying a single burial, from which it subsequently became dissociated. Its dispersal probably resulted from later burial activity.

Similarly, the pebble grinder from the south passage (Figs 107 and 174: 4782) and the four bone beads from the south chamber and passage were probably personal gravegoods originally. Only one of the beads (Fig 177: 14879) was found *in situ* in the south chamber (adjacent to orthostat 318, Fig 122). The other three beads (Fig 177: 18445, 19761, 20698) were recovered from sieving, hence only their general contexts are known. The bead (18445) from the buried soil forming the chamber floor could be a pre-cairn object unrelated to the burial activity; however, absence of beads from any other locations suggests that it belonged to the burial deposits. The bone beads may have been worn at the time of death. The tiny stone bead (Fig 177: 18568, recovered from sieving) from the north entrance was presumably also a personal ornament.

With the flint artefacts, it is more difficult to decide whether they were gravegoods, whether accidentally introduced, or whether they were residual. In the case of the serrated-edge flake already mentioned, its proximity to the semi-buried skull and the unusual type of this implement suggested deliberate introduction. Such may also have been the case with the more substantial pieces (the core, serrated-edge flake, and edge-gloss flake from the south chamber, the edge-trimmed flake from the south entrance, and the edge-gloss flake from the north chamber), but this is an assumption, as is the possibility that the unretouched flakes were accidental or derived (Chapter 10). The arrowhead fragment (Fig 166, 25) from the north entrance could have been lodged within a body at the time of burial.

The burial deposits contained thousands of bones of small animals (Appendix 12), which resulted from natural animal activity possibly considerably postdating the burials. This is less likely with the bones of larger animals from these deposits (Table 84). In the south chambered area, the passage deposits contained four bones from the lower forelimb of a roe deer, while the chamber had bones from a perinatal sheep/goat, possibly the remains of a complete skeleton (Fig 205). Otherwise, the animal bones were apparently isolated examples, whose significance is obscure. Their concentration in the south chamber and passage matched that of the artefacts. In the north chamber, the animal bones were confined to the area of undisturbed human bones, both dog and cattle bone being included in the main concentration of human bones (Fig 114). These animal bones cannot be explained as later introductions associated with disturbance. Dog was not represented elsewhere in the Hazleton Neolithic fauna, whereas sheep, cattle, and pig were common.

With the possible exception of the above perinatal sheep/goat, the other bones represent only parts of animals. The roe deer bones articulate and suggest a joint (p211). Whether fleshed or skeletal parts should be envisaged for the other single bones is, however, problematic.

Table 10 Summary of artefacts from the burial deposits

Context	*Area*	*Flint*	*Stone*	*Pottery sherds*	*Bone beads*	*Stone bead*
11/354	S entrance	1	–	–	–	–
187/323	S passage	–	1	–	1	–
267	N entrance	4	1	–	–	1
323	S passage	7	–	4	1	–
336	N chamber	1	–	–	–	–
353/354	S entrance	1	–	–	–	–
354	S entrance	1	–	–	–	–
412	S chamber	4	–	3	–	–
435	N chamber	1	–	–	–	–
452/453	S chamber	1	–	–	–	–
453	S chamber	1	–	1	1	–
479/535	S chamber	–	–	–	1	–
Totals		22	2	8	4	1

Analysis of the human bone distributions

This involved plotting the distributions of particular skeletal parts (*see* Chapter 12), in order to consider the spatial aspects of the data available on sidedness, age, sex, pairing, and articulation. The larger, more distinctively shaped bones (the longbones, pelvic bones, skulls, and mandibles) were plotted naturalistically (eg Fig 122), while the smaller bones were plotted using symbols (eg Fig 124).

Some of the skeletal parts were then considered in more detail, particularly the longbones which were separately analysed in order to maximise the number of conjoins and pairs, before looking at the overall patterning within the burial deposits. Caution is needed when assessing the bone plots given here. Only the identifications and the conjoining, pairing, and articulating attributes of the longbones and the south-side tarsal bones were extensively double-checked. Any detailed re-analysis of the other

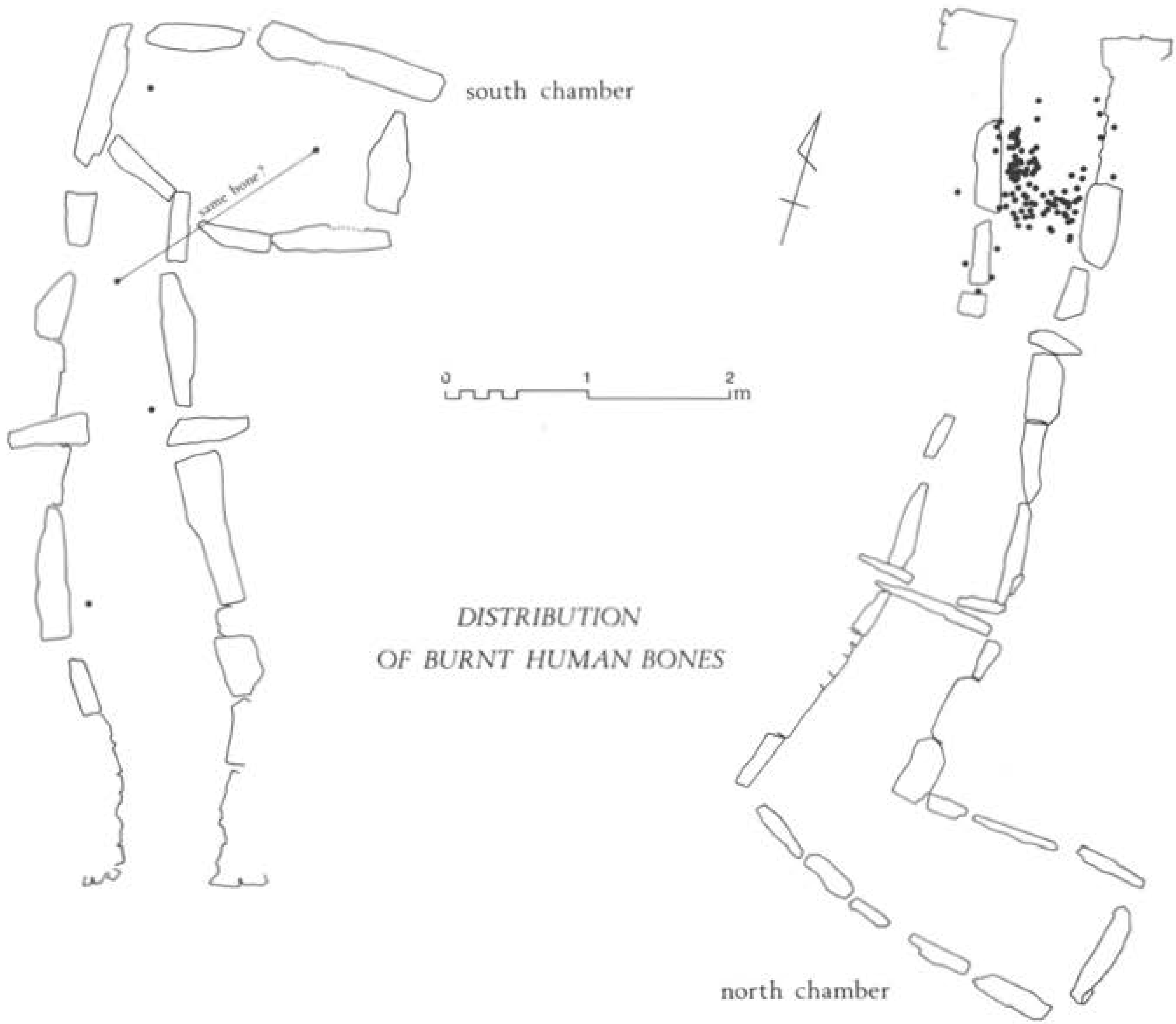


Fig 120 North and south chambered areas: distribution of burnt human bones

skeletal parts, especially the carpal bones, should not rely exclusively on these plots, but should involve examination of the actual bones.

Since there was absolutely no evidence that parts of the same individuals occurred in both chambered areas, the bone assemblages from the south and north sides are treated as entirely separate entities.

The south chambered area

Distribution plots are presented for longbones, skulls and mandibles, pelvic and sacral bones, hand and foot bones, atlas and axis vertebrae, patellae, clavicles, and scapulae (Figs 122–6). These plots should be used alongside the plans of all the bones (Figs 110–12). The distributions of the separate skeletal parts are in general consistent and complementary, both with themselves and with the overall bone distribution. Thus, none of the separate skeletal parts has such a restricted distribution as to be wholly absent from any zone or side of the chambered area, and, broadly speaking, the density of the distribution of each skeletal part reflects the general pattern of bone density. In this sense, none of the separate distributions appears particularly patterned, except for the skulls, which were predominantly grouped at the edges of the chambered area, although this may have been partly true for the pelvic bones as well.

There was no distinct pattern to the occurrence of the left and right examples of any skeletal part, these having an apparently arbitrary distribution. This emerges from all the plots, but was also specifically tested in the case of the tibiae and tarsal bones (Fig 131). There was a concentration of left-side tarsal bones in the north-west corner of the chamber and some cross-chamber patterning of left and right tarsals as the pairing data testify, but when the articulation data are considered as well, it is difficult to substantiate any deliberate structure to this element of the distribution.

Relatively few of the bones were identified as to sex, so patterning on this basis is difficult to explore, although the evidence from the skulls, pelvic bones, femora, and humeri (Tables 57–60) shows that, while male bones were distributed throughout the chambered area, females were only definitely present in the chamber and the passage (ie a pair each of femora and humeri

HAZLETON NORTH *ARTEFACTS ASSOCIATED WITH BURIAL DEPOSITS*

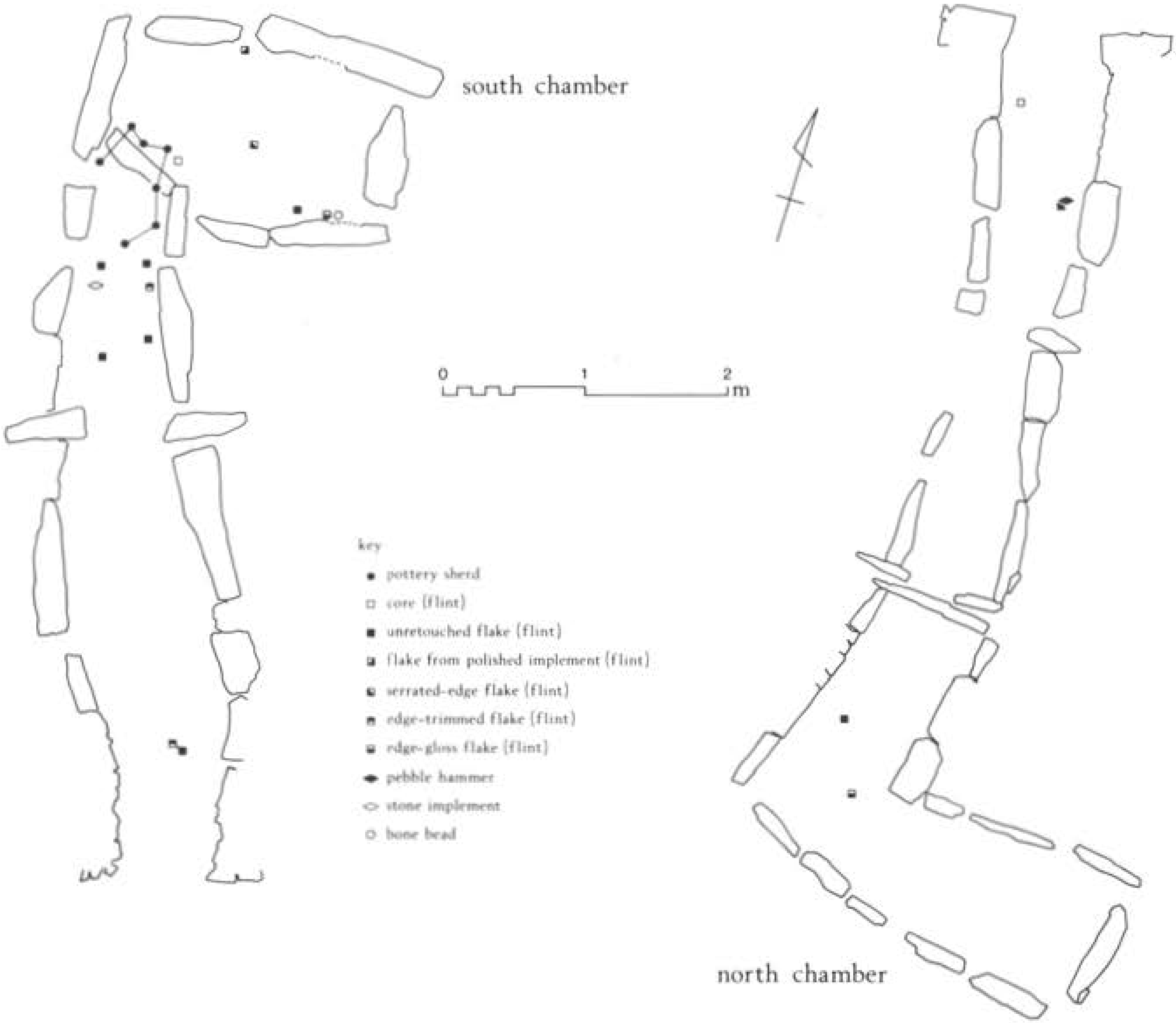


Fig 121 North and south chambered areas: distribution of artefacts associated with the burial deposits

from the chamber, two adult skulls from the chamber, and two pairs of ilia, both split between the chamber and the passage). Given the proportional infrequence of identified females to males at Hazleton (p188), however, it cannot be argued that this necessarily constitutes a significant pattern.

On the other hand, there does appear to be some structure within the burial deposits in terms of age. The longbones, clavicles, scapulae, axis and atlas vertebrae, and the hand and foot bones all indicate a tendency for pre-adult bones to be restricted to the chamber (and to a lesser extent the passage). Only a single infant femur, a fragmentary infant skull, and a complete juvenile skull from the entrance contradict this pattern. However, since it is the skulls which show the greatest potential for patterned distribution, the articulation of the juvenile skull from the entrance with a mandible from the chamber (Fig 123) is suggestive of this skull having been moved to the entrance from a previous location in the chamber. If so, the absence of pre-adult remains from the entrance would be further emphasised.

The information on pairs of bones is useful in at least two respects. First, it provides a means of investigating the existence of any patterning relevant to the skeletons of individuals. The distribution of paired bones points both to the occasional close grouping of paired bones, especially in the entrance, and to the considerable separation of other pairs. The separation does have distinct spatial limits, however, since the paired bones fall into two groups: those in the entrance and the area of the transverse slabs, and those in the chamber and passage (Fig 127). There were no apparent exceptions to this rule, except possibly in the case of a pair of juvenile femora, one of which came from the north side of the chamber, the other from just north of the transverse slabs. This rule was also true for the conjoining pieces of the same bones. The broken pieces of specific bones were normally found close together within the same zone of the chambered area, presumably indicating post-depositional breakage *in situ*. More widely separated conjoins, indicative of breakage and dispersal while the chambered area was in use, did occur, but only within the entrance or between the passage and chamber.

Second, the paired bones are of use in relating the general indications of minimum numbers of humans to actual individuals. To this end, special attention was given to the longbones. Table 11 gives the data behind the distributions shown on Figures 104 and 105. The interpretation of these data, insofar as the pairs are concerned, is reasonably straightforward. They indicate the presence of at least ten adults and four pre-adults (Table 12). The

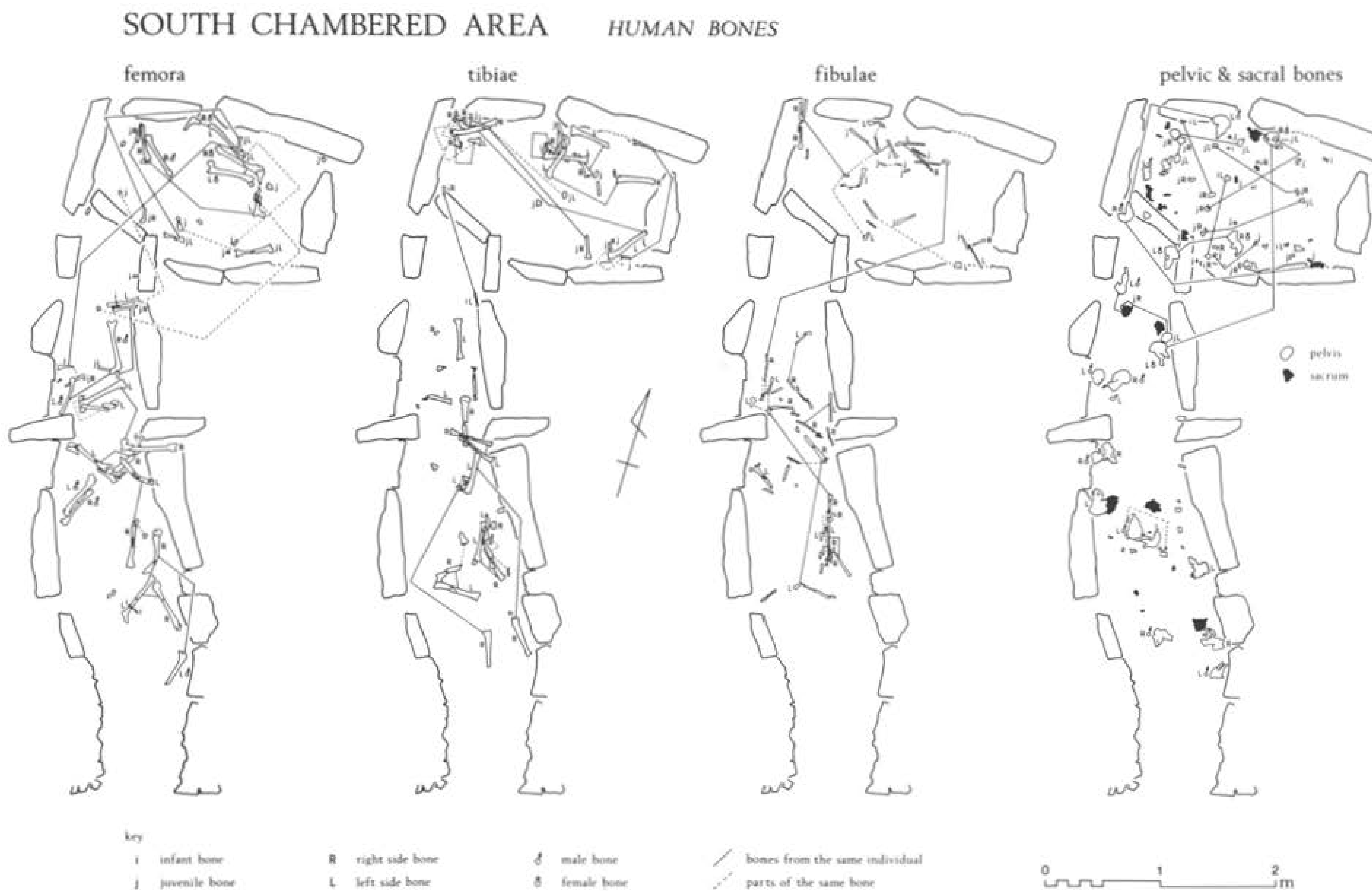


Fig 122 South chambered area: distribution of all identified leg, pelvic, and sacral bones, with information on conjoining fragments and pairs

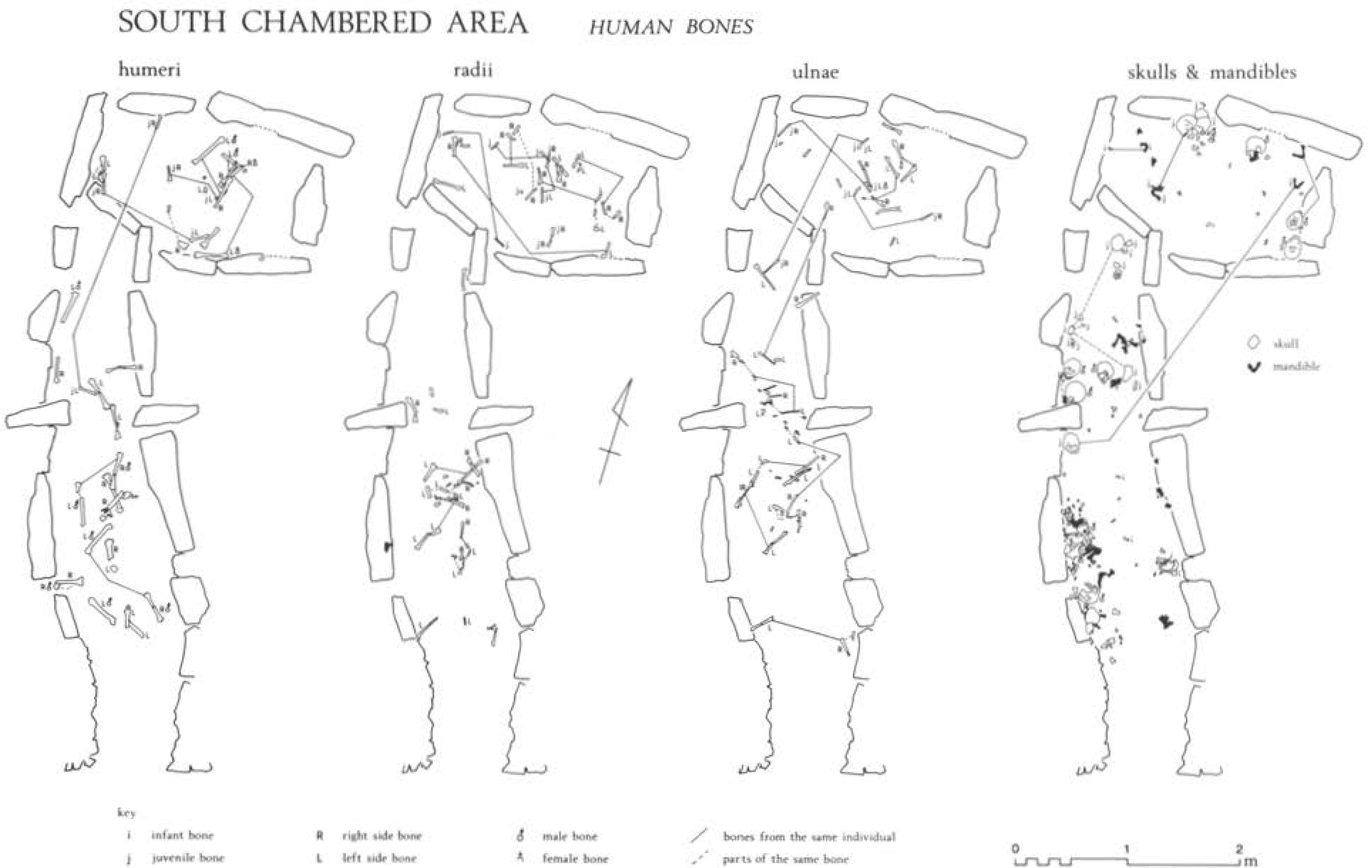


Fig 123 *South chambered area: distribution of all identified arm, skull, and mandible bones, with information on conjoining fragments and pairs*

Table 11 Human longbones from the south chambered area

	Entrance	*Passage*	*Chamber*	*Passage/ chamber*	*Entrance/ passage*
Humeri					
pairs: adult	2	–	3	–	–
pre-adult	–	–	2	1	–
singles: adult	4(L)4(R)	2(L)2(R)1(?)	2(L)2(R)	–	–
pre-adult	–	–	1(?)	–	–
Radii					
pairs: adult	3	–	5	–	–
pre-adult	–	–	3	–	–
singles: adult	3(L)3(R)	2(L)1(R)	1(L)1(R)	–	–
pre-adult	–	–	1(R)	–	–
Ulnae					
pairs: adult	5	1	2	1	–
pre-adult	–	–	2	1	–
singles: adult	1(L)	2(R)	3(L)1(R)	–	–
pre-adult	–	–	1(L)1(R)	–	–
Femora					
pairs: adult	5	1	3	–	1
pre-adult	–	1	2	1	–
singles: adult	–	2(L)	1(R)	–	–
pre-adult	1(?)	2(?)	1(L)	–	–
Tibiae					
pairs: adult	5	–	5	–	–
pre-adult	–	–	3	1	–
singles: adult	1(L)1(R)2(?)	1(L)1(?)	1(?)	–	–
pre-adult	–	–	1(?)	–	–
Fibulae					
pairs: adult	2	1	2	1	2
pre-adult	–	–	1	–	–
singles: adult	1(L)1(R)4(?)	1(R)1(?)	2(L)2(R)	–	–
pre-adult	–	–	7(?)	–	–

Table 12 Numbers of individuals based upon pairing longbones from the south chambered area

	Adult		*Infant/juvenile*	*Total*
	entrance/ passage	*chamber/ passage*	*all chamber/ passage*	*number of bones*
humeri	2	3	3	16
radii	3	5	3	22
ulnae	6	3	3	24
femora	7	3	4	28
tibiae	5	5	4	28
fibulae	4	4	1	18

Table 13 Minimum numbers of individuals based upon unpaired longbones from the south chambered area

	Adult		*Total*	*Infant/juvenile*		*Total*
	entrance/ passage	*passage/ chamber*	*number of bones*	*entrance/ passage*	*passage/ chamber*	*number of bones*
humeri	4	5	17	–	1	1
radii	3	3	11	–	1	1
ulnae	1	3	7	–	1	2
femora	–	2	3	1	1	4
tibiae	2	2	7	–	1	1
fibulae	3	3	12	–	4	7

Table 14 Total numbers of longbones from the south chambered area

	Adult				*Infant/juvenile*				*Grand*
	L	*R*	*?*	*total*	*L*	*R*	*?*	*total*	*totals*
humeri	13	13	1	27	3	3	1	7	34
radii	14	13	–	27	3	4	–	7	34
ulnae	13	12	–	25	4	4	–	8	33
femora	12	11	–	23	5	4	3	12	35
tibiae	13	11	3	27	4	4	1	9	36
fibulae	11	12	5	28	1	1	7	9	37

Table 15 Minimum numbers of individuals based upon both paired and unpaired longbones from the south chambered area

	Adult			*Infant/juvenile*		
	entrance/ passage	*passage/ chamber*	*Total*	*entrance/ passage*	*passage/ chamber*	*Total*
humeri	6	8	14	–	4	4
radii	6	8	14	–	4	4
ulnae	7	6	13	–	4	4
femora	7	5	12	1	5	6
tibiae	7	7	14	–	4	4
fibulae	7	7	14	–	5	5

pre-adults are all in the chamber/passage group, but the breakdown of the adult pairs between the chamber/passage and entrance groups is irregular. Thus, the femora suggest seven adults in the entrance, whereas the tibiae and radii suggest five adults in the chamber. If it were assumed that a rigid boundary existed between the two groups, then the minimum number of adults represented by the pairing longbones would be 12 rather than ten.

The data on single bones (the ones which could not be paired) are more difficult to interpret. First, there are numerous fragments of longbones, which could not be conjoined one to another or to any of the bones listed here and which therefore could represent further bones. Second, some bones, particularly pre-adult ones, could have become so fragmented as to have been unrecognisable or missed during the sorting process. Third, although the numbers of single bones included in Table 11 are considered to refer to separate bones, there is a slight possibility in the case of some of the shaft fragments, again particularly with pre-adult bones, that separate parts of the same shaft could have been counted twice. With these reservations, the minimum numbers given in Table 13 were estimated from the data in Table 11. When the numbers obtained from the singles are combined with those from the pairs, either in terms of the total numbers of bones (Table 14) or in terms of the minimum numbers of individuals (Table 15), there is a high degree of correlation for both adult and pre-adult bones.

The minimum numbers of individuals indicated by the different bones in these tables are closely comparable, suggesting 14 adults and six pre-adults. Some of the slight inconsistencies between the figures for different skeletal parts are resolved, if the individual bones are considered more closely. For example, the one unpaired adult right femur from the chamber (9993) was a particularly robust male bone, which had a matching pair of tibiae (8570 and 9612) from the chamber, yet had no comparison among the left femora. It is hard to imagine that the absent left femur could in this case have become so fragmentary as to have escaped recognition. Also, the two single adult femora from the passage (4833 and 7379) were both left; because of their size and character, neither could be the missing bone to pair with 9993, and there were no other adult femora or adult unsided shafts potentially to pair with them. This implies not only that the minimum total of adults based on femora is at least 13 rather than 12 as the figures might at face value suggest, but also that certain bones, in this case three adult femora, were absent from the deposits.

The minimum of 14 adult individuals suggested by this analysis is matched by that given on p183 on the basis of various other skeletal parts. All the available evidence points towards an equation between the number of individuals and the number of complete bodies originally present. The adult patellae are particularly instructive in this regard (Figs 126 and 233), since no fewer than 24 of these could be grouped into pairs, four in the entrance, six in the chamber, and two between the chamber and passage. Apart from the paired patellae, there were two single left examples and one fragmentary right, all from the entrance, representing a further two individuals and therefore a total of 14 adults altogether. Theoretically, the skulls might be expected to give the clearest indication of the numbers of individuals present, but in practice there were a large number of very fragmentary skull pieces which proved difficult to relate to particular skulls, making the calculation of skull numbers very inexact. Nevertheless, even the most cautious estimate of the number of separate skulls represented by the pieces plotted on Figure 123 gives a minimum total of 15 individuals (Table 16).

The minimum number of six pre-adults from the analysis of the longbones was only definitely indicated by the femora, in which

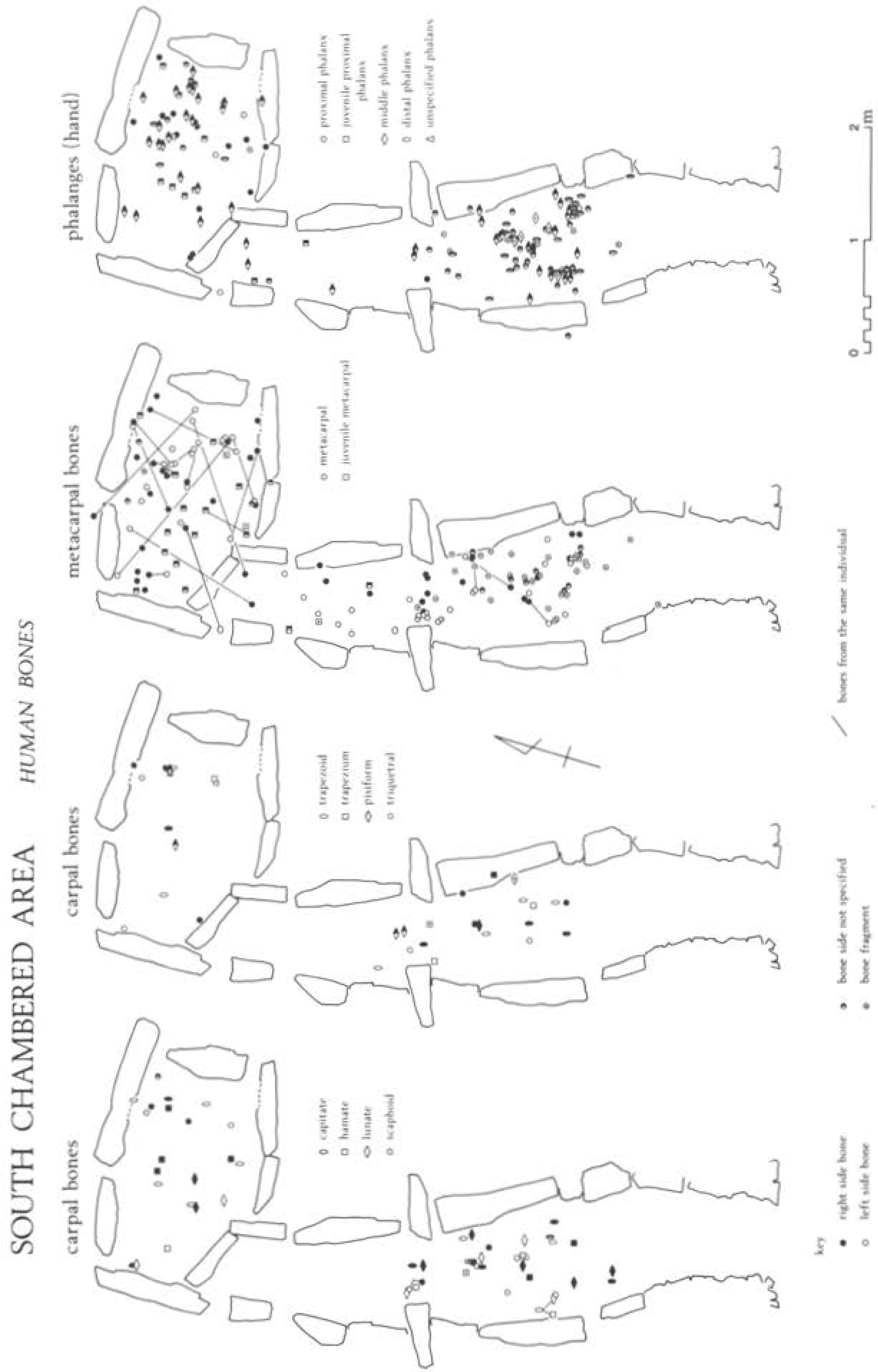


Fig 124 South chambered area: distribution of all identified and plotted hand bones, with information on pairs

SOUTH CHAMBERED AREA *HUMAN BONES*

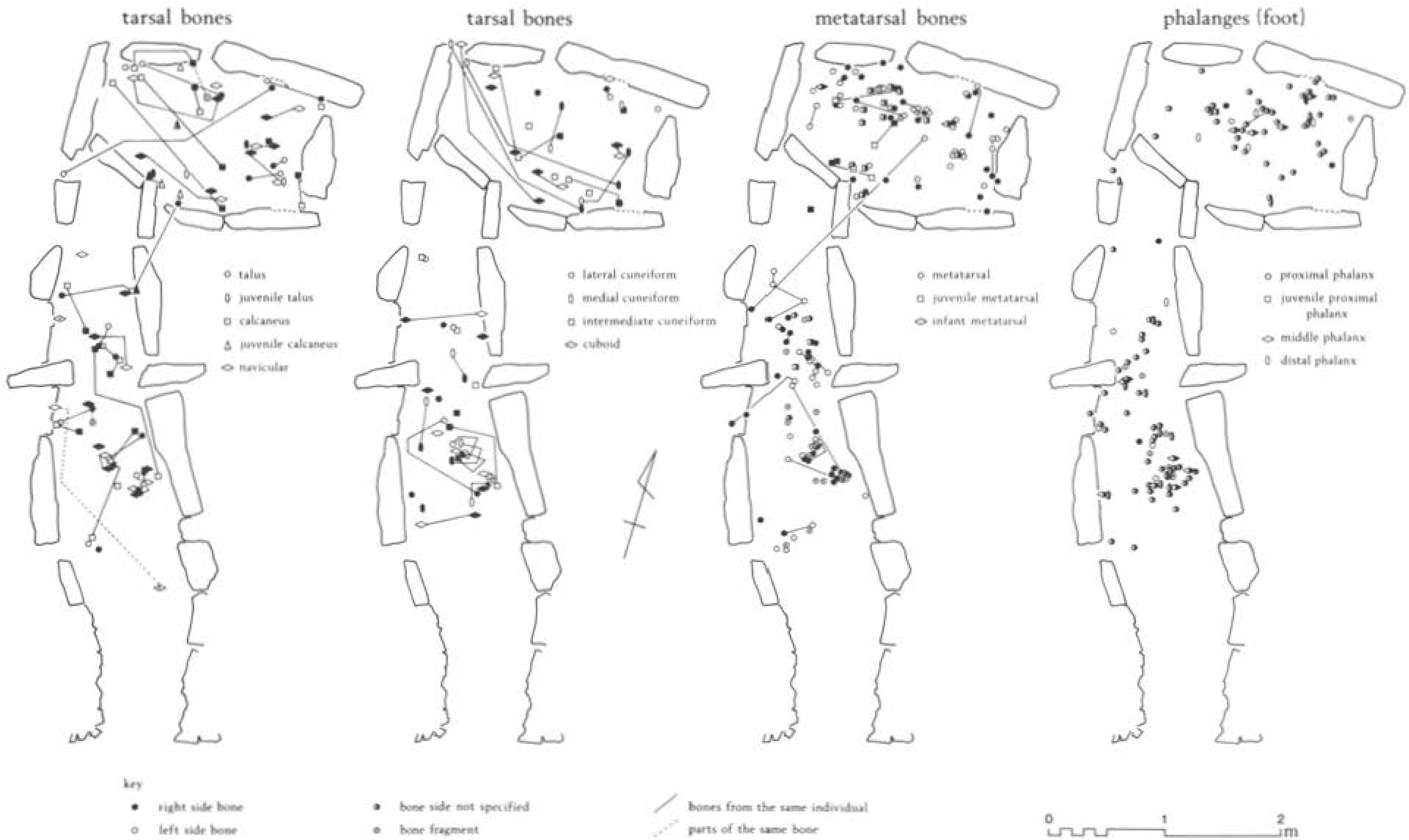


Fig 125 South chambered area: distribution of all identified and plotted foot bones, with information on conjoining fragments and pairs

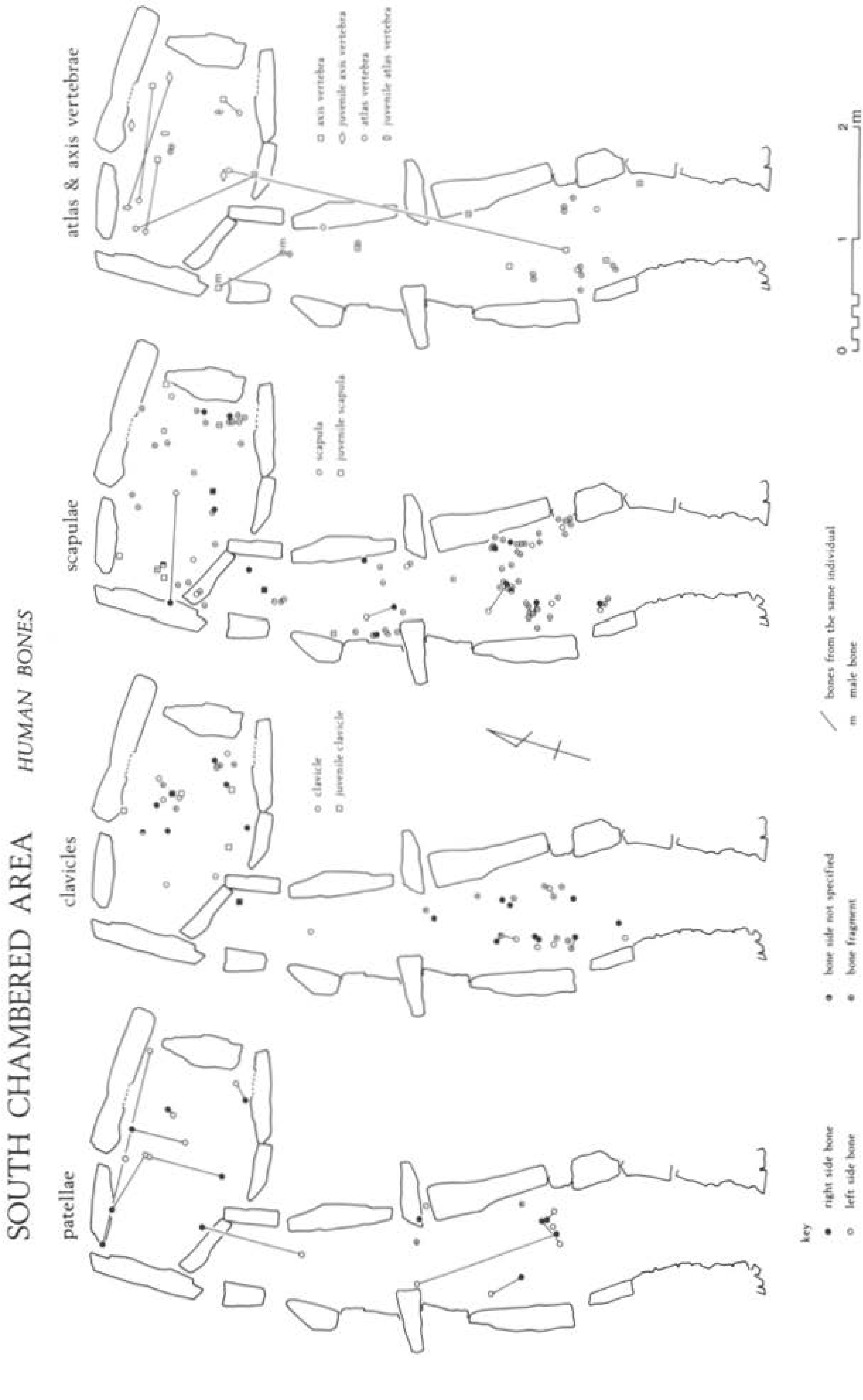


Fig 126 South chambered area: distribution of all identified patellae, clavicles, scapulae, and axis and atlas vertebrae, with information on pairs

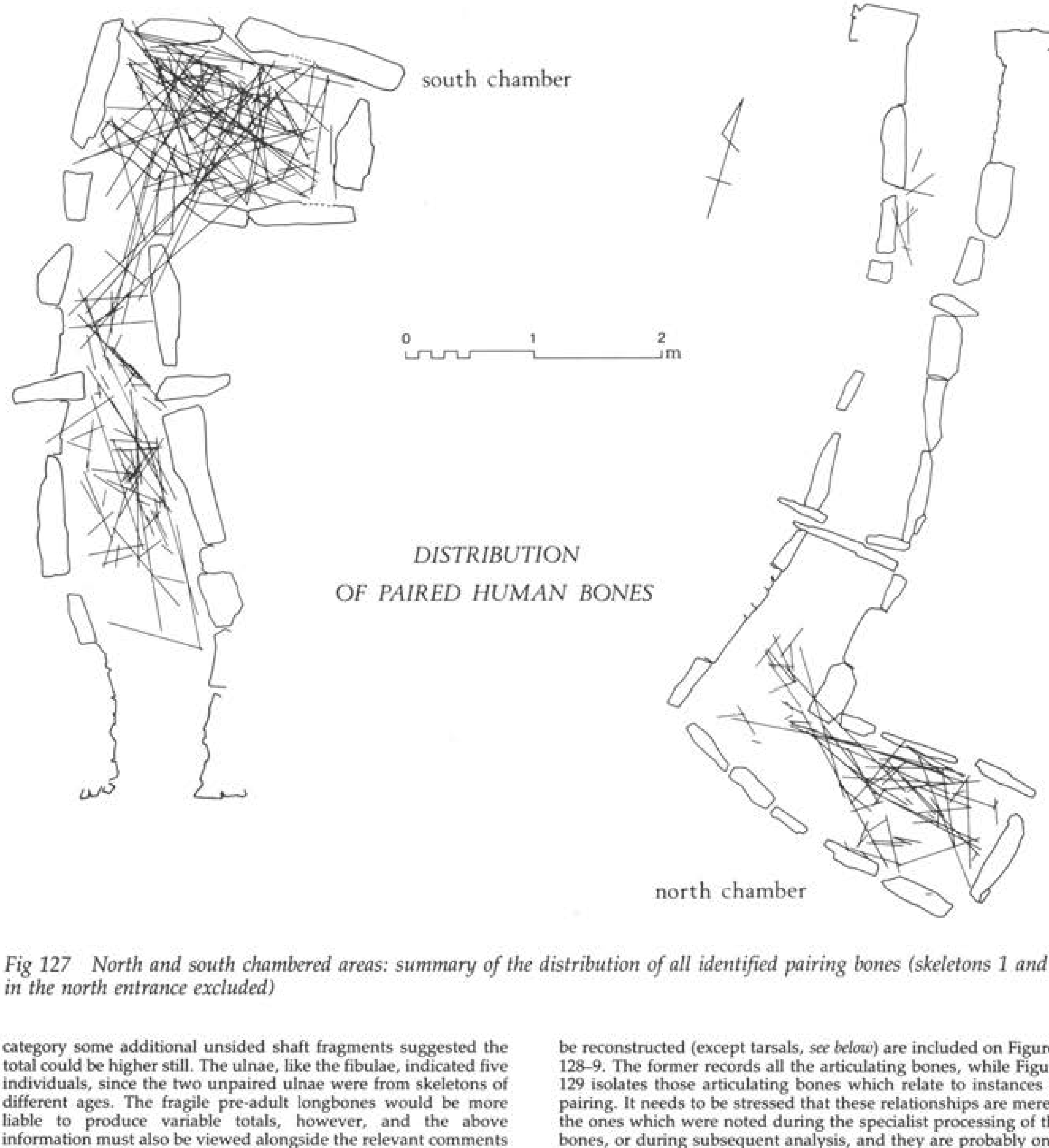


Fig 127 North and south chambered areas: summary of the distribution of all identified pairing bones (skeletons 1 and 2 in the north entrance excluded)

category some additional unsided shaft fragments suggested the total could be higher still. The ulnae, like the fibulae, indicated five individuals, since the two unpaired ulnae were from skeletons of different ages. The fragile pre-adult longbones would be more liable to produce variable totals, however, and the above information must also be viewed alongside the relevant comments by Dr Rogers (p183); she calculates a possible minimum of 11 pre-adults on the basis of other criteria, apart from the possible presence of a foetus in the south chamber on the basis of a single sphenoid bone.

The pairing information can be supplemented by information on former articulation, in those relatively few cases where it was possible to identify positively matching bones because of pointers given by general condition, size, and idiosyncracies, and by scrutiny of the articulating surfaces. Special attention was again paid to the longbones, but all instances of articulation which can

Table 16 Identifiably separate skulls from the south chambered area

	Entrance	*Passage*	*Chamber*	*Totals*
adult	4	3	3	10
pre-adult	1	1	3	5
Totals	5	4	6	15

be reconstructed (except tarsals, *see below*) are included on Figures 128–9. The former records all the articulating bones, while Figure 129 isolates those articulating bones which relate to instances of pairing. It needs to be stressed that these relationships are merely the ones which were noted during the specialist processing of the bones, or during subsequent analysis, and they are probably only a small proportion of the articulating relationships actually present. No specific project to isolate all the potential articulations was attempted.

In general, the pattern of articulating relationships echoed that of the pairs, with mainly close-grouped articulations in the entrance and more widely dispersed articulating bones in the chamber. Two exceptions were the juvenile skull from the entrance, which belonged with a mandible in the chamber, and an axis vertebra from the entrance, which articulated with an atlas vertebra in the chamber. Both of these articulations were separated by over 3m, and demonstrate, on the one hand, a link between the entrance and the chamber and, on the other, the rarity of its occurrence. The only articulating link between the chamber and the passage was between a cervical vertebra in the former and an axis vertebra in the latter. The distribution of the bones which include articulations and pairs highlights the difficulties of attempting to define individuals within a mass of largely disarticulated bones. There is some evidence from the entrance for parts of at least two individuals which have not become too widely

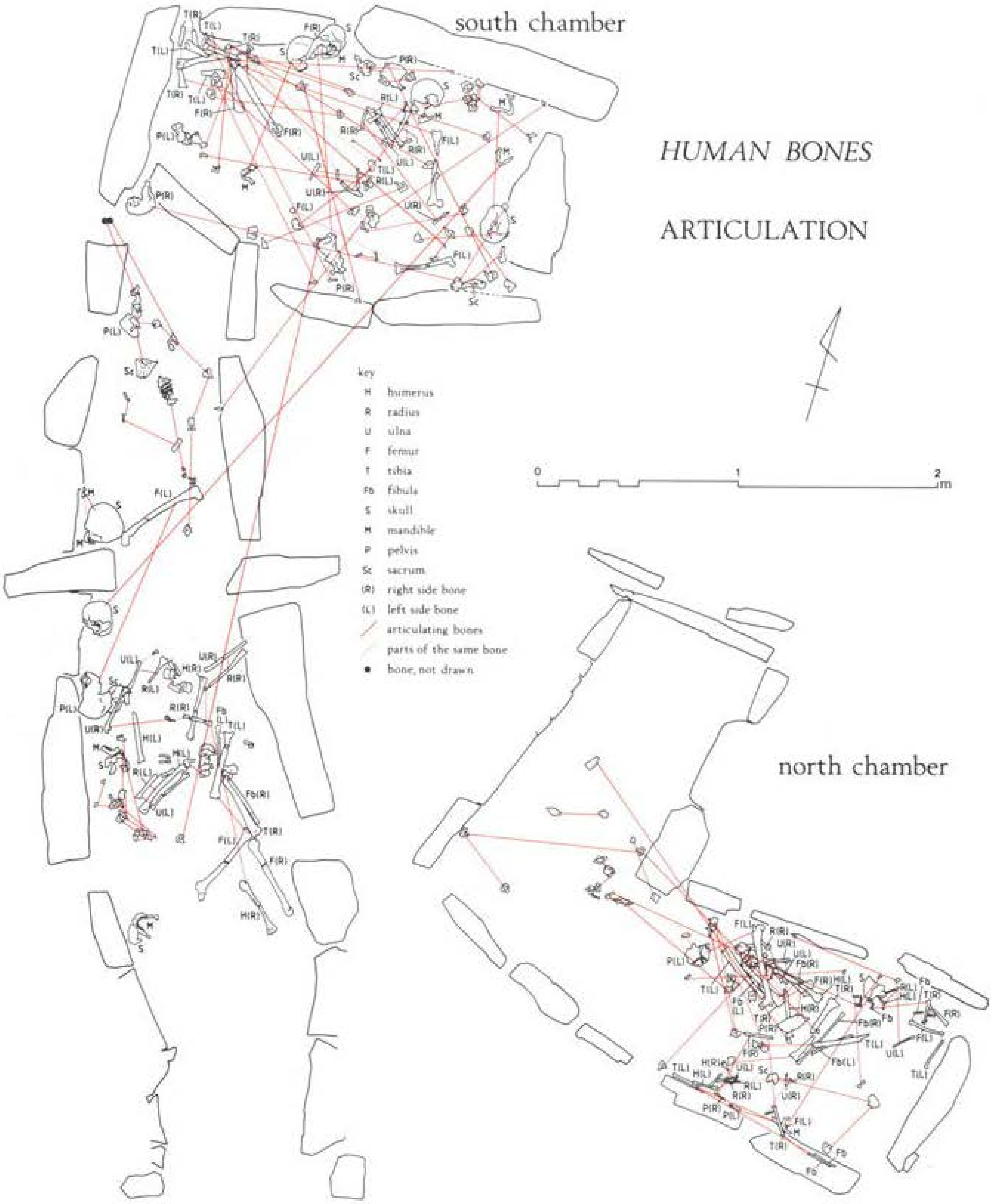


Fig 128 South chambered area and north chamber: distribution of all skeletal parts (excluding tarsal bones), which were articulated or identified as formerly articulating

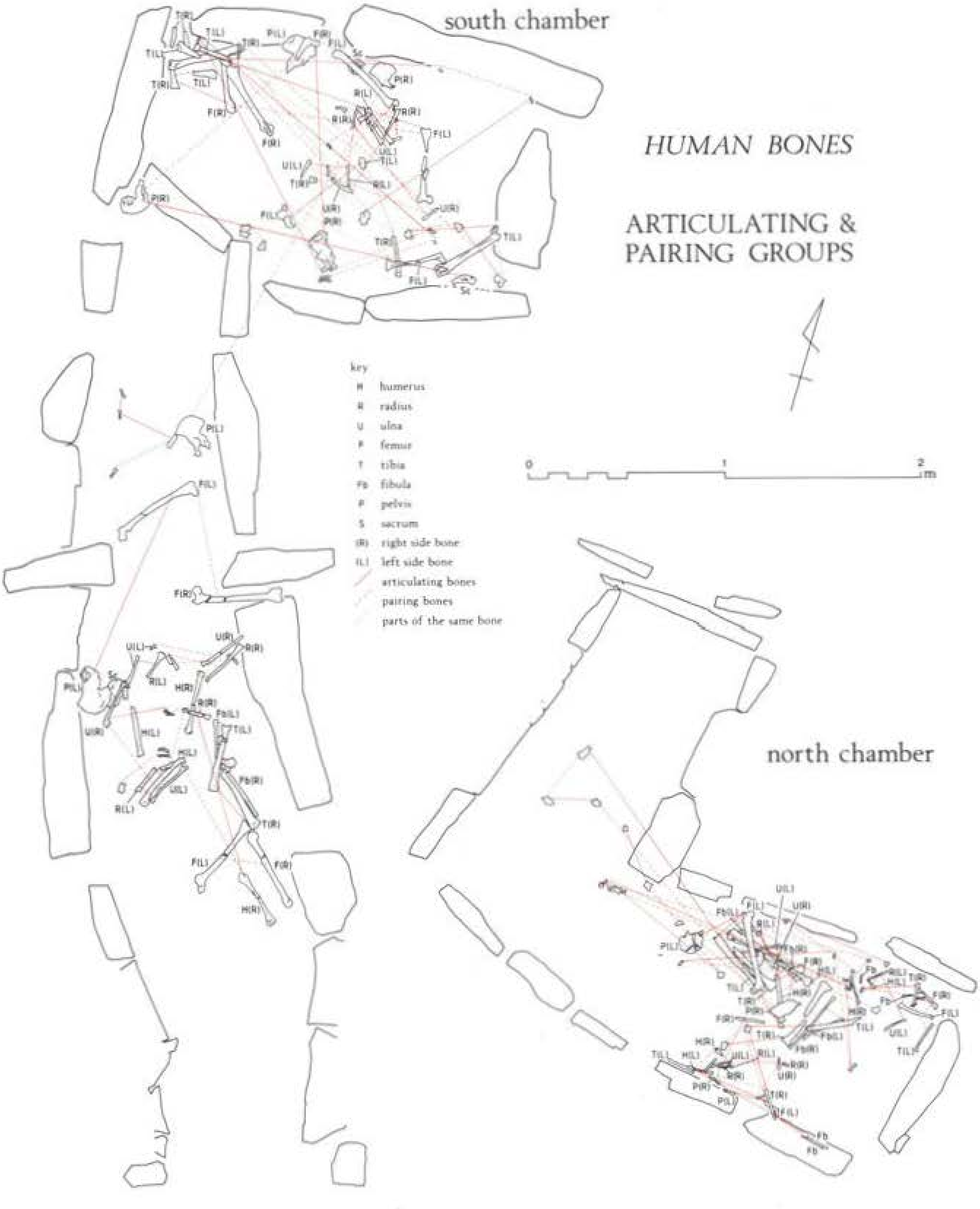


Fig 129 South chambered area and north chamber: distribution of all skeletal parts (excluding tarsal bones), which were articulated or identified as formerly articulating and which had recognised pairing bones

dispersed, but the picture in the chamber is one of widespread dislocation.

In the southern part of the entrance deposits, a group of two femora, two tibiae, two fibulae, two calcanei, and two tali paired and articulated and could be linked with a group of foot bones concentrated in the same area. To the west of this group, and somewhat more scattered, were two femora, two radii, and two ulnae which paired and articulated, and which could perhaps be associated with the concentration of hand bones in that area. Further north in the entrance was another group of two femora, two radii, and two ulnae, which paired and articulated. In the latter case, the character of these bones (*see* p185) suggested association with a group of paired femora at the entrance/passage junction, which articulated with a left pelvis and sacrum in the entrance and with a pair of clavicles also from the entrance. This cluster of associated bones implied the former presence of a separate adult (?male) skeleton in this position (individual D: Fig 130), while the other two clusters also hint at formerly intact inhumations in the entrance.

The chamber articulations included in the central chamber a group of two ulnae and two radii, which paired and articulated, and another group of the same bones belonging to a child (about three years old). In the north-west corner of the chamber were a pair of tibiae with an articulating femur and the other paired femur across towards the east side of the chamber. In the same corner were a pair of tibiae with a single articulating femur, the pair of which was not present in the assemblage. A female right hip bone on the south side of the chamber had an articulating femur and its pair on the north side of the chamber, and a right hip bone found on top of the sillstone articulated with a sacrum from the south-east corner, while the pairing left hip bone lay against the north side of the chamber. These and other articulations provide a distributional match for the pairing evidence from the chamber, indicating the presence in scattered form of parts at least of individual skeletons. In addition, a pair of widely-separated tibiae in the south chamber could be matched with a single femur and a mandible, with a pair of ilia from the passage, and with a skull from the south entrance as all belonging to a distinctive juvenile (p185), designated individual E (Fig 130).

The question of patterning within the distribution was considered further by a more detailed analysis of the tarsal bones (Fig 131). These were selected because they are robust bones, the adult examples of which were likely to be well-represented by complete examples, because they are distinctive bones with a high identification ratio, and because they include a clear-cut articulation between the talus and calcaneum. Behind this selection was the desire to investigate the possibility that appendage bones, if among the first bones to become disarticulated during post-burial decay, might have a distinct effect on the overall distribution. The metatarsals and phalanges might actually be better suited to such a case-study, since they would almost certainly become disarticulated before the tarsals, but they are very numerous, less reliably identified, and many came from sieving and could not be plotted. The tarsals were chosen in preference to the carpals, since a higher proportion of the latter were recovered by sieving.

The analysis of the tarsals provided detailed confirmation of the trends already postulated from the longbone and other plots and conclusively demonstrated the disrupted, dispersed pattern of disarticulation in the chamber compared with the more compact occurrence in the entrance, where at least one pair of virtually *in situ* sets of foot bones was involved. The plots do not suggest any overall concentration of foot bones in any particular zone, however, but rather that their presence was proportional to the distribution of all the other skeletal elements represented.

Table 17 lists the data on the occurrence and pairing of the tarsal bones. Only the tali and calcanei were available in sufficient numbers to contribute towards a minimum numbers analysis. The paired and unpaired totals indicate five pre-adults (calcanei) and 14 (or 15?) adults (tali). A total of 23 articulations could be established between tali and calcanei, relating to 14 separate individuals (12 adult, 2 pre-adult). These articulations were, like the pairings, mostly within their respective zones, except for a single instance linking the chamber and the passage. Similarly, of the 19 instances of articulation established between various cuneiforms (all adult), all but 2 were within their own zones. The exceptions were both between chamber and passage, but only one of these could be plotted on Figure 131, because the other involved a bone recovered from sieving. Only one positive instance of articulation between a talus and a tibia was established, in the entrance, but the general distribution of the tarsal bones compared with the tibiae suggested that *in situ* articulation can only be postulated in perhaps three instances, all in the entrance and entrance/passage zone.

Table 17 Tarsal bones from the south chambered area

		Adult			*Pre-adult*	
		entrance/ passage	*passage/ chamber*	*Total bones*	*passage/ chamber*	*Total bones*
calcanei	pairs	6	7		3	
	singles	–	–	26	1(L),1(?)	8
tali	pairs	5	8		1	
	singles	–	1(L),1(R)	28	1(L),1(R)	4
cuboids	pairs	2	5		–	
	singles	2(L),1(R)	2(L),2(R)	21	1(L)	1
naviculars	pairs	2	5		–	
	singles	3(L),4(R)	2(L),2(R)	25	–	–
medial cuneiforms	pairs	4	4		1	
	singles	2(R)	–	18	–	2
intermediate cuneiforms	pairs	3	2		–	
	singles	2(L)	6(L),3(R)	21	–	–
lateral cuneiforms	pairs	2	1		1	
	singles	2(R)	4(L),4(R)	16	–	2

Note: Adult totals for the smaller tarsal bones may include some pre-adult examples. Lower totals for the smaller tarsal bones reflect their greater propensity to decay/fragment and escape recovery, as well as their lesser chance of identification during analysis.

The north chambered area

On the north side, the analysis of the human bone distributions proceeded separately for the north chamber and the north entrance. For the north chamber, similar plots to those given for the whole of the south chambered area were prepared (Figs 132–4), whereas for the north entrance it was possible to be more specific about the burials involved, requiring more detailed plans showing all the actual bones (Figs 135–6).

The north chamber

As a consequence of the disturbance in the north chamber (Fig 114), all categories of bones were concentrated where the original deposits were intact, beneath fallen orthostat 342 and the area to the east (Figs 132–4). The bone plots, however, do show a number of instances of close-set pairing within the area of intact deposits, suggestive of deliberate placement of bones after complete, or partial, decomposition. There is also at least one pairing (metatarsals) between the intact deposit and the area to the west of orthostat 207 to attest the former degree of disarticulations. This is borne out by those bones which articulate (Figs 128–9), including another couple of links between the two areas just mentioned and also two cross-chamber links between bones in the intact deposit beneath 342 and those in gaps between paving and orthostats on the south side of the chamber.

The distributions also indicate the extensive occurrence within the chamber of pre-adult bones, which were present wherever there were bones. The information on sex (p187) indicated the presence of two adult females (femora) and two adult males (skulls). The minimum numbers of individuals suggested by the specialist analysis (p183) were four adults and four to six pre-adults (the

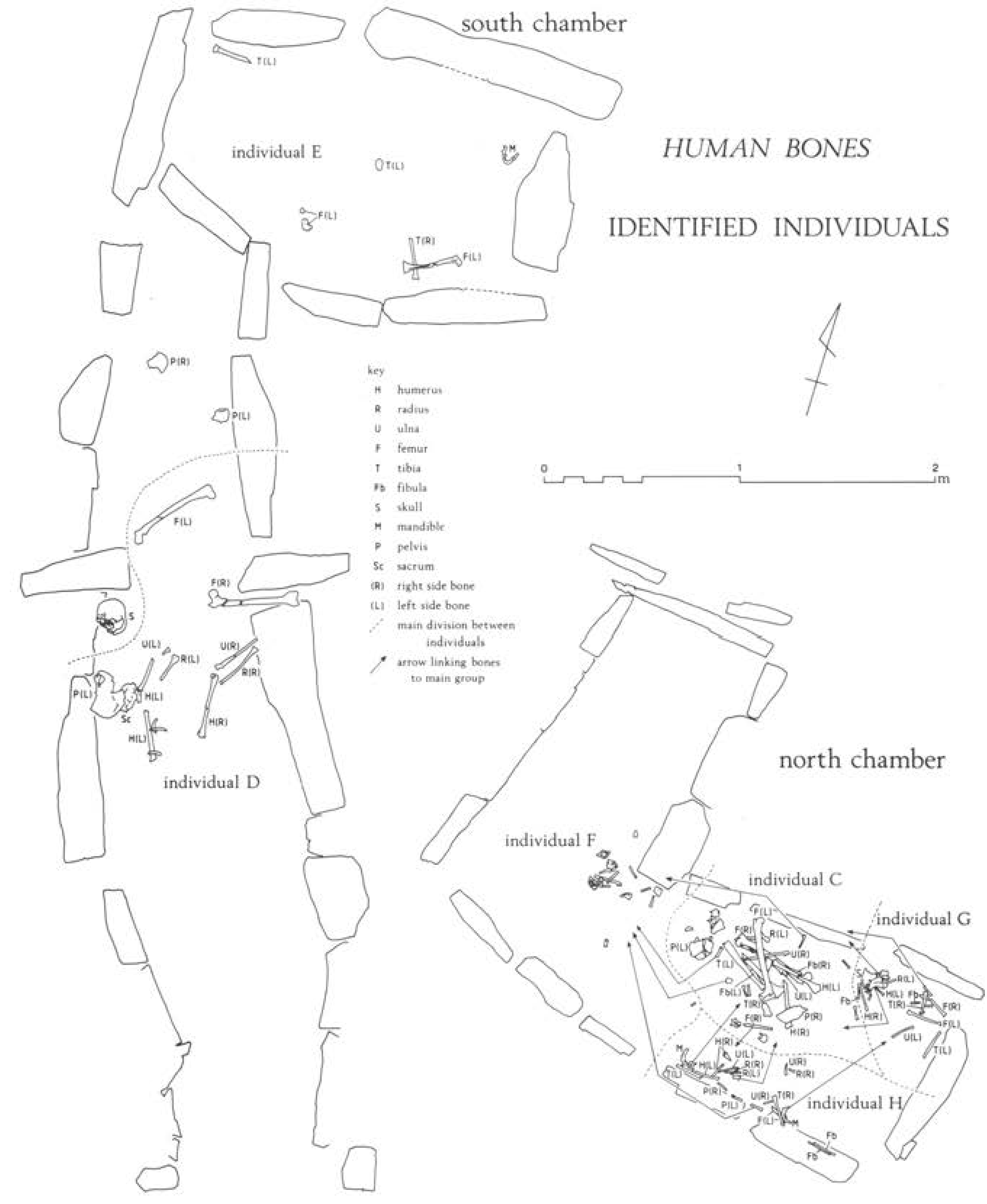


Fig 130 South chambered area and north chamber: distribution of bones belonging to identified individuals

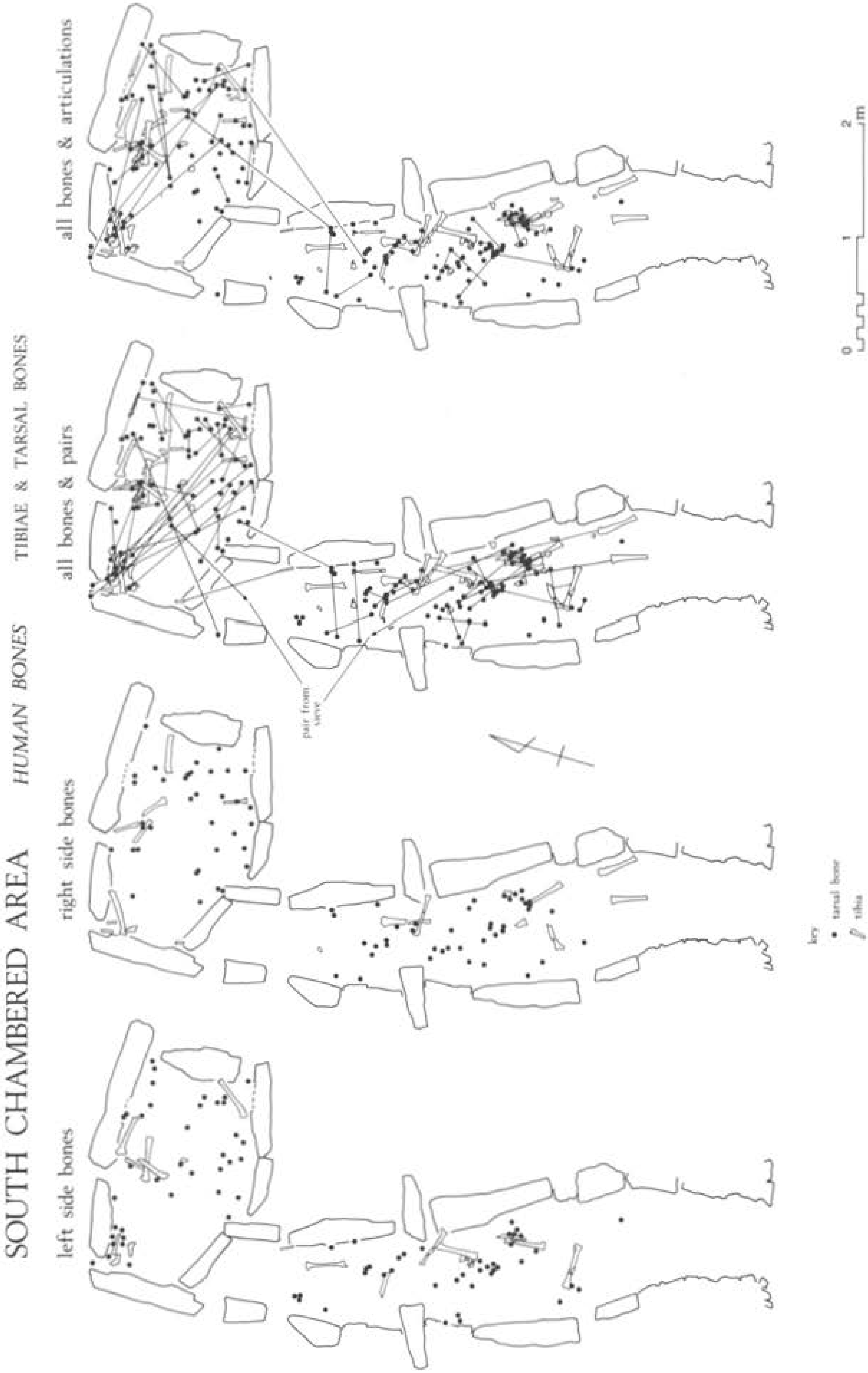


Fig 131 South chambered area: distribution of all identified tibiae and tarsal bones, subdivided into the bones from the left and right sides of the skeleton and showing information on pairs and former articulations

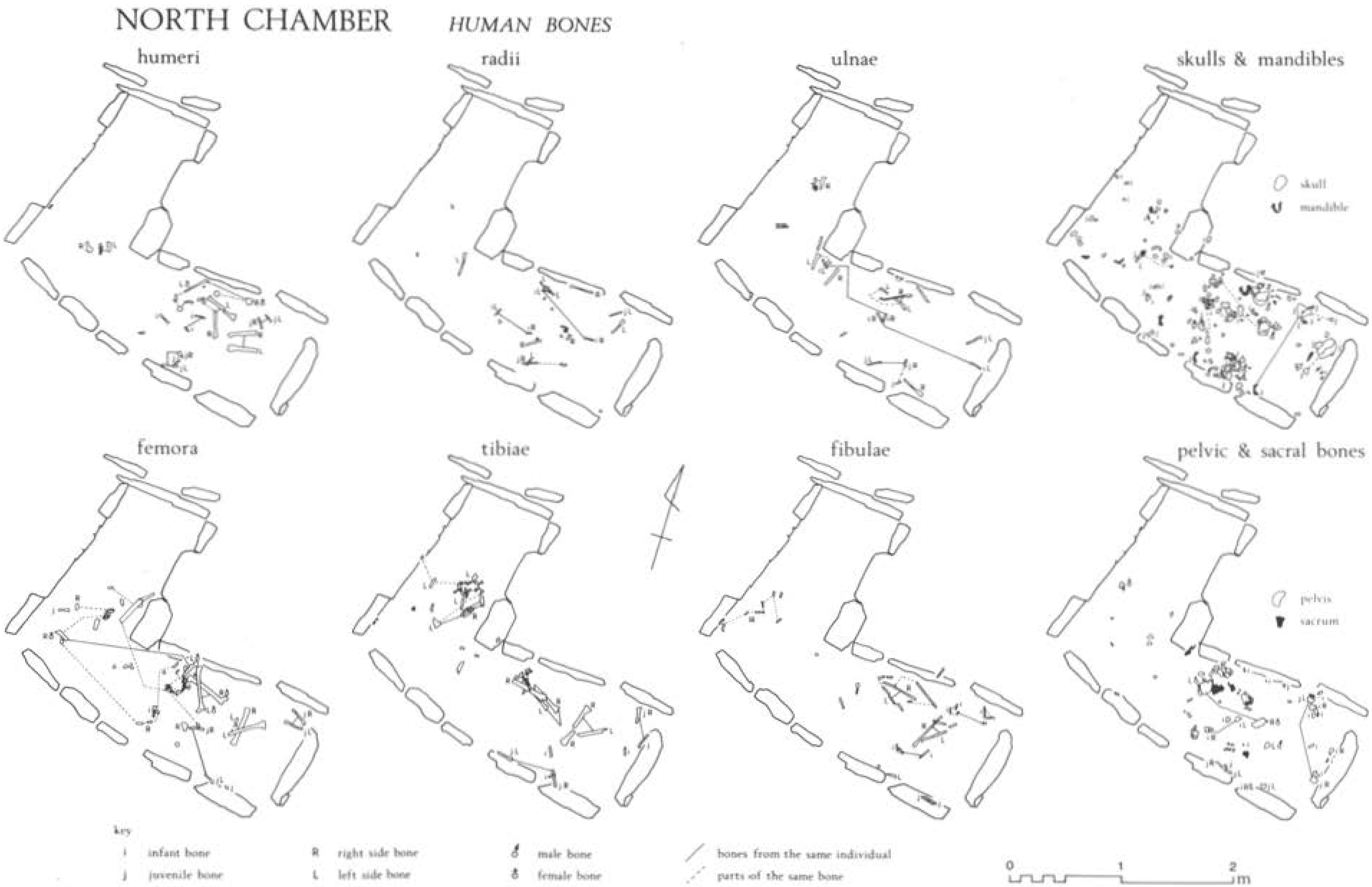


Fig 132 North chamber: distribution of all identified leg, arm, pelvic, sacral, skull, and mandible bones, with information on pairs and conjoining fragments

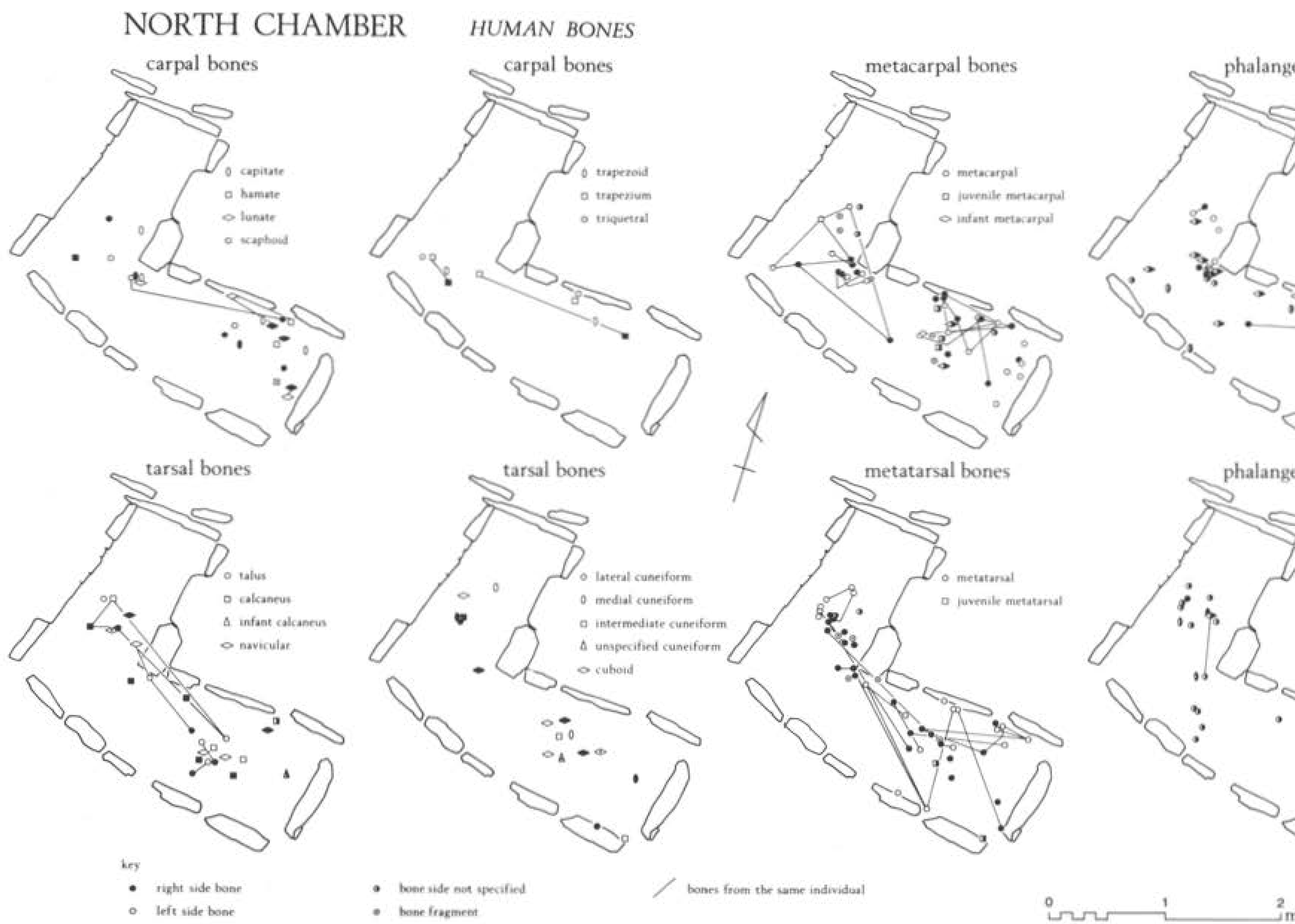


Fig 133 North chamber: distribution of all identified and plotted hand and foot bones, with information on pairs

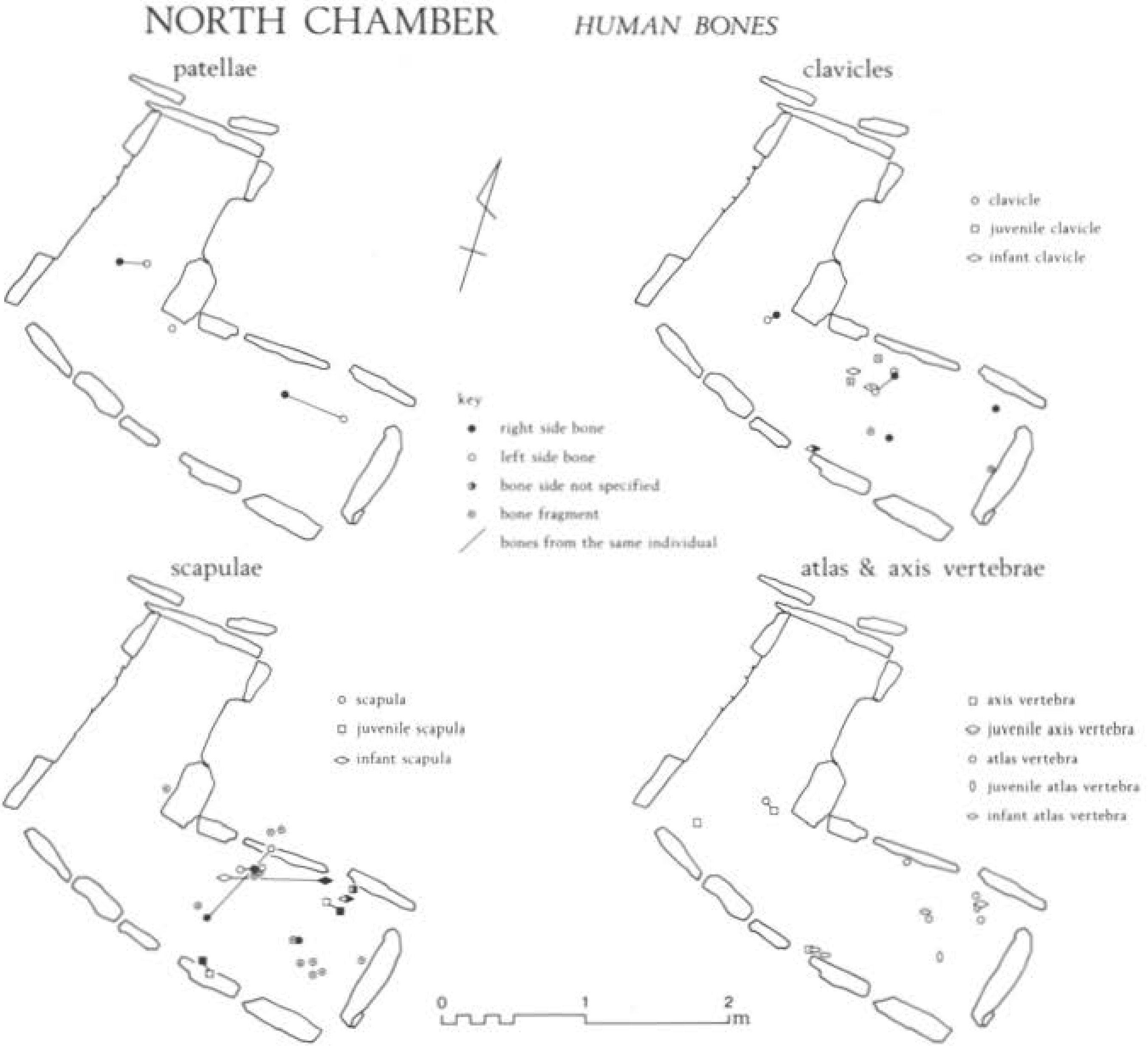


Fig 134 North chamber: distribution of all identified patellae, clavicles, scapulae, and atlas and axis vertebrae, with information on pairs

maximum on the basis of differential diaphyseal lengths of longbones). These figures can be compared with those obtained from a detailed conjoining and pairing analysis of the longbones (Table 18). The longbone data consistently indicated the presence of four adults and four pre-adults. There were also four adult skulls, albeit fragmentary, and at least two pre-adult skulls in the chamber assemblage, although only five patellae were identified. Two foetal bones also occurred, possibly from the same four- to five-month-old foetus, in the area south of the sillstone (Fig 114).

Since the overall total of individuals represented was very low, some success was achieved in isolating the bones belonging to separate skeletons (Fig 130). Chapter 12 describes the details of individual C, a young adult female whose identifiable bones were almost all grouped within the heap protected by the fallen orthostat, and individual F, an unsexed young adult. Further analysis suggested two other individuals, G and H (Appendix 10). Individual G was probably a three- to four-year-old child confined mainly to the north-east corner of the chamber. Individual H was probably a two- to three-year-old child located mainly on the south side of the chamber.

These groupings of probable individuals are extremely interesting in suggesting the existence of separate burials in separate zones. The implication from these groupings (especially those protected by orthostat 342 and the adjacent slab) is that the bones of individuals were kept more or less together in separate

Table 18 Human longbones from the north chamber

	Adult			*Total*	*Pre-adult*			*Total*
	L	*R*	*?*	*no*	*L*	*R*	*?*	*no*
humeri: paired bones	3	3	–		4	4	–	
singles	1	1	–	8	–	–	–	8
radii: paired bones	1	1	–		3	3	–	
singles	3	3	–	8	1	–	–	7
ulnae: paired bones	1	1	–		3	3	–	
singles	3	3	–	8	–	–	1	7
femora: paired bones	3	3	–		2	2	–	
singles	1	1	–	8	1*	–	1*	6
tibiae: paired bones	3	3	–		2	2	–	
singles	–	1	1	8	–	–	3	7
fibulae: paired bones	3	3	–		3	3	–	
singles	1	1	–	8	–	–	1	7

Note: *not a pair.

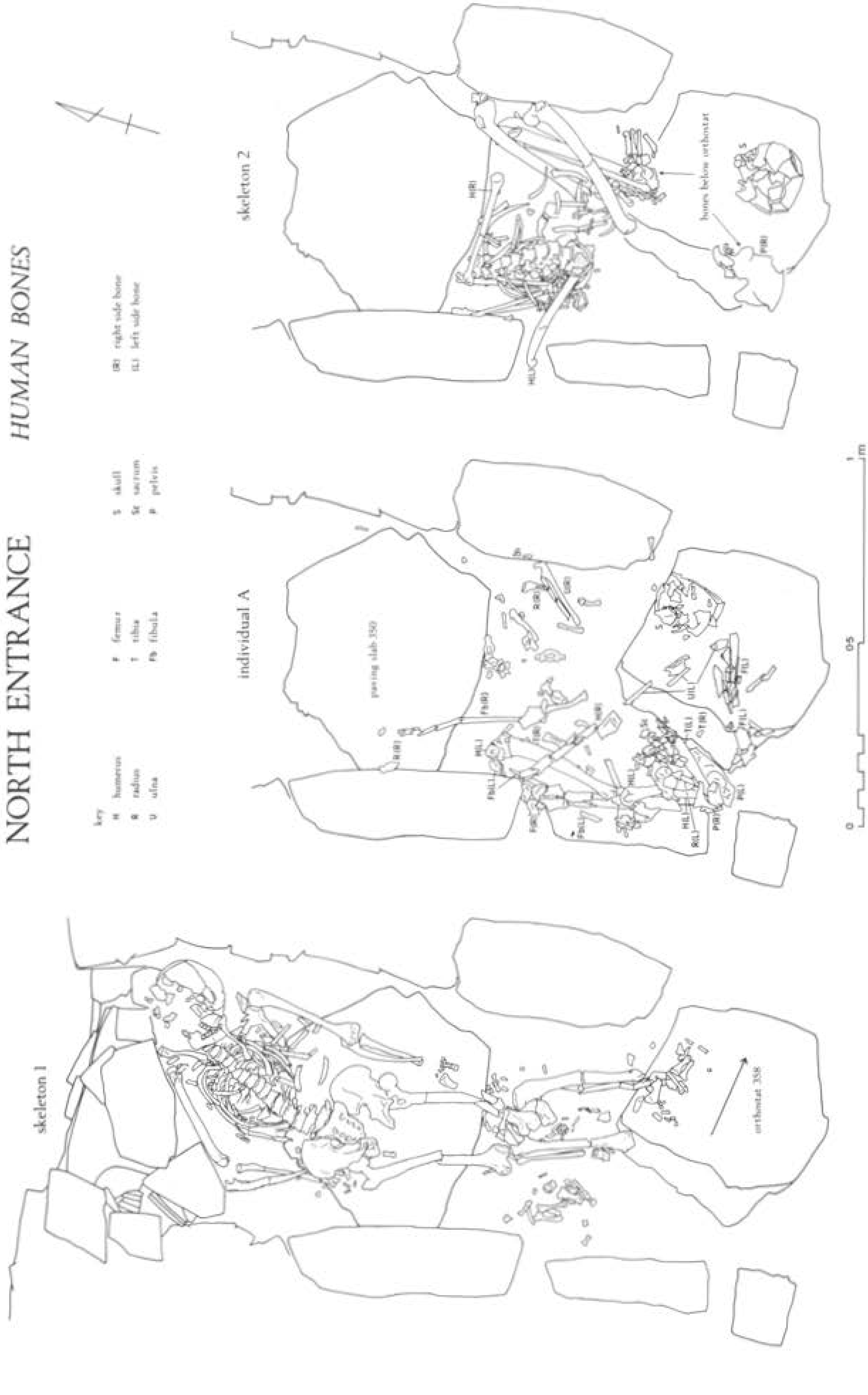


Fig 135 North entrance: distribution of all identified bones belonging to skeletons 1 and 2 and individual A

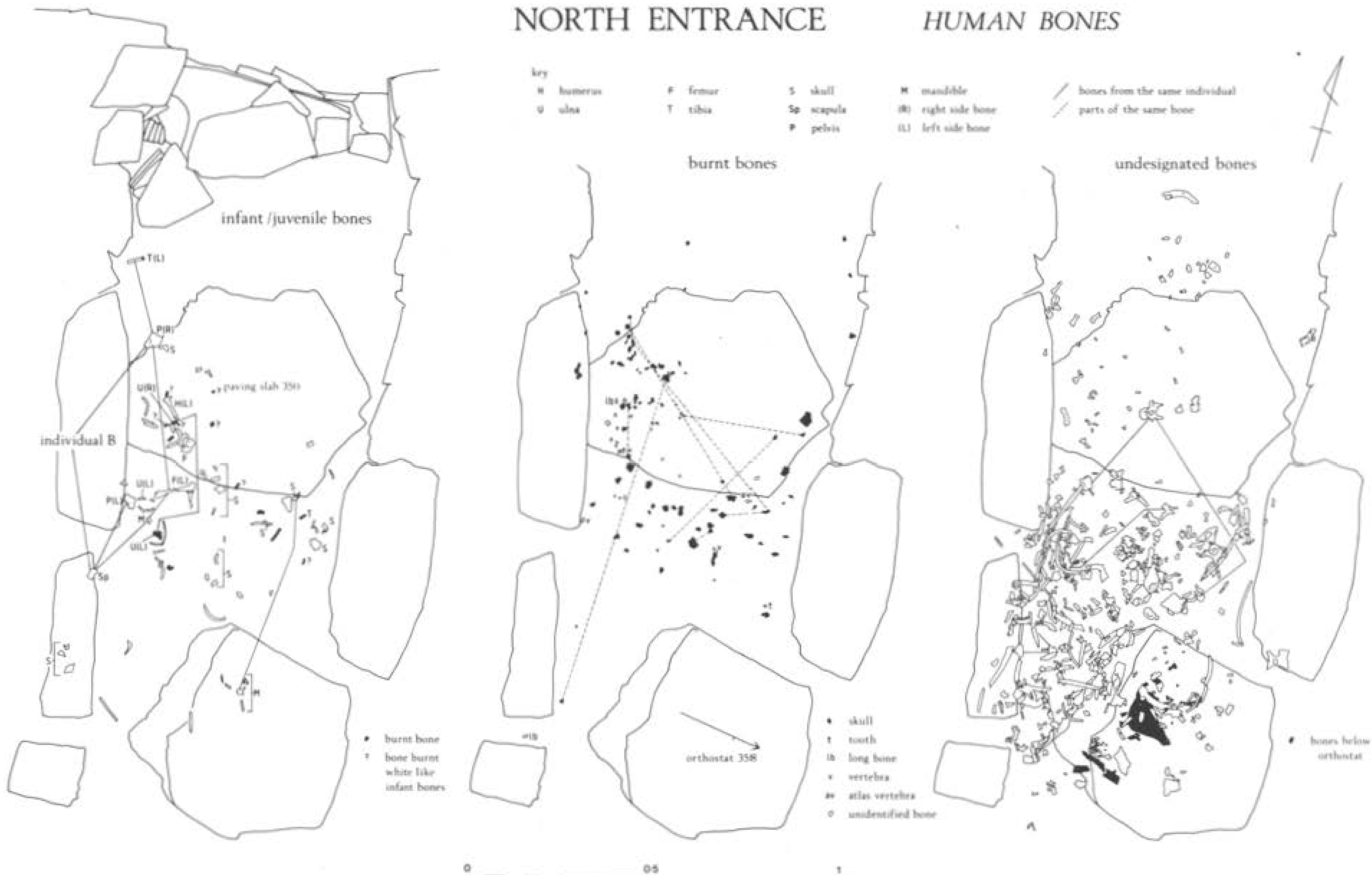


Fig 136 North entrance: distribution of all identified bones belonging to individual B, all pre-adult bones, all burnt bones, and all otherwise unassigned bones

areas, even after disarticulation was complete. In fact, in the absence of much evidence for *in situ* articulation, it is not necessary to assume that the present positions of these groupings reflect their original burial positions at all, but may reflect repositioning of the bones in some ordered fashion.

The north entrance

Here, the burial evidence allowed the identification of specific individuals and permitted observations on the sequence of burial activity (Figs 135–6). The entrance contained the remains of three adult inhumations, with skeleton 1 postdating the other two, and individual A probably postdating skeleton 2. The inhumation of a very young child and another pre-adult probably predated skeleton 1, as did the scattered cremated remains of a further adult and child.

The final burial was the extended inhumation of a 30–45-year-old male (skeleton 1) with gravegoods. After this deposition, the entrance was left completely undisturbed. Before this inhumation, or at the same time, numerous cremated bone fragments were scattered over the central area of the entrance. These burnt bones were from at least two individuals, an adult and a child. The burnt bones could possibly include the whole of a child cremation, but the adult bones were either cremated beyond recognition or were only partially deposited.

Prior to the above burials, the entrance had been prepared by clearing bones from the north end of the chamber and heaping them at the south end (*see* Fig 115). There is some evidence for special attention being paid to the bones at this stage, in that skulls (without mandibles), presumably belonging to the two previous adult inhumations, were placed on the ledge formed by the collapsed orthostat 358, one of them over the left foot of skeleton 1. The lower half of skeleton 2 was left intact, which might also reflect special attention or simply indicate that further clearance was unnecessary. When the individual represented by skeleton 1 was buried, therefore, sufficient time had elapsed for the previous burials to have become defleshed and for the separate body parts to be easily moved.

The adult bones from the entrance included a third inhumation, individual A. This was an adult male, perhaps over 50 years old (Rogers *in litt*), concentrated in the south-west corner. There was little sign of former articulation (except for the proximity of the two ilia, and the correct juxtaposition of the right radius and ulna), and no reason to believe that the bones were in their original position. Since several of the bones belonging to individual A overlay the intact remains of the lower part of skeleton 2, it was concluded that individual A represented an inhumation intermediary between skeletons 1 and 2. Alternatively, individual A could have been buried at the same time as skeleton 2, but located at the northern end of the entrance, and when subsequently moved its bones were placed over those of the other skeleton.

The flexed skeleton 2, probably the first burial in the entrance, was an adult of indeterminate sex (the pelvis was possibly male). If, however, the assignment of one of the skulls from above orthostat 358 to this individual is correct (Fig 135), then skeleton 2 can be regarded as probably male from the skull identification. Although the heel bones underlay the northern edge of orthostat 358, they were simply tucked into the cavity created by the angle at which the orthostat was resting. The position of the left hip and lower spine clearly respected the northern edge of the remains of the collapsed orthostat 359, and the moved right hip bone had been placed beneath, or had fallen beneath, the south-west edge of 358, where again there was a cavity. Thus, this burial postdated the collapse of the inner portal orthostats and the blocking of the throughway into the passage, and there was no indication that any of the entrance bones predated this collapse.

When the upper part of skeleton 2 was disturbed, the spine was truncated to respect the edge of paving-slab 350, and the right humerus was repositioned parallel to the southern edge of the slab. There may have been a desire freshly to expose the whole of this large slab as a suitable 'bier' for the corpse represented by skeleton 1, and the halting of the clearance at the slab's southern edge can be adequately explained by the nature of the entrance floor (Fig 95), since there was a step down from 350 to the adjacent paving 386 covering the southernmost part of the entrance.

The undesignated bones (Fig 136), not positively identifiable as belonging to any of the previous three individuals, comprised mainly ribs, vertebrae, and fragments. No longbones (other than small non-joining fragments) were present among this residue, which almost certainly derived from the three adult inhumations.

A scatter of pre-adult bones was also present in the entrance (Fig 136). Among these, it was possible to suggest one separate burial, a six-month-old child (individual B: Appendix 10), represented by the following bones of the same size and condition: left femur, left tibia, ilia, scapula, and mandible fragment. These bones were confined to the west side of the entrance, and other infant bones in the same area (including a left humerus and a left ulna) probably belonged to this individual. The bones assigned to individual B were near the top of the burial deposits in their area, and some overlay *in situ* bones belonging to skeleton 2. However, because the bones of individual B could have been moved to their present position from elsewhere in the entrance, this burial cannot be placed in sequence, except that its position and disarticulation suggest that it predated skeleton 1. At least two pre-adults (individual B and one other) were present on the basis of the ulnae and femora, since in addition to a left ulna (5549), which probably belonged to individual B, there were a pair of burnt infant ulnae and a separate, unburnt, distal femoral epiphysis (4102) which was not a pair with the left femur belonging to individual B.

7 Cairn use and decay

Non-burial activity associated with the use of the cairn

Contexts 40 and 166 (Fig 28) in the south quarry comprised a probable hearth and a spread of burnt and unburnt animal bone fragments together with part of a decorated pottery vessel and were radiocarbon dated to 2875±50 uncal bc (OxA–915/916). They could be associated either with the construction or use of the monument, and their nature and position were perhaps more in keeping with a 'domestic' interpretation. Apart from the above, the only activity possibly contemporary with monument use came from the cairn periphery. The features involved (Fig 17) were described in Chapter 2 and were of uncertain date and function, but those sealed by the forecourt collapse call for further comment here because of the animal bones from the same location. The absence of any indications of monument use, other than the burials themselves, need not imply that such use did not occur.

Finds and features from the forecourt area

The extra-cairn forecourt deposits produced some 179 animal bones (Table 86), concentrated near the forecourt facade (Figs 137 and 207).

The bulk of these bones were recorded as from context 155 (Fig 142), but the majority came from, or near, the base of this deposit, at the interface with the primary extra-cairn deposit 272 or wholly within that context and its interface with the buried soil. Some of the bone fragments were at or in the surface of the buried soil, but nevertheless were seen as part of the same scatter (Figs 195 and 197), as the clustering of the horizontal distribution appeared to confirm. Some of the bones included were, however, possibly derived from the pre-cairn soil.

Possibly related to the concentration of animal bones were two forecourt features, 349 and 356 (Figs 137 and 142: 20). These features were first regarded as areas of burning or possible hearths, containing plentiful charcoal fragments. Subsequent analysis showed that the content responsible for their dark colour was comminuted charcoal. The larger feature contained a very few fragments of burnt stone, but there was no burning of the surrounding soil. These features are more precisely patches of

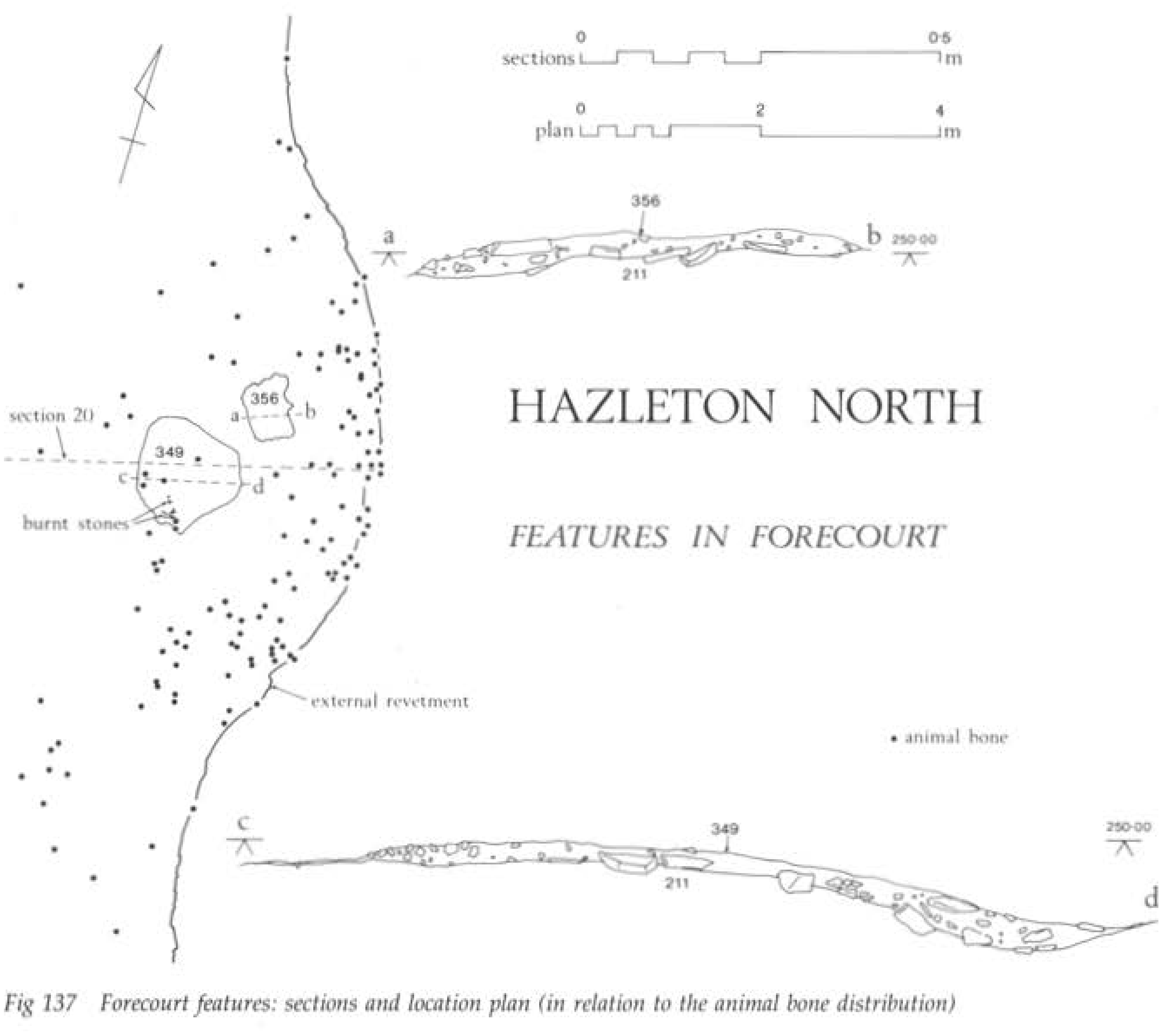


Fig 137 Forecourt features: sections and location plan (in relation to the animal bone distribution)

discoloured soil. Stratigraphically, they overlay the buried soil and underlay context 272 (the initial forecourt erosion deposit), predating the forecourt collapse. The patches were not intrusive into the former ground surface, but were in part infilling a slight depression in the forecourt soil and overlay some stones on the soil surface. In the final analysis, it is not possible to be specific about these features, which could be *in situ* accumulations or redeposited, although they must reflect human activity taking place on the forecourt surface during or after the monument construction and before the forecourt collapse. Features 349 and 356 exhibited no marked spatial correlation with the animal bones and need not be absolutely contemporary with them. However, the presence of three pig teeth within 349 indicates that it was likely to be either contemporary with, or to predate, the deposition of the bones.

The analysis of the animal bone assemblage (Chapter 13) shows a composition predominantly of cattle and pig skull and jaw bones and teeth; it was suggested that a ritual interpretation might be placed upon such selectivity. The stratigraphic position of the bones suggests that they were either placed upon the forecourt ground surface or conceivably originally attached to the forecourt facade. The two radiocarbon dates obtained from bones from this assemblage are early within the overall Hazleton sequence (Figs 225–6), as early as those from the pre-cairn surface. (The two cattle skulls selected for dating were definitely from above the buried soil.) The implication is that these bones do not postdate the use of the monument for burials. The forecourt facade must also have partially collapsed and sealed the bones at an early stage, otherwise they would not be preserved. It appears that the concentration of animal bones in the forecourt resulted from activity associated with the use of the monument at essentially the same period at which burials were taking place, and that in the forecourt, as in the north chambered area, decay of the monument forecourt was occurring during, or shortly after, its use.

The decay of the cairn

The transition from the appearance of the monument when completed and in use, with its external revetment fully exposed, to the situation recorded in Figure 139, was purely the result of natural processes of decay. There was nothing to suggest that the external facade was blocked or obscured by the deposition of additional material at any point around the periphery of the monument even in the forecourt or at the entrances to the chambered areas. The evenness of the stone spread revealed by excavation, both in plan and profile (Figs 56 and 57), must reflect recent agricultural landuse, but there seems little doubt that the external revetment had started to collapse relatively shortly after construction and probably within the Neolithic period.

At its uppermost surviving level, the Hazleton North cairn comprised a spread of limestone slabs and rubble approximately 60m long by 24m wide at the broader western end, tapering to 10.5m wide at the east end (Figs 6 and 57). This spread of stone masked the existence beneath of the carefully-constructed cairn (Figs 8, 9, and 46), which survived to a length of 53m (originally perhaps about 56m) and a width of 19m at the west end and 9.5m at the east end, retained within an outer drystone revetment. Figure 139 shows the outer stonework of the monument from the outer face of the inner revetment outwards (drawn after further cleaning, subsequent to the stage at which Figure 57 was drawn); the outer edge of those external revetment stones which were visible has been emphasised to allow the position of the retained cairn to be seen in relation to the extra-cairn material beyond.

This extra-cairn material, though somewhat patchy, varied only slightly in overall extent along the north and south sides of the cairn, rarely reaching 3m beyond the face of the revetment. The exception was at the west end, where the extra-cairn material extended for up to almost 8m beyond the central forecourt recess, and to about 4.5m beyond the revetment at the horns. In plan, the extra-cairn material was characterised by the occurrence of steeply-pitched stones, angled downwards away from the monument (Fig 138).

To investigate the nature of the extra-cairn stonework, 37 sections all around the monument were recorded, in each case from the outer limit of the stone spread as far as the external revetment facade (Figs 140–3). A consistent pattern of extra-cairn deposits emerged. The external revetment was almost everywhere leaning outwards, sometimes at a considerable angle, and merged into the upper extra-cairn stonework in such a way as to leave no doubt that this material consisted in large part of collapsed former revetment. The tumbled effect can be observed on many of the sections (eg 8, 11, 13, 14, 15, 22, 23, 26, 28, 29, and 31, and Fig 144).

The standard stratigraphy comprised a deposit of stone chips and fragments, with the occasional larger stone, in a reddish-brown loam (contexts 164, 230, 272, 621, 622, and 623 at different points around the cairn), which directly overlay the original ground surface. This primary deposit varied in thickness along the north and south sides of the cairn (average about 0.1m; maximum 0.25m, *see* Fig 140: 13). In the central forecourt, the primary deposit (272) merged into 289 (Fig 142: 20), representing a ploughed fringe.

Over this primary deposit lay the stones of the extra-cairn material proper, usually only a single vertical stone deep (contexts 24, 157, 155, 156, and 301). The sections confirm the predominant pitch of the extra-cairn stones and show their clear stratigraphic relationship to the external revetment. Several sections (eg Fig 140: 14) demonstrated unequivocally that the extra-cairn stones derived chiefly from the revetment (many of the fallen stones were clearly former facing-stones) and that they reflected the progressive collapse of the revetment.

The clearest illustration of the derivation of the extra-cairn stones from the facade was provided at the inner edge of the south horn (Figs 141: 21; 145–6). Here the collapse preserved an impression of the event, since the tumbling stones had fortuitously wedged into

Fig 138 Extra-cairn stonework (context 157) on the north-west side of the cairn (at the same level as Fig 139), viewed from the west; scale in 0.5m divisions

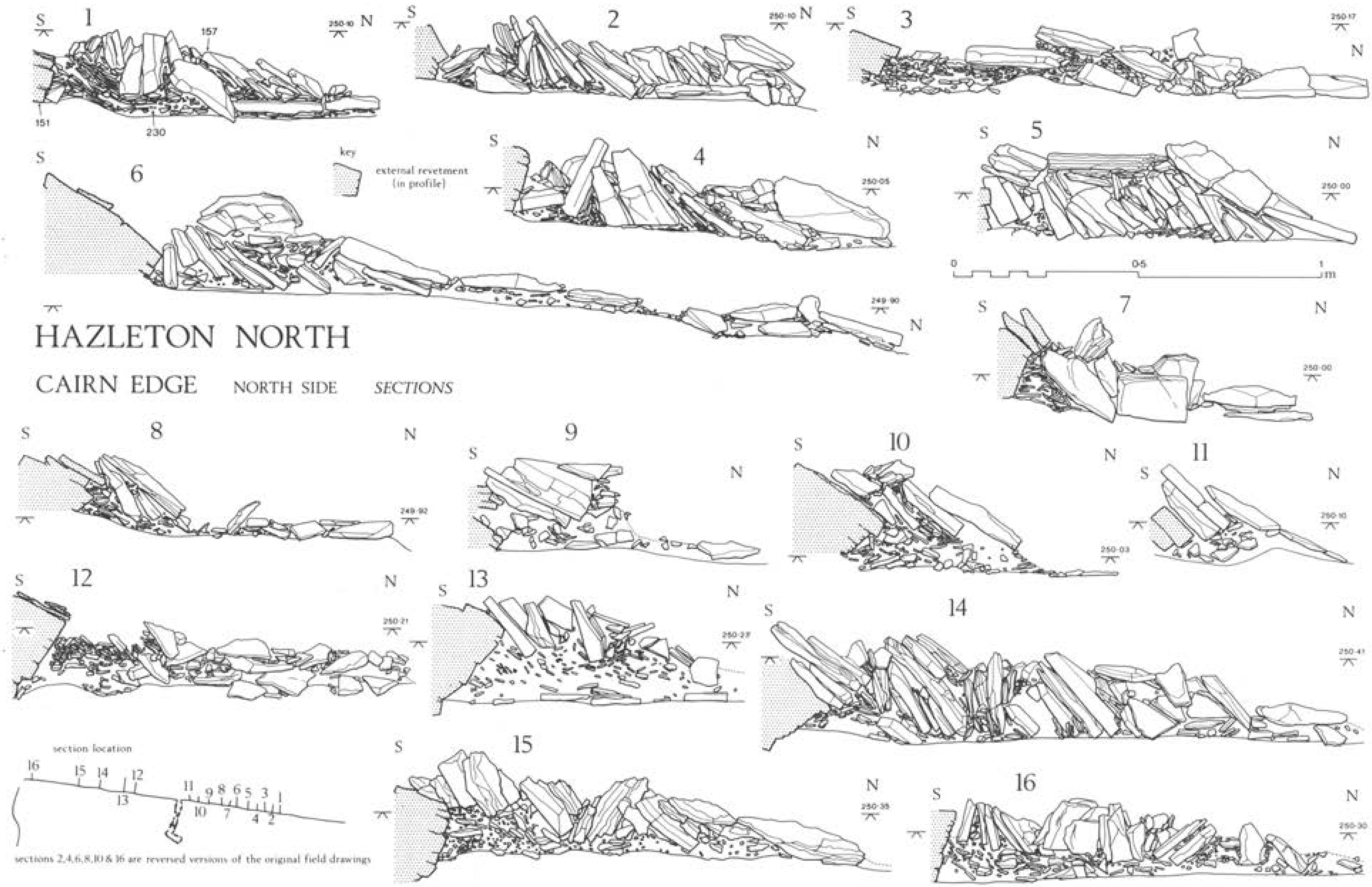


Fig 140 Sections through the extra-cairn material along the north side of the cairn (the context numbers shown in section 1 apply throughout)

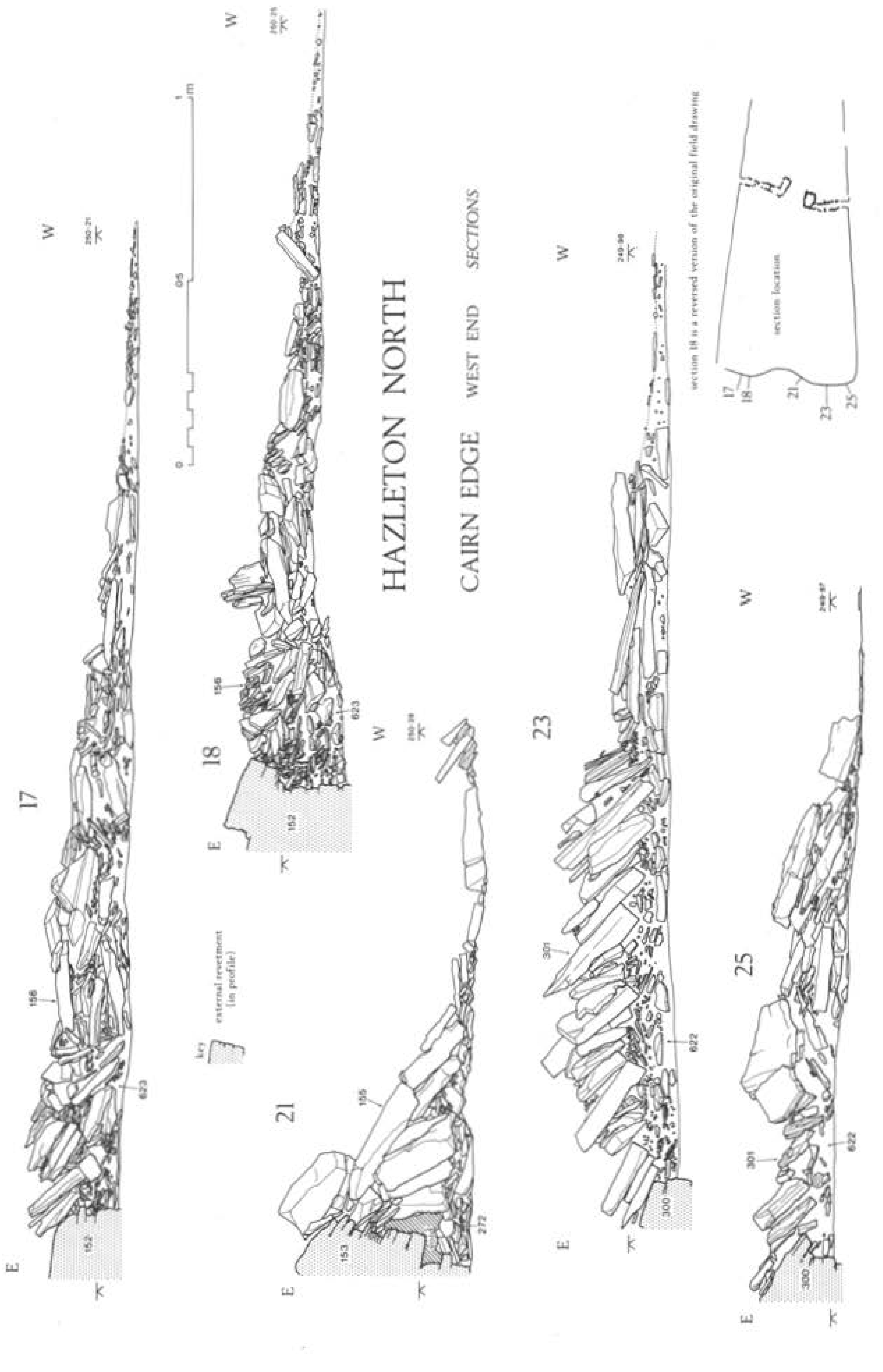


Fig 141 Sections through the extra-cairn material beyond the west end of the cairn

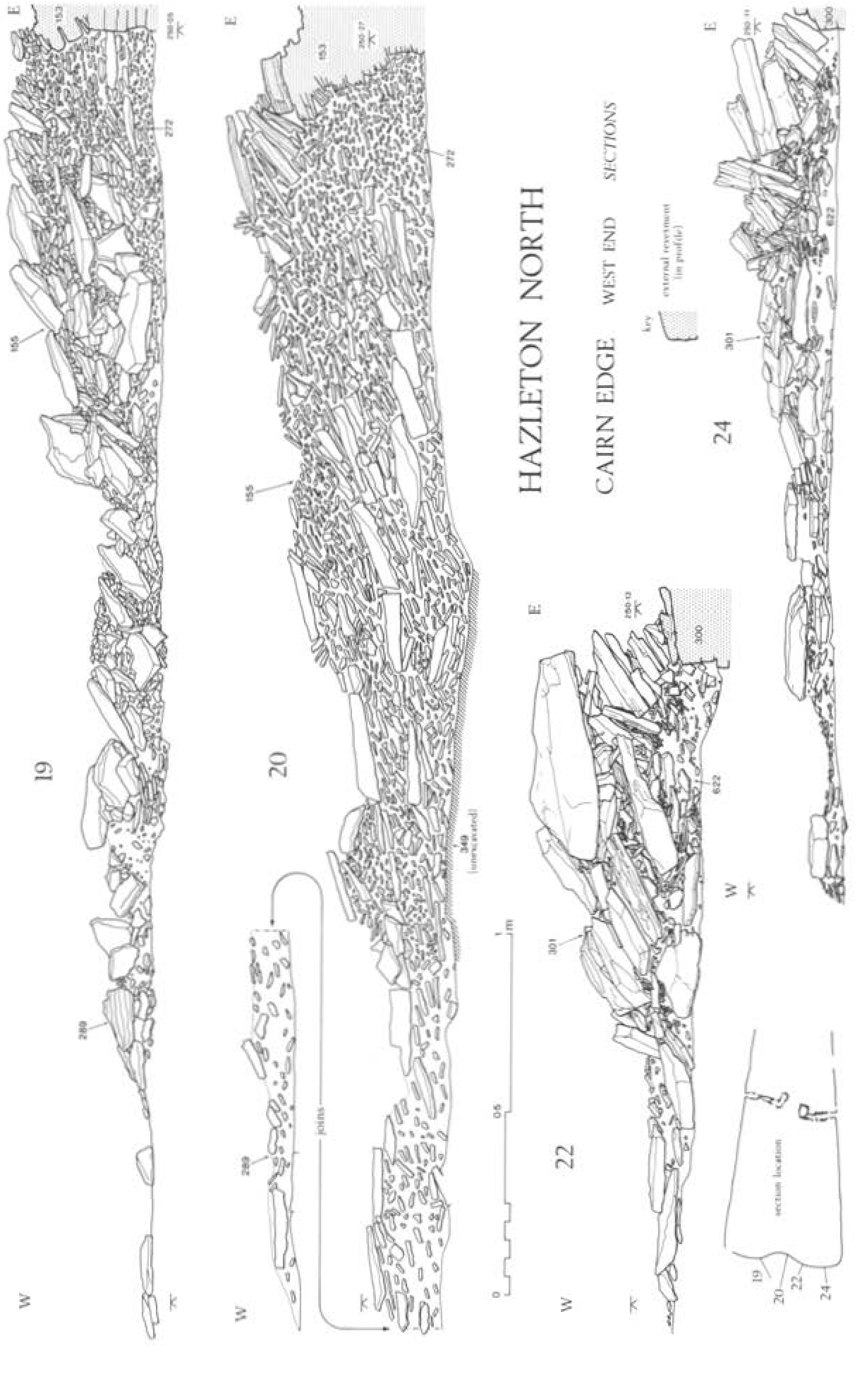


Fig 142 Sections through the extra-cairn material beyond the west end of the cairn

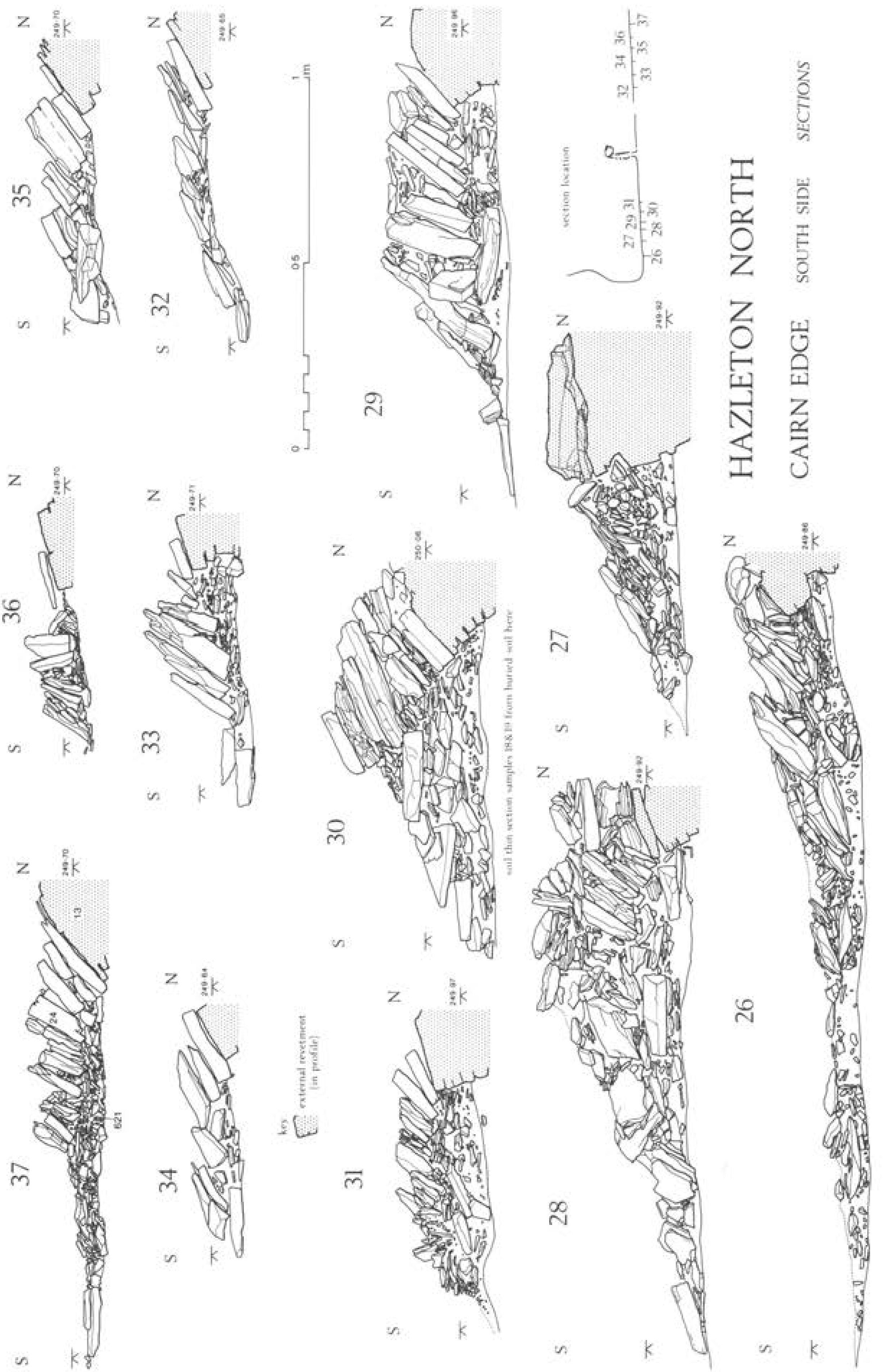


Fig 143 Sections though the extra-cairn material along the south side of the cairn (the context numbers shown in section 37 apply throughout)

Fig 144 Segment of extra-cairn stonework (context 24) in section on the south-east side of the cairn, viewed from the east; scale in 10 and 50mm divisions

place, leaving a void in the angle between the collapsed stones and the base of the revetment. The horn revetment had collapsed directly onto a thin lens of primary deposit (272), which demonstrated the absence of any kind of blocking at this point. Indeed, in none of the 37 sections was there any suggestion of either stones or soil having been deliberately placed against the outer revetment to obscure or support it.

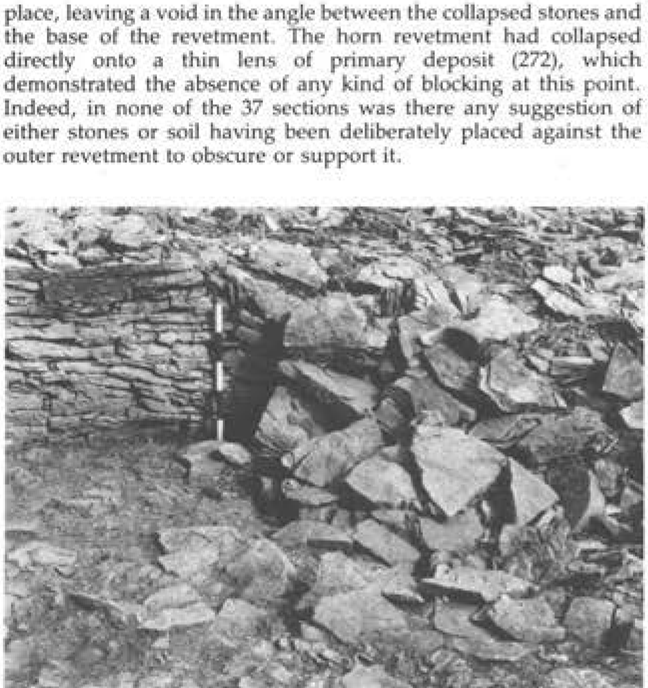


Fig 145 South horn at the west end of the monument: the exposed external revetment (context 153) on the left, and the unexcavated collapsed revetment (context 155) cascading from it on the right, viewed from the west; scale in 0.1m divisions

The primary deposit between the extra-cairn stones and the buried soil was the product of the initial erosional phase while the exposed revetment was still standing. During this phase, soil, vegetation, and spalls of stone had accumulated. There was little evidence to suggest what period of time was involved. The only finds comprised flint artefacts, animal bone fragments, and a single Neolithic sherd (fabric 1). These finds were all likely to have derived from the pre-cairn soil, except for a cow mandible (6710), which underlay the cairn collapse (context 24) at a point 9m east of the south horn, and the animal bones in the forecourt area (*see above*). The presence of these bones within the forecourt collapse and the absence of post-Neolithic items from extra-cairn contexts are suggestive of fairly rapid cairn collapse during the Neolithic period. Variations in the depth of the primary external deposits may reflect differences of time in the facade revetment collapsing at separate points around the perimeter.

In the central forecourt, the primary deposit was almost 0.4m deep, reflecting the greater height of the facade here. As long as the external revetment remained intact, a greater accumulation of erosional debris could be expected in this relatively protected area and, as the section shows (Fig 142: 20), this was largely composed of stone chips identical in appearance to those found weathering off the facade when first exposed during excavation (arch photo 1981/29/26).

There was no evidence for blocking arrangements outside the two lateral entrances. On the north side, the extra-cairn stonework at the entrance was no more extensive than in the adjacent areas (Fig 139); on the south side, the virtual absence of extra-cairn stones outside the entrance rendered any conclusions impossible.

Outside the north entrance, immediately adjacent to and parallel with the entrance blocking revetment 273, was a line of horizontal slabs (163), overlying a relatively thick horizon of small stones in soil (164). The situation (Figs 57 and 139; arch photos 1981/4/10, 1981/25/26, and 1981/27/28) must be interpreted in the light of the north entrance burials not being disturbed. The blocking revetment 273 did not behave like the adjacent external revetment, but remained relatively upright rather than pitching outwards,

Fig 146 South horn at the west end of the monument: as Figure 145, but viewed from the north at a lower angle (cf Fig 141: 21); scale in 0.1m divisions

presumably because of the absence of internal pressure. This allowed a relatively deep accumulation of primary deposit (*c* 0.15m; arch drg 144). At some stage, the blocking revetment must have started to collapse itself; some of it falling inwards into the entrance, and some of it slipping outwards onto the primary accumulations.

Disturbances in the cairn

All the disturbances recognised in the cairn are shown on Figure 147. Those disturbances affecting the chambered areas (603, 604, and 611) have already been considered (Chapter 5); the others, which were mainly undatable interruptions of the cairn fabric, can be briefly summarised.

At the eastern end of the cairn was a group of irregular patches, where the normal cairn fabric was replaced by smaller stones mixed with soil. These features, all located along the axial spine, mostly penetrated right through the shallow depth of the cairn, but did not disturb the underlying soil. Features 610 and 617 merged into each other, probably as part of the same disturbance. They covered an irregular area about 6m long east/west by 3.2m wide north/south with a depth of only 0.2m, reflecting the shallowness of the surrounding cairn. Immediately to the west was a more clearly defined feature (613), roughly circular with a diameter of *c* 2.4m and a depth of 0.5m. Another amorphous feature (602) with a maximum dimension of 2m was only 0.25m deep and did not penetrate through the cairn.

A few fragments of animal bone came from contexts 227 and 160 (the fills of 617 and 613 respectively), but of all the disturbances at the eastern end of the cairn, only 613 produced any datable finds: six post-medieval sherds, which suggested a mid-eighteenth century AD or later date. The irregular nature of these features, their location in the axial area where the stones would have been of relatively large size, and the fact that they did not penetrate the underlying soil suggested that they could all be stone-robbing holes.

Two other possible features (not included on Figure 147) were recorded at the eastern end of the cairn. At the far end, on the axial spine, a patch (180) similar to those above, but smaller and shallower, was probably only the result of plough or animal action, while a rectangular depression 1.0 × 0.8m and 0.3m deep (607) could have resulted from the disturbance of a single large slab.

Towards the western end of the cairn on the axial ridge, a sub-rectangular feature (605; 1.5–2m × 1m deep) had a fill of large slabs with little interstitial soil, overlying small stones in a loose soil. A clay-pipe stem was found in the upper fill and a couple of unidentified animal bone fragments from the lower fill. This feature was possibly a deliberate exploratory pit.

Feature 606, at the north-east corner of unit R, was rectangular in shape, about 1.6 × 0.7m across, 0.4m deep, and with a loose, small stone and soil fill, while 601, with a similar fill, was a roughly circular depression, about 0.9m across and up to 0.3m deep, located on the axial ridge immediately north-west of the south chamber.

To the north of unit O, a very clear-cut, ovoid intrusion (614; about 2.3 × 1.5m across) was detectable from the uppermost cairn surface down to the lower cairn stonework, where it removed parts of revetments 198 and 348. The fill of this feature (183), mainly small stones in dark soil, was recorded on the main cairn section (Fig 56). It has been suggested (Chapter 3) that this feature could have been the source of the stones (context 73) found in the fill of the adjacent part of the north quarry, in which case this feature could not be interpreted as a stone-robbing pit, though this would

HAZLETON NORTH

DISTURBANCES

Fig 147 Disturbances in the cairn: location plan

otherwise seem the best explanation. An iron nail was the only find from context 183, but the position of this near the base of the fill could suggest that 614 was too recent to be the source of the context 73 stones.

Feature 616 in the area of unit M was a substantial pit-like feature, the phasing of which was uncertain. This feature was not defined until after the removal of the stones of axial element 440, when an oval pit, 1.4 × 1.3m, was found to penetrate through the primary dump 377, through the buried soil, and into the surface of the underlying bedrock (Fig 43; for the plan and profile of the feature, from the level of the buried soil, *see* Fig 15). The lower fill of the pit (480) comprised material similar to, but looser than, the surrounding primary dump, while the upper fill (472) consisted of soil-free stones like those of 440 (arch photo 1982/27/6). Context 480 contained an edge-trimmed flint flake and some animal bones (one pig; two sheep/goat; one vole), and 472 contained two unretouched flint flakes and other animal bone fragments (two sheep-sized; two field vole). The level from which this feature had been cut was uncertain. A slight possibility existed that this could have been a pre-cairn feature, left void with a covering, after the subsequent disintegration of which the overlying deposits had collapsed into the hole. Otherwise, 616 could only certainly be shown to have been cut from the level of the surface of the dump. Its position also coincided with a disturbance noted higher up in the cairn stonework, in context 310, which was only recorded photographically (arch photos 1981/35/32–4) because of problems in defining an edge to the disturbance, given the general variability of the rubble infill of unit M.

Context 616 could, therefore, have been a major intrusion into the cairn from its surface, even though its existence could only be conclusively demonstrated from the level of the primary dump. Since this was the only post-monument feature to penetrate the pre-cairn surface, and since its position within the pre-cairn surface was very close to the midden (Fig 13), it is also worth noting the proximity of this feature to the context 611 disturbance of the south chambered area and the associated spread of Neolithic pottery to its north. There must be a possibility that the flint and pottery finds which concentrate on the cairn surface at this point could be derived from the buried-soil spoil of a sondage in the position of context 616.

Overall, the Hazleton North cairn had clearly not suffered to any great extent from stone-robbing, despite the comments of Witts (*see* p3), nor had it seen any intensive chamber-searching. Despite this, both chambered areas were partially disturbed, which might suggest that, at whatever date the disturbances took place, it was possible to calculate the position of the chambers from surface evidence. Remarkably, the forecourt area of the monument appears to have escaped the attention of chamber-seekers.

Possible Romano-British disturbance

The question of Romano-British activity at Hazleton requires separate consideration in view of the presence of the large sherd of Severn Valley ware in the infill of the south chamber (Fig 97).

Apart from the Roman coins and sherds found in superficial contexts, a sherd of grey-ware came from an axial element (context 444 beneath unit S), a tiny fragment of Severn Valley ware came from the south entrance (context 354), and six sherds from the uppermost cairn stonework. The sherd from context 444 was found quite close to disturbance 605 which could perhaps explain its presence, while the south entrance sherd was equally close to disturbance 603 and was anyway not far below the modern field surface. The sherds from the uppermost cairn were inseparable from those from the modern ploughsoil. It is the large unabraded sherd from the south chamber which is the most difficult to explain. It could relate to the disturbance documented in the south chamber area, even though it could not be ascribed to a specific feature, or it could be connected with animal burrowing. Its unabraded state suggests the former rather than the latter, and it must indicate Romano-British presence of some sort on the spot.

The actual total of Romano-British material from Hazleton is small compared with that known from other Cotswold-Severn tombs (Annable 1970; O'Neil and Grinsell 1960, 54), but the south chamber sherd is a reminder that these monuments did exercise some kind of fascination for people in Roman times (Piggott 1962, 55). Whether Annable (1970, 55) is correct in seeing the broken Romano-British sherds at Cotswold-Severn sites as dedicatory offerings to the spirits of the dead, or whether these are merely evidence of a fashion for visiting ancient monuments is obviously

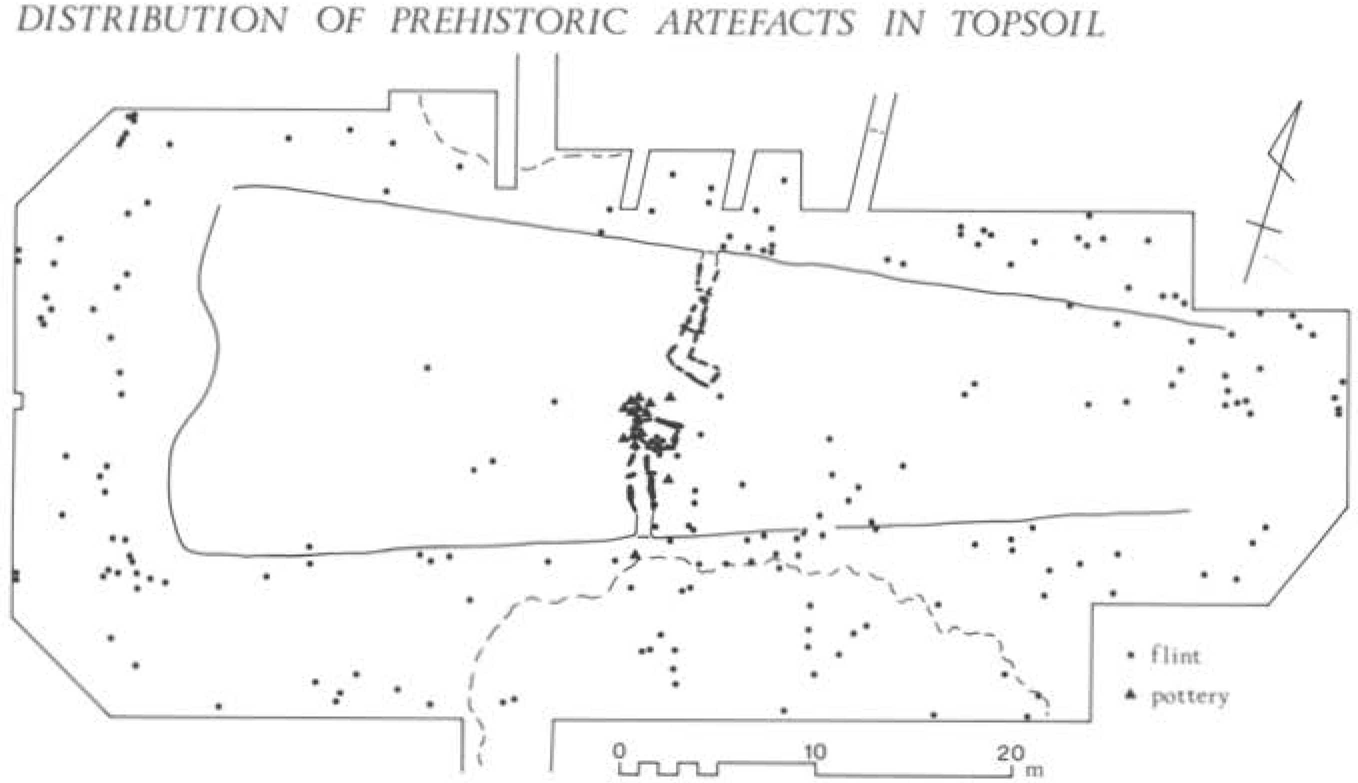


Fig 148 Distribution of prehistoric artefacts from superficial contexts within the excavation area

debatable, but at Hazleton North it appears possible that sondages into the south chamber and perhaps the western cairn (context 605), and even the north chamber, could have been dug during this period.

Finds from superficial contexts

All superficial deposits were removed by hand, and trial sieving of a 20% sample of all the upper soil from the south-east quadrant of the excavation area was undertaken.

In the event, the number of artefacts proved so low (Fig 148) that the scatter was probably purely fortuitous, and the sieving almost certainly explains the slightly higher frequency of flints from the south-eastern side of the site. The 20 Neolithic sherds from context 2, the topsoil over the cairn, were an exception, since these were concentrated in the area immediately to the north of the south chamber (Figs 148 and 159). These sherds have already been discussed (p86), and their relatively recent redeposition into the topsoil is proposed, since it is extremely unlikely that Neolithic pottery could have survived in a superficial position for five millennia.

The flint artefacts from all 'post-monument' contexts are listed by type in the flint report (Table 25) and comprise a total of 466 pieces. The topsoil contexts produced 197 of these, among which the diagnostic implement types were both Mesolithic and Neolithic, while the uppermost cairn produced only five flints. That the superficial flints did not in the main derive from the cairn was confirmed by the distribution plot (Fig 148), showing the flints concentrated around the cairn periphery and over the quarry. An exception was again noted in the case of the south chamber, where a small concentration of flints lay just to the east of the cluster of Neolithic pottery.

The incidence of Romano-British and later pottery sherds in the superficial layers showed no concentrations and was interpreted as the incidental result of local settlement and farming. Although, as explained above, the unabraded Roman pottery fragment from the south chamber must indicate specific Romano-British activity at the cairn, this is not reflected in the surface finds. The recovery of three Roman coins from the topsoil and one from context 4 merely reflects the general local distribution as indicated by field-surface finds, with recovery increased in this case by hand-excavation.

The low density of artefacts associated with the uppermost cairn and superficial deposits indicated that the cairn surface was not the focus of any post-monument prehistoric or later activity, at least until the present century, when use as a wartime shooting range may explain the seven rifle bullets from ploughsoil over and around the cairn.

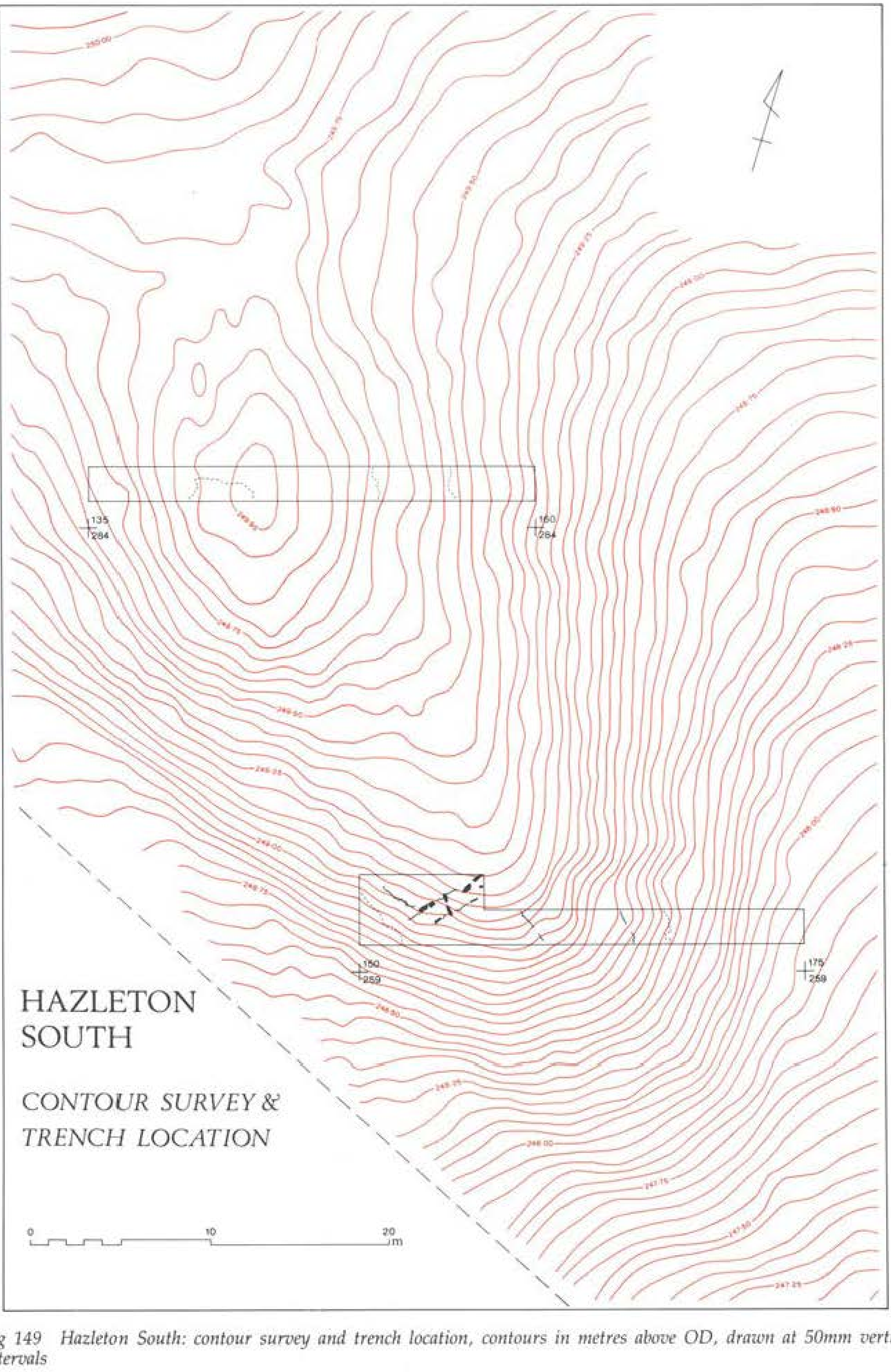


Fig 149 Hazleton South: contour survey and trench location, contours in metres above OD, drawn at 50mm vertical intervals

8 Hazleton South

Introduction

The barrow known as Hazleton South (SP 0720 1882) lies on the southern edge of Barrow Ground field, some 80m south-west of Hazleton North (Fig 2). The barrow is visible on the ground as an elongated, amorphous, low mound with a stony surface after ploughing; it has been regularly ploughed in the recent past.

To clarify the status of Hazleton South, a contour survey (Fig 149) and geophysical surveys (Chapter 17) were undertaken in 1980, followed by an exploratory excavation involving the opening of two parallel trenches, 23m apart; the north trench across the highest part of the mound and the south trench across the break of slope to the south.

The south trench

This trench was laid out as a slit trench 25 × 2m, aligned roughly east–west, but the western 7m were subsequently extended northwards by 2m, to give a total excavation area of 64sq m (Figs 150–1).

Ploughsoil was removed by hand to expose the underlying deposits, which were then recorded in plan, but were not themselves disturbed. The ploughsoil removed varied in depth from less than 50mm over some of the cairn to approximately 150mm at the east end of the trench.

A broad band of stones occupied the larger part of the trench, comprising small- to medium-sized rubble, with areas of larger slabs and some patches where few stones were present. Principal among the identifiable features were the tops of large slabs set vertically within the surrounding stones. Eight of these were visible (Fig 150, contexts 114–21), all apparently of the same kind of imported coarse-grained limestone used for many of the orthostats in Hazleton North. The tops of some of these blocks (especially 115–18) were flush with the surface of the ploughsoil and bore the marks of recent plough-damage.

These slabs were the tops of orthostats, defining an entrance and passageway, approximately 0.8–1.0m wide, narrowing to 0.6m between orthostats 117 and 121, the former presumably displaced inwards from its original position. Slabs 114 and 115 could represent part of a single large orthostat. The entrance and passage were separated by two transverse slabs (116 and 120), the gap between them being only 160mm at this level. Another possible orthostat (128), also of the same limestone and apparently vertical, was partially exposed in a position roughly central to the postulated passageway. If this was an orthostat, then its position would be anomalous; it could represent an orthostat originally contiguous with 121 which had subsequently slumped into the passage. Two other pieces of the same kind of limestone (123 and 124), at the northern edge of the entrance and passage, were lying horizontally and appeared to be part of the cairn structure, perhaps forming part of a revetment between the orthostats.

The rubble infill (125) of the entrance and passage contrasted with the somewhat larger and more compact stonework (106) to north and south, partly because of its looser, more humic matrix, partly because of the greater and more variable pitching of its stones. The southern edge of 125, on both sides of the transverse orthostat (120), was marked by a row of stones (126), slightly pitched away from the entrance. This row appeared to continue behind orthostat 119 and then curve sharply to the south (Fig 150). The line formed by the inner faces of the slabs (114 and 115) on the north side of the entrance was continued south-westwards for at least 0.7m by an alignment of medium-sized stones. Although no obvious alignment projected south-west from 119 on the south side of the entrance, the north-side stones suggested that the entranceway continued westwards and was flanked by a revetment. Its western limit was obscure, with no indication of an external revetment line in the undifferentiated stonework (112) of the western edge of the stone spread. Behind orthostat 114, a north-west/south-east alignment of relatively large stones probably represented the revetment of a constructional unit to the north of the entrance/passage. The variable composition of the cairn fabric was demonstrated by contexts 110 and 129, representing more marly patches of infill.

A further internal feature was present at the centre of the cairn. This comprised a north-west/south-east alignment of slabs (107), apparently representing a revetment with a face towards the north-east. This face was opposed by other slabs (108), pitched downwards to the north-east. These stones were in turn overlain by the mass of cairn stonework to the east (106). This feature was interpreted as a bipartite axial construction of the kind which was shown at Hazleton North to extend almost the whole length of the cairn.

Towards the eastern edge of the stone spread was another alignment of horizontal slabs (104), which appeared to form an east-facing revetment. This revetment was presumably an internal one, forming the eastern edge of a constructional unit and not the outer edge of the cairn. A further 2m wide band of stones (105) resembled the equivalent context 112 to the west and, like it, masked the external revetment.

No finds of any significance were recovered from this trench, although the topsoil produced five fragments of iron ploughshares, presumably a result of contact between plough and cairn in the recent past. In view of the excavation brief, this trench was not extended any further than was necessary to prove the existence of an orthostatic chambered area appropriate to a Cotswold-Severn tomb. After backfilling, additional soil was dumped over the trench to provide some protection for the chambered area.

Fig 151 Hazleton South: south trench, viewed from the west; scale in 0.5m divisions

The north trench

On removal of the topsoil in this trench, again 25 × 2m in extent, it was immediately apparent that no cairn comparable to that in the south trench was present (Figs 150 and 152).

The only area where any density of stones existed was a 4m wide band (106) towards the east end of the trench. This band was composed almost exclusively of small stone fragments and exhibited no patterning, except that its east and west edges could reflect the general cairn alignment indicated from the south trench. To the east of 106 was the same stony red-brown subsoil (103) as beyond the eastern cairn edge in the south trench.

To the west of 106, the whole of the trench below the ploughsoil was composed of a subsoil (130), similar to 103, except that it had a significantly higher stone content. A denser patch of stones, about 3m wide, existed at one point (131), but again exhibited no distinctive features. The ploughsoil had an average depth of 200mm in this trench. The upper subsoil was removed by trowelling to a maximum depth of 300mm below the ground surface in the non-stony areas without revealing further features. Modern plough-grooves were observed crossing both stony and non-stony areas.

The north trench produced more flint artefacts than the south trench, 18 as opposed to 11, but in both trenches the flints were exclusively ploughsoil finds and of an undiagnostic character. The north trench did, however, contain four Neolithic sherds (p152) from the subsoil contexts 130 and 131 (Fig 150). These sherds, all of a similar fabric and perhaps from a single vessel, occurred at depths of 230–280mm below the field surface.

Fig 152 Hazleton South: north trench viewed from the east, with context 106 in the foreground; scale in 0.5m divisions

The contour and geophysical surveys

The contour survey (Fig 149) showed the barrow alignment to be north-west/south-east. The actual extent of the barrow is more difficult to judge from the contours, which are not as pronounced nor discrete as in the case of Hazleton North, but the length is approximately 50–60m and the width between 10–20m, increasing towards the north-west. The absolute high point of the barrow was 249.95m OD towards its northern end, and the maximum height relative to the surrounding field surface was approximately 1m.

Comparison of this contour survey with that of Hazleton North (Fig 5), bearing in mind the known dimensions of the northern cairn, suggests that the two monuments were of roughly comparable size. Any such comparison, however, relies on the present contours of Hazleton South being those of the original form of the underlying cairn, in spite of the evidence from the north trench for its partial disappearance.

Of the two geophysical surveys (Chapter 17), the resistivity plotting was the most informative. This is especially so when the resistivity data are presented in alternative graphic ways as in Figures 153–4. The large, linear negative anomalies either side of the cairn can be interpreted as flanking quarries. The full extent of the quarry to the south-west of the cairn is unclear; this quarry presumably runs beneath the metal fence at the field edge, if not under the modern road beyond. The north-eastern quarry is approximately 42m long and 12m wide, running roughly parallel to the cairn edge. The western side of the north-east quarry appears to have a much more regular edge than the eastern.

The position of the chambered area is marked on the resistivity plots by a peak in the positive readings, while the area traversed by the north trench is marked by a large negative anomaly, similar to those which define the quarries; presumably the negative anomaly in this case relates to the absence of cairn stonework.

Discussion

The south trench demonstrated the existence of a lateral chambered area set within a long cairn which has a north-west/south-east orientation. The stonework of the cairn has indications of internal constructional elements resembling those in Hazleton North.

Estimation of the state of preservation of Hazleton South is made difficult by the uncertainty of the evidence from the north trench. It seems probable that the broad end of the cairn has been obscured by stone-robbing. By contrast, the south trench demonstrated that the cairn there is quite well preserved and the orthostats do not appear to be seriously truncated. There is, therefore, every reason to expect that

Fig 153 Hazleton South: symbol density plot of initial untreated data from resistivity survey, see Figure 221 for the location of the survey area (computer plot prepared by A Bartlett)

any burial deposits will have survived as well as those at Hazleton North.

While the orthostats in the south trench appear to delimit an entrance/passage arrangement, the actual form of the chambered area is unclear. Any chamber present might either be a simple box termination of the passage or involve a right-angled turn towards the south-east to give an overall L-shape. Alternatively, and in contrast to Hazleton North, the chambered area could involve a right-angled turn towards the north-west or could conceivably cross the central axis of the cairn (as at Burn Ground: Grimes 1960). Without further excavation, the precise form of the chambered area remains unknown.

Also unknown is whether there could be other chambers present within the cairn. The resistivity survey (Figs 153–4) showed a peak of positive readings in a location coinciding with the entrance/passage, but extending well beyond the area defined by the exposed orthostats. There is a possibility that more than a single chambered area is implied, possibly even a further two chambers, set into the north-eastern side of the cairn (as at Gwernvale: Britnell 1984a).

If the north trench did cross the full width of the cairn towards the forecourt end, then the absence of stone is enigmatic. Witts, however, commented that many stones were removed for road-making and wall-building (1883, 80), and, although he seems to refer to Hazleton North where it has been shown that the northern cairn was *not* extensively robbed, Hazleton South is at the edge of a field and next to a road and thus a much more likely source of stone. Stone-robbing could have occurred at the originally broader and higher end of Hazleton South prior to 1883; contexts 130 and 131 in the north trench could then be explained as residual cairn and sub-cairn soil, with the pottery finds relating to pre-cairn activity.

Witts (1883, 79) described Hazleton South as being 150ft (45.7m) long, 70ft (21.3m) in maximum width, and 5ft (1.5m) high. The

Fig 154 Hazleton South: resistivity survey contour plot, showing data after treatment to suppress the overall rise in readings towards the west; see *Figure 221 for the location of the survey area (computer plot prepared by A Bartlett)*

tops of two orthostats were apparently visible in Witts's time: '... on the surface of the ground near the south-east end; they lie parallel to each other and 10ft [3m] apart'. No sign of these stones was visible in 1920 (Crawford 1925, 101), and it is impossible to decide if these orthostats were part of the group revealed in 1980. Only the diagonally-opposed orthostats 117/119 or 114–15/121 could match Witts's measurements.

The dimensions recorded by Grinsell in 1959 of length 165ft (50.3m), maximum width 80ft (24.4m), and height 3ft (0.9m) seem to reflect the continued spreading and lowering of the cairn and correspond more or less to those recorded before excavation in 1980.

9 The prehistoric pottery

by I F Smith and Timothy C Darvill

Introduction

The Neolithic pottery comprises some 379 sherds (weighing 1066g), mostly from the buried soil beneath the cairn, and two vessels deposited after initial construction of the cairn. One of these vessels was in the south chamber, the other, a decorated example, came from the south quarry (Table 19). Neolithic sherds from all other contexts on the site are probably residual from activity either predating the cairn or associated with its construction and use. Two sherds of Iron Age pottery from the south quarry are the only ceramic evidence for subsequent prehistoric activity at Hazleton.

The description and discussion of the pottery, the sorting into fabric groups (with an 8× lens), and the selection of representative sherds for microscopic examination were undertaken by IFS. Preparation of the thin sections (*see* Darvill 1983, 552–62), the reports on petrology, and on raw material sources are the work of TCD, who also contributed to the discussion. The petrological slides are housed in the thin-section library at the Department of Archaeology, University of Southampton. In this report, the library reference for each slide is given (eg N436), together with the relevant find number (eg sherd 11846). A list of the fabric attributions, grouped according to context and specifying all feature sherds, is in the archive, while a concordance of find number, context, and fabric type for the illustrated pottery is in Appendix 2. Where necessary, reference to sherds not illustrated is made by citing the find numbers. The post-prehistoric pottery is documented in Appendix 3.

The assemblage from the sub-cairn soil

A total of 264 sherds, all undecorated, was mostly concentrated in the midden area (Fig 155).

The extremely fragmentary condition of this pottery (some 37% of sherds measured less than 10mm square) doubtless results partly from disturbance during cairn construction and from the relative fragility of most fabrics. Nevertheless, the rarity of sherds that can be conjoined at old breaks, and of matching pieces from rims, necks, or carinations, suggests that this material was a secondary deposit of some kind. In this connection, although nearly 11% of the sherds had been refired, none was directly associated with the hearth on the sub-cairn surface (Fig 20).

Sherds tempered with calcareous substances, especially calcite (fabrics 1 and 2), have usually been affected by chemical reaction, resulting in the loss of exposed inclusions. This alteration seems to have occurred *in situ* because there is little evidence of physical weathering, indeed sherds with siliceous inclusions (fabric 5) are in remarkably fresh condition.

The pottery is discussed below under the headings of fabric groups established by macroscopic inspection and thin-sectioning. The relative frequency of occurrence of each fabric is given in Table 20.

Table 19 Neolithic pottery: general quantification

Area	*Number of sherds*	*%*	*Weight in grams*	*%*
sub-cairn soil (Table 20)	264	52.2	833	49.7
cairn periphery (Table 21)	19	3.7	45	2.7
lower cairn fabric	5	1.0	9	0.6
burial deposits (one vessel)	9	1.8	260	15.5
base of south quarry (one vessel)	118	23.3	349	20.8
upper fill of south chamber and adjacent area (Table 22)	56	11.1	79	4.7
miscellaneous quarry fills (Table 23)	31	6.1	96	5.7
unstratified	4	0.8	4	0.3
Totals	506		1675	

Table 20 Neolithic sherds from the sub-cairn soil

	Feature sherds	*Body sherds*	*Total no*	*%*	*Weight in g*	*%*	*Min no of vessels*
fabric 1	13	108	121	45.8	411	49.3	10
fabric 2	9	15	24	9.1	80	9.7	6
fabric 3	8	86	94	35.6	206	24.7	6
fabric 4	2	7	9	3.4	44	5.3	1
fabric 5	4	12	16	6.1	92	11.0	2
Totals	36	228	264		833		25

Fabric 1: calcite tempered

(Slide N436, sherd 11846; Fig 156: 1–17)

This fabric is characterised by sub-angular fragments of calcite, mostly about 1mm across, but occasionally up to 5mm. In thin section, these fragments can be seen to be set within a fine-grained, slightly micaceous groundmass. Individual flecks of muscovite mica up to 0.1mm long can be distinguished. A moderate scatter of fine, subangular grains of quartz up to 0.11mm across can also be seen, together with occasional clay pellets up to 1mm across. The materials used in this fabric were well prepared and evenly mixed.

Identical calcite could have been obtained widely on the Cotswolds. The clay, however, is not available among the oolite series of the Upper Jurassic, but is best matched in the lias clays available around the fringes of the Cotswold limestone. The nearest sources to Hazleton would be in the Coln Valley about 6km west or in the Windrush Valley about the same distance east. A modern sample of clay from the Coln Valley near Andoversford was found to be very similar to Hazleton fabric 1, although outcrops of similar materials are fairly extensive.

The fabric 1 vessels, consistently fired in a reducing atmosphere, are dark-faced and well finished; burnish is present. Two joining sherds (Fig 156: 13) from a carinated bowl are exceptional in retaining conspicuous tooling-marks as well as traces of an imperfectly-concealed ring-joint at the carination.

The largest of four simple upright rims in fabric 1 comes from a cup about 100mm in diameter (Fig 156: 8), the other three (Fig 156: 9–11; the last two possibly from the same vessel) are apparently from a further two cups. There are also two body sherds that clearly belonged to these or similar cups. The other rims may be described as rolled over – Figure 156: 2 displays no more than a slight fold; Figure 156: 7 has a flat external facet; Figure 156: 1, comprising two joining and one non-joining segments, forms a neat 'bead'. Four sherds (Fig 156: 13 and 17, plus a small fragment, 13285) represent two bowls with concave necks, strong carinations, and, apparently, relatively shallow bodies. The larger of these was about 200mm in diameter at the carination. There is one further sherd from a concave neck (Fig 156: 16). The remaining carination (Fig 156: 15) is less emphatic.

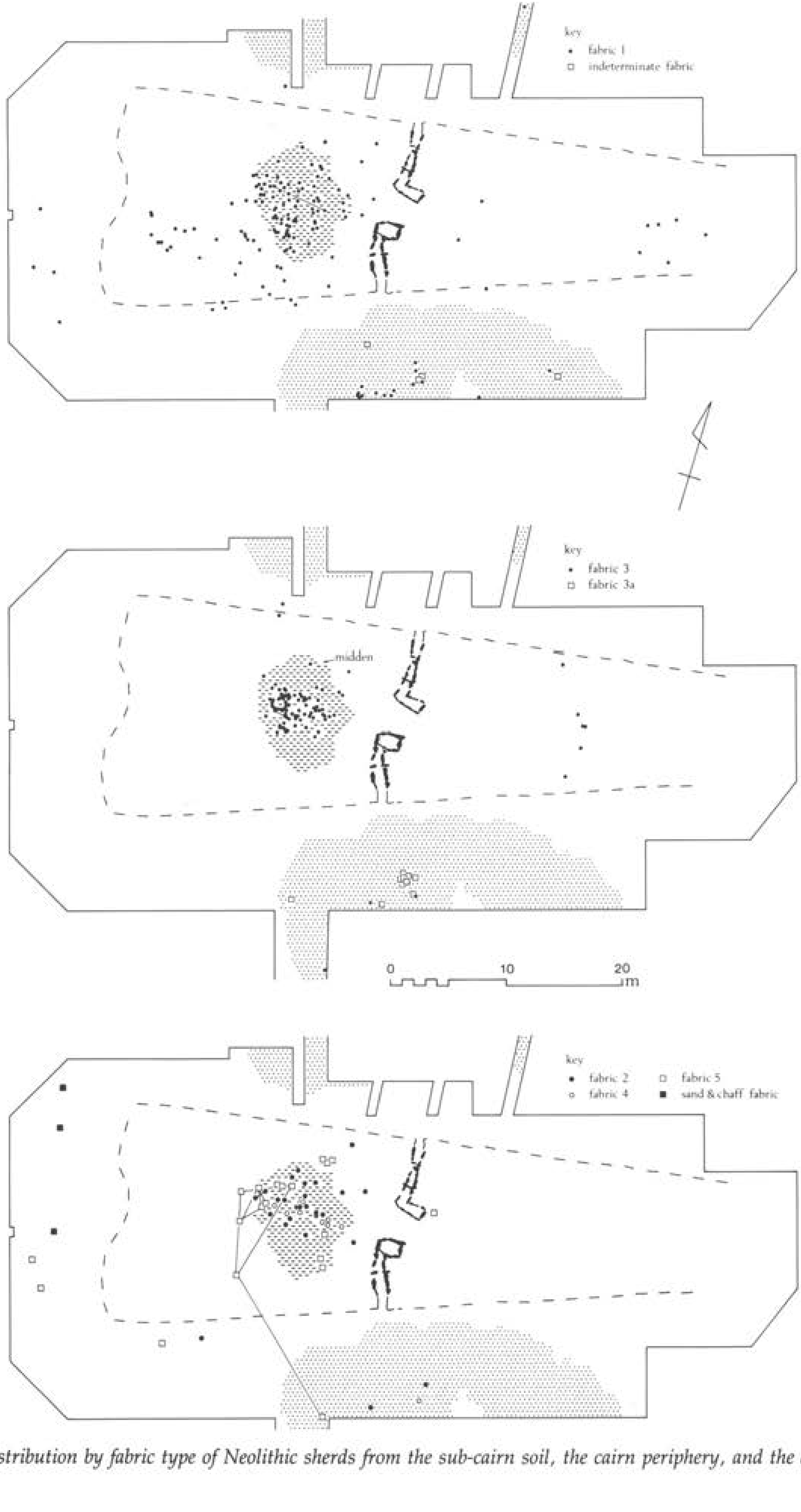


Fig 155 Distribution by fabric type of Neolithic sherds from the sub-cairn soil, the cairn periphery, and the quarries

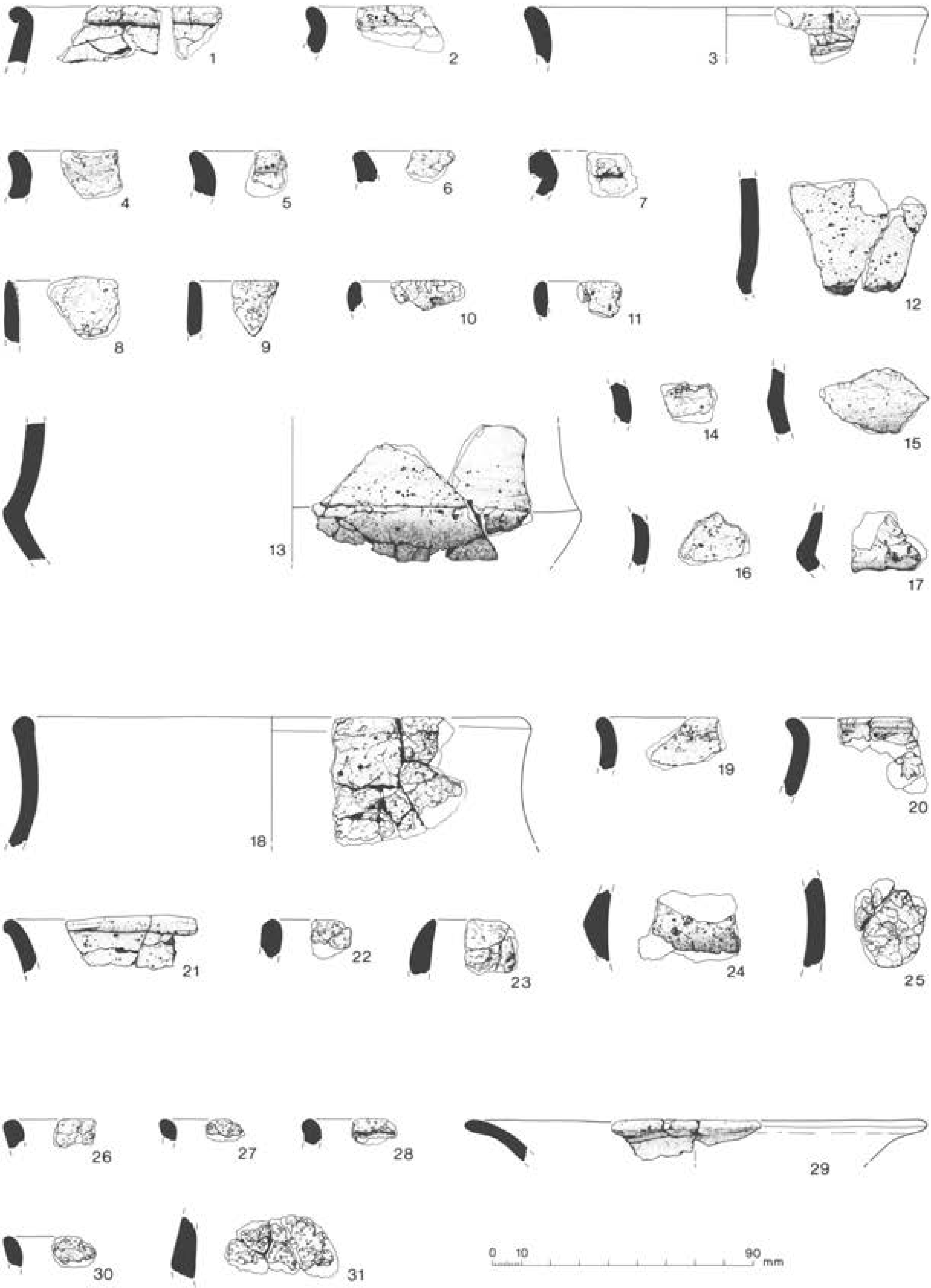


Fig 156 Neolithic pottery: 1–17 are fabric 1, 18–25 are fabric 2, 26–31 are fabric 3; 4, 6, and 14 are from context 2; 5 is from context 10; 1–2, 7, 11–12, 17, 20, 23, and 31 are from context 211; 8–10, 13, 15–16, 18–19, 21, 24–30 are from context 561; 3 and 22 are from context 563 (scale 1:2)

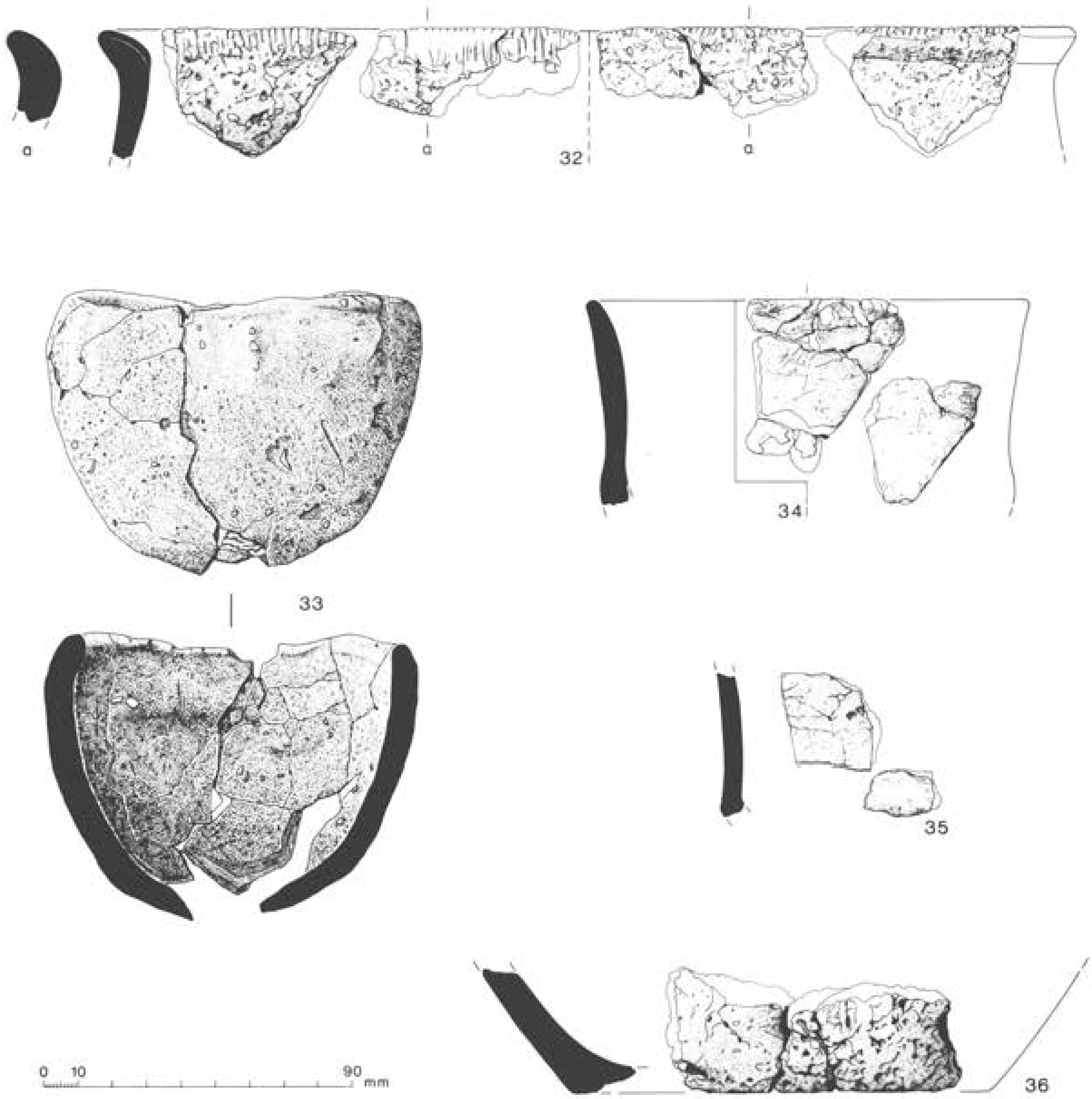


Fig 157 Neolithic (32–5) and Iron Age (36) pottery: 32 is fabric 3a, from context 40; 33 is fabric ?3, from contexts 323, 412, and 453; 34 is fabric 4, from context 561; 35 is fabric 5, from contexts 211 and 561; 36 is fabric 6, from context 566 (scale 1:2)

Fabric 2: crushed limestone and calcite tempered

(Slides N437 and N440, sherds 16179 and 15477; Fig 156: 18–25) This fabric is characterised by sub-angular fragments of crushed limestone and calcite. The latter dominates the clasts added as tempering in the sampled sherds and fragments are commonly over 1mm across. The limestone fragments tend to be more angular than the calcite ones, but are about the same size. Discrete fragments of fossil shell and oolites are present within the fabric. In thin section, the clay matrix can be seen to be slightly micaceous with occasional calcareous fragments. Quartz grains are not common and tend to be small and angular. Fragments of non-translucent iron ore were noted.

No available clay samples provide a good match for the materials used for this fabric. The clasts could have been obtained from almost anywhere within the limestone uplands. The clay could have been derived from localised outcrops within the upper lias or inferior oolite series rocks of the area.

The surface finish and firing of fabric 2 are similar to fabric 1. A rim with a neatly-rolled 'bead' (Fig 156: 21, two joining sherds) belonged to an open vessel about 150mm in diameter. Other rims are everted (Fig 156: 19–20, plus an incomplete profile, 15074, possibly from the same vessel) or perhaps minimally enlarged (Fig

156: 18). The latter rim, diameter 170–75mm, came from a bowl with a high, slightly concave neck set upon a globular body. There is one detached fragment from a concave neck (Fig 156: 25) and a single carination (Fig 156: 24, plus a smaller piece, 15853).

Fabric 3: crushed limestone temper

(Slides N438–9, sherds 8875 and 16359; Fig 156: 26–31)
This is broadly similar to fabric 2, without any trace of calcite. In thin section, there is slightly more quartz in fabric 3 than in fabric 2. The source area is likely to have been similar to that of fabric 2. In the hand specimen, fabric 3 is readily distinguishable from fabrics 1 and 2 by a speckled appearance, due to abundant particles of fossil shell and by the red or brown colours of the outer surfaces, indicative of firing in an oxidizing atmosphere. The standard of finish is lower than that typical of fabric 1.

The two largest rim fragments in fabric 3 belong to the same vessel (Fig 156: 29). This vessel has a very uneven rim, but an approximate assessment gives a diameter of about 155–60mm and a flaring, everted profile. Four other very small rim sherds comprise two that may be slightly everted (Fig 156: 26 and 30) and two that seem to be rolled (Fig 156: 27–8). A single sherd (11546) may come from a neck, and one other (Fig 156: 31) retains the angle of a carination.

Fabric 4: limestone-tempered calcareous clay

(Slide N441, sherd 12772; Fig 157: 34)
This fabric is characterised by friable crushed limestone in a soft, grainy clay matrix. The whole fabric is highly calcareous. The likely cause of this appearance is firing in excess of *c* 700°C. Microscopically, the field of view is dominated by fragments of fine-grained limestone, fossil shell, and oolites (some fragments up to 1.5mm across). Among the rock fragments are a few angular grains of quartz up to 0.75mm across and a few clay pellets rich in iron.

The source of this fabric cannot be determined with certainty, but it would be compatible with one of the numerous small pockets of Cotswold calcareous clay. All sherds of this group are intensely refired to a bright red colour throughout. The surfaces had been well smoothed.

The larger fragments in fabric 4 (Fig 157: 34) represent a vessel with a simple rim, a relatively long and straight neck, and a rounded shoulder. The diameter of this vessel could be between 130mm to 170mm. Body sherds include one probably from a cup (16932).

Fabric 5: flint-tempered sandy ware

(Slide N442, sherd 12432; Fig 157: 35)
This fabric has a sandy texture with sparse fragments of flint ranging from 1 to 5mm across. Two sherds assigned to this fabric have single fragments of limestone, possibly hinting at a Cotswold source, but no such rock was noted in the sample thin section. The clay matrix contains abundant sub-angular grains of quartz sand, much of it less than 0.5mm across, although there are occasional larger rounded grains. Mica flecks up to 0.4mm long and a considerable quantity of non-translucent iron ore fragments are also visible under the microscope.

A sample of clay taken from a surface outcrop of Fuller's Earth series strata in Lower Barrow Ground field at Hazleton provides a very good match for the matrix of fabric 5, although outcrops of similar materials extend for some distance from the immediate vicinity. The flint temper could either have been derived from knapping debris or from crushed glacial-drift pebbles (Richardson 1933, 84).

Fabric 5 is sharply differentiated from fabrics 1–4 by its hardness and resistance to chemical erosion. As a consequence, the sherds are in general larger and the conchoidal fractures very fresh; this is the only fabric group to include a number of sherds that can be conjoined (*see* Fig 155). Surfaces are well smoothed, with the flint inclusions usually concealed. The vessels were fired in a reducing atmosphere.

There are no rims in fabric 5. Most of the sherds seem to have belonged to a carinated vessel with a slightly concave neck (Fig 157: 35, and one small neck fragment, 12449). The conjoining body sherds (one group of three and one of four) come from this vessel. (A further join was found between the group of three and a sherd recovered from the south quarry.) A second, somewhat heavier, carinated bowl seems to be represented by a small fragment (13409), which lacks its inner surface.

One additional, unstratified piece (8197) probably came from the sub-cairn soil. The wall of this sherd is very thin (4mm), and the abundant sub-angular quartz grains, up to 0.75mm across, are considerably coarser than those found in fabric 5; there is no visible flint. A fragment (3370) from the south quarry fill has identical characteristics and might come from the same vessel.

Table 21 Neolithic sherds from the cairn periphery

Context no	*Fabric 1*	*Fabric 2*	*Fabric 3*	*Fabric ?5*	*Sand & chaff*	*Total no*	*Total wt in g*
3	–	–	–	1	–	1	1.9
3/4	3*	–	–	1	–	4	9.3
4	2*	–	–	1	2	5	12.5
4/211	1	–	–	–	1	2	2.8
24/211	1	–	–	–	–	1	1.1
211	4	1	1	–	–	6	17.6
Totals	11	1	1	3	3	19	45.2

Note: *One sherd from each of these figures is only tentatively identified as fabric 1.

Sherds from the cairn periphery

A total of 19 sherds came from contexts around the periphery of the cairn (Fig 155 and Table 21).

All of these sherds were thought by the excavator to derive from deposits potentially equivalent to the pre-cairn surface, although one of the fabric types in this group, represented by three sandy fabric sherds showing elongated voids left by burnt-out organic substances, is not otherwise present in the pre-cairn pottery assemblage. These three sherds, all from beyond the western limit of cairn spread, could be of post-Neolithic date. Most of the 19 sherds are small featureless body fragments, several being refired. Exceptions are a small fragment (687) from a neck and the angle of a shoulder in a fabric similar to, or identical with, fabric 5, a neck and carination from a fabric 1 vessel (Fig 156: 12), and a simple rim (Fig 156: 23) of fabric 2, probably from a cup.

Sherds from the cairn fabric

Single body sherds were recovered from each of three primary dumps (contexts 210, 309, and 446). A fourth was found among horizontally-piled slabs adjacent to the south chamber (context 390).

Fabrics 1–4 are represented. A very small sherd of fabric 5 was found in the axial construction (context 444) near the base of the cairn. All of these sherds relate to the cairn construction phase, but in each case they are likely to be residual from the pre-cairn activity.

Pottery associated with use of the monument

Chambered areas

The only Neolithic sherds associated with the burials were the large conjoining fragments from the lower fills of the south chamber and passage (Fig 121), which form a virtually complete, undecorated cup (Fig 157: 33).

It is assumed that this vessel was originally complete within the chambered area. The rim diameter is about 100mm, the height about 80mm, and weight approximately 260g. Variations in profile and markedly uneven surfaces, with unobliterated finger-indentations on the upper part, suggest that this is a 'thumb-pot', fashioned from a single ball of clay.

The fabric is soft and very friable; both surfaces are reddish-brown in colour with darker patches. Visible inclusions comprise unevenly-distributed particles of shell, generally 2–3mm across, occasionally up to 7mm. No calcite, oolites, or limestone were seen, but the shell appears to be fossil in origin. Both fabric and firing are like fabric 3 from the pre-cairn surface; thin-sectioning has not been undertaken.

Bottom of the south quarry

A decorated vessel (Fig 157: 32) represented by 118 sherds (weight 349g) came from the hearth (context 40) on top of the primary fill of the south quarry. The absence of any sign of refiring suggests that the sherds had been placed in ashes that were already cold.

The everted rim, enlarged by the application of a separate coil to the top and inner surface, is around 240mm in diameter and decorated with deep, closely-spaced transverse incisions, 1mm wide, which extend to variable depths on the interior surface. The surviving part of the upper body profile suggests a bag-shaped vessel; none of the body sherds shows any indication of a carination. Outer surfaces are a dusky red in colour; inner surfaces display occasional dark patches. The fabric (3a) is soft and very crumbly, with ragged fractures.

Fabric 3a: limestone and bone temper

(Slide N443, sherd 3028; Figs 157: 32; 158)
This fabric is similar to fabric 3, but is distinguished by fragments of bone, seemingly combined with the limestone-tempered clay as an additional tempering agent. In thin section, the clay matrix can be seen to contain a little mica, occasional angular quartz grains up to 0.3mm across, and a few iron-rich clay pellets. Some of the limestone fragments include oolites. Both the limestone additives and the clay could have been obtained from the periphery of the limestone outcrops near Hazleton. Two of the larger bone fragments were sent to D R Brothwell, who kindly submitted the following report:

> 'Two small fragments of bone were received. They were removed from the pottery fabric and had therefore received the same firing temperature as the clay of the vessel. Thus, the bone was grey and modified by heat. The condition of the bone was good, however, and did not show warping and typical cremation fissuring. At first glance, the pieces of bone look like shaft fragments, but on closer examination it was evident that only one displayed characteristic dense cortical bone. Figure 158: a and b show this cortical bone at two magnifications (using a scanning electron microscope). These contrast with the SEM details of the second piece (Fig 158: c and d), which seem to indicate an odd cancellous or porotic cortical bone. Identifying these fragments to species is at present an impossible task, although an attempt was made to establish with more certainty their human/non-human status. Why the second piece appears to be so unusual is not clear, although it might indicate a disease process, or it might perhaps be immature bone. Probably both fragments are non-human, and there seems little doubt that the second piece is.'

Two body sherds, indistinguishable in fabric and condition from those of fabric 3a and presumably from the same vessel, were recovered separately from the upper quarry fill (contexts 212 and 565) at distances of 4 and 10m respectively from the hearth. A further two sherds came from context 166, associated with context 40. (These four sherds are included in the total of 31 sherds from miscellaneous quarry fills in Table 23.)

Sherds associated with the decay of the monument

Upper fill of the south chamber and adjacent areas

A single unstratified sherd came from the top of context 11 in the entrance; a further 16 sherds came from contexts 9, 268, and 287 in the chamber (Fig 159 and Table 22). There are no sherds with features; most are very small and two have been refired.

Although generally more weathered, these fragments are not macroscopically distinguishable from those attributed to fabrics 1–3 as found in the sub-cairn assemblage. Context 10, the fill of a possible disturbance (*see* p82), produced a further 19 small sherds, again abraded, including four refired examples. A sherd from an everted rim (Fig 156: 5) and 15 of the body sherds can be assigned to fabric group 1. The remaining three fragments, little more than crumbs, probably belong to fabric groups 2 and 3.

A further group of 20 sherds found in the topsoil (context 2), mostly overlying or near the south chamber (Fig 159), possibly derived from context 10. Several of these sherds retain traces of redeposited calcium carbonate like that present on sherds from the chamber fill. Fabric group 1 is again predominant; the 16 sherds include two rims (Fig 156: 4 and 6), which could have belonged to the same vessel as the rim (Fig 156: 5) from context 10. There is also a refired sherd from a neck (Fig 156: 14). The remaining body sherds correspond with fabric group 2.

All the above sherds and their contexts are itemised in Table 22. It seems likely that they form an associated group and that they are residual. In view of the overall similarity between this group of sherds and the pottery from the pre-cairn surface, and bearing in mind the almost total absence of pottery from the burial deposits, it can be suggested that these sherds are somehow derived from a pre-cairn context.

Table 22 Pottery from the upper fill of the south chamber and adjacent areas (*see* Fig 159)

Context	*Fabric 1 sherds*		*Fabric 2 sherds*		*Fabric 3 sherds*		*Totals*	
no	*no*	*wt*	*no*	*wt*	*no*	*wt*	*no*	*wt*
2	16	29.1	4	8.4	–	–	20	37.5
9	2*	3.4	–	–	1	0.8	3	4.2
10	16	17.4	1*	0.2	2*	1.2	19	18.8
11	1	0.6	–	–	–	–	1	0.6
268	4*	6.2	4*	7.6	4*	4.0	12	17.8
287	–	–	–	–	1*	0.1	1	0.1
Totals	39	56.7	9	16.2	8	6.1	56	79.0

Note: All weights given in grams. *These figures include very small sherds only tentatively assigned to a fabric group.

Upper fills of the quarries

A single sherd of Neolithic pottery from the north quarry appears to belong to fabric 1 (Table 23).

Apart from the vessel and stray sherds from context 40, all the Neolithic pottery from the south quarry matches that from the sub-cairn soil and appears to be residual from pre-cairn activity.

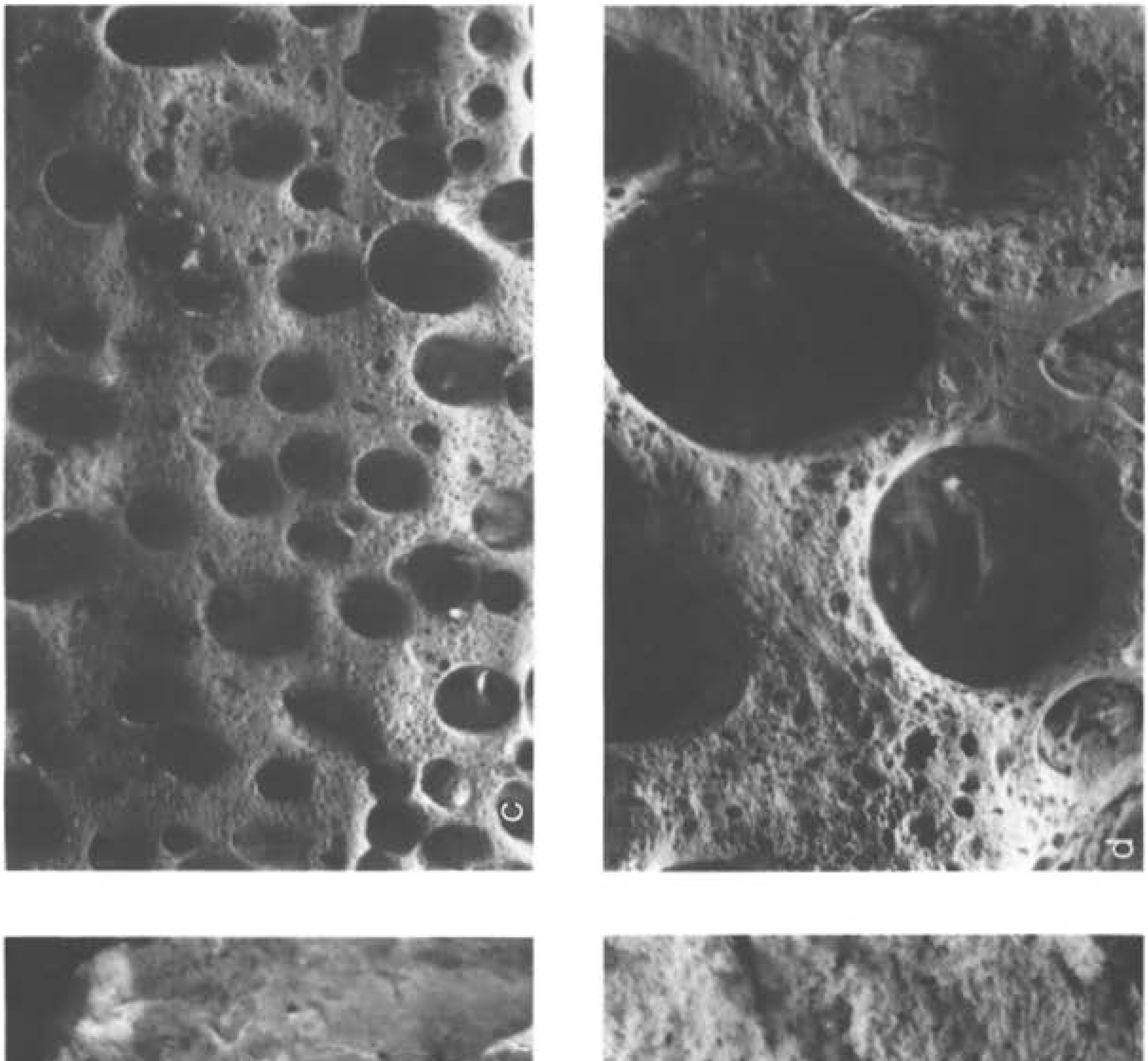


Fig 158 Bone temper from vessel in south quarry: first fragment, cortical bone, (a) general view of fractured surface ×50, (b) close-up of fractured cortex with typical haversian systems ×200; second fragment with unusual morphology, (c) general view of 'porotic' appearance ×50, (d) close-up ×200 (SEM photos: Keith Dobney)

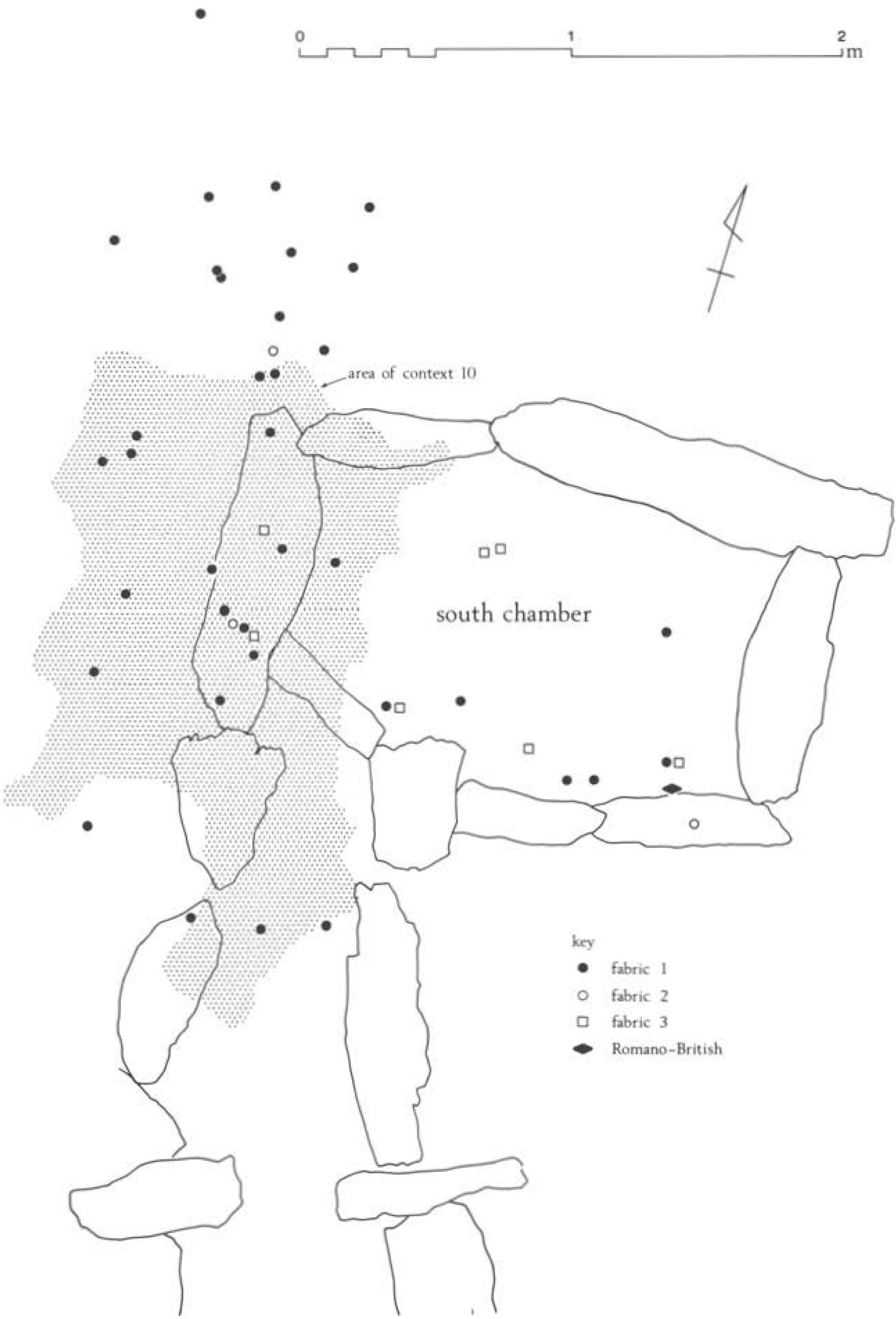


Fig 159 Horizontal distribution of pottery from the upper fill of the south chamber and adjacent contexts

Direct evidence is afforded by the conjoining fabric 5 body sherds (Fig 155), one from the quarry, the other three from the sub-cairn soil. Another body sherd from the upper fill (context 563) is so similar to an otherwise unique sherd (unstratified, but probably from the pre-cairn surface) as to suggest that both belonged to the same vessel. Other resemblances to the pre-cairn pottery are that the fabrics are much the same, with fabrics 1–3 positively identified. No large pieces indicate direct deposition of newly-broken pots. The only feature sherds are two simple rims from context 563 (Fig 156: 3 and 22) and belonging respectively to fabrics 1 and 2. Figure 156: 3 is from a bowl with a rim diameter of about 140mm.

Most of the south quarry sherds are clustered in a restricted area which might suggest derivation from a single episode of edge collapse. This distribution is likely to be biased by the differing excavation conditions; those sherds from the south edge of the area were found during careful hand-digging under dry conditions.

Table 23 Neolithic pottery from the quarry fills

	South quarry				*North quarry*			
	primary fills		*tertiary fills*		*secondary fills*		*Totals*	
Fabric	*no*	*wt*	*no*	*wt*	*no*	*wt*	*no*	*wt*
1	1*	2.0	14*	57.1	1*	1.5	16	60.6
2	–	–	2*	6.6	–	–	2	6.6
3	1	4.2	2*	0.8	–	–	3	5.0
3a	120	350.6	2	7.3	–	–	122	357.9
4	–	–	1*	0.7	–	–	1	0.7
5	–	–	1	7.5	–	–	1	7.5
unclass	1	1.2	3	5.1	–	–	4	6.3
Totals	123	358.0	25	85.1	1	1.5	149	444.6

Key to context numbers and types:
Fabric 1: primary (328), secondary (63), and tertiary (3, 563, and 566)
Fabric 2: tertiary (563)
Fabric 3: primary (214/215) and tertiary (563)
Fabric 3a: primary (40 and 166) and tertiary (212 and 565)
Fabric 4: tertiary (563)
Fabric 5: tertiary (unstratified)
Unclass: primary (46) and tertiary (563)

Notes: All weights given in grams. *These figures include very small sherds only tentatively assigned to a fabric group. It is possible that some of the tiny fabric 1 sherds from the south quarry (contexts 563 and 566) could belong to fabric 6 and could, therefore, be of Iron Age date. The fabric 5 sherd from the tertiary fill of the south quarry conjoins with a sherd from the sub-cairn soil.

Discussion of the pottery from Hazleton

The pottery from Hazleton North makes a valuable, if modest, contribution to knowledge of Neolithic culture in Gloucestershire and throughout the region of Cotswold-Severn tombs. The ceramic refuse, presumably domestic in origin, that had been discarded before construction of the tomb, *c* 2990 uncal bc, has specific stylistic links with pre-cairn assemblages from two other laterally-chambered tombs in Wales and in Oxfordshire. The two vessels deposited during the period of mortuary use, by or before *c* 2875 uncal bc, comprise a simple cup from the south chamber and, from the hearth in the south quarry, the remains of a large bowl that finds close parallels in pottery from Cotswold-Severn tombs in Wales.

Pre-cairn pottery

The pre-cairn pottery consists primarily of the 264 sherds sealed beneath the structure; they include 36 feature sherds (from rims, necks, and/or carinations), which are estimated to represent a minimum of 25 individual vessels (Table 24). Three small groups of fragments recovered from other contexts – the periphery of the cairn (Table 21), the upper fill of the south chamber and adjacent areas (Table 22), and the south quarry (Table 23, but excluding fabric 3a sherds) – bear so close a resemblance in physical condition, fabric composition, and morphology to the pottery underlying the cairn as to warrant the assumption that all had originally formed one assemblage. The displaced material includes nine feature sherds, probably from seven separate vessels, thus raising the minimum number to 32 (Table 24).

The general standard of manufacture is seen to have been high: walls are relatively thin and even, and surfaces had mostly been well smoothed, with traces of burnish occasionally surviving. The limestone-tempered and oxidized fabric 3 vessels are somewhat less well-formed and finished than the dark-faced fabrics 1, 2, and 5.

As set out in Table 24, 18 of the 32 vessels have been recognised from rim sherds alone, 12 from neck and/or carination fragments, and only two retain complete rim and neck profiles. These last represent bipartite vessels of different types. The rim of the necked bowl (Fig 156: 18) is just perceptibly enlarged and the slightly concave neck has broken off at its junction with a globular body; the greatest diameter of this vessel would have been at mid-height. The original proportions of the shouldered bowl (Fig 157: 34) are uncertain: the diameter at the simple rim can only be estimated as within the range 130–70mm. In any case, the straight neck indicates that the diameter at the rounded shoulder would have matched that of the rim.

Other sherds from bipartite bowls include a further three with straight necks and either a rounded shoulder (Fig 156: 12) or a crisp, if unemphatic, carination (Fig 156: 15; Fig 157: 35). Bolder profiles with concave necks and pronounced carinations are also present (Fig 156: 13 and 17); detached neck sherds are markedly concave (Fig 156: 14, 16, and 25). Some carination fragments are too small to provide

Table 24 Neolithic feature sherds from the sub-cairn soil, the cairn periphery, and contexts associated with the decay of the monument

	Rim and neck	*Neck/ carination*	*Rim only*	*Totals*
fabric 1	–	6	8	14
fabric 2	1	2	5	8
fabric 3	–	1	5	6
fabric 4	1	–	–	1
fabric 5	–	3	–	3
Totals	2	12	18	32

Note: The numbers given are estimates of the minimum numbers of vessels represented by the feature sherds.

further information about form (Fig 156: 24 and 31). In all, carinated and shouldered bowls comprise about 40% of individually-recognised vessels.

Some of the rims presumably belong to bipartite bowls – perhaps Figure 156: 3 and 19, and the conjoining sherds Figure 156: 21, evidently from an open vessel. Rolled rims (Fig 156: 1 and 7) and some that are everted (Fig 156: 2 and 20) may come from simpler bowls, perhaps with some degree of constriction at the mouth. Upright rounded or pointed rims with diameters of the order of 100mm (Fig 156: 8, 9, 10/11, and 23) represent at least four cups. The dominant characteristic of these and of other rims, which are too small or indeterminate to indicate vessel form, is lightness and simplicity; only one specimen (Fig 156: 7) might be considered 'heavy', and any elaboration has been achieved almost entirely by manipulation rather than enlargement.

The reconstruction offered for Figure 156: 29 suggests a shallow, saucer-like original with strongly-everted rim. The flaring profile and apparent proportions (rim diameter to inferred depth is roughly 4:1) are difficult to match in contemporary assemblages. Perhaps the nearest approximations are to be found in two shallow, carinated bowls from Carn Brea, Cornwall (Smith 1981, 166–8, P50 and P78). However, the sherds from Hazleton are so irregular as to raise doubts about their reliability as a sample of the whole vessel.

That problematic vessel apart, all of the forms – cups, bag-shaped bowls with rolled or everted rims, necked bowl, and carinated or shouldered bowls – can be matched more or less exactly in the larger and more varied assemblages of plain pottery from Maiden Castle, Dorset (Wheeler 1943, figs 26, 27, 30, 35) and Windmill Hill, Wiltshire (Smith 1965, figs 14–15, 17–19). These assemblages, however, are also characterised by the presence of many vessels with lugs or handles, and carinated bowls are numerically insignificant. Hazleton is differentiated from them by the apparent absence of lugs and, more decisively, by the high proportion of carinated bowls: a feature which also distinguishes several other small assemblages from the area of the Cotswold-Severn tombs.

Perhaps the most detailed resemblance is to be found in the pottery from a possible Neolithic quarry at Cherhill, Wiltshire (Evans and Smith 1983), situated on the western edge of the Avebury group of chambered tombs and about 6km from Windmill Hill. At least 9 of the 23 vessels had carinations or shoulders; simple cups and a ?necked bowl were present; rims were predominantly light; and lugs and decoration were absent. The single radiocarbon determination of 2765±90 uncal bc (BM–493) suggests contemporaneity with the main period of activity at Windmill Hill. The original discussion of the Cherhill pottery (Evans and Smith 1983, 91 and 112) centred around an attempt to explain away the obvious differences from the pottery in use at the nearby causewayed enclosure. Now, it appears that Cherhill's affinities may lie with the tradition manifested by the pre-cairn pottery found not only at Hazleton, but also beneath at least two other tombs with lateral chambers: Ascott-under-Wychwood and Gwernvale.

At Ascott-under-Wychwood, Oxfordshire, around half of the pre-cairn vessels are carinated (D Benson pers comm); more detailed evaluation of the pottery and chronology must await publication of the excavations. The 17 vessels attributed to pre-cairn activity at Gwernvale, Powys, include at least five, and possibly eight, carinated bowls, four of them partly reconstructed to show light rims, open profiles, and moderately-concave or straight necks (Britnell 1984a, 97–105). Sherds from one of the bowls were in a pit with charcoal dated 3100±75 uncal bc (CAR–113; Table 97). The assemblage also included hemispherical bowls with heavy rims. So far as can be judged, there are no important differences of form between the carinated bowls at Hazleton and at Gwernvale; those from the latter site are attributed by Lynch (*in* Britnell 1984a, 106–10) to her 'Irish Sea Group', which is considered to represent a 'western' style within the earlier Neolithic pottery of Wales and is typified by the bowls from the portal dolmen of Dyffryn Ardudwy, Gwynedd (Powell 1973). The non-carinated vessels from Gwernvale are referred by Lynch to an 'Abingdon' or 'English' tradition; there are few points of resemblance to the non-carinated bowls from Hazleton.

A third Cotswold-Severn tomb, ill-recorded but apparently also of the type with lateral chambers, is relevant to this discussion. The sherds from the 1867 excavation of Cow Common long barrow, Gloucestershire, comprise five light, everted rims, three or four of them large enough to show that they belonged to bowls with concave necks (Darvill 1984a, 86 and fig 2). Greenwell's account (1877, 514) specifies that the sherds were found 'towards the west end of the mound, and not much below its surface'. While the circumstances allow speculation that the sherds may constitute debris of an earlier occupation incorporated in the mound, the positive evidence that they did not come from a chamber may be significant in view of the absence of carinated bowls from 'period-of-use' deposits at Hazleton and Gwernvale and their rarity in equivalent contexts elsewhere in the Cotswold-Severn tomb region (noted by Lynch *in* Britnell 1984a, 108).

Sites in north Somerset and south-west Cornwall have also produced pottery which could be included without difficulty under the current definition of the 'Irish Sea Group'. The seven or nine plain carinated and shouldered bowls distributed along the course of the Sweet Track in the Somerset Levels (Kinnes 1979; Smith 1976) are dated within the period *c* 3330–3118 uncal bc on the basis of multiple radiocarbon determinations obtained from structural components of the track (Orme 1982, 12). The large Cornish assemblage from the settlement at Carn Brea, already established before 3049±64 uncal bc (BM–825), comprised some 38% carinated bowls (Smith 1981). Some of them seem typologically identical with examples from Cow Common or Dyffryn Ardudwy, yet were in use with, and made of exactly the same fabric as, non-carinated bowls of classic 'Hembury' or 'south-western' style.

Finally, finds from Cannon Hill, near Maidenhead, Berkshire (Bradley *et al* 1975–6) show the presence in the Thames Valley of potters producing fine carinated bowls similar to those from Gwernvale and the other sites mentioned above, as well as to the Grimston-style type specimens from eastern Yorkshire (Newbigin 1937, fig 1: 1–3). Associated forms included simple cups and tall carinated jars which are difficult to match elsewhere.

These circumstances hint at the complexity of the cultural relationships that may be expressed in the pre-cairn pottery from Hazleton; until a clearer pattern emerges any attempt to apply a stylistic label would be premature. Perhaps the most interesting aspect is that in this tomb, as in others, the carinated bowls that were so important in the pre-cairn phase found no place in mortuary usage.

The diversity of forms and of fabric types identified within the pre-cairn pottery would seem appropriate for a domestic assemblage designed to serve a variety of purposes. Analysis has shown that different tempering materials had been added in various combinations to a range of clay types. Assuming that these variations reflect choices related to the intended functions of the pots, it may be possible to recognise three subdivisions of the fabric range:

1 fabrics containing materials with good refractive properties, capable of withstanding thermal shock and thus useful for cooking-pots, eg fabrics 1 and 5
2 fabrics with porous inclusions which would allow slow evaporation through the vessel walls and thus be suitable for keeping liquids cool or for storing solid foodstuffs, so that they can 'breathe', eg fabrics 3 and 4
3 with both types of inclusion for more general usage, as fabric 2.

Although there are no exclusive correlations between specific vessel forms and fabric types at Hazleton, most noticeably in the case of the carinated bowls which were certainly made in four of the Neolithic fabrics (Table 24) and probably in the fifth as well, correspondences between forms and fabrics could be found at Gwernvale (Darvill *in* Britnell 1984a, 110–13). Broadly similar mixtures of fabrics occur at Ascott-under-Wychwood (D Benson pers comm) and are characteristic of the pottery from causewayed enclosures, as at Peak Camp, Gloucestershire (Darvill in prep), Windmill Hill (Smith 1965, 43), and others in Wessex.

Investigation of potential sources of the raw materials represented in the pre-cairn pottery has indicated that most, if not all, would have been available within a few kilometres of Hazleton. Comparison with samples from other Early/Middle Neolithic sites in Gloucestershire brings out similarities as well as marked differences. As at Hazleton, calcite-tempered ware formed the largest component of the pottery from Peak Camp (Darvill in prep), but, although the tempering was essentially the same, the clays used were not. Clays local to the Birdlip area of the Cotswold scarp are represented at Peak Camp, and clays putatively local to the Andoversford-Northleach area of the Cotswold interior were used at Hazleton. In contrast, limestone-tempered wares, which comprised the second-largest component at both of these sites, were very similar in the range and nature of the additives and in the clay used. Whether or not the same sources were exploited for both sites is impossible to say in view of the wide distribution of the relevant clay outcrops.

Pottery associated with the use of the tomb

The pottery apparently contemporary with the use of the monument comprises only two vessels: the cup from the south chambered area and the more fragmentary pot from the hearth in the south quarry.

The cup (Fig 157: 33) had presumably been placed intact, perhaps containing food or drink, with one of the earlier inhumations. The limestone-tempered ware is similar to fabric 3 of the pre-cairn pottery, not only in the character of the inclusions, but also in the firing and the poor quality of the finish. The fragments of pre-cairn cups, none made of fabric 3, had thinner walls and seem to have been more refined than this specimen with its irregularities of profile, wall-thickness, and surfaces. As a roughly-modelled 'thumb-pot', it represents a minimum expenditure of effort, time, or skill. The type is stylistically insensitive, because of its simplicity and its recurrence in virtually every sizeable Early or Middle Neolithic assemblage.

The pot from the hearth in the south quarry (Fig 157: 32) had been a capacious bag-shaped vessel, with a rim diameter of some 280mm and probably an equal depth. The fabric (3a) is tempered with limestone and a large quantity of calcined bone: the texture is therefore porous. Size and fabric type may suggest suitability for storage, although the present friability of the ware may indicate original weakness. The enlarged rim, with a profile that is markedly angular in places, has been turned upwards as well as outwards; the resulting broad internal bevel is decorated with transverse incisions. A relationship between this well-developed rim and some of those among the pre-cairn pottery (eg Fig 156: 2 and 5) is difficult to establish because the earlier ones are so fragmentary and lack enlargement. The heavy form and decoration may suggest affinity with the Abingdon style. However, the data presented in the recent comprehensive analysis of the pottery from the type-site (Avery 1982, 26–35) are not entirely encouraging. Transversely-incised rims are shown (under the heading 'vertical line') to comprise only 9% of all decorated rims. The form of the Hazleton rim could perhaps be accommodated within the rim category 'A2: angular out-turned', comprising 10% of all rims. Yet the illustrations show that in the case of the nominated exemplar and others that seem to conform to the description, the outwardly-projecting rim lies horizontally: only one or two have internal bevels.

This might seem to be a trivial distinction were it not that the vessel in Figure 157: 32 does find good counterparts elsewhere. There are at least four examples from Windmill Hill, one plain and three decorated (Smith 1965, P7, P136, P159, and P223), and the form is well-represented in Wales, where it is usually undecorated. At Gwernvale, there is a particularly thick example from a pre-cairn context (Britnell 1984a, fig 37: 1) and a thinner version from the blocking of the cairn (fig 41: 25). The form in question would, therefore, seem to have been current in the vicinity of Gwernvale for potentially half a millennium (*see* Table 97). Two further examples come from Ty-isaf, Powys: one from Chamber II and the other from its entrance passage and possibly, therefore, from a blocking context (Darvill 1982, fig 3: F; Grimes 1939, fig 6: 1–2). One of the specimens from the settlement at Clegyr Boia, Dyfed (Williams 1953, fig 12: 31–32) is decorated with transverse strokes and seems very close to the Hazleton vessel. At these Welsh sites, other heavy rims may conform more nearly to the classic Abingdon types as now defined (Avery 1982, table 3), but continued reference back to that particular style may hinder recognition of regional individuality to the west.

A separate and unusual feature of the vessel in Figure 157: 32 is the bone temper. It is perhaps surprising that this material seems to have been used so rarely in view of its ready availability and obvious advantages over rock tempers, at least for some purposes. The few instances known to the writers of the use of bone in Neolithic and Beaker pottery from Britain and Ireland are listed below. Whether these instances result from occasional experimentation or systematic practice is not clear. However, it is virtually certain that many examples have escaped recognition because the bone has been so finely comminuted as to be identifiable only in thin section, as with the sherds from The Breiddin and The Grange stone circle.

Known bone temper in Neolithic and Beaker pottery in Britain:

1 Hazleton North, Gloucestershire: Figure 157: 32
2 Robin Hood's Ball, Wiltshire: one sherd said to contain bone and flint (Thomas 1964, table I)
3 Avebury, Wiltshire: sherd from ditch of the henge monument submitted to Reid, who reported that the 'grout' consisted mainly of burnt bone (Gray 1935, 138, note 1)
4 The Breiddin, Powys: sherd F3, ?Beaker; well-crushed fragments of a phosphatic material, provisionally determined as collophane, which could be fossil bone or lightly burnt bone – too small to allow precise identification (Darvill, unpublished data)
5 Carrowmore (tomb 27), Co Sligo: one sherd (Cleary 1984, 73, with further references; Hulthén 1984)
6 Creevykeel, Co Sligo: several sherds (Hulthén 1984, 208)
7 The Grange stone circle, Lough Gur, Co Limerick: Beaker sherd containing bone with maximum size of at least 1.5mm; identified by SEM/EDAX method and chemical analysis (Cleary 1984).

In addition to these sites in Britain and Ireland, bone has also been identified as a tempering agent in fourth and third millennium uncal bc pottery in Norway (Cleary 1984; Hulthén 1981), the Netherlands (Cleary 1984; Modderman 1981), Belgium (Cleary 1984; Hulthén 1984, 208), and northern France (Cleary 1984; Constantin and Courtois 1980).

Iron Age pottery

Fragments of two Iron Age pottery vessels were recovered from the tertiary fill (contexts 3 and 566) of the south quarry. One piece is a substantial portion (Fig 157: 36), representing about 20% of the circumference, of a flat base with a diameter of 140mm (fabric 6). The other is a featureless body sherd (fabric 7).

Fabric 6: abraded limestone tempered

(Slide N444, sherd 3695; Fig 157: 36)
This fabric contrasts with the limestone-tempered fabrics described above in that the inclusions are mostly rounded and occur as rock fragments rather than as separate detritus components. This is very clear in thin section, where oolites do not appear singly, but only in clusters tightly bound together by calcareous cement. Fragments of shelly limestone and occasional pieces of calcite are also present. The additives fall into the size range 1.0–2.5mm. The groundmass is slightly micaceous, with a sparse scatter of angular quartz grains up to 0.1mm across. A slightly laminar texture is evident when viewed under the microscope, suggesting poor mixing of the clay and additives. In general, this fabric is unlike the Neolithic ware with superficially similar petrology. A local origin is, however, likely.

Fabric 7: igneous and metamorphic rock tempered

(Slide N445, sherd 3647)
This fabric is characterised by the presence of angular fragments of igneous and metamorphic rock up to 4mm across. In thin section, these clasts are set within an anisotropic groundmass containing traces of divided calcareous matter. Angular quartz grains ranging in size from 0.05–0.19mm across and occasional rounded clay pellets up to about 1mm across are visible within the groundmass as components of the clay. The rock fragments are mostly composed of feldspar and quartz. Epidote, hornblende, and opaque iron ore were also noted, together with pyroxene and mica.

The source of this fabric is undoubtedly the same as Peacock's Group A Iron Age wares (Peacock 1968, 415), probably in the Malvern Hills area of Hereford and Worcester. The Hazleton site falls within the known distribution area of this ware, of which the most easterly findspots in Gloucestershire are at Bourton-on-the-Water and Lechlade (Saville 1984b, 157).

Pottery from Hazleton South

Four prehistoric sherds were recovered from the excavation of the north trench across Hazleton South (Fig 150), comprising three body sherds and a simple, rounded rim (1647). The macroscopically-visible inclusions comprise fossil shell, ooliths, and occasional limestone fragments; no calcite was observed. In fabric and firing, these sherds, which could all derive from a single vessel, are similar to fabric 3 sherds in the sub-cairn assemblage from Hazleton North.

10 Flint and chert artefacts

Introduction

A total of 5593 pieces (including chips and spalls) of struck flint and chert, weighing 5.87kg, was recovered from the excavated area of Hazleton North (Table 25). For an inventory of artefact contexts *see* Appendix 4 and for a concordance of illustrated pieces *see* Appendix 5.

The greater part of the collection comes from the sub-cairn soil, although this is much more pronounced by number than by weight. This is due to the high proportion of tiny chips from the buried soil, particularly as a result of wet-sieving, and also the two heavy cores (combined weight 900g) from the burial deposits. The pre-cairn assemblage is mirrored on a small scale by the flints from the monument construction, use, and decay. It is probable that the flints incorporated into these phases were residual from pre-cairn activity.

The artefacts associated with post-monument contexts do, however, provide some contrasts with those from the buried soil, especially the transverse and barbed-and-tanged arrowheads, the 'fabricator', and the larger number of scrapers. These arrowheads, and probably the 'fabricator', are implements which would not have been current before or during the use of the tomb, and they point to later Neolithic and Early Bronze Age activity at Hazleton, which is confirmed by the results of the surface survey (Appendix 7). Scrapers are not easy to date on typological grounds, but the greater number of them from the post-monument phase may imply the inclusion of examples which are of later Neolithic or Bronze Age date. Nevertheless, the assemblage is relatively free of later prehistoric material, and the pre-cairn material provides the opportunity of examining a stratified earlier Neolithic industry.

The pre-cairn assemblage can be subdivided according to the contexts of pieces either within the midden area; incorporated in feature fills; or generally scattered across the sub-cairn soil (Table 26). The midden area produced numerically about half of the total assemblage, although more numerous soil samples from the midden (Fig 12) have inflated the number of tiny spalls recovered. Since the early Neolithic date of the midden is established, the midden assemblage can usefully be compared with the rest of the pre-cairn material. A typologically Mesolithic component (microliths and microburins) is a significant element in the general scatter, but not so in the midden. On the other hand, a high proportion of the Neolithic polished fragments are from the midden (the proportions are reversed when considered by weight, however). Unclassified burnt fragments are also concentrated in the midden.

Table 26 suggests that the pre-cairn assemblage may be subdivided between separate Mesolithic and

Table 25 The total excavated flint assemblage: typology and phasing

	Phases (see key below)						*Total*	*Total*
Type	*1*	*2*	*3a*	*3b*	*4*	*5*	*no*	*wt in g*
unretouched flakes	4083	21	9	11	11	350	4485	2894.0
cores	18	–	2	–	–	3	23	1237.4
core fragments	9	–	–	–	1	3	13	152.0
serrated-edge flakes	1	–	–	–	–	1	2	2.2
edge-trimmed flakes	37	2	2	–	–	7	48	180.3
edge-gloss flakes	2	–	2	–	–	–	4	14.0
microliths	73	–	1	–	–	6	80	14.0
microburins	4	–	–	–	–	1	5	0.6
leaf-shaped arrowheads	2	–	1	–	1	3	7	4.9
transverse arrowhead	–	–	–	–	–	1	1	1.8
b-and-t arrowheads	–	–	–	–	–	2	2	7.7
scrapers	5	–	–	–	–	14	19	198.2
piercers	5	–	–	–	–	3	8	41.9
burins	1	1	–	–	–	1	3	30.5
polished implement frags	48	–	–	–	–	1	49	73.6
laurel leaf	1	–	–	–	–	–	1	6.0
unclassified bifacial	–	–	–	–	–	1	1	6.4
worn-edge flakes	3	–	–	–	–	–	3	16.5
'fabricator'	–	–	–	–	–	1	1	34.4
pièce esquillée	1	–	–	–	–	–	1	1.4
miscellaneous retouched	32	–	–	2	2	32	68	423.9
unclassified burnt frags	723	2	3	3	2	36	769	524.6
Numerical totals	5048	26	20	16	17	466	5593	
Numerical percentages	90.3	0.5	0.3	0.3	0.3	8.3		
Total weight in grams	3734.0	58.2	985.5	12.3	49.9	1026.4		5866.3
Percentages by weight	63.6	1.0	16.8	0.2	0.9	17.5		

Key to phases
1 pre-monument (context nos 4/211, 155/211, 157/211, 211, 211/301, 349, 437, 452/453, 453, 471, 474, 481, 483, 484, 561)
2 monument construction (context nos 261, 261/309, 269, 278, 286, 293, 297, 309, 377, 390, 420, 442, 444, 479)
3a monument use, chambers (context nos 11/354, 267, 323, 336, 353/354, 354, 412, 435)
3b monument use, quarries (context nos 54, 55, 57, 66, 91, 166, 213, 221/223, 327, 573)
4 monument decay (context nos 8, 12, 95, 157, 162, 230, 268, 272, 301, 338/568)
5 'post-monument' (context nos 1, 1/2, 2, 2/4, 3, 3/4, 4, 5, 10, 10/187, 41, 47, 89, 90, 145, 159, 193, 209, 212, 472, 480, 563, and unstratified)

Table 26 Mesolithic and Neolithic flints from the sub-cairn soil

Type	Midden no	Midden wt	Elsewhere no	Elsewhere wt	Totals no	Totals wt
unretouched flakes	1913	933.9	2170	1439.0	4083	2372.9
cores	5	99.1	13	167.9	18	267.0
core fragments	1	17.8	8	77.7	9	95.5
serrated-edge flake	–	–	1	2.0	1	2.0
edge-trimmed flakes	10	46.1	27	88.5	37	134.6
edge-gloss flakes	1	5.0	1	4.2	2	9.2
microliths	6	1.5	67	10.2	73	11.7
microburins	1	0.1	3	0.5	4	0.6
leaf-shaped arrowheads	–	–	2	1.1	2	1.1
scrapers	2	29.0	3	50.9	5	79.9
piercers	1	2.1	4	18.3	5	20.4
burin	–	–	1	19.9	1	19.9
polished implement frags	31	32.4	17	39.6	48	72.0
laurel leaf	–	–	1	6.0	1	6.0
worn-edge flakes	–	–	3	16.5	3	16.5
pièce esquillée	1	1.4	–	–	1	1.4
miscellaneous retouched	9	34.1	23	142.2	32	176.3
unclassified burnt frags	431	279.8	292	167.2	723	447.0
Totals	2412	1482.3	2636	2251.7	5048	3734.0
(percentage)	(47.8)	(39.7)	(52.2)	(60.3)		

Notes: All weights given in grams. The 'elsewhere' totals include the following flints from the fills of sub-cairn features: 42 unretouched flakes, wt 25.3g, and 9 unclassified burnt fragments, wt 1.1g.

Neolithic foci. Subsequent analysis confirms this (Figs 170 and 173), with the Neolithic focus provided by the midden and the Mesolithic focus by the area subsequently occupied by the forecourt and south horn. The typologically-diagnostic artefacts are however widely dispersed (Figs 162–3); for example, microliths and a microburin occur within the midden area. 'Horizontal stratigraphy' does not provide a rigid separation between Mesolithic and Neolithic components, therefore, and the potential mixture of both must be borne in mind.

Every flint was examined (if necessary under a 10× binocular microscope), catalogued, and weighed; this primary information forms part of the excavation archive. The present report gives an account of the raw material and individual artefact types, followed by an analysis of the stratified material, including a refitting exercise, and a consideration of the wider correlations of the assemblage. The flints from Hazleton South and from surface survey are described in Appendices 6 and 7.

The raw material

The lithic assemblage is composed almost entirely of flint, the exceptions being an edge-trimmed flake of black chert (Fig 165: 17; context 442) and two unretouched flakes of grey chert (one from the midden, the other from the buried soil east of the midden). No obvious origin can be given for these cherts, but the virtual absence of chert shows its exploitation to be insignificant and probably incidental.

The flint normally has a flaked surface discoloured by incipient cortication to a pale grey, white, or cream from its basic, medium-grey appearance when fresh. The best indication of type and likely origin for the flint is given by the cores, especially when they retain some original cortex. At least two of the cores (Fig 169: 116–17) have characteristics which suggest the import of nodules from chalk locations in the east or more probably the south/south-east of England, and these nodules are likely to have been mined. Alternatively, some of the other cores and some implements retain areas of smooth, pebble-type cortex (Fig 171: 123), which suggest flint derived from gravel or boulder-clay deposits.

A few tiny fragments of heavily-rolled flint must be the result of natural transport during the Pleistocene or earlier. The Cotswold uplands, however, do not contain any naturally-occurring flint of a size or condition suitable for use by prehistoric knappers. It is therefore inevitable that any struck flint would have to have been imported to Hazleton. Cores and much other knapping debris on site indicate the direct import of nodules. The nearest possible source of knapping-quality flint would be from the glacial deposits of the Vale of Moreton, 20km (12.5 miles) north-east, but there is no direct evidence that any of the flint is from these deposits.

The Mesolithic knappers at Hazleton may well have had access to different flint resources than their Neolithic successors. The most diagnostic Mesolithic items, the microliths, cannot yield any data on their origin because of their lack of cortex, but the evidence available from the small number of definitely Mesolithic cores suggests a different surface source. For example, one of the Mesolithic cores, to which other pieces could be refitted, was worked on site from an imported gravel pebble (Fig 171: 123).

A distinctive flint type, cream to creamy-grey, and of a matt, almost cherty, appearance, occurred as a scatter on the buried soil, concentrated in the midden area. Three of the conjoining flake groups (Fig 171: 122, 126, and 128) are of this raw material, and there are at least seven other non-conjoining flakes. Four of the very small fragments from polished implements are of the same or very similar type. It may be that all the pieces of this distinctive flint result from the working of broken imported axeheads. The large number of polished flint axehead fragments from Hazleton, and generally from the Cotswolds (Tyler 1976), suggest that the exploitation of axeheads as a secondary flint resource may have been a significant factor in the region during the earlier Neolithic period.

Technology

The heavily-worn quartzitic pebble hammer (Fig 174: 5059) placed with the final burial in the north entrance is assumed to be a hammerstone used in flint-knapping, and this may be the case with the other quartzitic hammerstone (Fig 174: 15628) which was found in the subsoil just beyond the cairn edge (Chapter 11).

Only a couple of other pebbles from the site show any abrasion of the sort which could result from knapping, and the only positive evidence for the use of a flint hammerstone comes from a miscellaneous retouched piece (10923) with an abraded dorsal surface, suggestive of having been struck from a hammerstone.

From visual inspection, the flakes suggest the use of a mixture of hard and soft hammers (Ohnuma and Bergman 1982). None of the antlers or animal bones, however, showed any indication of use as knapping tools.

The assemblage

Unretouched flakes

The unretouched flakes, over 91% of which came from the buried soil, are dominated by tiny chips and spalls, as reflected by the low average weight (0.6g) of all complete and broken pieces combined. These tiny flakes are a natural concomitant of flint-knapping activity and will always be dominant in a collection from areas where knapping has taken place, assuming good preservation and favourable recovery techniques. Such conditions were present at Hazleton, where the overlying cairn had protected the flints on and in the buried soil, and where the silty, stonefree,

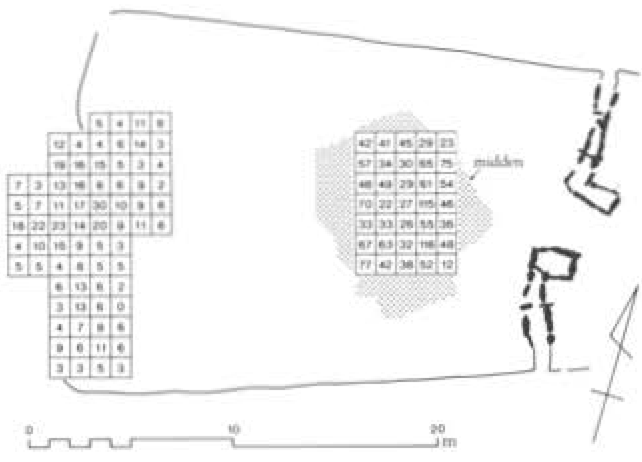


Fig 160 Location of unretouched flake samples from the sub-cairn soil: flake quantification by numbers per metre square

texture of this soil was conducive to the recovery of even tiny flakes by hand excavation. The wet-sieving of soil samples, particularly from the midden area, inevitably increased the number of small flakes, but at the same time demonstrated the success of hand excavation in recovering all but the most minute pieces. Most of the tiny flakes are difficult to characterise, but they presumably result from a mixture of primary knapping, secondary working and trimming, spontaneous retouch during knapping, and damage and breakage of larger pieces.

Two flake samples from the buried soil were analysed in detail: one from beneath the forecourt and south horn area (72sq m) and the other from the midden (35sq m). The areas selected were the two densest zones of flint scatter (Figs 160 and 170) associated with foci of Mesolithic and Neolithic activity respectively. The two samples (Table 27) contain 45% of all the unretouched flakes from the pre-cairn phase.

The unretouched flakes were initially separated into complete and broken examples (Table 28). The higher proportion of incomplete flakes among the midden sample is noticeable, which may relate to the presumably redeposited nature of the material of which the midden was composed. However, throughout this analysis it must be remembered that there is a bias because of the contribution of wet-sieving to the midden assemblage, which could be partly responsible for this and other contrasts.

The complete, unretouched flakes were subdivided (Table 29) on the basis of cortex retention or absence into the categories of primary (dorsal surface wholly cortical), secondary (dorsal surface partly cortical), and tertiary (non-cortical). Tertiary flakes are numerically dominant in both samples, but the tertiary:secondary ratio is reversed if the values for weight are considered. The consistently low mean weight of the flakes (1.6g secondary, 0.4g tertiary) is a further indication of their overall smallness, which is confirmed by the analysis of flake dimensions (Table 30).

For the reasons already given, the complete dominance of flakes shorter than 20mm was predictable. The very low numbers of flakes longer than 40mm are not unique in this kind of analysis (Saville 1981c, 113), but they do present practical problems for evaluation of the reduction strategies involved. The tiny flakes are not normally an intentional product for further use and are largely irrelevant to an investigation of preferred shapes and sizes, which might be expected to reveal factors of functional and perhaps cultural significance (*see*, however, the results of the refitting analysis, especially in the case of Mesolithic cores). This is confirmed when the size of the flakes used as blanks for implements is considered (Table 31).

Few implements, except the microliths, are under 20mm in length, but over half of the total are clustered in the 20–40mm range. Investigation of the shape of the unretouched flakes was therefore limited to those 20mm or over in length or breadth, using length/breadth index values (Saville 1980c, 18; 1981c, 147) and also length/breadth graphs (Fig 161), from which breadth:length ratios were extracted (Tables 32 and 33). Despite the small size of the samples, these analyses show that the flake populations have a significant tendency towards narrowness (Saville 1981d, 43), which accords with the ages of these assemblages and the known pattern of changes in flake shapes during the post-glacial period (Pitts 1978), although the average shape of flakes in the midden sample is towards the broad end of the expected range. More interestingly, there is a contrast between the two samples in this respect, since those flakes from the forecourt area contain a significantly higher proportion of narrow flakes. This contrast can be assumed to have a cultural/chronological dimension, in that the forecourt sample is expected to relate to Mesolithic activity. The technological explanation is presumably that the forecourt knapping primarily involved the reduction of microblade cores to produce small blades for microlith production, whereas the knapping represented by the midden sample involved the reduction of less specialised cores to produce a variety of blanks for larger implements.

The shape preferences revealed among the unretouched flakes should, if valid, be confirmed by the shapes of the implements from the same samples. There are relatively few complete implements from the pre-cairn assemblage against which this can be tested (Table 34), but the figures do at least confirm the use of

Table 27 Composition of the pre-cairn samples used for unretouched flake analyses (*see* Fig 160)

Type	*Forecourt* no	*Midden* no	*Total* no
unretouched flakes	503	1344	1847
cores	6	3	9
core fragments	1	1	2
edge-trimmed flakes	6	8	14
microliths	35	4	39
microburins	3	1	4
scraper	–	1	1
piercers	3	–	3
burin	1	–	1
polished implement frags	–	24	24
pièce esquillée	–	1	1
miscellaneous retouched	6	5	11
unclassified burnt frags	44	299	343
Totals	608*	1691+	2299

Notes: *Includes one unretouched flake reconstituted from two discrete fragments; a total of 609 pieces is shown on Figure 160. +Includes one unretouched flake reconstituted from two discrete fragments; a total of 1692 pieces are shown on Figure 160.

Table 28 Proportions of complete and broken flakes among forecourt and midden samples

	Forecourt no	%	*Midden* no	%	*Totals* no	%
complete	207	41.1	395	29.4	602	32.6
incomplete	296	58.9	949	70.6	1245	67.4
Totals	503		1344		1847	

Table 29 Unretouched flakes: cortex groups

	Forecourt				*Midden*				*Totals*			
Group	*no*	*(%)*	*wt*	*(%)*	*no*	*(%)*	*wt*	*(%)*	*no*	*(%)*	*wt*	*(%)*
primary	–		–		4	(1.0)	1.9	(0.7)	4	(0.7)	1.9	(0.4)
secondary	59	(28.5)	94.8	(61.9)	88	(22.3)	141.1	(51.7)	147	(24.4)	235.9	(55.4)
tertiary	148	(71.5)	58.3	(38.1)	302	(76.7)	129.9	(47.6)	450	(74.9)	188.2	(44.2)
Totals	207		153.1		394		272.9		601		426.0	

Notes: All weights given in grams. The figure of 394 midden flakes omits from the previous totals one tertiary flake which was not available for further analysis.

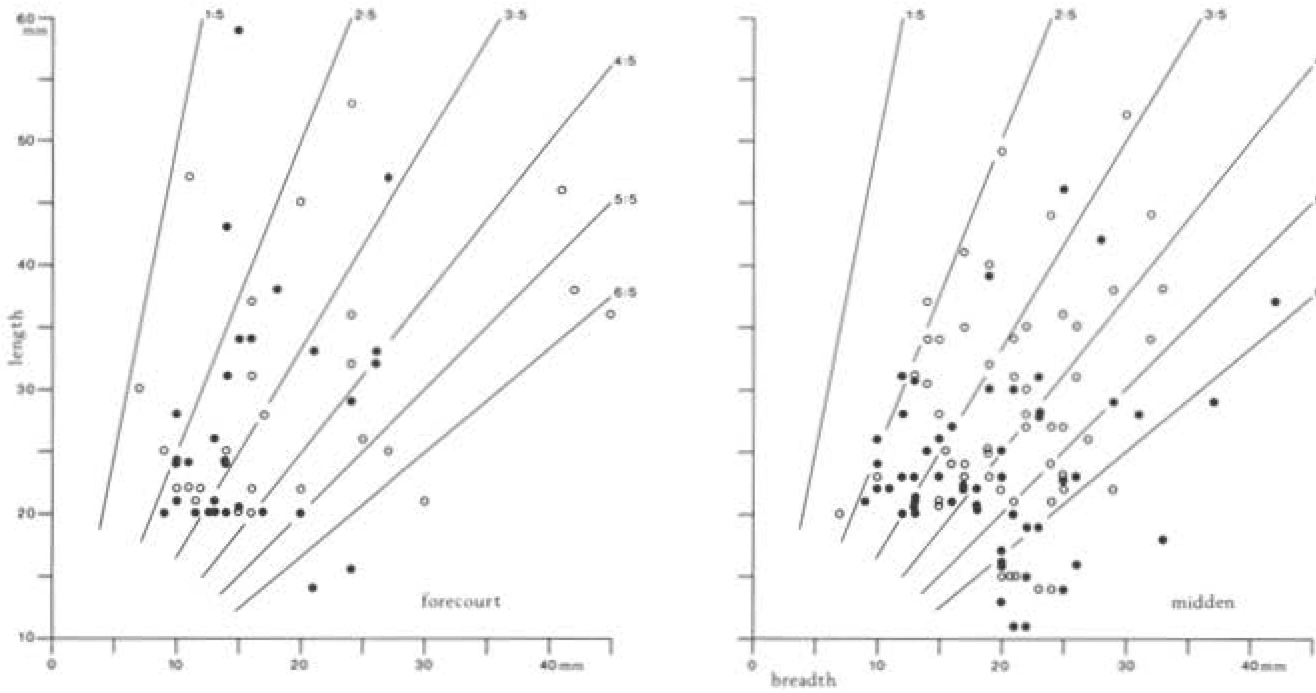


Fig 161 Length/breadth scatter diagrams for complete unretouched flakes (over 20mm in length or breadth) from the sub-cairn soil; closed circles = tertiary flakes, open circles = primary and secondary flakes

blades in the edge-trimmed flake, serrated-edge flake, piercer, and miscellaneous retouched categories, although they offer no real scope for the further investigation of suspected chronological divergence between the two flake samples.

Only two of the complete flakes in the forecourt sample, and only three from the midden sample, have faceted platforms, indicating the relatively-straightforward reduction practices involved. Four complete flakes from the midden sample, and another four from the forecourt sample, could be described as core rejuvenation flakes. Several highly distinctive flakes struck, either in error or as a rejuvenation procedure, from the faces of bladelet cores, were present in the forecourt area (Fig 165: 1–2).

Table 30 Unretouched flakes: length values

Length in mm	*Primary and secondary* *fore-court*	*mid-den*	*Tertiary* *fore-court*	*mid-den*	*Sub-totals* *fore-court*	*%*	*mid-den*	*%*	*Grand totals*	*%*
<10	10	14	66	159	76	36.7	173	43.9	249	41.4
10–19.9	24	31	54	101	78	37.7	132	33.5	210	35.0
20–29.9	14	24	18	33	32	15.5	57	14.5	89	14.8
30–39.9	7	17	7	7	14	6.8	24	6.1	38	6.3
40–49.9	3	5	2	2	5	2.4	7	1.8	12	2.0
50–59.9	1	1	1	–	2	0.9	1	0.2	3	0.5
Totals	59	92	148	302	207		394		601	

Cores

Only 23 cores are present in the entire assemblage, most of them from the sub-cairn soil (Fig 162). Tables 35 and 36 summarise the size and weight of the cores and their typology with reference to the surviving platforms (Clark 1960). The mean maximum dimension of the cores is 40.4mm, or only 36.5mm if the exceptional north entrance core (Fig 169: 117) is excluded. The mean weight is 53.8g, or 22.2g without the north entrance core, or as low as 16.0g, if both of the chambered area cores are excluded from the calculation. Analysis of the maximum surviving lengths of flake scars on the cores (Table 37) provides a complement to the data on the lengths of unretouched flakes and implements (Tables 30–31). Assuming the samples used for the data in each of these tables are representative, the conclusion must be that most cores reflect the use of initially small-sized pebbles for flaking (which in turn is likely to reflect the predominance of Mesolithic cores, *see below*).

Of the two large cores from the chambered areas, Figure 169: 117 certainly and Figure 169: 116 probably represent deliberately interred gravegoods. The size of these cores (126mm×750g and 66mm×150.9g) isolates them from those from all other contexts and relates both to the raw material involved and the amount of flaking. The size of nodule represented by Figure 169: 117, its thick, creamy-coloured cortex, and the unabraded and unsmoothed condition of the cortex all combine to suggest that the raw material is fresh chalk flint and an indication of the import of flint nodules

Table 31 Selected implement categories: length values

Length in mm	*Serrated-edge flakes*	*Edge-trimmed flakes*	*Edge-gloss flakes*	*Micro-liths*	*Leaf arrows*	*Scrapers*	*Piercers*	*Pièce esquillée*	*Miscellaneous retouched*	*Totals*
10–19.9	–	–	–	10 (8)	–	–	–	–	3 (2)	13 (10)
20–29.9	–	4 (4)	–	8 (7)	3 (1)	3	3 (2)	1 (1)	2 (2)	24 (17)
30–39.9	–	7 (3)	3 (3)	2 (2)	–	1	1	–	1 (1)	15 (9)
40–49.9	2 (1*)	2 (2)	1 (1)	–	–	3 (1)	1	–	2 (1)	11 (6)
50–59.9	–	5 (4)	–	–	–	1 (1)	1 (1)	–	2	9 (6)
60–69.9	–	–	–	–	–	–	–	–	1	1
70–79.9	–	1 (1)	–	–	–	–	–	–	–	1 (1)
Totals	2 (1)	19 (14)	4 (4)	20 (17)	3 (1)	8 (2)	6 (3)	1 (1)	11 (6)	74 (49)

Notes: The numbers of implements stratified in pre-cairn or chambered area deposits are given in parenthesis. *Includes the polished flake with a serrated edge.

Table 32 Unretouched flakes: length/breadth index values of complete flakes 20mm or more in length or breadth

Length/ breadth value	*Primary and secondary fore-court*	*Primary and secondary mid-den*	*Tertiary fore-court*	*Tertiary mid-den*	*Sub-totals fore-court*	*%*	*Sub-totals mid-den*	*%*	*Grand totals*	*%*	
<0.6	–	–	–	3	–	–	3	2.8	3	1.9	very broad
0.6–1.0	5	13	3	16	8	14.6	29	27.3	37	23.0	broad
1.1–1.5	7	21	9	15	16	29.1	36	34.0	52	32.3	medium/ broad
1.6–2.0	6	6	7	12	13	23.6	18	17.0	31	19.2	medium/ narrow
2.1–2.5	4	10	8	6	12	21.8	16	15.1	28	17.4	narrow
>2.6	3	2	3	2	6	10.9	4	3.8	10	6.2	very nar- row
Totals	25	52	30	54	55		106		161		

Table 33 Unretouched flakes: breadth/length ratio values of complete flakes 20mm or more in length or breadth

Ratios	*Primary and secondary fore-court*	*Primary and secondary mid-den*	*Tertiary fore-court*	*Tertiary mid-den*	*Sub-totals fore-court*	*%*	*Sub-totals mid-den*	*%*	*Grand totals*	*%*
1.5-2.5	3	2	3	2	6	10.9	4	3.8	10	6.2
2.5-3.5	9	13	14	14	23	41.8	27	25.5	50	31.1
3.5-4.5	6	17	7	13	13	23.7	30	28.3	43	26.7
4.5-5.5	3	10	4	6	7	12.7	16	15.1	23	14.3
5.5-6.5	2	4	–	8	2	3.6	12	11.3	14	8.7
>6.5	2	6	2	11	4	7.3	17	16.0	21	13.0
Totals	25	52	30	54	55		106		161	

Table 34 Selected implement categories: length/breadth index values of complete examples

Length/ breadth value	*Serrated-edge flakes*	*Edge-trimmed flakes*	*Edge-gloss flakes*	*Scrapers*	*Piercers*	*Pièce esquillée*	*Miscellaneous retouched*	*Totals*	
<0.6	–	–	–	–	–	–	–	–	very broad
0.6–1.0	–	3 (1)	1 (1)	2	–	–	1	7 (2)	broad
1.1–1.5	1 (1*)	5 (4)	1 (1)	5 (1)	2	1 (1)	5 (2)	20 (10)	medium/ broad
1.6–2.0	–	3 (3)	2 (2)	–	2 (2)	–	2 (2)	9 (9)	medium/ narrow
2.0–2.5	1 (1)	6 (5)	–	–	1 (1)	–	2 (1)	10 (8)	narrow
>2.6	–	2 (1)	–	–	1	–	1 (1)	4 (2)	very nar- row
Totals	2 (2)	19 (14)	4 (4)	7 (1)•	6 (3)	1 (1)	11 (6)	50 (31)	

Note: *This is the polished flake with a serrated edge. •Scraper totals differ from Table 31 because one scraper is incomplete in breadth.

Table 35 Cores: maximum dimensions

Maximum dimension in mm	*A1*	*A2*	*Core classes B2*	*B3*	*C*	*D*	*Totals*
20–29	–	2	2	–	1	–	5
30–39	1	1	5	1	2	1	11
40–49	–	1	3	–	1	–	5
60–69	–	1	–	–	–	–	1
120–129	–	–	–	–	1	–	1
Totals	1	5	10	1	5	1	23

Table 36 Cores: weights

Weight in grams	*A1*	*A2*	*Core classes B2*	*B3*	*C*	*D*	*Totals*
<10	–	2	4	–	–	–	6
10–19	1	1	4	1	3	1	11
20–29	–	–	2	–	–	–	2
40–49	–	1	–	–	1	–	2
150–159	–	1	–	–	–	–	1
750–759	–	–	–	–	1	–	1
Totals	1	5	10	1	5	1	23

Table 37 Maximum lengths of surviving flake scars on all complete cores

Maximum flake scar length in mm	*Number of cores*
10 – 19	6
20 – 29	12
30 – 39	4
60 – 69	1
Total	23

from outside the region (Saville 1982c). The cortex on Figure 169: 116 resembles that on Figure 169: 117 and a similar source can be suggested, although separate nodules are definitely represented. In both cases, the cores have been extensively flaked, yet they are not residual, both being capable of further flaking to produce useful blanks. The big core (Fig 169: 117) has had at least 23 flakes longer than 10mm detached. These have been struck from the exterior of the nodule and would have been wholly- or partly-cortical flakes. The flaking has been largely preparatory, leaving a core designed to produce broad flakes. Figure 169: 116 has been more extensively worked, having reached a single platform phase after the production of both flakes and blades.

The other cores in the assemblage are all in a residual stage, at the limit of useful flake production. Only ten of these cores retain any cortex, and on these the cortex is rarely extensive or distinctive enough to assist source identification. One core from the midden (Fig 165: 8) does have similar cortex to those from the chambered areas, as do one (13343) from beneath the east end of the cairn and also a typologically Mesolithic core from the forecourt area (Fig 171: 124), while another Mesolithic core from the forecourt area (Fig 171: 123) has a smooth cortex suggestive of derivation from a pebble from gravel or boulder-clay.

The chronological/cultural diversity which must be present among the cores cannot be conclusively resolved except in the case of the Early Neolithic date of the two cores from the chambered areas. On typological grounds, however, it is judged that the bipolar bladelet cores (Figs 165: 3 and 172: 130; also 593 and 5669) and other bladelet cores (Figs 165: 4–5, 171: 123–4, and 172: 131; also 16107) are likely to be Mesolithic, and thus it is of interest that all but four of these came from the area of microlith concentration in the forecourt (Figs 162–3). Of the four non-forecourt Mesolithic cores, one came from the midden (16107), two from the buried soil just north-east of the midden (Figs 165: 4 and 172: 131), and one from topsoil (593). Cores judged on purely typological grounds to be Neolithic (excluding Fig 169: 116–17) were all from the buried soil: two from the midden area (Fig 165: 6 and 8), one from just north-east of the midden (12413), and one from beneath the east end of the cairn (13343).

Separate analysis of the cores from the forecourt area, and those in or near the midden, revealed little significant difference in core class, size, weight, or length of surviving flake scars, but did show a difference in the form of surviving flake scars (Table 38; blades have a length:breadth ratio of 2:1 or greater). This analysis provides a crude indication of the technological importance of blade production within the forecourt zone (ie the Mesolithic focus) as opposed to the Neolithic midden area – a contrast already suggested by the unretouched flakes – and confirms the more subjective, purely visual impression of Mesolithic/Neolithic morphological diversity among the cores.

Core fragments

The fragmentary cores confirm the impressions gained from the complete ones. They include a probably Mesolithic example with smooth, abraded cortex from a gravel or boulder-clay pebble (10891) from the forecourt, another Mesolithic-style bipolar bladelet core also from the forecourt (Fig 172: 136), and a core with thin, but unabraded cortex – reminiscent of the chambered area cores – from the buried soil just within the cairn edge on the north-eastern side (3564). One core fragment from the midden (Fig 165: 7) is of a distinctive kind of flint, which resembles that of several of the polished implement fragments, and may be further evidence for the complete flaking down of part of an axehead.

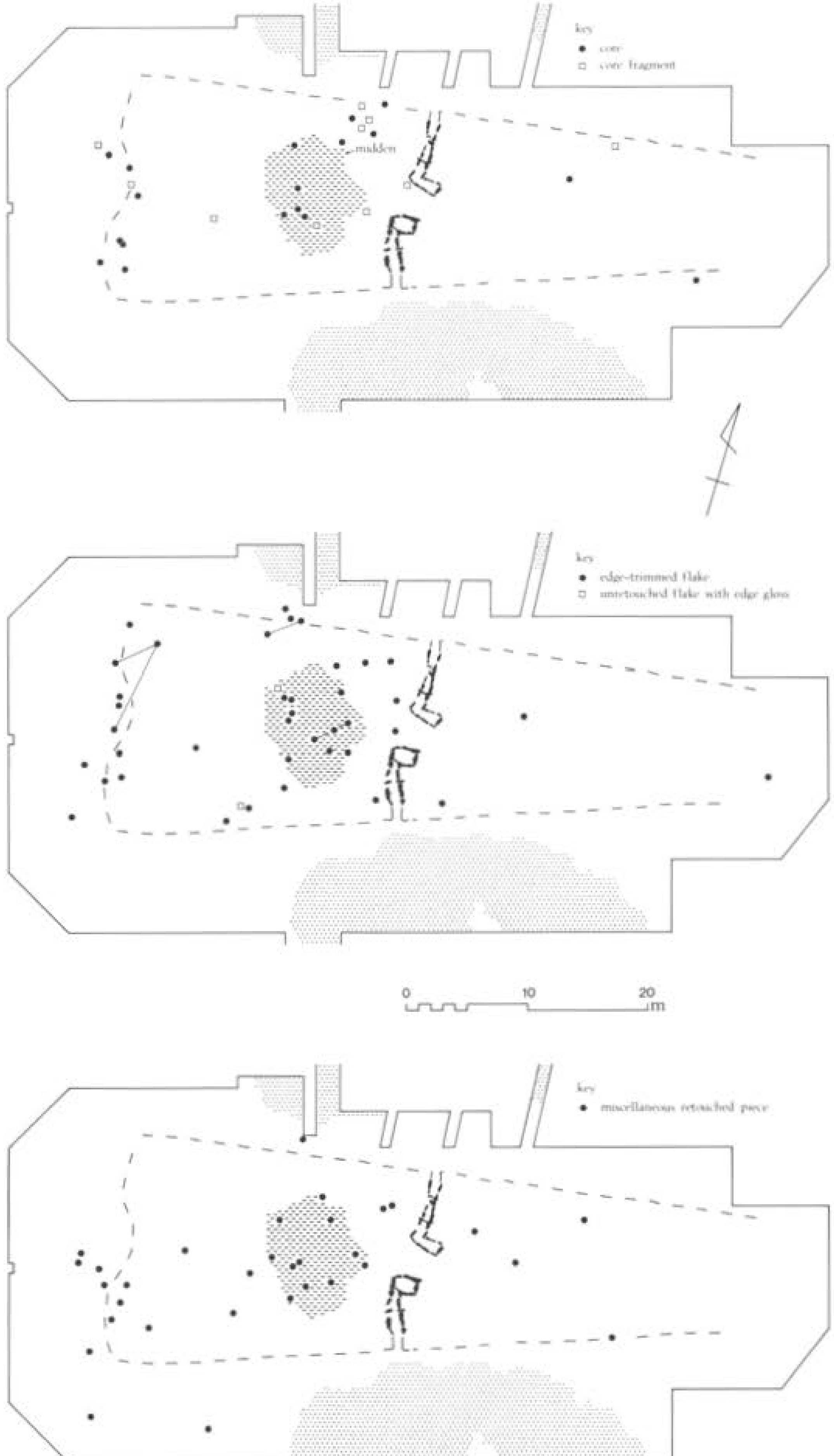


Fig 162 Distribution of flint artefacts from the sub-cairn soil and from the subsoil beyond the cairn edge: cores and core fragments; edge-trimmed flakes; unretouched flakes with edge gloss; and miscellaneous retouched pieces

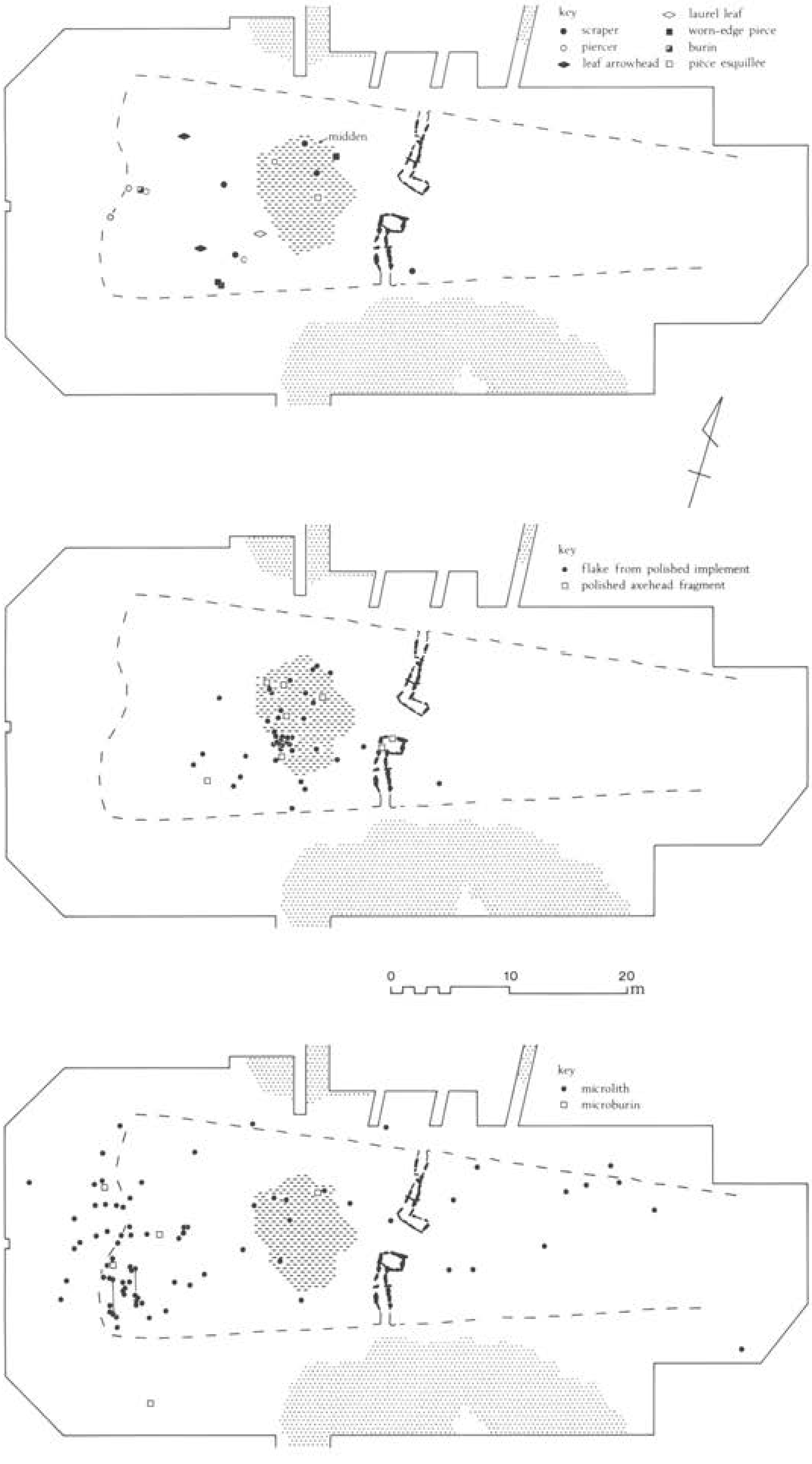


Fig 163 Distribution of flint artefacts from the sub-cairn soil and from the subsoil beyond the cairn edge: scrapers; piercers; worn-edge pieces; pièce esquillée; *?burins; leaf-shaped arrowheads; laurel-leaf; flakes from polished implements; polished axehead fragments; microliths; and microburins*

Indicates the presence and position of an intact or partially intact striking platform at the proximal (bulbar) end of a struck flake

Indicates the proximal end of a struck flake when the striking platform is absent, as a result of breakage or retouch

Edge retouch: placed alongside a retouched edge in instances where this is otherwise not clear from the illustration itself

Edge gloss: visible on the surface of the edge at those points alongside which the symbol is placed

Edge smoothing/wear: pronounced rounding of the edge adjacent to where this symbol is placed

Edge serration: series of minute denticulations alongside the flake edge adjacent to this symbol

Fig 164 Key to symbols used in flint artefact illustrations

Table 38 Flake shapes of surviving negative scars on cores from midden and forecourt areas

	Blade	*Blade & flake*	*Flake*
forecourt	4	2	2
midden	–	3	6
Totals	4	5	8

Serrated-edge flakes

Only three examples of this common Neolithic tool-type are present. One of them (Fig 168: 98), from the south chamber, is on a flake from a polished axehead and is classified under that category (*below*). Only one of the other two is complete (Fig 165: 9) with serrations down the left-hand edge. This implement was from the floor of the south chamber, in a context (452/453) which could indicate either its deposition as a gravegood or its presence in the sub-cairn soil. The remaining fragment (1584) is from an unstratified position on the north-west side of the excavation area.

Edge-trimmed flakes

A total of 48 pieces, representing 45 implements (2 pieces join to make one example, and 3 pieces join to make another: *see* Fig 162; 2 other pieces have joining untrimmed segments), are treated together in this category as having areas of edge-trimming consistent with deliberate modification and/or use. The category is a miscellaneous one, in that these pieces frequently have little in common in terms of the shape and size of blank used, but are nevertheless a recurrent and significant type (Saville 1981c, 126). Only 19 of the 45 implements are complete enough for metrical analysis (Tables 31 and 34). Although the broken state of the majority of these pieces is a hindrance to classification, in only two or three instances is it felt that the absent portion may have represented the working part of a tool, such as a piercer. In most cases, it is assumed that the modified sharp edges of the flakes are the working edges.

The provenance of these pieces is listed in Tables 25–7 and 43. Of the two from the chambered areas, Figure 169: 112 from the south passage could possibly be a gravegood, as could Figure 169: 115 from the south entrance, though less reliably so. Otherwise, all the edge-trimmed flakes were from the buried soil or probably derived therefrom, although identification is biased by the difficulty of recognising minimal retouch and trimming on the more abraded artefacts from superficial contexts.

The distribution of edge-trimmed pieces from the buried soil is weighted towards the midden area (Fig 162), although only 10 pieces were from the midden itself (eg Fig 165: 15, 16, and 18; the latter two of undoubted Neolithic character). There was also a group from the forecourt, so the presence of both Mesolithic and Neolithic implements is probable. In fact, of the pieces from the forecourt area of the buried soil (eg Figs 165: 11–14, 19 and 166: 21) only one appeared to be on a non-Mesolithic blank (6698) – in this case a large flake with a thin, mottled cortex similar to pieces from the midden and chambered areas. Apart from the forecourt examples, only one other piece (Fig 165: 10), a small blade from the topsoil, is judged to be Mesolithic.

This category contains the single instance from the assemblage of a black chert tool (Fig 165: 17). The context (part of the lower cairn construction) is unhelpful in assigning a date, because the piece is almost certainly redeposited.

Edge-gloss (Saville 1981c, 126) is present on only three of the edge-trimmed pieces (Fig 165: 18–20), all from in, or close to, the midden, while one of these (Fig 165: 20) and a further two pieces from the same area have some edge-smoothing (Fig 165: 12 and 16), in the latter case extensive. The black chert flake also has slight edge-smoothing.

One of the complete examples (Fig 165: 20) is reassembled from two joining pieces, which were lying some 3m apart on the pre-cairn surface, and together show the potential for large blank production in the Neolithic industry. Another edge-trimmed flake, this time a Mesolithic example (Fig 165: 11), comprises three separate segments which were found a maximum of 7.8m apart at the north-west edge of the area covered by the cairn. Separately, these segments were regarded as broken, unretouched flakes; only after rejoining did the edge-trimming extending along all three segments become apparent. The other two reassembled pieces comprise proximal segments, originally classified as edge-trimmed, which join with distal segments originally regarded as unretouched fragments (Figs 165: 15 and 169: 115).

Unretouched flakes with edge gloss

There are four flakes and blades which can be distinguished as utilised, even though they have no other modification, simply by the presence of patches of edge-gloss (Saville 1981c, 126). Two are from the pre-cairn surface (Fig 162), one from the midden (Fig 166: 22) and the second from the area of the structure (Fig 166: 23). The other two are from positions at the base of the fills of the north and south chambers (Fig 169: 113–14), in deposits containing burials, and can be interpreted as possible gravegoods. The positioning and extent of the gloss varies on each piece, as can be seen from the illustrations. Edge-gloss is otherwise present in the assemblage on the serrated flake from a polished axehead (Fig 168: 98) from the south chamber, and on three edge-trimmed flakes from in, or close to, the midden. At Hazleton, therefore, edge-gloss appears to be a Neolithic characteristic.

Microliths

A total of 80 pieces of flint are identifiable as microliths or fragments therefrom. Six of these fragments were found to be joining pairs (Fig 167: 58 and 67; also 13076/13720), hence the total of 77 microliths used in this section. Only 36 of the 77 are complete enough for typological classification (Table 39). The simplified typology used shows the microlith assemblage to be characterised by edge-blunted and geometric forms. The unclassifiable pieces

Table 39 Microlith typology

Type	*Number*	*Illustration no in Fig 167*
obliquely-blunted	2	45 and 48
edge-blunted	17 (9)*	47, 49–57, and 60–66
geometric triangular	13 (7)	69–80 and 87
geometric crescentic	2 (2)	84–85
geometric *tranchet*	1 (1)	88
idiosyncratic	1 (1)	89
unclassified fragments	41	
Totals	77 (20)	

Note: *Numbers in parentheses are the totals of each type complete enough for measurements to be used in metrical analysis.

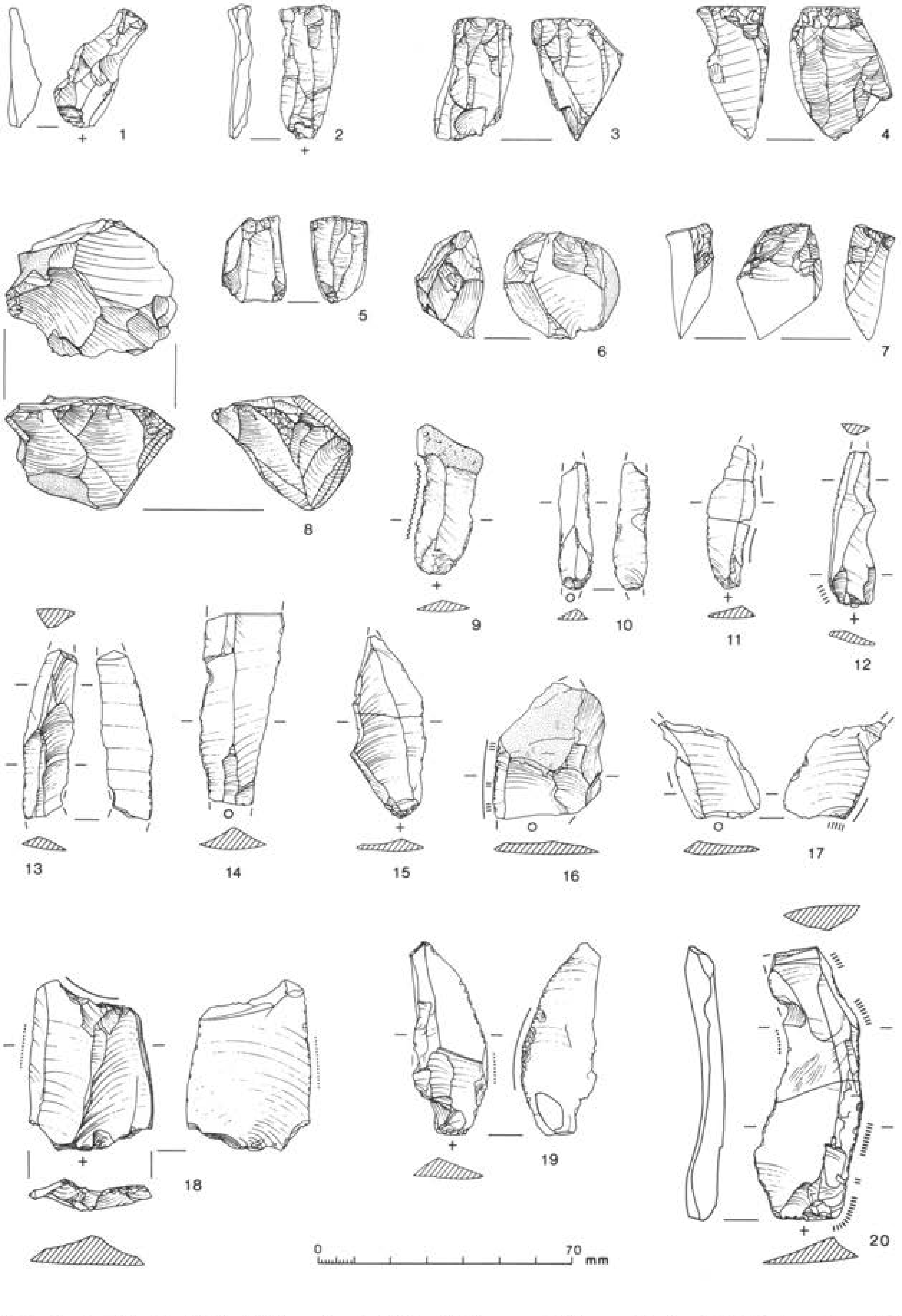


Fig 165 Flint and chert artefacts 1–20: unretouched flakes (1–2); cores (3–8); serrated-edge flake (9); edge-trimmed flakes (10–20); number 17 is chert, the rest are flint (scale 2:3)

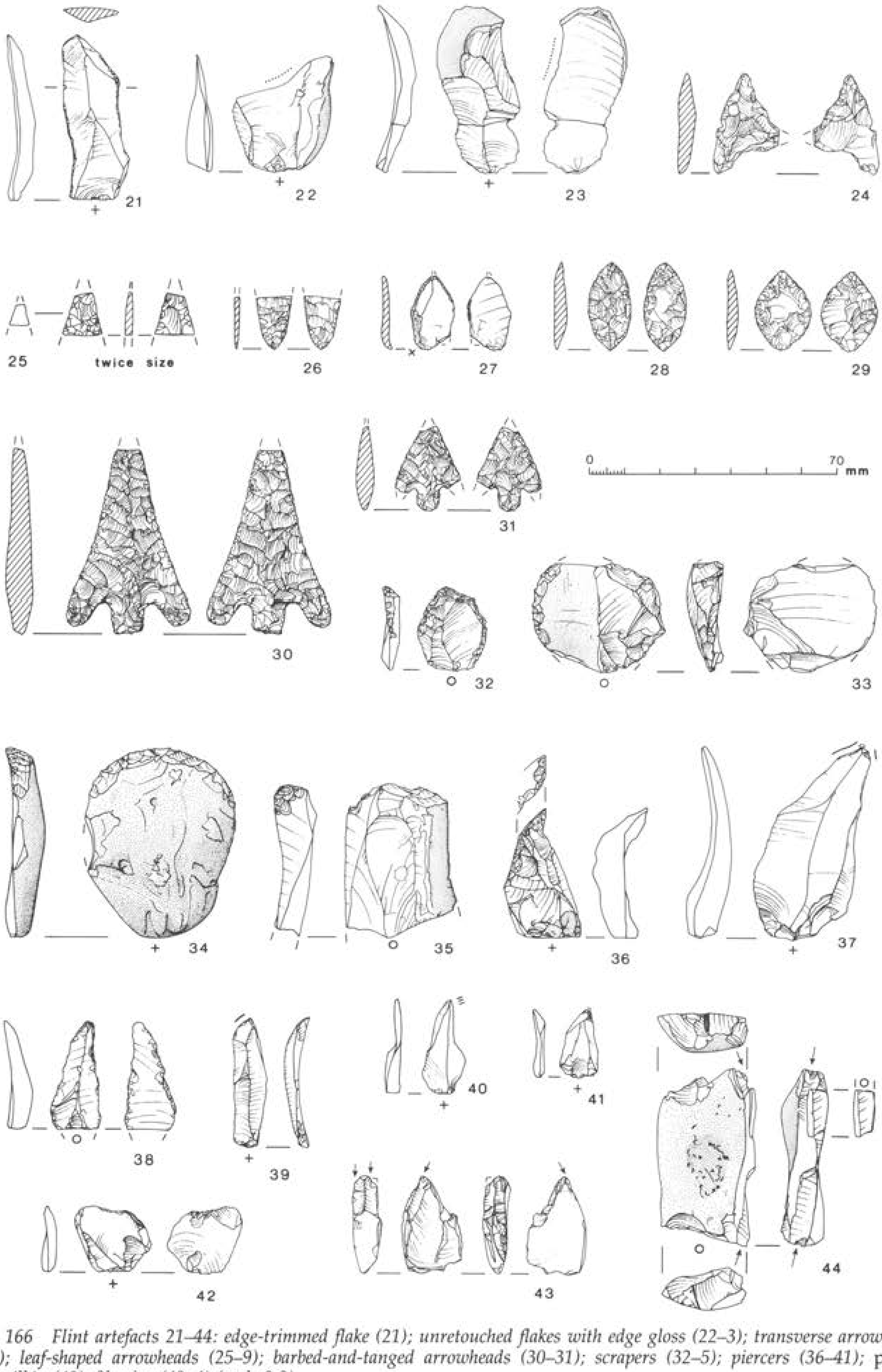


Fig 166 Flint artefacts 21–44: edge-trimmed flake (21); unretouched flakes with edge gloss (22–3); transverse arrowhead (24); leaf-shaped arrowheads (25–9); barbed-and-tanged arrowheads (30–31); scrapers (32–5); piercers (36–41); pièce esquillée *(42); ?burins (43–4) (scale 2:3)*

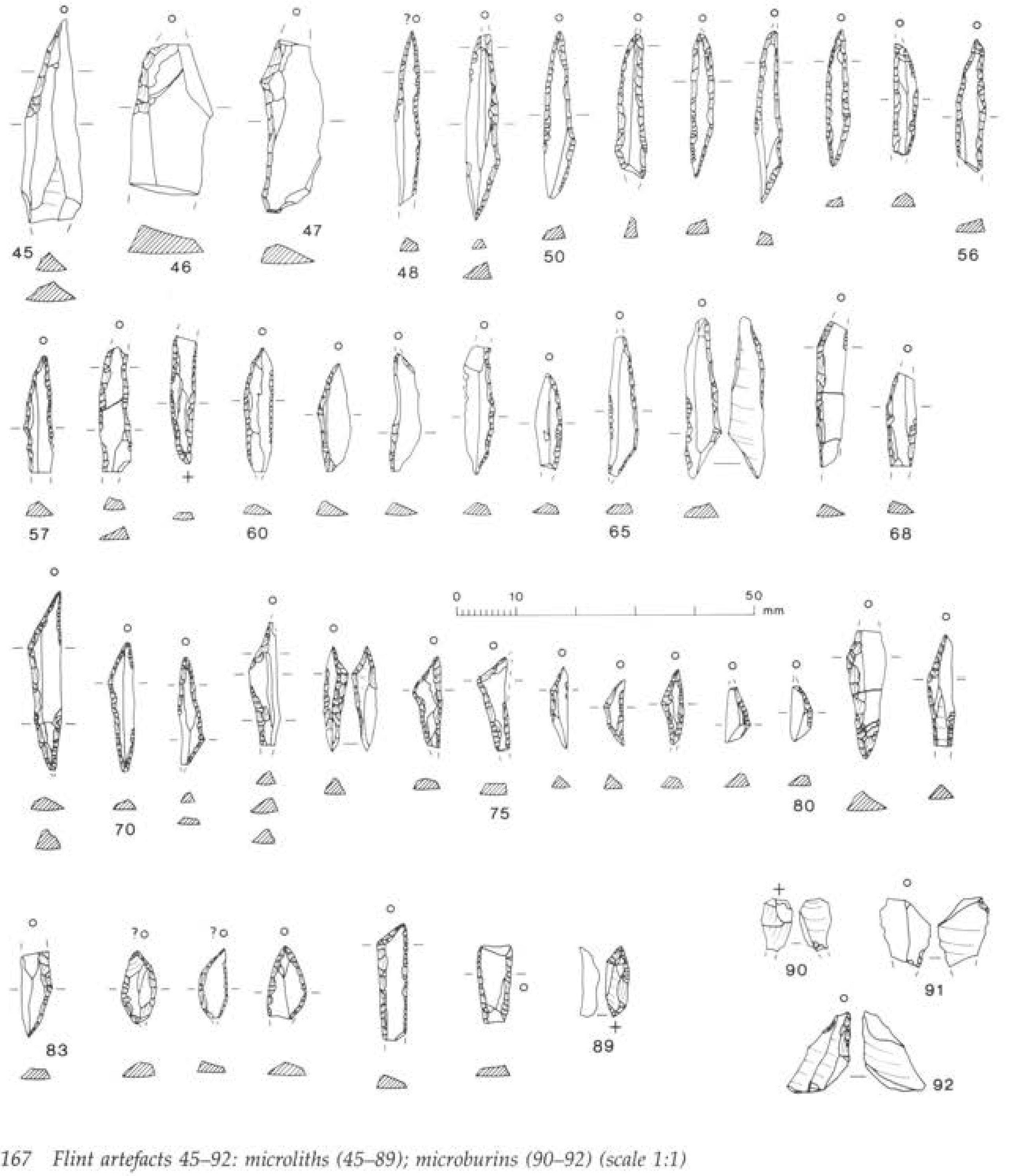


Fig 167 Flint artefacts 45–92: microliths (45–89); microburins (90–92) (scale 1:1)

seem not to contradict this pattern, and in many cases these can be assigned tentatively to classified categories, for example: obliquely-blunted (Fig 167: 46), edge-blunted (Fig 167: 58–9, 67–8), geometric triangular (Fig 167: 81–3), and geometric crescentic (Fig 167: 86). Some of the geometric triangles are relatively large yet relatively narrow and are only arbitrarily distinguishable from some of the edge-blunted forms (and vice versa).

A distinctive sub-category within the oblique- and edge-blunted forms is the needle-point type (Fig 167: 48–55 and possibly 167: 56–9), which comprises a relatively thick, approximately straight-sided point, usually with bilateral blunting retouch. These needle-points have some similarity with *mèches de Foret* type awls (Jacobi 1980, 154), and some of the Hazleton examples (eg Fig 167: 51) could possibly have functioned as the tips of hand-held perforators. All except Figure 167: 59 are on non-bulbar bladelets, however, probably having been manufactured by microburin technique, and none show any obvious signs of scaling or crushing at the tips, so it is assumed that the majority of these needle-points did not function as perforators.

The typology of the microliths aligns them with the narrow-blade, later Mesolithic industries of southern England, in a variant which perhaps can be characterised by the importance of the needle-point form. Only the three larger, broader-blade points (Fig 167: 45–7) could be out of place in such industries, since these are forms which do occur in industries of earlier date. Even in their broken state these three microliths are markedly different in dimensions from the other microliths, having a mean length of 30mm, a mean width of 11mm, and a mean thickness of 3.5mm. The problem is whether or not these broad forms are residual from earlier Mesolithic activity on the same spot (cf Healey and Green 1984, 129). Given the numerical insignificance of these forms at Hazleton and the existing lack of evidence for any earlier Mesolithic in the Cotswold region (Saville 1984c, 69), and bearing in mind the propensity for some broad forms to be manufactured throughout the Mesolithic period, it is best to be cautious about suggesting any great chronological depth to the Mesolithic activity at Hazleton and to conclude that the microlithic component, and hence the Mesolithic industry in general, is essentially later Mesolithic.

Twenty of the classifiable microliths are complete enough for metrical analysis (Table 31), and mean size values were calculated (Table 40). These values compare closely with those obtained from much larger samples of microliths from Warwickshire surface sites (Saville 1981e, 54–5), except that the relative narrowness of the Hazleton forms emphasises the insignificant presence of broader-bladed edge-blunted and obliquely-blunted pieces.

Table 40 Mean size values of complete microliths

Type	length	Dimensions in mm breadth	thickness
edge-blunted	25.1	5.1	2.1
geometric	16.8	4.7	1.9
idiosyncratic	12.0	4.0	3.0
overall mean	20.3	4.8	2.0

The external parallels for the Hazleton microliths are to be found in the local Mesolithic of Gloucestershire (Saville 1984c, fig 5) and, more generally, within the later Mesolithic of southern England. The absence of points with inverse basal retouch may reflect a stylistic separation from the later Mesolithic industries of central England (Saville 1981e, 59–60), or possibly a chronologically later starting point for Mesolithic activity at Hazleton. The tranchet (Fig 167: 88) and ?quadrangular (Fig 167: 87) forms may offer a chronological pointer in that such microlith types are usually associated with industries post-dating *c* 5000 uncal bc (Jacobi 1980, 175).

The microliths from the buried soil were concentrated at the west end of the excavation area, beneath the forecourt and south horn of the subsequent cairn (Fig 163), but a scatter occurred elsewhere, including in the midden. The single microlith fragment from the lower fill of the south chamber can be regarded as residual and intrusive.

Microburins

The five microburins are classified in Table 41. Their distribution (Fig 163) matches that of the microliths, except that Figure 167: 90 is from an unstratified position beyond the cairn, near the south-west limit of excavation.

The unclassified example is a tip type, possibly notched on the RHS, but with a straight transverse facet, which could be the result of fortuitous breakage. None of the other pieces are typical microburins, which could imply that microburin technique was not an important factor at Hazleton, if it is assumed that microliths were manufactured within the excavated area. This may be confirmed by the relatively low microburin to microlith ratio of 1:15 (Saville 1981e, 57).

Leaf-shaped arrowheads

These total seven from the excavation, although only two were stratified in the buried soil (Fig 163). One of the latter is complete (Fig 166: 28) and has a relatively narrow, regularly lenticular shape; this may also have been the case, in a more elongated version, with the other stratified arrowhead, which is represented only by its proximal segment (Fig 166: 26). The complete example can be defined as type 4B (Green 1984).

The example from context 267, associated with human burials in

Table 41 Microburin classification

Type	No	Illustration
butt, notched LHS	2	Fig 167: 90 (also 13834, not illus)
tip, notched RHS	1	Fig 167: 92
tip, notched LHS	1	Fig 167: 91
unclassified	1	(11348, not illus)

the entrance to the north chambered area, is a small tip fragment (Fig 166: 25). Only 5mm long, and with ancient breaks at each end, this fragment was recovered from sieving and its precise location within the entrance cannot be given. It is assumed to derive from a leaf-shaped arrowhead, rather than any other arrowhead type.

Of the unstratified leaf-shaped arrowheads, Figure 166: 27 is an atypical example with minimal retouch confined to the edges of a suitably preformed flake, which retains its bulb, while Figure 166: 29 is a squatter version of Figure 166: 28. Both of these arrowheads are of Green's type 4A. The remaining two examples are fragmentary and cannot be classified.

The leaf-arrowhead shapes at Hazleton match the range of shapes known from surface finds from the north Cotswold region (Green 1980, table 4.1), although types 4A and 4B have not previously been recorded in association with chambered long cairns in the north Cotswolds (Green 1980, tables 4.18 and 4.28).

Transverse arrowhead

A single, rather atypical example of a transverse arrowhead (Fig 166: 24) came from the topsoil. Typologically, this piece is borderline between a chisel and an oblique (Green 1984). The angle at which it would have been mounted is uncertain.

Barbed-and-tanged arrowheads

The two barbed-and-tanged arrowheads are very different. One (Fig 166: 31), from the topsoil, is a Sutton b type (Green 1984), of the typical Cotswold style of Bronze Age arrowhead (Green 1980, table 6.3); the other (Fig 166: 30) is an extremely unusual find from this region of a large Ballyclare b type (Green 1984), with exceptionally-fine retouch and a strikingly concave shape on both of the long sides. The break at the tip is an ancient one, leaving a present length of 51.5mm and a projected original length of 58mm; the weight is 6.2g. This arrowhead type is regarded as of Early Bronze Age date and probable 'ceremonial' function (Green 1980, 138), and the presence of an example at Hazleton is enigmatic. The implement was found in a stabilisation horizon within the lower tertiary fill of the south quarry and was presumably residual in this context.

Scrapers

Only 5 of the 19 scrapers were stratified in the sub-cairn soil, with a distribution (Fig 163) which avoided the westernmost excavated area and included two examples from the midden (Table 42). The latter two are fragmentary and heavily calcined (12103 and 15646), but are classifiable as Neolithic end-scraper types, as are the other three stratified examples. Two of these (Fig 166: 34–5) are end scrapers on relatively large, cortical flakes, the other (Fig 166: 33), which has a damaged scraping edge, is an extended end scraper with a prepared base at the proximal end. None of the unstratified scrapers is especially distinctive, except that, on typological grounds, one example is probably Mesolithic (Fig 166: 32).

Table 42 Scrapers: typology and contexts

Context	End	Extended end	End and side(s)	Side	Denticulate	Atypical	Totals
2	3	1	–	1	–	1	6
3	1	3	1	2	1	–	8
211	2	1	–	–	–	–	3
561	1	1	–	–	–	–	2
Totals	7	6	1	3	1	1	19

Piercers

These eight implements include five stratified examples, of which three were from the forecourt, one from the midden, and one from the area just south-west of the midden (Fig 163). Each of the forecourt piercers (Fig 166: 36 and 40–1) is typologically Mesolithic in view of the blanks used: two are small, pointed flakes with retouched distal tips (Fig 166: 40 with the point worn smooth by use; Fig 166: 41 with minimal bilateral trimming to emphasise the point); the other is a core rejuvenation chunk from a bipolar microblade core with a fortuitously-pointed projection, modified by inverse retouch (Fig 166: 36). One of the unstratified piercers (Fig 166: 39; from context 4 adjacent to the forecourt) is also a Mesolithic form, on a pointed plunging flake from the face of a microblade core, with minimal retouch at the tip. The other stratified piercers comprise a typologically-indistinct example (Fig 166: 38), and a piercer on a large non-cortical flake (Fig 166: 37), likely to be of Neolithic manufacture. The two remaining unstratified piercers are both post-Mesolithic forms: one with undiscoloured retouch on a discoloured flake (434) and the other a spurred piercer type (378).

Possible burins

The three artefacts classified as burins include only one reasonably definite example (Fig 166: 43), an unstratified find of a small dihedral burin on a thermal blank: a piece which is of obvious Mesolithic character. Of the other two, the most convincing (Fig 166: 44), from the sub-cairn surface in the forecourt, is a double-ended angle form on a thick, cortical flake. Both ends of this piece have pre-treatment of the burin facet platforms, at the proximal end involving removal of the original flake platform. It can be argued that this piece is not a functional burin because of the indented nature of the facets, although the final facet at the distal end at least could be use damage. A single, fragmentary spall, found some 3m from the parent artefact, refitted. The length of this artefact, which is Mesolithic whatever its typological identity, is 50mm and it is manufactured from a relatively large pebble. The third artefact (11238), from a primary construction context (293), has some of the character of a burin, but it is as likely to be a core-rejuvenation flake with some unspecific inverse retouch.

Polished implement fragments

In total, 49 pieces of flint have traces of external polish indicative of derivation from polished implements. Only eight are sufficiently distinctive to be classifiable as axehead fragments, but it is assumed that all the pieces probably originate from axeheads. Many of these fragments are very small (average weight only 1.5g), and their total weight (73.6g) is less than a third of the weight of many individual polished flint axeheads from the Cotswold region. None of the pieces conjoin, but on the basis of flint type and colour it is estimated that the eight axehead fragments represent at least six separate axeheads, while the 41 flakes and other fragments represent at least a further seven separate axeheads. This minimum total of 13 axeheads would represent a substantial element in the Hazleton assemblage, both in numbers of implements and in terms of raw material.

In one instance (Fig 168: 93), the polished piece has been smashed from the corner of the blade or butt of an axehead, possibly during use, but in 43 of the remaining 48 cases the pieces are flakes, which almost certainly result from the reworking of axeheads as cores. This evidence for reworking demonstrates the suitability of axeheads as sources of raw material (once breakage has prevented their further use), and explains the rarity of whole axeheads in domestic assemblages, since presumably, if not reworked, they would be carefully curated. The five polished pieces which are not the product of deliberate flaking are burnt spalls, apparently created by spontaneous detachment from the surfaces of polished implements (or fragments therefrom) exposed to heat. Only one of the polished pieces was used as the blank for an implement. This piece (Fig 168: 98) has the traces of a serrated edge on the RHS, although few of the serrations now remain intact, and a small patch of edge-gloss on the inverse upper RHS. Fine edge-trimming is apparent on the lower LHS and inversely on the upper LHS. These edge modifications suggest that this piece has functioned as a serrated-edge type of cutting tool.

Little can be said of the typology of the axeheads from which any of these pieces derive because of their small size (Fig 168: 93–7). One of the fragments (Fig 168: 96) is an unusual instance of a partially-cortical piece of flint being used as the blank for a polished axehead. The raw material from which these polished fragments and flakes derive is, to judge from the colour and texture of the flint, from a different source to that from which the majority of artefacts in the assemblage are derived. It would seem probable that polished axeheads were imported to the area as finished items, rather than manufactured locally from imported raw material.

All the polished pieces were from the buried soil beneath the cairn except for one find from the soil above the cairn. The stratified pieces are clustered in the 'Neolithic zone' (Fig 163), with 31 of the total from the midden and the others from its periphery. Two pieces were from the buried soil within the area of the south chamber. One of these (Fig 168: 98) was in close association with the jaw of the skull wedged between the bases of orthostats 246 and 317 (Fig 109). Since this implement was vertically above the base of the skull, since it is intact, and since it is the only polished piece reworked as an implement, there do seem circumstantial grounds for suggesting it was a gravegood deposited to accompany the skull. The other piece from the chambered area (Fig 168: 94) was found at the base of the buried soil beneath the sillstone between the chamber and passage, so, although this is a recognisable axehead fragment, it is very unlikely to have been a gravegood.

Laurel-leaf and unclassified bifacial piece

A fragmentary example of a probable laurel-leaf implement (Clark 1960, 223) was found on the pre-cairn surface on the south-west edge of the midden (Fig 163). Unusually for this implement class, the retouch is almost entirely unifacial on the dorsal surface (Fig 168: 99). The dimensions and weight of this fragment preclude it being part of a leaf-shaped arrowhead, and the only alternative interpretation would be as a knife, since it does have a sharp RHS edge. The unclassified bifacial piece is an unstratified find (567). It is not a core, but it is too thick (8mm) and heavy to be a leaf-shaped arrowhead and too squat to be a laurel-leaf.

Worn-edge pieces

These three artefacts were all from the sub-cairn soil (Fig 163), from the area of the structure and the midden. Two distinct types are probably represented. The only worn-edge piece *sensu stricto* (Saville 1977, 4) is the bulbar segment of a blade with very heavy use of the LHS, which has resulted in a bevelled, completely smooth edge (Fig 168: 100). The incomplete nature of this piece precludes further definition, and it could equally well be Mesolithic or Neolithic, though the former is perhaps more likely. The other two pieces (Fig 168: 101; also 19180) have only limited edge-wear, which is not continuous nor heavy and is perhaps more likely to result from the hafting/handling of the tool than directly from its use. These are probably both Neolithic pieces, undoubtedly so in the case of the piece on a Levallois-type flake with faceted platform and bi-directional flake-scar beds (Fig 168: 101). Both of these flakes have distal damage which may have removed crucial areas of modification and obscured their actual typology, perhaps as piercers. At least four other pieces in the edge-trimmed category exhibit edge-wear to a lesser or greater extent (Fig 165: 12, 16–7, and 20), resulting from use or hafting.

'Fabricator'

An unstratified find of an unusual example of this implement type, in that it is manufactured on a narrow, cylindrical nodule of flint (216). The nodule has been truncated at one end and had slight preparatory retouch at the other, prior to extensive use which has produced the characteristic abrasion and smoothing on both terminals.

Pièce esquillée

A single example of a *pièce esquillée* (or splintered piece) was found in the midden (Fig 163). This is a small secondary flake with no

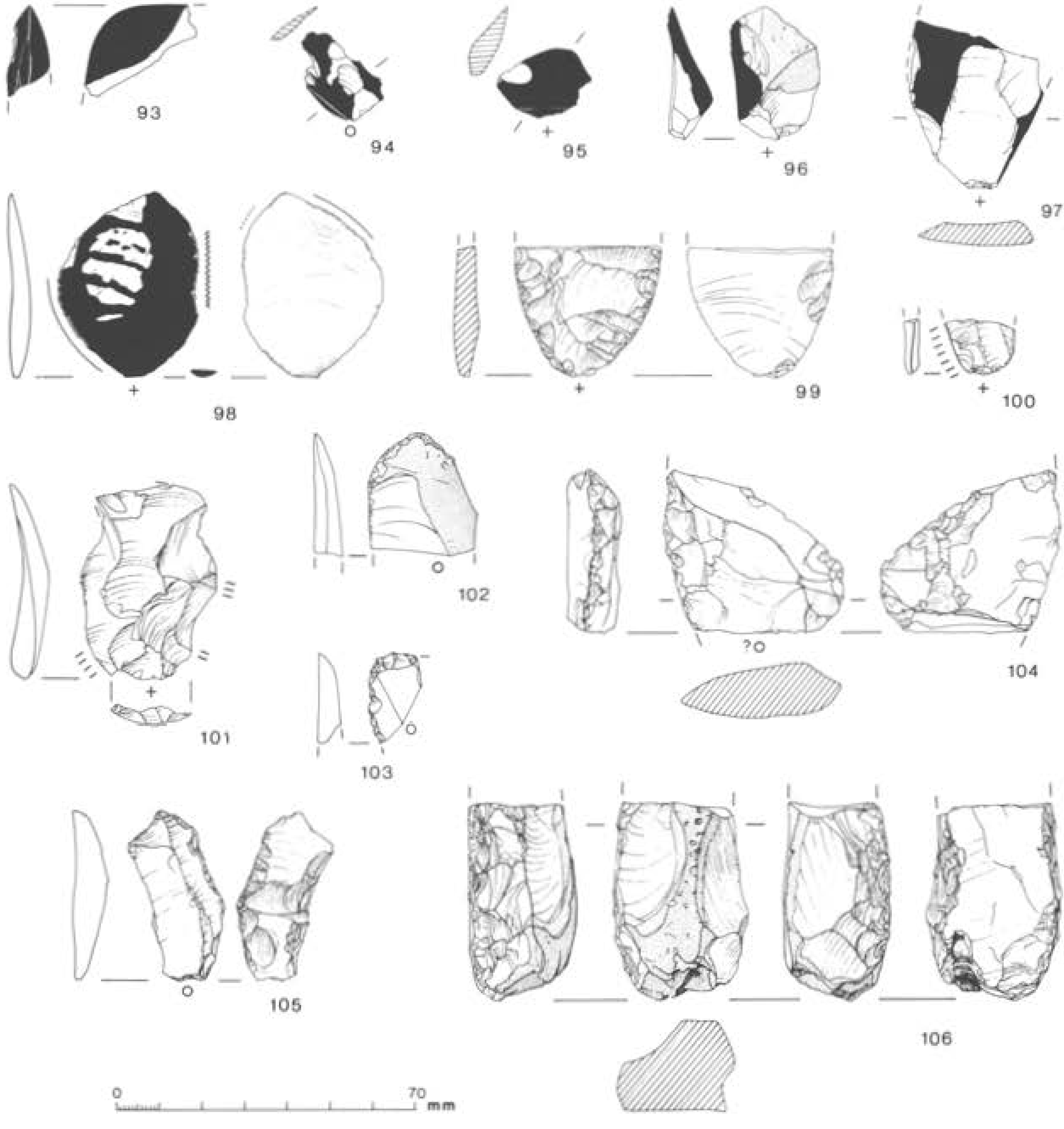


Fig 168 Flint artefacts 93–106: polished axehead fragments (93–8); laurel-leaf (99); worn-edge flakes (100–101); miscellaneous retouched pieces (102–6) (scale 2:3)

modifications other than shallow invasive removals from the ventral face at the distal end, indicative perhaps of wear rather than deliberate retouch (Fig 166: 42).

Miscellaneous retouched pieces

Sixty-eight pieces have been treated together as having some deliberate retouch. Only 11 of the 68 are complete, so any metrical analysis is ruled out, although it is clear that a variety of blanks are represented, from small blades to broad, heavy flakes. It would be rash to speculate on a possible function for some of these pieces, but for others it can be suggested that they relate to formal tool categories in the following numbers: edge-trimmed pieces 10; microliths 7; arrowhead 1; scrapers 9; piercers 10; knives 3; and pick 1. Their incomplete or irregular nature prevents precise allocation to these categories, but this subjective analysis does suggest that in the main the miscellaneous pieces are likely to echo the range of classified tools, rather than indicating the presence of otherwise unclassified types. The exceptions would be the possible knives and the pick, since neither of these categories are otherwise recorded. The possible knives (367, 3327, and 9865) share the characteristic of relatively shallow invasive retouch, in two cases inversely, but are too broken or damaged for positive identification and none were securely stratified. The possible pick (Fig 168: 106) is the proximal end of a heavy prismatic tool with steep bilateral retouch on a thermal flake. It is from an unstratified subsoil remnant to the south of the south horn. Typologically, it is difficult to say if this piece is described more correctly as a pick, a rod, or even a 'fabricator'.

The probable arrowhead (342) is a small bifacially-retouched fragment from the topsoil, and it most likely represents the tang or barb of a barbed-and-tanged arrowhead. Other pieces warrant individual comment: Figure 168: 105 is a complete, but unclassifiable implement with retouch forming a semi-pointed distal tip, a blunted proximal end where the platform has been removed, and extensive flaking across the ventral surface. Although from topsoil, this piece is undoubtedly Mesolithic in character, as is Figure 168: 103, from context 4/211 beyond the south horn, which is the broken distal segment of a Mesolithic scraper. Another Mesolithic piece (14117) is a plunging flake from a pebble core, with wear at the base and inverse retouch just below the distal tip.

Figure 168: 104 from the upper fill of the north quarry is a segment of a large flake tool, which has been reworked after breakage to form a piercer. The character of this piece, both in style and in raw material, which is a coarse, cherty flint, contrasts with the rest of the assemblage. A broken flake (10923) from context 4/211 south of the cairn has some inverse retouch on the transverse distal edge, but more significantly has a very abraded dorsal surface at its proximal end and has undoubtedly been struck from a parent piece used as a hammerstone.

More than half of the pieces in this category come from superficial contexts, which is a sign of the greater propensity for implements to become post-depositionally damaged and unclassifiable in deposits subject to cultivation. The distribution of stratified pieces (Fig 162) suggests that a mixture of Mesolithic and Neolithic artefacts is involved.

Unclassifiable burnt fragments

This category is largely composed of small unidentifiable fragments of flint, which have been produced independently by the action of intense heat, but it does include a smaller element of recognisably struck pieces made fragmentary by heat damage. The average weight of all these pieces is only 0.7g, and it is not possible to say whether any may have originated from the use of flint 'pot-boilers' or whether they result simply from chance exposure to burning, although the latter is more likely in view of the relatively low overall weight. Almost all of these fragments come from the sub-cairn soil, and the majority come from the midden and its environs, indicating an association with the Neolithic activity.

Discussion of the stratified flints

Flints from the chambered areas

Probable, or possible, gravegoods are listed in Table 43, and their positions are shown on Figure 121. To those listed in the table can probably be added the serrated-edge flake (Fig 165: 9; context 452/453) and the flake from a polished implement (Fig 168: 98; context 453), which both seem likely to derive from the lower fill of the south chamber. Outstanding among the chambered area flints is the large core (Fig 169: 117) from the north entrance. This is the only unequivocal flint gravegood because of its direct association with skeleton 1, although the close proximity of the polished flake (Fig 168: 98) to a skull in the south chamber could make this also a gravegood.

Although subjective, it seems probable that the larger and more distinctive pieces among the remainder, particularly the second core (Fig 169: 116), the serrated-edge flake (Fig 165: 9), the two edge-trimmed flakes (Fig 169: 112 and 115), and the two

Table 43 Flints from the lower fills of the chambered areas, in association with the burial deposits

Context	*Unretouch flakes*	*Cores*	*Edge-trimmed flakes*	*Edge-gloss flakes*	*Microlith*	*Arrowhead*	*Unclass burnt frag*	*Totals*
267	1	1	–	–	–	1[1]	1[1]	4
336	1	–	–	–	–	–	–	1
435	–	–	–	1	–	–	–	1
412	1	1	–	1	1[1]	–	–	4
323	5[2]	–	1	–	–	–	1[1]	7
11/354	–	–	1[3]	–	–	–	–	1
353/354	–	–	–	–	–	–	1[1]	1
354	1[3]	–	–	–	–	–	–	1
Totals	9	2	2	2	1	1	3	20

Notes:
[1]Pieces recovered from sieving, not plotted on Figure 121.
[2]Includes one piece from sieving, not plotted on Figure 121.
[3]These two pieces join to form a single edge-trimmed flake.

Key to contexts
267 north entrance
336 and 435 north chamber
412 south chamber
323 south passage
11/354, 353/354, and 354 south entrance

unretouched flakes with edge-gloss (Fig 169: 113–14), could also have been intentionally included with the burials.

Equally subjectively, it seems inherently improbable that the other flints from the chambered areas (such as the small or fragmentary unretouched flakes (Fig 169: 108–9), the unclassified burnt fragments, and the microlith fragment) could be intentional deposits. It is more likely that these pieces derived from the buried soil and became mixed with the burial deposit contexts by chance. Context 323 contained a large unretouched flake (Fig 169: 110), on which the cortex resembles that of the large core (though they do not conjoin). This and two other pieces, an unretouched trimming flake (Fig 169: 111) and a burnt unretouched flake (Fig 169: 107), could conceivably have been deliberate introductions.

The tip of a bifacially retouched arrowhead (Fig 166: 25, presumed leaf-shaped) came from context 267 in the north entrance. It is exactly the kind of fragment which could remain within the body of the victim of an arrow-wound. Given the rarity of arrowheads at Hazleton, this possibility must be a strong one.

Small though it is, the collection of possible flint gravegoods appears to exceed the number of flints recovered from the chambers of any other Cotswold-Severn tomb (Clifford 1950, 30; Piggott 1954, 145). Hesitation is called for, however, because of the different methods of recovery and recording of artefacts from earlier excavations, and because of the few undisturbed burial chambers excavated in recent years. Nevertheless, the apparent absence of noteworthy flint finds from burial areas (the main exception being the polished flint axehead from Ty-isaf; Grimes 1939, 130) does suggest that flint gravegoods were unusual. Leaf-shaped arrowheads have been noted in several instances (*see* p264), and the evidence of an arrowhead embedded in a human vertebra at Ascott-under-Wychwood, Oxfordshire (Selkirk 1971, 8; with another example from the chambered tomb of Tulloch of Assery B, north Scotland: Corcoran 1966, 44) suggests that arrowheads may have been introduced into chambered tombs inside the corpses of archery victims, rather than as gravegoods.

Flints from the sub-cairn soil

Distribution

Figures 162–3 show the distribution of various artefact categories in the sub-cairn soil, and their typological study has shown the subdivision between Mesolithic and Neolithic activity. The typological subdivision is matched by a distributional one.

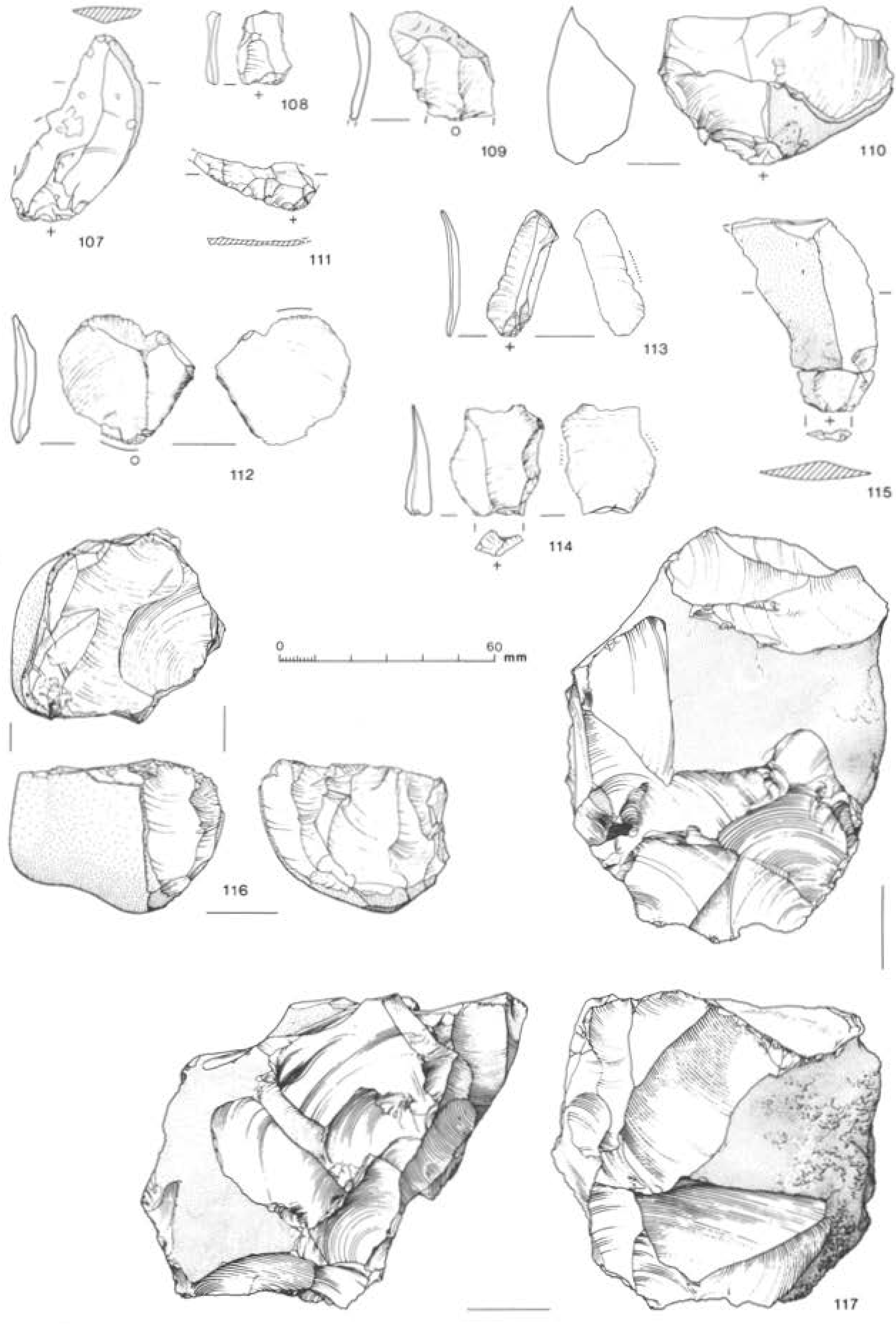


Fig 169 Flint artefacts 107–17 from the chambered areas: unretouched flakes (107–11); edge-trimmed flakes (112 and 115); unretouched flakes with edge gloss (113–14); cores (116–17) (scale 2:3)

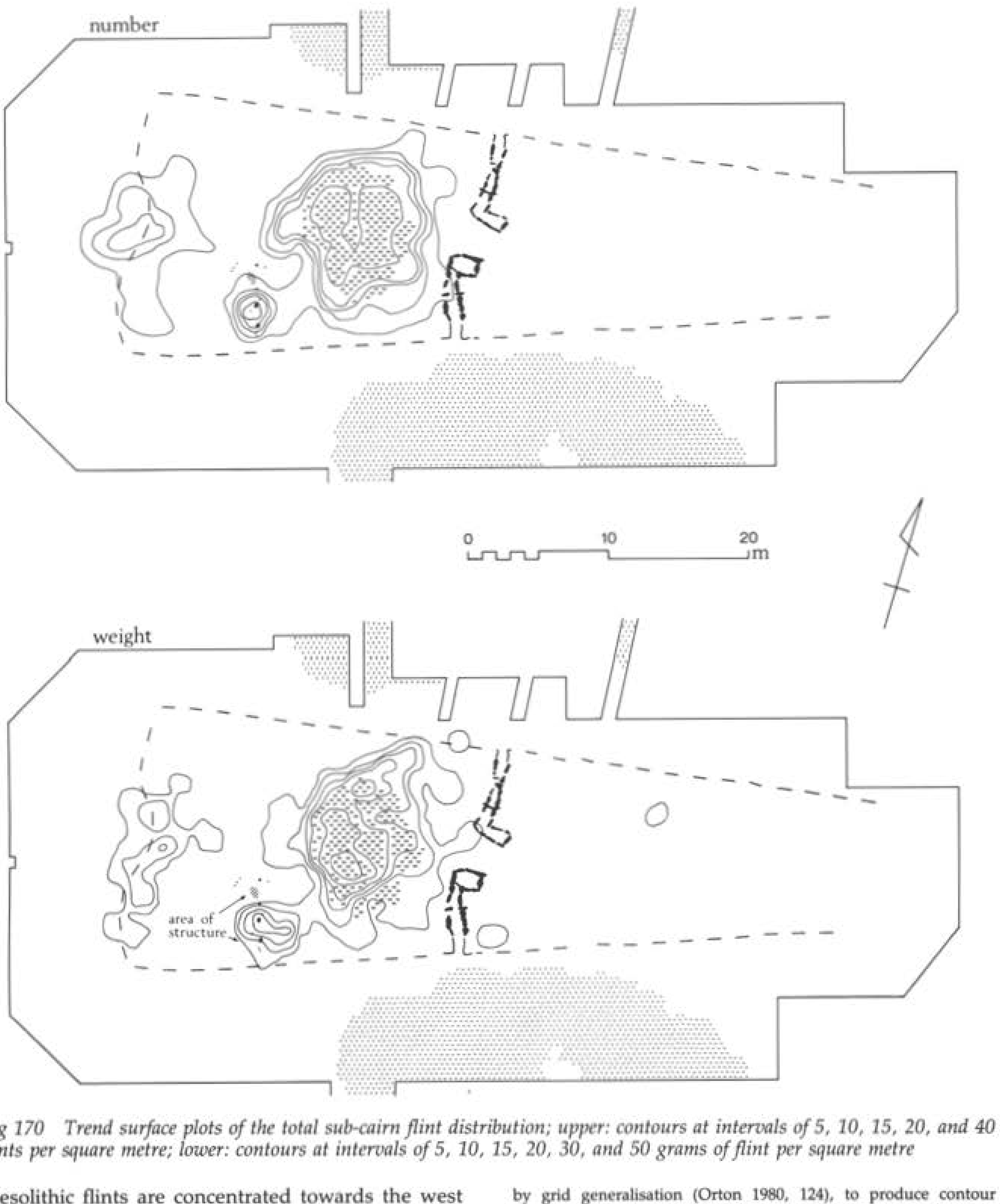


Fig 170 Trend surface plots of the total sub-cairn flint distribution; upper: contours at intervals of 5, 10, 15, 20, and 40 flints per square metre; lower: contours at intervals of 5, 10, 15, 20, 30, and 50 grams of flint per square metre

Mesolithic flints are concentrated towards the west end of the site, and the Neolithic pieces towards the midden. This subdivision was further investigated by analysis of the total distribution of the flints from the pre-cairn surface and its periphery.

Virtually all of the flints from the sub-cairn soil were recorded by three-dimensional co-ordinates. The archive contains plots of the exact positions of these flints (drgs 612 and 616–19) and plots showing the absolute numbers (drg 530) and weights (drg 675) of the total flints from each metre square of the excavation grid. In the present report, the metre square plots have been converted, by grid generalisation (Orton 1980, 124), to produce contour diagrams of the pre-cairn flint distribution by number and weight (Fig 170). These contour diagrams, which are very similar, demonstrate a major concentration in the midden area and a lesser one beneath the forecourt and south horn. At the 5 flints/5g of flint per square metre levels (used as the minimum contours), the distributions are mutually exclusive. This does not, however, match any absolute typological subdivision. Thus, it is not possible to subdivide the whole pre-cairn collection into Mesolithic and Neolithic assemblages using spatial data, any more than it is on typological grounds.

However, the distribution and typology, considered together, do indicate the existence of two separate foci of activity: one is basically Mesolithic and the other basically Neolithic. The composition of the Mesolithic assemblage in the forecourt has already suggested its derivation from *in situ* knapping. A further, smaller focus of Mesolithic knapping may have existed just to the north-east of the midden, now represented only by a couple of cores and rejuvenation flakes (eg Fig 172: 131–2). The activity represented by the Neolithic flint involves redeposition, rather than *in situ* knapping. This is borne out by the refitting analysis (*see below*) and accords with the other archaeological evidence from the midden. Outside of the midden area, it is less easy to offer an explanation for the Neolithic flint artefacts, other than as a general scatter.

The link in flint distribution between the area of the sub-cairn structure and the midden (Fig 170) is striking and may point to a chronological and cultural link. Very few definitely Mesolithic pieces come from the structure area, whereas there are several Neolithic artefacts south-west of the midden (Fig 163). The flint distribution evidence can be used to suggest that the structure is likely to be Neolithic rather than Mesolithic. The proximity of the structure to the midden, coupled with the refitting evidence (*see below*; Fig 173), raises the question of whether the structure could provide the original location for the débitage deposited in the midden. A consideration of the total artefact distribution in the structure area (Fig 20) suggests that the flints bear only a limited spatial relationship to any possible structural outlines. The possibility of a totally unrelated flint concentration occurring in the same location as the structure by chance is difficult to accept, however, and it must be concluded that there is a positive, if obscure, relationship between the two features. It is noticeable, for example, that, in both the detailed plot (Fig 20) and the trend surface contours (Fig 170), the flint distribution focuses on the putative porch to the south of the hearth (Chapter 19).

Refitting analysis

A refitting analysis of the flints from the sub-cairn soil was undertaken, primarily to investigate patterns of distribution in the Mesolithic and Neolithic elements of the assemblage. The analysis also provided information on flint reduction strategies. Almost all of the refits are between pieces of flint from the pre-cairn buried soil, or from the cairn periphery. The exception was a conjoining group of four pieces (Fig 171: 126), one of which was located at a primary dump (context 261/309), while the other three were found in the midden area.

Two categories of refits are involved. First, there are instances of individual flakes reassembled from two or more segments (ie *liaison*: Leroi-Gourhan and Brézillon 1972, 327). In each instance, a careful examination was made to establish that the break was ancient, rather than modern. Normally, the reassembled pieces are unretouched flakes (Fig 171: 118 and 121), but in the forecourt area three separate microliths (Fig 167: 58 and 67; and 13076/13720) and one edge-trimmed flake (Fig 165: 11) are included and from elsewhere two further edge-trimmed flakes (Fig 165: 15 and 20). Also included in this category of refits are the joining halves of flakes created by Siret fractures, where the flake has bifurcated in manufacture, of which at least two examples were present from the midden assemblage (Fig 171: 119–20).

Second, there are instances where separate pieces can be conjoined, following the sequence in which they were knapped during core reduction or retouching (ie *remontage*: Leroi-Gourhan and Brézillon 1972, 327). In most cases, these conjoining pieces are simply pairs of flakes representing subsequent removals from the parent piece, but some lengthier reduction sequences were reconstructed from the forecourt area (Figs 171: 124 and 127; 172: 129–30), and a single example of a retouch spall conjoining with an implement was observed (Fig 166: 44).

The locations of the reassembled and conjoined pieces are shown in Figure 173, where a clear subdivision exists between the midden area and the area subsequently overlain by the forecourt (*see* Table 44, which lists the incidence of refits).

From Table 44 and Figure 173, it is clear that the pattern of refits in the forecourt area is quite different from elsewhere. In the forecourt, the number of reassembled flakes is relatively low and the number of conjoins relatively high, while in the midden area the opposite is true. Also, the number of instances where more than two pieces are conjoined is much higher in the forecourt than elsewhere. Consideration of the typology of the flints involved makes the contrast between the areas even more marked. Not only do all the typologically-distinctive conjoins in the forecourt area involve pieces of Mesolithic character, but at least three of the conjoins from the midden area also involve Mesolithic pieces.

Table 44 Flint refits from the sub-cairn soil

	Reassembled flakes		*Sequential conjoins*	
Area	*no of flakes*	*no of segments*	*no of instances*	*no of pieces*
forecourt	14	31 (32.6%)	25	70 (74.5%)
midden	32	64 (67.4%)	11	24 (25.5%)
Totals	46	95	36	94

The contrasting pattern of refits is emphasised by analysis of the distances separating the refitting pieces (Table 45 shows the mean values calculated from the distances involved in all the refits listed in Table 44). These figures demonstrate that the average distance between refits is considerably less in the forecourt area than elsewhere.

Table 45 Mean values of distances (in m) separating refitting flints

	Reassembled flakes		*Sequential conjoins*	
	forecourt	*midden*	*forecourt*	*midden*
max distance apart	7.8	11.6	14.8	14.6
min distance apart	0.2	0.04	0.5	2.0
overall mean	2.6	4.4	3.4	7.3
overall sd	1.8	3.2	2.5	4.7

The implications of the refitting analysis are of considerable importance for the study of the pre-cairn activity. No refits were established between the forecourt and midden areas, thus substantiating the typological disparity between the assemblages from these two zones. The conjoins do, however, reinforce a link between the area of the structure and the midden (including a sequential conjoin between a flake from posthole 589 and the southern side of the midden, Fig 172: 135). These links provide further support for the interpretation of the structure as part of the Neolithic pre-cairn activity, and possibly for a link between activities associated with the structure and the formation of the midden.

The distribution of the refits across the whole of both the forecourt and midden areas of flint concentration supports the interpretation of the scatters involved as representing unitary activity areas, otherwise some bi-modality might be expected within the distribution patterns in each area. This suggestion must be tentative, because post-depositional disturbance could have blurred any original distinctions, and because there is recognised to be some mixture of Mesolithic and Neolithic conjoining pieces in the midden area, but the implication might be that each scatter could represent a relatively short-lived episode of deposition.

The main implication of refitting is that the different patterns revealed by analysis reflect different histories of deposition. In the forecourt area, because of the density of conjoining pieces and their relatively compact distribution, the flint scatter can be seen to represent the remains of *in situ* Mesolithic knapping.

The forecourt scatter is not a wholly intact knapping-floor, since, even allowing for the potential vagaries of excavation recovery, many more instances of conjoining would be expected. There are, for example, no complete core reduction sequences present, there are three Mesolithic cores to which no flakes could be conjoined (Fig 165: 3–5), there are three non-conjoining plunging flakes from the faces of bipolar cores (eg Fig 165: 1–2), and there are flakes which are definitely struck from the same parent piece but which cannot be refitted. Thus, the forecourt knapping assemblage appears incomplete. This may be partly explained by the vulnerability of the western edge of this area to post-Neolithic disturbance, which has almost certainly created an artificial western limit to the scatter, but the Mesolithic debris may also have been disturbed by Neolithic activity.

In contrast, the small number of conjoins present in the midden assemblage, despite its larger size, its intact nature, and the high

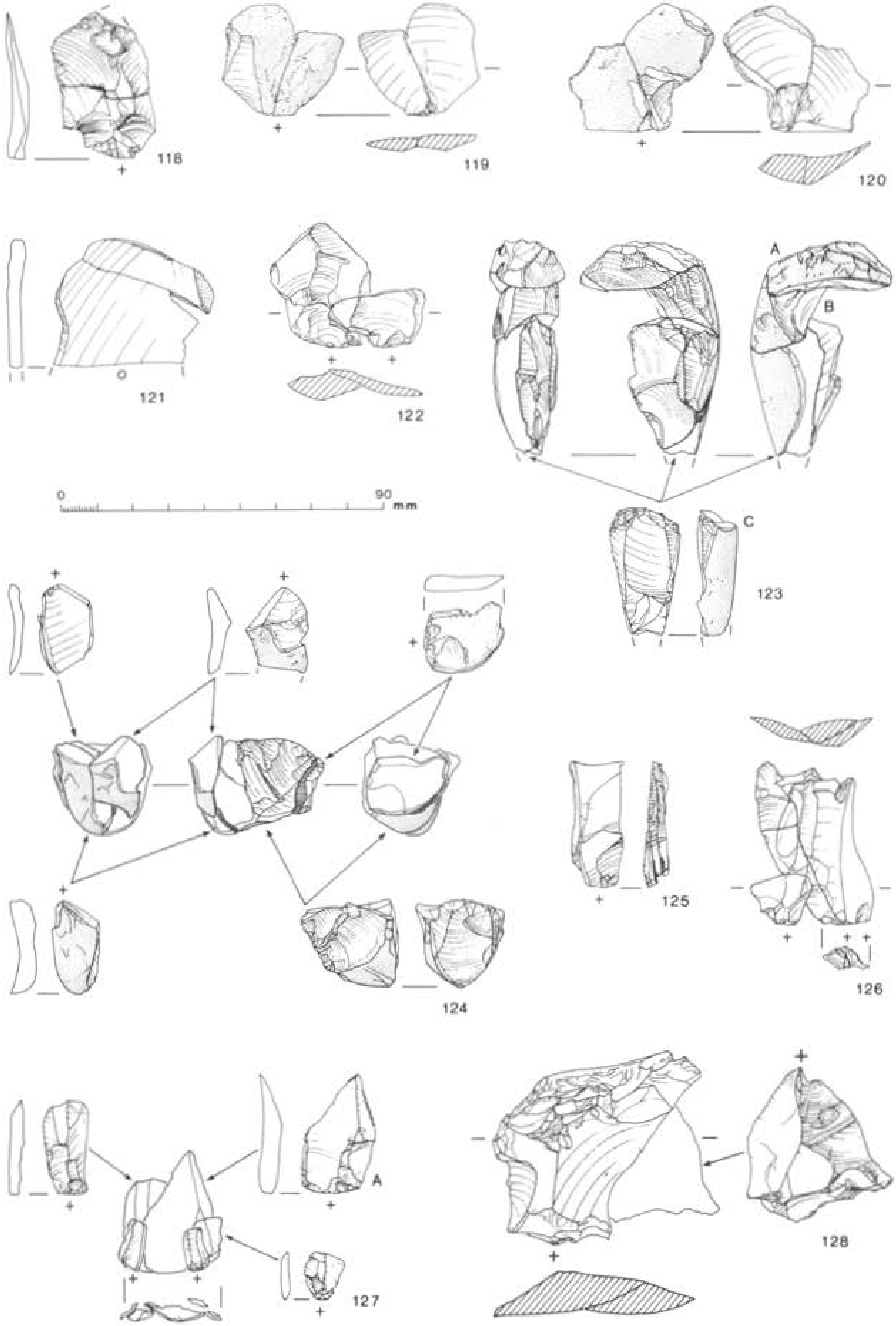


Fig 171 Flint artefacts 118–28: refitting pieces (scale 2:3)

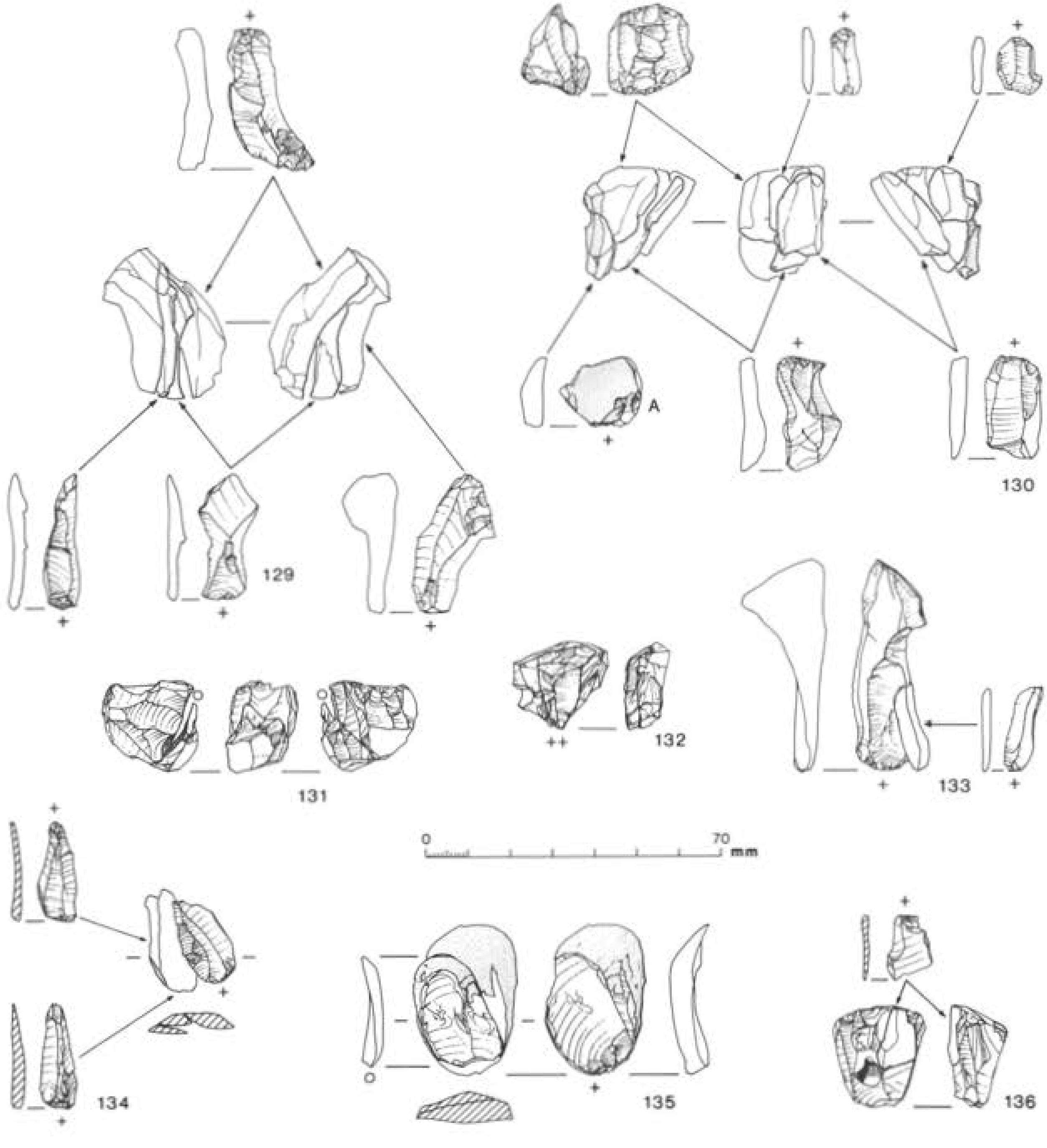


Fig 172 Flint artefacts 129–36: refitting pieces (scale 2:3)

level of artefact recovery, implies that this scatter is not the result of *in situ* knapping. The Siret fractures (Fig 171: 119–20) were obviously each produced by single flaking blows and it would normally be expected that each pair should be deposited close together, but they were actually found 4.1 and 7.8m apart respectively. Only one core could be allocated a conjoining flake, and this was of Mesolithic character, presumably predating the midden deposit (Fig 172: 131). At least two of the other conjoins were of Mesolithic typology (Fig 172: 132). The relatively high number of reassembled flakes from the midden and their widely-scattered distribution (which is inconsistent with breakage by Neolithic trampling) suggest that this assemblage is not the *in situ* remains of a knapping-floor. The refitting evidence is in keeping with an interpretation of the midden as redeposited refuse: flint débitage having been collected during the removal of organic waste from an activity area and dumped on the midden. The absence of any refits among the polished axehead flakes and fragments is a further pointer to the redeposited nature of the Neolithic assemblage, as is the flake in one of the Neolithic conjoin groups (Fig 171: 126) which came from a primary dump rather than the sub-cairn soil.

The conjoining flints are also of considerable interest for the typological and technological information which they reveal. The reduction strategies, albeit incomplete, leading to residual micro-

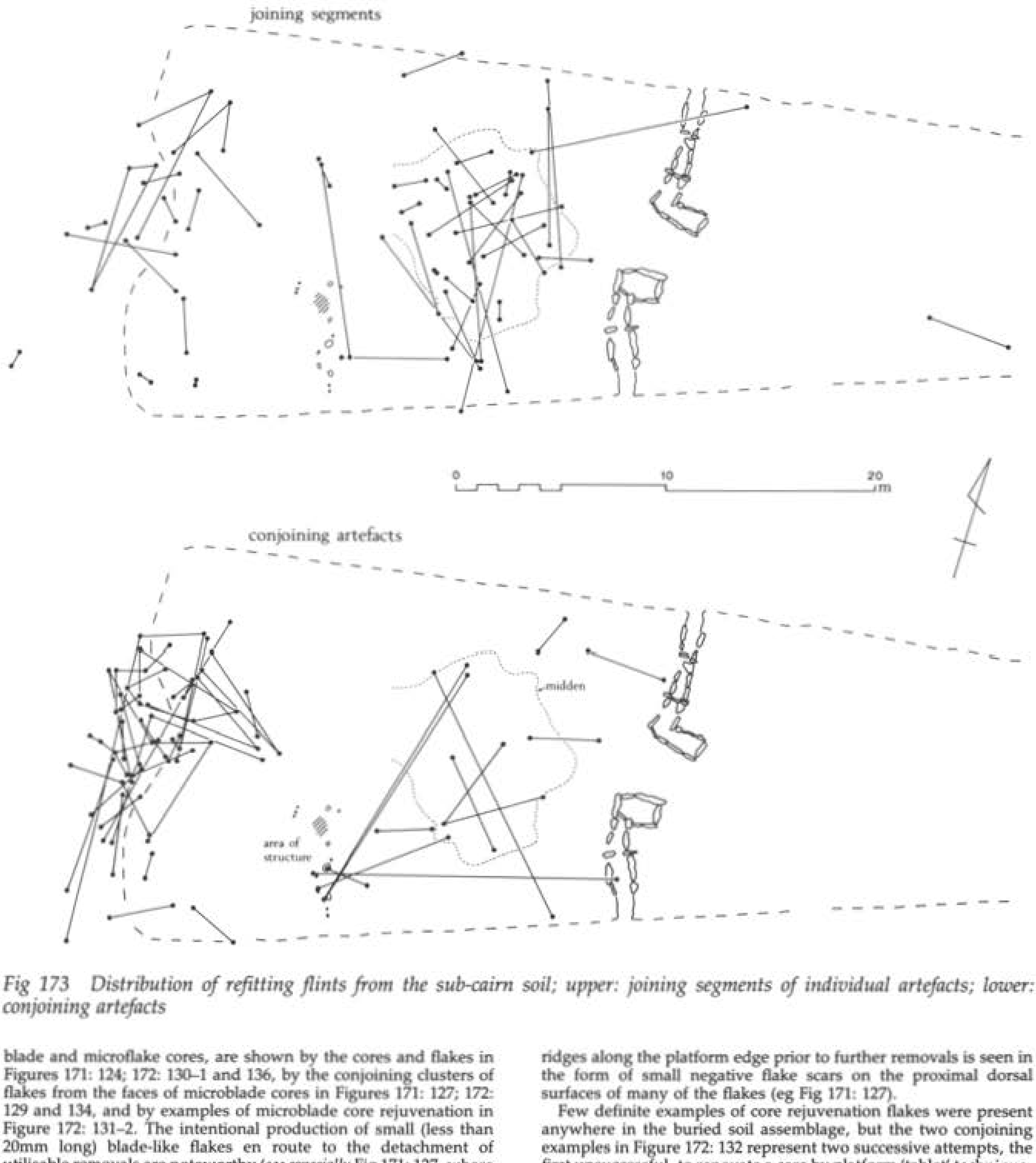


Fig 173 Distribution of refitting flints from the sub-cairn soil; upper: joining segments of individual artefacts; lower: conjoining artefacts

blade and microflake cores, are shown by the cores and flakes in Figures 171: 124; 172: 130–1 and 136, by the conjoining clusters of flakes from the faces of microblade cores in Figures 171: 127; 172: 129 and 134, and by examples of microblade core rejuvenation in Figure 172: 131–2. The intentional production of small (less than 20mm long) blade-like flakes en route to the detachment of utilisable removals are noteworthy (*see especially* Fig 171: 127, where flake A is an example of a potential edge-trimmed flake or piercer).

The flaking technology involved is uniformly the removal from the pebble exterior of relatively large, broad, cortical flakes to produce single or opposed platforms (usually formed by a single negative flake scar), from which narrow removals are made, parallel to each other, down the face of the core. Figure 171: 124 shows the platform production stage of broad, cortical flake removals, while Figure 172: 130 shows a developed stage of blade and bladelet removals. (Flake A in Fig 172: 130 was a late, unsuccessful attempt to produce a further opposed platform.)

The bipolar aspect of the reduction strategy (ie producing blades from opposed ends of the same core face) is clearest on Figure 172: 129 and 134, thus confirming the evidence of the flake scar patterns on many of the cores (Figs 165: 3 and 172: 136) and flakes (Fig 165: 2). The trimming, with a hammer, of the upstanding negative scar ridges along the platform edge prior to further removals is seen in the form of small negative flake scars on the proximal dorsal surfaces of many of the flakes (eg Fig 171: 127).

Few definite examples of core rejuvenation flakes were present anywhere in the buried soil assemblage, but the two conjoining examples in Figure 172: 132 represent two successive attempts, the first unsuccessful, to renovate a core by platform 'tablet' technique. This is the kind of rejuvenation typical with microblade cores, in this case from a core which has had platforms at right angles to each other. The broken conjoining flake in Figure 172: 131 may also have been intended as a 'tablet' rejuvenation flake.

The way in which a somewhat atypical piece of raw material, a pebble with a very smooth, water-worn cortex and yellow-stained thermal areas, has been reduced to a small core, is shown by Figure 171: 123. A single large chunk (A) was removed from one pole of the pebble to produce a platform from which some flaking, not apparently very successful to judge from the flake beds, was effected down the face of the core, although no refitting pieces belonging to this stage were found. To continue flaking in the same direction and plane, the core was renovated by the removal of a chunk (B), which included the whole of the remaining surface of the previous platform. The removal of B led to the final stage of the core (C), to which only two flakes could be refitted. At least two absent flakes/blades from this final core stage could have been of suitable size and shape for tool blanks, and it is presumed that such was the case and they were removed for use elsewhere.

All the illustrated pieces mentioned in the previous paragraphs are typologically Mesolithic, although Figure 172: 131–2 are from the midden part of the site rather than the forecourt. The only illustrated Neolithic examples of conjoining flakes are Figures 171: 122, 125–6, and 128; and 172: 135. In the case of Figure 171: 122, 126, and 128, the flint is of the cream-coloured cherty type peculiar to the Neolithic assemblage and very likely to result from the working of a broken axehead.

The scope for reduction strategy reconstruction is less with the Neolithic material because of the absence of conjoining flake sequences and cores, but the refits shown in Figures 171: 122, 126, and 128; and 172: 135, emphasise the different shape and larger size of the flakes being produced. The few Neolithic cores from the buried soil, such as Figure 165: 6 and 8, emphasise the multi-angle flaking, with consequent multi-faceted platforms and separate phases of orientations to the flaking (also apparent on the gravegood core, Fig 169: 117).

Conclusion

The Hazleton flint assemblage belongs almost exclusively to the two earliest phases on the site, the Mesolithic and Neolithic activity of the pre-cairn phases. The construction and use of the monument appear to have involved little need for flint artefacts (cf Healey and Green 1984, 113), apart from the few items interpreted as gravegoods. The primary fills of the quarries were remarkably free of artefacts of flint or stone.

The absence of flint in association with the construction and use phases of the monument probably indicates that it was not immediately adjacent to a settlement. After the use of the monument, a few flints suggest only a small amount of later prehistoric activity. This activity was presumably of a casual nature, although a specialised barbed-and-tanged arrowhead (Fig 166: 30) could have derived from a destroyed Bronze Age burial. (Bronze Age round barrows in association with Neolithic long cairns are well documented in the Cotswolds, eg at Burn Ground: Grimes 1960; cf Drinkwater 1972, 144–8.)

The Hazleton flint assemblage is the largest excavated collection available from a Cotswold Neolithic site, pending publication of those from Crickley Hill, Gloucestershire, and Ascott-under-Wychwood, Oxfordshire, and it is the largest published excavated assemblage from a prehistoric site of any period on the Cotswolds. Its numerical total, however, is inflated by the large number of spalls and chips recovered, and it lacks an extensive series of the more informative artefact types (eg cores). The stratified component is also compromised by the presence of both Mesolithic and Neolithic industries, which are admixed to an unknowable degree. Nevertheless, some wider comparisons can be drawn.

The Cotswold Mesolithic is as yet poorly known. However, the Hazleton microliths, of later Mesolithic type, match the finds from Syreford, Gloucestershire (Saville 1984c, 70–1) and offer general parallels with Mesolithic finds from the adjacent counties of Oxfordshire (Case 1952/53 and 1986) and Warwickshire (Saville 1981e). The relative importance of 'needle-point' microliths at Hazleton, and the absence of such characteristic later Mesolithic forms as points with inverse basal retouch, present potential regional contrasts. The assemblage is, however, too small for this to be emphasised.

The relatively small size of the assemblage, especially given the wide area of the focus in the forecourt (at least *c* 70sq m; Fig 160), cautions against making sweeping conclusions about the nature of the occupation. However, the small number of scrapers – a maximum of two can be regarded as typologically Mesolithic – compared with the number of microliths might suggest a primary subsistence type of site (Mellars 1976, 388): a forward hunting camp as opposed to a base camp. At a forward camp, which could have been occupied by a small group for a very short period, the main activity would be retooling, involving the knapping of cores to produce blades for microliths.

In the absence of local Neolithic assemblages with which the Hazleton material can be compared, comments can be made on relationships further afield. Within the wider framework of the earlier Neolithic flintwork of southern England, as known from such classic sites as Hurst Fen, Suffolk (Clark 1960) and Windmill Hill, Wiltshire (Smith 1965), the Hazleton assemblage offers several points of similarity and contrast. In terms of tool types, Hazleton has the range of categories to be expected – serrated flakes, leaf-shaped arrowheads, scrapers, piercers, polished axeheads, and laurel-leaves – but not necessarily in the customary proportions. It is noteworthy, for example, how unimportant are serrated-edge flakes in the Hazleton assemblage, when these are such a major element in the tool component of other early Neolithic sites, particularly the causewayed enclosures (Healey and Robertson-Mackay 1983, 16–17). At Carn Brea, Cornwall, the absence of serrated flakes was perhaps compensated for by the presence of numerous edge-trimmed flakes, particularly since many of the latter had a pronounced edge-gloss (Saville 1981c, 144). Such an explanation will not suffice at Hazleton, where not only are the edge-trimmed flakes less numerous, but where edge-gloss is a rare phenomenon. Equally noticeable are the very small number of stratified scrapers. The low representation of retouched forms at Hazleton may simply lie in the misleadingly large assemblage total, inflated by so many tiny flakes. Differing levels of flint recovery make inter-assemblage comparison somewhat hazardous. When the number of tiny spalls present at Hazleton is subtracted, the size of the assemblage is quite modest, and the underrepresentation of retouched forms is more apparent than real.

Metrical analysis of the larger unretouched flakes from the midden area showed a mixture of blades and broader forms (Fig 161; Tables 32–3). A substantial amount of research has been devoted to the analysis of the shapes of unretouched flakes from Neolithic sites in southern England (Healey and Robertson-Mackay 1983; Pitts 1978; Saville 1981d). This research demonstrates a technological shift during the Neolithic period from blade to flake production. The interpretation of such analyses needs to consider biasing factors, such as the proportion of secondary to tertiary flakes, the proportion of small to large flakes, the overall size of the sample, and the type of raw material. Thus, for example, the mixture of flake shapes in samples from Hazleton and Carn Brea (Table 46) can be seen to be quite comparable when account is taken of the fact that the Carn Brea sample only includes flakes with a length (not a width) 20mm or greater, which will inevitably have reduced the number of broad flakes included.

Table 46 Comparison of length/breadth index values of unretouched flakes 20mm or more in length from Hazleton and Carn Brea, Cornwall

Length breadth value	*Hazleton midden**		*Carn Brea Sites A1, D, and K†*		
	no	*%*	*%*	*no*	
<0.6	3	2.8	–	–	very broad
0.6–1.0	29	27.3	12.5	97	broad
1.1–1.5	36	34.0	39.8	310	medium/broad
1.6–2.0	18	17.0	30.0	234	medium/narrow
2.1–2.5	16	15.1	11.7	91	narrow
>2.6	4	3.8	6.0	47	very narrow
Totals	106			779	

Note: **See* Table 32; includes flakes less than 20mm in length if their breadth exceeds 20mm. †*See* Saville 1981c, 147, table 45.

Nevertheless, the proportion of broad flakes in the Hazleton midden sample seems to be quite high, a trend being recognised in the flake components of other Early/Middle Neolithic assemblages (Healey and Robertson-Mackay 1983, 22). The suggested dividing line between Early/Middle and later Neolithic flake samples of 35% or more of flakes having a breadth:length ratio narrower than 3:5 (Saville 1981d, 43) is clearly set too high in the case of Hazleton (Table 33). This perhaps suggests that ratio comparisons alone are insufficiently-subtle gauges of the differing technologies involved. It is of some interest, however, that the Hazleton Mesolithic flake sample is significantly different from the midden one (Tables 32–3), having a much higher proportion of narrow flakes or blades, effectively reversing the trend postulated by Pitts and Jacobi (1979, 171). Unsubtle though it may be, the analysis of length/breadth data at Hazleton does provide a means of discriminating between the Mesolithic and Early Neolithic flake samples in line with the other observable differences between the technologies involved.

Obviously, the most relevant comparisons with the Hazleton assemblage will be flint collections from other Cotswold-Severn tomb sites which have been excavated in a similar fashion. Most relevant of all will be the assemblage from the nearby (Fig 1) tomb at Ascott-under-Wychwood, which interim summaries make clear has a major later Mesolithic component with triangular and crescentic geometric microliths (Case 1986, 18). Pending definitive publication, the only detailed report on the lithic assemblage from an extensively-excavated Cotswold tomb is Gwernvale, Powys (Healey and Green 1984). This is another laterally-chambered tomb, but one of the Black Mountain group, located 85km west of Hazleton, across the Severn valley.

Gwernvale, like Ascott and Hazleton, has a large Mesolithic component in its pre-cairn assemblage, interpreted as representing both the Early and later Mesolithic, with Mesolithic occupation preceded by Upper Palaeolithic activity on the same spot (Healey and Green 1984, 129). Some doubts have been expressed about the multi-phase pre-Neolithic interpretation placed upon the Gwernvale flints (Saville 1985, 343). The presence of later Mesolithic occupation comparable with Hazleton, however, is not in doubt. Regarding the settlement activity which the Mesolithic finds from these sites convey, Healey and Green (1984, 130) suggest '...a temporary camp for the exploitation of ungulates', while Case (1986, 18) prefers a base camp at Ascott-under-Wychwood, apparently because of an equal mix of scrapers and microliths.

The Neolithic assemblage at Gwernvale is, as at Hazleton, difficult to isolate except in the case of a few characteristic implement types. Contrast is provided by the relatively high number of leaf-shaped arrowheads at Gwernvale (some 20 from the pre-cairn soil; Healey and Green 1984, 130), compared with two at Hazleton. The estimate of eight polished flint axeheads at Gwernvale (Healey and Green 1984, 125) compares with 13 at Hazleton, the importance of broken axeheads as blanks for further flaking being apparent at both sites. Scrapers are much more prominent in the Gwernvale assemblage, being at least five times as common in the pre-cairn assemblage as at Hazleton (Healey and Green 1984, 123). Of more interest, however, is that, both at Gwernvale and Hazleton, and apparently at Ascott, there is pre-cairn Neolithic activity which has included the deposition of substantial quantities of lithic material. Only at Hazleton does this material seem to have been largely redeposited in a discrete midden area, but in each case a picture of domestic activity seems to be implied.

Finally, some comment is necessary on the separate Mesolithic and Neolithic flint assemblages identified at Hazleton on typological grounds. It has been suggested above that the formation processes of the Mesolithic and Neolithic deposits are different (ie *in situ* knapping and redeposition with rubbish). The assemblages themselves have been shown to differ in the technology employed and in the range of implement types present, and to a certain extent in terms of the raw material exploited. Whatever the absolute date of the Mesolithic at Hazleton, the two flint assemblages are quite distinct. Two interrelated conclusions are possible: on the one hand, it seems unlikely that the same population group could be responsible for producing the two assemblages, unless a significant period of acculturation intervened; and on the other, if the two assemblages are chronologically very close, then two quite separate populations must be supposed.

11 Stone, bone, and fired clay

Stone artefacts

Quartzitic pebble tools

Two extensively-worn quartzitic hammerstones were found. One (Fig 174: 5059) is abraded over almost the entire surface and is almost spherical in form (max dimension 60mm; wt 224.5g). The rock is a fine-to-medium grained quartzite, pinkish-grey/brown in colour. A smoother, convex area (30×28mm) could represent the original outer surface. This hammerstone was found in the entrance to the north chambered area, by the left knee of skeleton 1 and very close to where the left hand would have been prior to disturbance (Fig 234). It is assumed to be a gravegood, complementing the large flint core found with the same skeleton (Fig 169: 117). By association, this hammerstone is interpreted as a flint-knapping tool. C Bergman, P Harding, and Dr M Newcomer have confirmed this function (pers comms); they would expect the shape and the abrasion pattern to result from extremely intensive and/or longterm use as a knapping tool. This hammerstone is perhaps a curated artefact: a possession of personal significance appropriate as a gravegood.

The second hammerstone (max dimension 64mm; wt 193.9g), of a finer-grained quartzite, was found on the subsoil beyond the external revetment on the north side of the cairn (Fig 175). It is only approximately two-thirds complete (Fig 174: 15628). Part of the flat and smooth upper and lower surfaces, grey-brown in colour, of the original pebble exterior remain, the rest of the periphery of the original pebble having been worn away by extensive abrasion and leaving an artificially-smooth, pinkish-grey/brown coloured surface. It may be a flint-knapping tool, but the width and regularity of the abraded surface could result from the hammering of a somewhat less resilient substance.

A third, quartzitic sandstone, pebble tool (max dimension 94mm; wt 347g) has a smooth, brown, original outer surface. The flattish, elongated form of the pebble is unmodified except at both ends, which are worn smooth as a result of use for pounding or grinding (Fig 174: 4782), exposing the yellow-brown interior. One end has been damaged, possibly in use. The convex surface (41×23mm) at the other end must result from prolonged rubbing or pounding against a resilient surface, presumably in the course of some grinding process, rather than knapping. This tool was on the floor of the passage in the south chambered area, close to orthostat 316, lying flat (Figs 107 and 111). The artefact was not in association with any particular bones, but it is probable that it was a personal gravegood.

The origin of the three pebbles described above is uncertain. Various quartzitic pebbles are common on ploughed fields in the Cotswolds, as relicts of glacial transport. The quartzitic sandstone pebble (Fig 174: 4782) is lithologically very close to some of the pebbles found during excavation (eg 5290, 5834, and 10729) and could be a locally-collected pebble. The rock types of the two hammerstones are not found among the natural pebbles from the excavation, and they are less easy to match in the general range of quartzitic Bunter pebbles. Indeed, the more fine-grained of the two hammerstones (Fig 174: 15628) is lithologically very close to a sarsen (*see* B Worssam, geological archive notes), although it is rather different in macroscopic appearance to the sarsen described below. Thus, while it is possible that one of the hammerstone pebbles (Fig 174: 5059) could have been collected locally, it is almost certain that the sarsen-like pebble was imported from further afield.

Hammerstones or similar stone tools have been reported from several Cotswold-Severn tombs (Corcoran 1969, 72), but it is often difficult to find precise information about these objects. Recent excavations have produced a small, circular, stone rubber or hammer, very similar to the Hazleton hammers, from a presumably pre-cairn context at the Sale's Lot long cairn (O'Neil 1966, 30 and fig 4, 16), and another similar object, which may also relate to pre-cairn activity, was found at the Penywyrlod tomb, Powys (Savory 1984, fig 10, 5). Similar implements are known from contemporary settlements in southern Britain, for example at Broome Heath, Norfolk (Wainwright 1972, fig 48, S5).

Numerous other quartzite and quartzitic sandstone pebbles, many of Bunter type, were found (Chapter 16). The majority are very small and probably entirely natural and of chance occurrence on the site. The apparently random distribution of pebbles in the sub-cairn soil (arch drg 780) shows no correlation with other artefact concentrations. Only three pebbles exhibited probable use and are listed (Table 47). The positions of the two from the sub-cairn surface are shown on Figure 175; they were found towards the eastern end of the sub-cairn area, and either a Mesolithic or Neolithic context for the use of these pebbles is possible. Only a small number of the pebbles have been broken artificially (10727, 10927, and 14318), possibly during use, although the remaining pieces, none of which can be refitted, do not exhibit abrasion.

Table 47 Quartzitic pebbles with abrasion

Find no	*Maximum dimension*	*Weight in grams*	*Context*	*Description*
3562	63mm	97.7	201	One end of a broken, elongated, quartzite pebble. The end which is present has obvious abrasion consistent with use as a hammer, possibly in flintknapping (Fig 174: 3562)
13219	49mm	72.4	211	Complete quartzite pebble, with abrasion on two opposed edge areas, consistent with knapping use (Fig 174: 13219)
13338	21mm	2.4	211	Tiny burnt fragment from the exterior of a pebble, showing the edge of an abraded zone (not illustrated)

Sarsen fragments

Eight pieces of very pale grey-brown, fine-grained quartzitic sandstone, identified as sarsen (Chapter 16), were recovered from the sub-cairn soil (Fig 175 and Table 48). All external surfaces exhibit wear. In two cases (16503 and Fig 176: 17304), the external surface areas are finely smoothed, while the wear on the other worn pieces is less intense and regular. In the absence of complete artefacts in this material, it can only be suggested that these pieces are fragments of grinding or pounding stones (or perhaps all part of the same artefact). Sarsen mauls are common on Neolithic sites in southern England (eg Windmill Hill, Wiltshire: Smith 1965, 120–4) and would presumably have been imported to the Cotswolds as finished items from sarsen-rich areas (Bowen and Smith 1977). The Hazleton fragments mainly reflect breakage along natural planes, but at least two pieces have a flake form (eg Fig 176: 17304), although the production of such flakes is probably unintentional.

Table 48 Sarsen fragments from the sub-cairn soil

Find no	*Maximum dimension in mm*	*Weight in grams*	*Flake*	*External surface present*	*External surface worn*
15662	59	37.6	?	yes	yes
16503	36	5.9	?	yes	yes
16541	22	2.3	no	no	–
17197	78	112.7	no	yes	yes
17304	77	65.8	yes	yes	yes
17368	36	6.4	yes	yes	yes
17614	38	12.7	?	no	–
17706	78	77.8	?	yes	yes

Coarse quartzitic sandstone

Some 61 fragments of coarse quartzitic sandstone (total wt 3058.5g) were recovered from the sub-cairn soil (Fig 175). These fragments derive from quernstones or smaller rubbers or mullers. The precise origin of this sandstone is not established (Chapter 16), but the querns also indicate the import of finished artefacts for the production of which the Cotswold region has no local raw materials.

Of the 61 fragments, 42 were non-rejoinable with a weight range from 1.0–135.3g (average 24g). The remaining 19 could be refitted

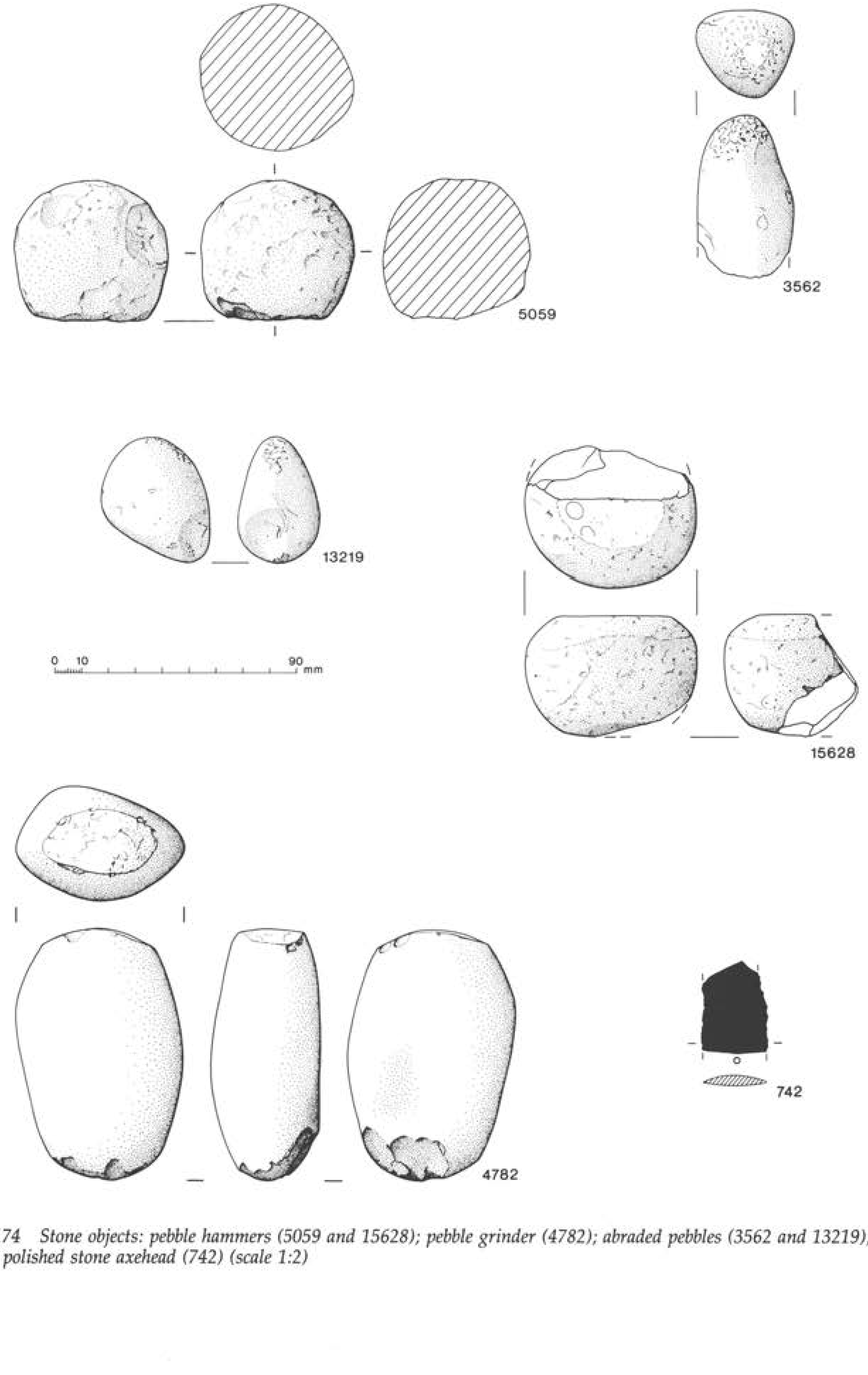


Fig 174 Stone objects: pebble hammers (5059 and 15628); pebble grinder (4782); abraded pebbles (3562 and 13219); flake from polished stone axehead (742) (scale 1:2)

Fig 175 Distribution of stone artefacts and fragments in the sub-cairn soil, excluding unworked pebbles

into five groups of 2, one group of 4, and one group of 5 rejoining pieces. The distribution of these refits (Fig 175) shows a dispersal pattern within the midden area already familiar from the flint (Fig 173). The implication is that these stones were broken up elsewhere and selectively redeposited on the midden. (A further 36 tiny fragments came mainly from the midden area; these are not plotted on Figure 175.) Of the refitted pieces, the most informative are the two groups which can be identified as broken saddle-querns (Fig 176: 15293 etc and 16700/17990). It is impossible to say how many querns might be represented, but contrasts in the surfaces suggest that at least two querns are involved. Of the non-rejoining fragments, only one (Fig 176: 16350) is identifiable and must be part of a small, flat rubber or muller.

Why the quernstones are so fragmentary is problematic. Reuse as hearthstones could have led to such fragmentation, but only one fragment shows clear signs of burning. Some of the fragments could perhaps result from use as anvils. All the Hazleton pieces of coarse-grained sandstone derive from the pre-cairn phase. Large pieces of quernstone could obviously be used as building stone, as indeed they were in the long cairns at Burn Ground (Grimes 1960, 75) and at Gwernvale, Powys (Britnell 1984a, 134); the implication is that those from the pre-cairn activity at Hazleton were too fragmentary to be used in this way. Some fragments of querns or rubbing-stones were noted from the pre-cairn deposits at Gwernvale (Britnell 1984a, 134–5).

Polished stone axehead fragment

A flake from the exterior of a polished stone implement, almost certainly an axehead (Fig 174: 742), was found on the surface of Barrow Ground field just to the east of the excavation. The flake is a medial segment (present length 39mm; wt 5g). This flake was submitted to the Implement Petrology Survey of the South-West, and the petrological analysis was undertaken by Dr H Howard (serial no 1814/G129). The rock was identified as the Group VI (Great Langdale, Lake District) range of epidotized tuffs. The Great Langdale source for stone axehead manufacture is assumed to begin around 3000 uncal bc (Smith 1979, 18), and axeheads from Lake District rocks are the most common sourceable stone axeheads found in Gloucestershire (Darvill 1984, 98).

Stone bead

A tiny, perforated stone pebble (max diameter 3mm; max thickness 1.5mm) was found in sieving the lower fill of the entrance to the north chambered area. The off-centre perforation is of hour-glass type (Fig 177: 18568). Such a perforation is most likely to have been made by a pointed flint tool. The stone is brown externally and buff-coloured at the perforation. It has been tentatively identified (by B Worssam) as a ferruginous siltstone of possible local origin.

Such an object can only be a bead. A bead of this minute size is unlikely to have served any decorative function by itself, although a string of similar beads would conceivably make an effective bracelet or necklace. Stone beads from other Cotswold-Severn tombs offer no comparison, since both the known examples, from Ty-isaf, Powys (Grimes 1939, fig 4, 7), and West Kennet, Wiltshire (Piggott 1962, fig 18, 14), are much larger. Even the smallest shale or jet beads from West Kennet (Piggott 1962, fig 18, 8–9) are over twice the size of the Hazleton example. Indeed, apparently not until the Bronze Age do beads of this size become a feature of the archaeological record (eg Annable and Simpson 1964, 47), and even then they are extremely rare.

Bone objects

Beads

Figure 177: 14879 is a longitudinally-hollow, tapering tube, plain, apparently fully cut at both ends, though now damaged. The ends and surface of the bead are worn. Length 19mm, max diameter 12mm. Sheep/goat phalanx (species identifications are by B Levitan). From the north edge of context 479/535, the socket of orthostat 318 on the south-east side of the south chamber.

Figure 177: 18445 is a longitudinally-hollow, cylindrical tube of very thin bone, presumably fully cut at both ends. One terminal has numerous external cut marks which presumably relate to failures or carelessness in its manufacture. Length 16mm, max diameter 10mm. Longbone of a greylag goose. From context 453, the surface of the buried soil at the base of the fill of the south chamber. From sieving, hence precise position not known.

Figure 177: 19761 is a longitudinally-hollow tube, plain, cut at both ends. The bead is worn. Length 7mm, max diameter 7.5mm. Bone indeterminate. From context 323, lower fill of passage to south chamber. Found during post-excavation sorting and so precise position not known.

Figure 177: 20698 is a longitudinally-hollow tube, cut at both ends and worn. The terminals show clear signs of the manufacturing technique. The original bone has been cut or sawn through two-thirds to three-quarters of its width, then snapped off, presumably in segments along its length. The surface of the

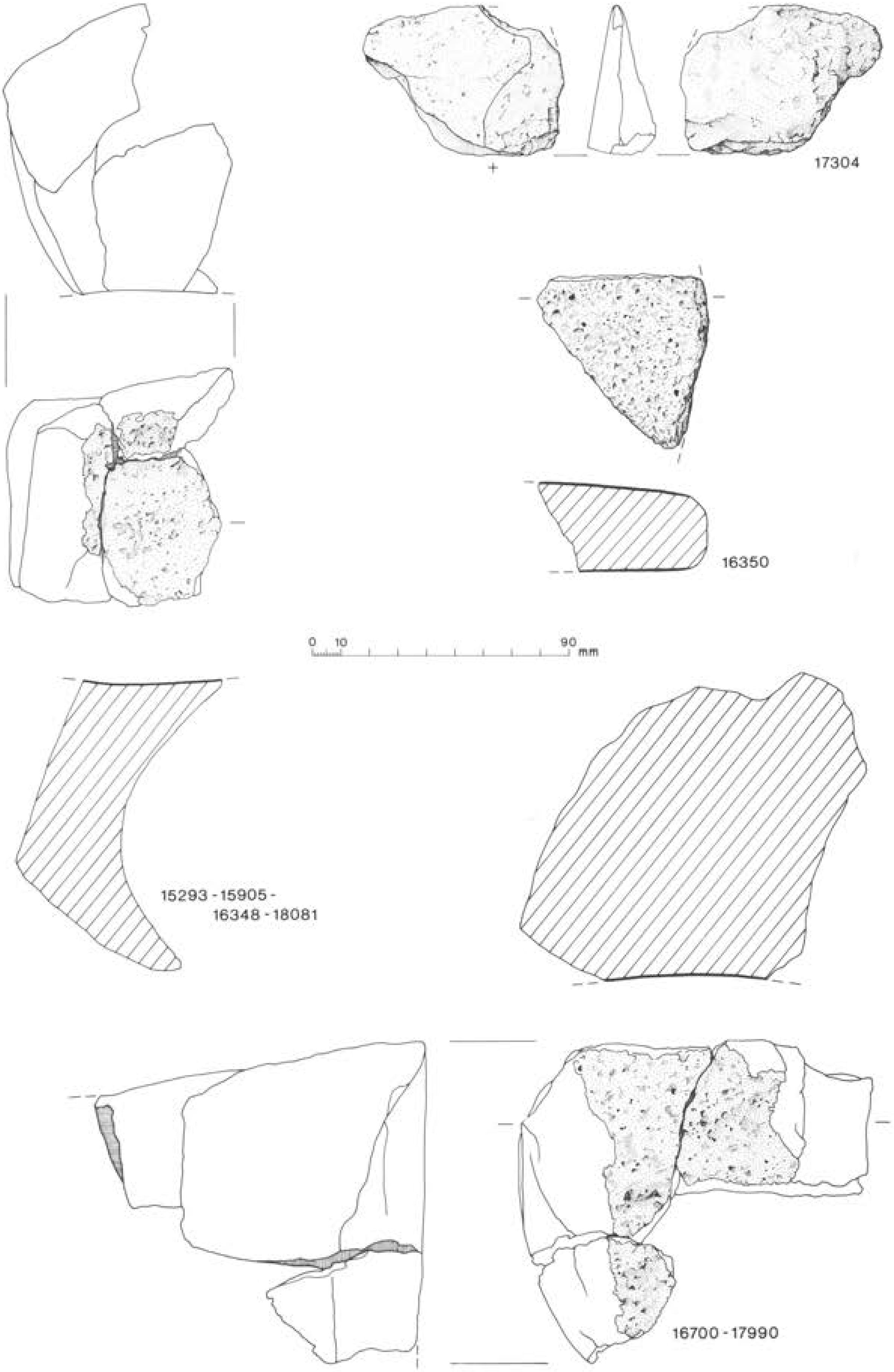


Fig 176 Stone objects: sarsen flake (17304); quartzitic sandstone rubber (16350); quartzitic sandstone saddle-quern fragments (15293 etc and 16700/17990) (scale 1:2)

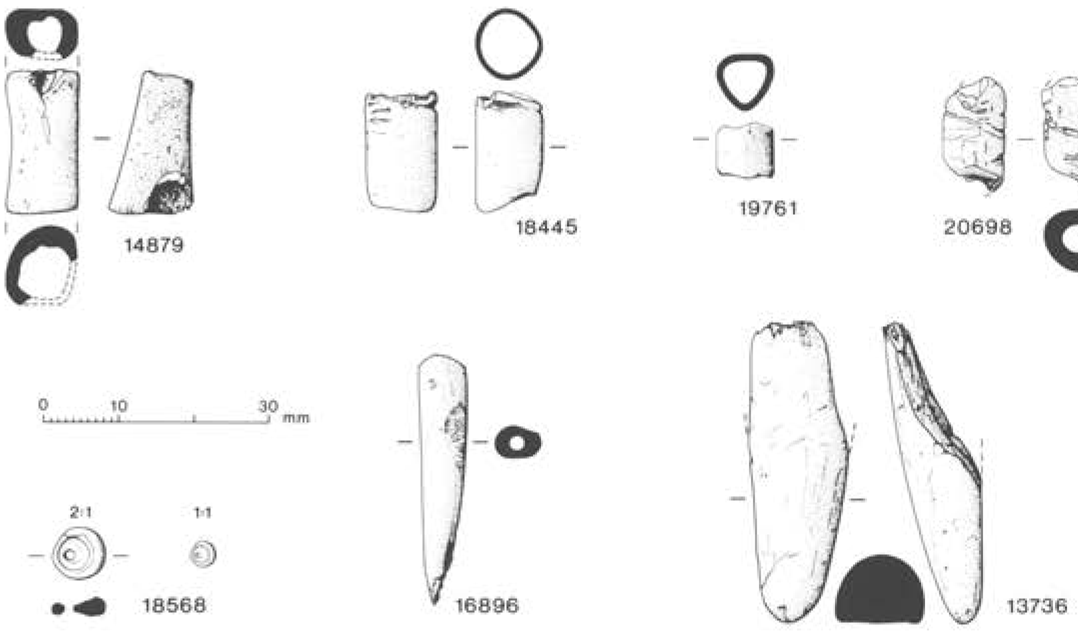


Fig 177 Bone beads (14879, 18445, 19761, and 20698); stone bead (18568); and bone points (13736 and 16896) (scale 1:1; 18568 also shown at 2:1)

bead has irregular, semi-circumferential cut-marks. These marks could be decorative, but they more probably result from cuts associated with the segmenting process of manufacture. Length 15mm, max diameter 10mm. Probably tibia of probable sheep/goat. From context 187/323, lower fill of passage to south chamber. From sieving, hence precise position not known.

Points

Figure 177: 16896 shows a narrow, sharp point, broken in antiquity at the base and slightly damaged at the point. Shaped. Present length 33mm. Pig incisor. From context 561, the midden area of the sub-cairn soil.

Figure 177: 13736 is a broken tip of a rounded, extensively-worn, D-sectioned point, probably fashioned on a longitudinally-split bone. Ancient break. Present length 41mm. Probably a metatarsal, species indeterminate. From context 390, at lower level of horizontally-placed slabs on the east side of the chambered area, so incorporated in the cairn fabric.

Discussion

The four bone beads all derive from within the south chamber or passage (Fig 121), in contexts which suggest that they were originally gravegoods associated with the burial deposits, although they cannot now be related to any specific burial.

A single bone bead came from the Cotswold-Severn tomb at Notgrove (Clifford 1950, fig 5, f) and six from West Kennet (Piggott 1962, fig 18, 2–7; Clarke *et al* 1985, fig 2, 9). Two of the West Kennet beads (Piggott 1962, fig 18, 4 and 7) offer close parallels for the Hazleton beads, while the bone tube, which Piggott does not regard as a bead (1962, fig 18, 1), bears similar cut-marks to two of the Hazleton beads (Fig 177: 18445 and 20698) and has probably been made by the same cut-and-snap technique. This technique of bead manufacture was recognised from waste pieces at Windmill Hill (Smith 1965, 129), even though no actual beads were found at that site. The beads at West Kennet which are bored from solid bone (Piggott 1962, fig 18, 3 and 5–6) represent a totally different method of manufacture.

As with the single stone bead already described, it is enigmatic that so few bone beads were present in the chambered areas, since they would be unlikely, even all together, to represent a sufficient number for a single necklace. There are, however, alternative uses for bone beads which could explain their presence in small numbers. Mercer (1980, 31) has suggested that three tubular bone beads found with a child burial at Hambledon Hill, Dorset, were toggles from a hair band, and this, or a similar explanation as hair beads with strands of hair simply pushed through the tube and knotted or plaited to keep the bead in place, would suit the Hazleton finds. This kind of bead could also have functioned as a toggle-fitting for clothes or bags.

The two bone points (Fig 177: 16896 and 13736) are associated with the pre-cairn and cairn construction phases respectively, although the latter could have been redeposited as a broken fragment from the pre-cairn assemblage.

Sharp, needle-like points are known from several Cotswold-Severn tombs, including Ty-isaf (Grimes 1939, fig 4, 8), West Kennet (Piggott 1962, fig 17, 11–14), Sale's Lot (O'Neil 1966, fig 4, 15, 17–18), and Notgrove (Clifford 1936, fig 3), having been made from various types of animal bone. Artefacts like these are a familiar component of Early/Middle Neolithic assemblages and are usually interpreted as associated with the use of animal skins (Piggott 1954, 84). The larger, more rounded point (Fig 177: 13736) is less easy to parallel, perhaps because of its broken state and extensive wear, since otherwise there is similarity with the bone gouge, chisel, or awl type of implement, often made from split metapodials, known from several Cotswold-Severn tombs (Clifford 1950, 30; Piggott 1954, 146) and from non-funerary sites (Smith 1965, 128–9). Piggott's suggestion (1962, 49–52), on the basis of the West Kennet data, that bone artefacts such as those described here may be secondary deposits in Cotswold-Severn tombs, relating to later Neolithic activity, can be discounted in the case of Hazleton, where the evidence shows bone beads and points to be a feature of the early third millennium uncal bc artefactual repertoire.

Fired clay

Apart from small fragments from superficial or cairn decay contexts, the only pieces of fired clay recovered were a small (12mm) piece from a cairn construction context (261) and four pieces from the pre-cairn surface, three of them from the area of the midden. Of these stratified pieces, only one (Fig 178: 17949) from the midden can be characterised as daub. This daub fragment has a flat, smoothed outer face with parallel linear marks and an uneven inner surface with the concave, negative impression of a withy with a minimum diameter of 14mm.

Daub is an apparently rare find on British Early/Middle Neolithic sites.

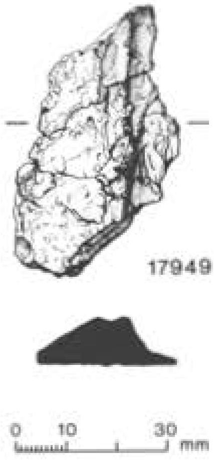


Fig 178 Daub fragment (scale 2:3)

12 The human skeletal material

by Juliet Rogers

Introduction

Over 9000 human bones (and fragments) were recovered from the Hazleton North excavation, the majority in a disarticulated and fragmentary state. Only two articulated skeletons were found, both in the north entrance, one virtually complete (skeleton 1), the other without its upper half (skeleton 2). Generally, the condition of the bones was good. *In situ* conservation (using PVA) was undertaken in only two instances: on parts of skeleton 1 and on some longbones in the outer part of the south entrance; in both cases, the bones in question were quite close to the modern field surface. Almost all the bones, apart from those treated with PVA, were washed using tapwater. No post-excavation conservation of the bones was undertaken, other than limited rejoining of broken bones (using 'HMG' or 'UHU' glue).

The size of the pieces of bone recovered by hand excavation ranged from complete skulls and femora to small slivers and crumbs. Breakage was common. After all the bones which could be planned had been removed, the residue from the burial areas was passed through sieves, resulting in a mass of tiny fragments, crumbs, and bone dust, which was largely unidentifiable.

Apart from the fragmentation, the surfaces of some bones were abraded by contact with the surrounding soil and stones, and certain bones carried tooth-marks. The latter were observed in particular on ten bones from the north burial area and five from the south (Table 49). These tooth-marks were assessed, on the basis of their 'freshness', to determine whether they were ancient or modern. Nine of the tooth-marks were apparently fresh – definitely so in the case of a fibula from the north chamber on which the gnawing truncated calcareous concretion, presumably the result of animal gnawing during 1981–2 when the bones were accessible. Six of the tooth-marks appeared to be ancient, including those on a fibula and a ramus from the north chamber with calcareous concretion overlapping the marks. Although an exhaustive check for ancient gnawing was not undertaken, there was a general impression that this was not a frequent occurrence.

The aim of the skeletal examination was first to identify each of the bones recovered, although for the smaller fragments and crumbs this was either impossible or too time-consuming to undertake. Having identified the bones wherever possible, it was then attempted to rejoin fragments and reconstruct complete bones, to match bones into pairs, and to identify articulating bones, in the hope of isolating individual skeletons. Needless to say, complete skeletons or even complete parts of the skeleton are normally capable of yielding much more information than masses of disarticulated bones. No list of the numbers of each bone type is given, as this would be more confusing than useful in view of the number of fragments (for example, some 592 separately-numbered finds were identified as 'skull', but these ranged from complete skulls to tiny fragments). Once the bones were identified, they could be used to assess the number of individuals represented, the likely age, sex, and stature, and the presence or absence of diseases. The rejoining and pairing of bones, and the recognition of articulations, provided information of use in analysing the distribution of burials within the chambered areas (*see* Chapter 6).

Identification

Each bone or fragment had generally been assigned a unique find number, normally written on the bone itself, and each piece was usually bagged separately and boxed in numerical sequence, subdivided only according to origin from the north or south chambered areas. (The main exceptions to this sequence involved the two skeletons from the north entrance, which had been assigned a single find number each, and much of the fragmentary sieved material, which was grouped together in bags with only a single find number.) Initially, each item of bone was kept separate, and notes were made about the type of bone, the part of the bone if a fragment, the side of the body from which it came, and, if possible, about age and sex and about pathology or other distinguishing marks. These notes were passed to the archive assistant (E Hall), who compiled separate catalogues for the north and south chambered areas, listing the human bone identifications

Table 49 Human bones with animal tooth-marks

Find no	*Bone identification*	*'Modern/ ancient'*	*Site location*	*Context*
3810	cranium, frontal fragment	mod	S entrance	11/354
4747etc	fibula (L)	anc	N chamber	315/336
4779	ulna shaft (L)	mod	S passage	187/323
5037–1	mandible ramus, posterior margin	anc	N entrance (skel 1)	267
5037–24	humerus (R)	anc	N entrance (skel 1)	267
5090	tibia, distal fragment (L)	anc	N chamber	322
5091	?fibula, shaft fragment	mod	N chamber	322
5094	tibia, distal fragment (R)	mod	N chamber	336
5484	infant tibia shaft	mod	N chamber	336
5514	clavicle fragment	mod	N chamber	336
6491	fibula (R)	mod	N chamber	336
7253	unidentified fragment	mod	S entrance	354
8662	tibia (R)	anc	S chamber	412
8715	radius, mid-shaft fragment	mod	S chamber	412
9061	mandible ramus (R)	anc	N chamber	336

in find number sequence, and catalogues listing selected human bones by type, subdivided according to provenance from the north entrance, north chamber, south entrance, south passage, or south chamber. At this stage, it was only feasible to conjoin fragments with consecutive or close find numbers.

Burnt bone

During preliminary examination over 200 fragments of burnt bone were noted (Table 50, *see* Figs 120 and 136). Many of these had been recovered by sieving and were, therefore, very small, unidentifiable fragments. They ranged from white (calcined) or black, through greyish-blue (the majority), to slightly charred. The burnt bones were mostly adult, from one or more individuals, but some infant bones were identifiable. One of the vertebra fragments, three of the rib fragments, the two ulnae (a pair), and two of the unidentified longbone fragments were from a child. Cranial fragments far outnumbered the other varieties of bone identified (and the total of 95 includes many conjoined pieces), but this may be in part because these were readily distinguishable, however small the fragments. The cranial fragments did include pieces from a child's skull, but the fragments were too small to comment on the individuals represented, apart from the fact that at least one adult and one child were present.

Table 50 Burnt human bones (mostly fragmentary)

Type	*North entrance*	*South entrance*	*South passage*	*South chamber*
skull fragments	95+	–	–	–
vertebrae	7	–	–	–
ribs	17+	–	–	–
hand bone (phalangeal)	1	–	–	–
teeth	2	–	1	–
tibia	1	–	–	–
femora	–	–	1*	1*
ulnae	2	–	–	–
unidentified longbones	11	–	1	–
unidentified fragments•	51+	3	12	7
Totals	187+	3	15	8

Note: *Parts of the same femur probably. •Plus many further tiny fragments and crumbs of burnt bone from the sieving of the north entrance deposits.

Number of individuals

Estimates of the minimum numbers of individuals were calculated for the north and south chambered areas (Tables 51–2). Diagnostic bones, or bones that survived well and were easily identifiable, were used in the estimates. Thus, for example, the distal humerus was selected in preference to the proximal humerus, because it survived intact more often and because, even when damaged, the left and right sides were less easily confused. In all, 15 bones or parts of bones were selected for diagnosis. The numbers of each bone were recorded, whether it was a left or a right side, and whether from an adult or a child. In the case of the north chambered area, the bones from the articulated skeletons were included with the others. Before arriving at minimum totals, consideration was also given to other bones, in particular to the children's teeth and longbones (*see below* and Tables 53–4), to see if recognisably different sizes and stages of development, and thus ages, were involved. For the north chambered area, the totals, including the two skeletons, were 7 adults and ?8 children, and for the south chambered area 14 adults and ?11 children. The burnt cranial fragments from the north entrance also indicate the partial presence of at least one other adult. The overall minimum numbers estimates are therefore 22 adults and 19 children: a total of 41 individuals.

The reconstruction of individual skeletons

The extent to which reconstruction can be undertaken with accuracy is restricted if the bones are fragmentary, if they lack many special identifying features (such as unfused epiphyses or particular pathological changes), or if there are more than a few individuals represented. For the Hazleton collection, this exercise was tackled in three stages: individual bones were repaired whenever possible or practical (eg not attempted for ribs); bones were paired when possible; and assemblages of tentatively articulating or associated bones were isolated. The first stage is accurate – only perfect joins were accepted – but the other stages are more problematic. Pairing can be unequivocal with bones which are absolutely complete and regular, as can be the refitting of adjacent bones with precise articulations, such as vertebrae, pelvis/sacrum, or talus/calcaneum, when the bones are undamaged. Other groupings must be regarded as much more tentative. It was usually not possible to reassemble anything approaching a full skeleton, and the sheer number of jumbled bones from the south chambered area frustrated such attempts, which were more successful with the smaller, and spatially-subdivided, assemblages from the north entrance and chamber.

Table 51 Minimum numbers: north chambered area

Bone	*Adults* *Ent*	*Adults* *Cham*	*Children* *Ent*	*Children* *Cham*	*Totals* *Adults*	*Totals* *Children*	*Grand totals*
atlas vertebra	3	4	–	3	7	3	10
axis vertebra	3	3	–	1	6	1	7
distal humerus	3	4	2	4	7	6	13
scapula glenoid	3	2	1	4	5	5	10
proximal ulna	3	3	2	4	6	6	12
distal radius	3	4	–	4	7	4	11
ilium	3	1	1	4	4	5	9
ischium	1	1	–	3	2	3	5
proximal femur	3	4	1	3	7	4	11
patella	3	3	–	–	6	–	6
distal fibula	3	4	–	1	7	1	8
talus	3	4	–	–	7	–	7
calcaneum	3	4	–	2	7	2	9
metatarsal I	3	4	–	–	7	–	7
metatarsal V	3	4	–	2	7	2	9

Table 52 Minimum numbers: south chambered area

Bone	*Chamber, passage, and entrance combined* *Adults*	*Children*	*Grand totals*
atlas vertebra	13	1	14
axis vertebra	12	2	14
distal humerus	13	5	18
proximal ulna	12	4	16
distal radius	11	3	14
ilium	12	6	18
ischium	9	6	15
proximal femur	11	8	19
patella	14	–	14
distal fibula	10	–	10
talus	14	4	18
calcaneum	13	4	17
metatarsal I	14	2	16

Table 53 Ages of pre-adults estimated from tooth eruption

	Years *under 1*	*1–2*	*2–5*	*5–11*	*11–15*
North chambered area	2	2	3	–	–
South chambered area	–	2	2	2	1
Total individuals	2	4	5	2	1

Table 54 Ages of children estimated from diaphyseal lengths: north (N) and south (S) chambered areas

Bones	*Years* *under 1* *N*	*S*	*1–2* *N*	*S*	*2–5* *N*	*S*	*5–8* *N*	*S*	*8–12* *N*	*S*	*unspecified* *N*	*S*
humeri	1	–	2	–	3	1	–	2	–	1	–	–
radii	–	–	2	–	3	1	–	–	–	2	1	–
ulnae	1	–	3	–	2	3	–	1	–	–	–	–
ilia	2	1	1	2	2	–	–	1	–	2	–	–
femora	1	–	1	2	2	1	–	1	–	1	–	–
tibiae	–	–	1	1	2	1	–	1	–	3	–	–
Number of children	2	1	3	2	3	3	–	2	–	3	(1?)	–

Total children: 8 (N) + 11 (S) = 19

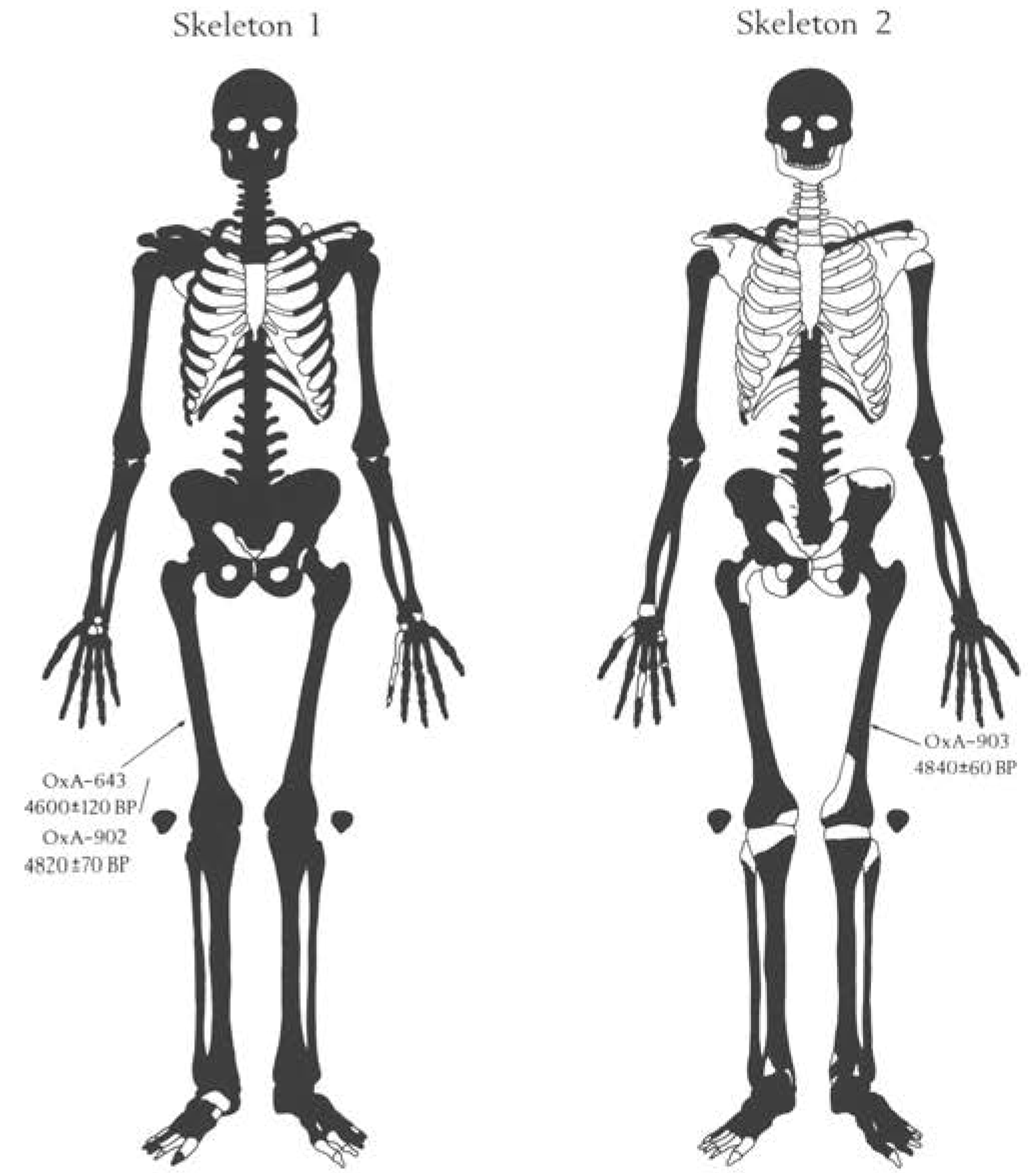


Fig 179 Skeletons 1 and 2, bone-presence diagrams

The terminology devised by the excavator has been followed here, whereby the two articulated burials from the north entrance were designated skeletons 1 and 2, while potential skeletons isolated during post-excavation were labelled individual A, B, etc. The bones comprising skeletons 1 and 2 and the other individuals are itemised in Appendix 10.

North entrance

Starting from a situation where one virtually-complete skeleton (skel 1) and one partially-complete skeleton (skel 2) were recovered during excavation, the post-excavation analysis was able to resolve problems of attribution of minor bones (especially hand and foot bones) incorrectly assigned to skel 1 in the field, to assign further bones to skel 2, and to identify and partially reconstruct a further skeleton (individual A), leaving a collection of infant bones, some, if not the majority, of which belonged to a six-month-old child (individual B: Fig 136).

Most of the component bones of the extended burial (skel 1) were present (Fig 179), but many of them were fragmented which restricted the measurements that could be obtained. The skeleton was probably male, aged between 30–45 years. The spine exhibited signs of extensive posterior joint osteoarthritis and some similar changes in the hip joints. There were, in addition, two healed fractures, one at the distal left fibula and one at the proximal end of the shaft of the second metatarsal.

The crouched burial (skel 2) was found with only the lower half of the skeleton articulated, but further bones from among those found loose in the entrance could be assigned to it (Fig 179), some with confidence, others, like the skull, only very tentatively from the anatomical evidence alone. This skeleton was adult, but the sex was strictly speaking indeterminate, though the pelvic morphology suggested that it was probably male. The only evidences of disease were the changes indicative of osteoarthritis found in the left hip, in the joint at the base of the right thumb, and in the posterior vertebral joints.

The third adult skeleton in the north entrance (individual A) was an adult male (Fig 180). The bones were large and the areas of muscle attachment distinguished by the amount of new bone formation present. There was also new bone between the proximal ends of the 2nd and 3rd metatarsals of the left foot and in the spine. Only a relatively few vertebrae could be assigned to this skeleton, but the lumbar and sacral areas, although fragmented,

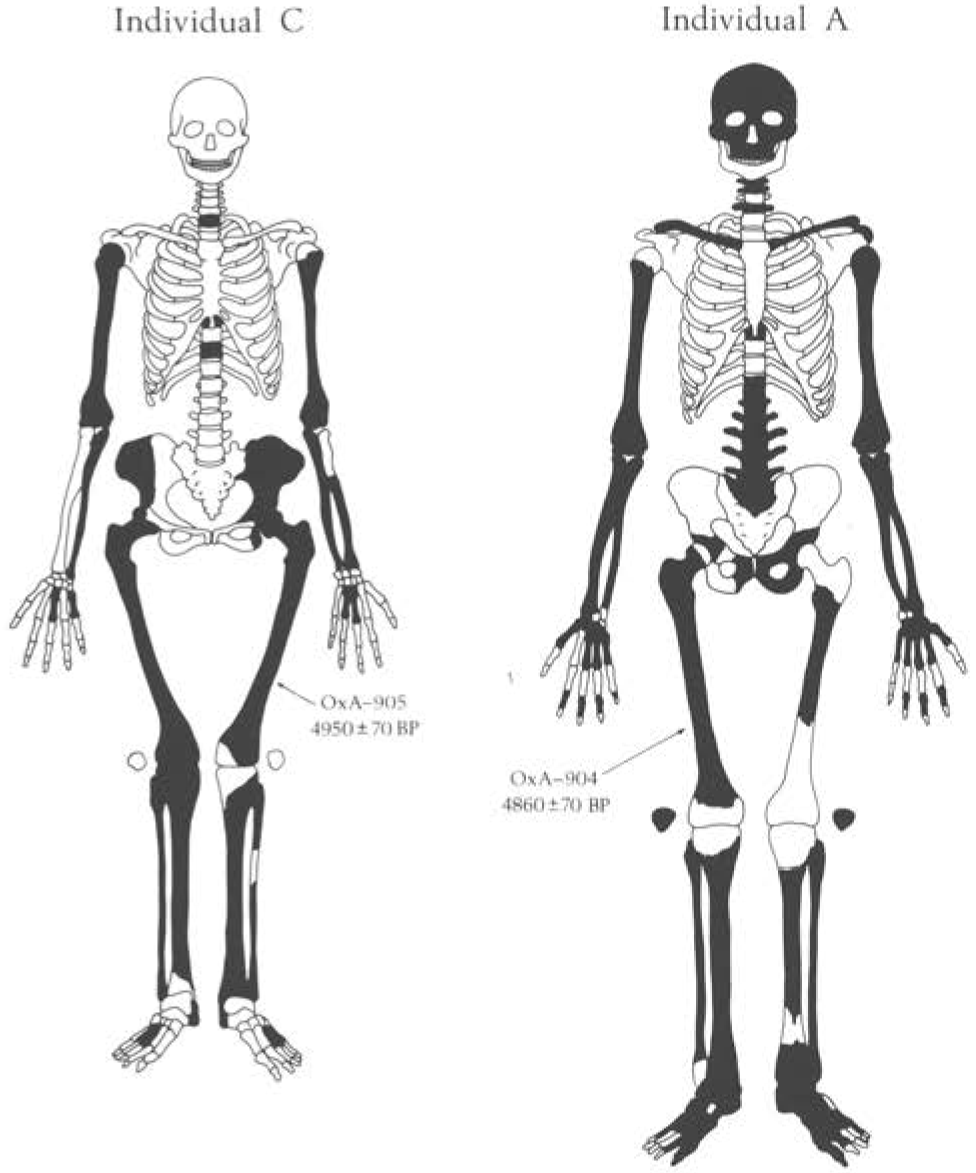


Fig 180 Individuals A and C, bone-presence diagrams

showed fusion of the 1st and 2nd lumbar and of the 3rd and 4th lumbar vertebrae. These lumbar vertebrae have large and prominent, but smooth, syndesmophytes (Fig 189). In addition, a pair of thoracic vertebrae likely to belong to this skeleton have areas of new bone on the right side of the vertebral bodies. All these changes taken together suggest that this individual suffered from DISH (Rogers 1982; *see below*).

North chamber

At least two groupings of bones could be suggested from post-excavation analysis. One of these (individual C; Fig 180) was an assemblage of post-cranial bones, all of which had epiphyses either just completed or in the process of uniting, placing the age at about 19–22 years. The sex of individual C was probably female. The second grouping (individual F) was a very tentative assemblage of bones, comprising atlas, axis and CV3 fused, cervical vertebrae, clavicles, and hand and footbones, linked solely on the evidence of their relative size, texture (very smooth), and colour (green/grey). Refitting within these sub-groups was fairly certain, however, and the feet were a definite pair.

South chambered area

It proved possible to reassemble a few small groups of adjacently-located bones, for example a group comprising a right and left ilium (8498, 9473), sacrum (8733), and 5th lumbar vertebra (10690) from the south chamber, but only two groupings were large enough to warrant the suggestion of separate skeletons. The first (individual D), an adult, possibly male, comprised pairs of humeri, radii, ulnae, clavicles and, more tentatively, femora, and an innominate and sacrum, from the junction of the south entrance and passage. The unifying feature of these bones was their slightly elongated form and their gracile character.

The second grouping (individual E; Fig 181) was a collection of juvenile bones, consisting of a skull, a mandible, pairs of ilia and tibiae, and a left femur with both epiphyses surviving, found scattered across the area from the north end of the entrance through to the south chamber (Fig 130). There is no precise matching within this group, other than the skull with its mandible and the pairs of ilia and tibiae. However, the age of the skull and mandible on the basis of the dentition, 12–15 years, is compatible with the age from the diaphyseal lengths of the post-cranial

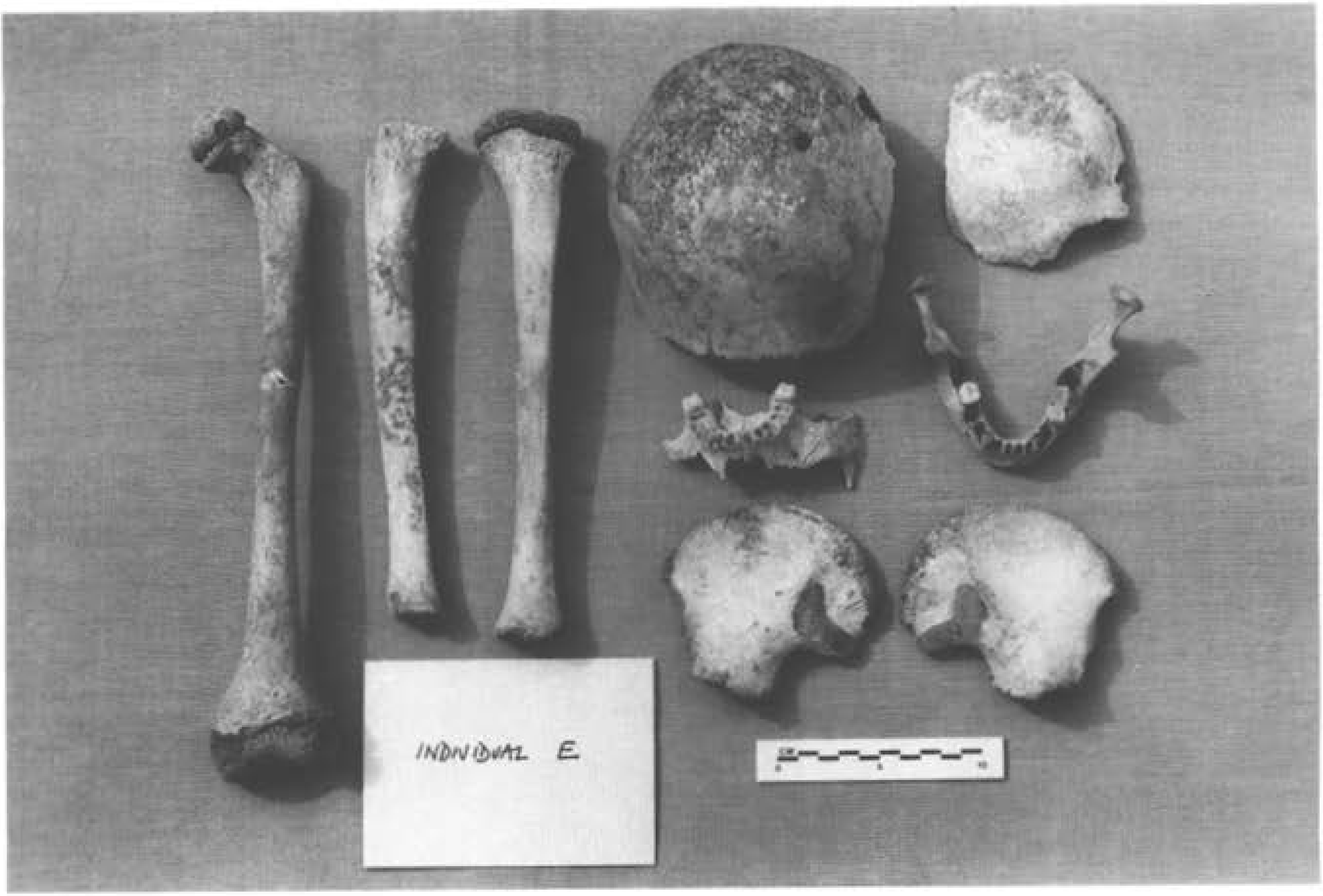


Fig 181 Bones assigned to individual E

material of 9–11 years. This was the only group of bones of this age from the south chambered area.

Age

Age is normally estimated using various criteria involving the whole skeleton and, provided that epiphyseal union is incomplete, such estimates are relatively accurate. Once a bone has reached its adult form, and especially if the skeletal remains are disarticulated, it is much more difficult and, more importantly, more inaccurate to assign a precise age, other than simply 'adult'.

Sub-adults and children

In childhood, the dental status is the most accurate method for ageing an individual skeleton (Lewis and Garn 1960). By observing the state of development of the teeth and the pattern of eruption, an age range can be assigned to an individual. The skeletal age may not necessarily be the same as the dental age (Hillson 1986), but, for children over the age of about 12, the degree of epiphyseal fusion allows skeletal age to be estimated. Like tooth development, fusion of the various epiphyses also progresses in an orderly way. There is, however, quite a wide range of ages at which particular epiphyses may unite, even in the same population, and this is dependent on such variables as the sex of the individual, nutrition, and disease (Stewart 1979). Thus, there may be quite a large element of error in the skeletal age assigned to a particular individual from a Neolithic population.

Before the age at which epiphyseal fusion commences, the only easily-available method of estimating skeletal age is from the length of the diaphyses of the long bones (Stewart 1979). This is much less precise than epiphyseal fusion and is also subject to the variables mentioned above. This was the only method available for the majority of the pre-adult bones from Hazleton, however, and it did allow certain groups of child bones to be grouped together as belonging approximately to the same age range. Only one individual was in the stage of epiphyseal fusion and that was practically complete. There was a discrepancy between the dental ages estimated and the ages estimated by the diaphyseal length: a problem discussed by Sundick (1979). The bones produced younger ages than the dental development and eruption by a factor of one to three years.

In the north chambered area, 8 children were represented, not always by all elements, ranging in age from about 6 months to a 3–4-year-old, while the 11 children from the south chambered area exhibited a much wider age range. Tables 53–4 show the numbers of children found in each age group from teeth and bone length. In addition to the bones listed, there were two separate foetal bones found in the north chamber: parts of a frontal bone (8761) and the petrous part of a temporal bone (8765) of a 4–5-month foetus, and one small fragment (21054) from the south chamber which could have been part of a foetal sphenoid bone (it is only 12mm long and the identification is uncertain) of a size indicative of a 6–7-month foetus (Fazekas and Kosa 1978).

Adults

A number of criteria involving teeth and other postcranial elements can be used to age an adult skeleton once epiphyseal fusion has been completed. Throughout the life of a tooth, a degree of wear occurs, and the rate of attrition is subject to wide variability

Table 55 Age assessment of adults from tooth attrition

	Years 17–25	25–35	35–45	over 45	Adult unspec
North chambered area	2	1	2*	–	–
South chambered area	–	3	3	2	4
Total individuals	2	4	5	2	4

Note: *Includes skeleton 1 in the north entrance.

according to individual behaviour (eg tooth grinding), diet, culture, and tooth morphology, which may be modified by disease. Attrition is progressive, although the rate may not be constant (Hillson 1986). Miles (1963) and Brothwell (1981) have assessed groups of molar teeth of different periods from various archaeological sites in Britain and have produced charts showing degrees of attrition calibrated to an age range. Brothwell's chart has been used here to assess the dental ages (Table 55).

Another method of ageing the adult skeleton is to use the morphology of the pubic symphysis. The face of this element changes with age in a progressive fashion, which has been documented and calibrated by Todd (1920) and McKern and Stewart (1957) for males and by Gilbert and McKern (1973) for females. Their criteria were used here to age the few complete symphyses surviving (Table 56).

Table 56 Age of adults estimated from pubic symphysis

	Years 30–40	40–50	over 50
North chambered area	1*	–	1
South chambered area	2	2	1
Total individuals	3	2	2

Note: *Skeleton 1.

The estimation of age from the evidence of suture closure is now regarded as a generally unreliable method (Genovés 1969) and has not been attempted for the Hazleton bones. The only suture which does unite with any degree of constancy is that of the basi-sphenoid synchondrosis, which unites at about 17–19 years of age, but no skull in this age range was found.

One indicator of the attainment of some degree of skeletal maturity is the process of ossification of certain cartilagenous elements of the skeleton, for example, the costal or the thyroid cartilages. Many fragments of ossified cartilage from various parts of the body were found from both chambered areas, so that, although this is not a feature which occurs at a constant stage in humans, these fragments do demonstrate the presence of older individuals (Fig 182). Eighteen various fragments, including an ossified first costal cartilage from skeleton 1 and a probable calcified blood vessel, were identified from the north chambered area and 22 mixed fragments of ossified material from the south chambered area.

Sex

The ability to identify the sex of a skeleton depends on the degree of sexual dimorphism of the various skeletal parts, of which the pelvis normally exhibits most variation. Sex is assigned using either the morphology of the bone or in some cases measurements. In both sexes, the range of variation found both for morphology and measurement will overlap, so that it is helpful to have a large

Table 57 Sex data from pelvic morphology

	Female	Male
North entrance	–	2 (?3)
North chamber	1 (?2)	1
South chambered area	2	8

Table 58 Sex data from skull morphology

	Female	Male
North entrance	–	3
North chamber	–	2 (?3)
South chambered area	2	7

Fig 182 Fragments from the north entrance of ossified thyroid cartilage (left: 6655, 6658) and a hyoid bone fragment (right: 5072) (photo: J Rogers)

series of complete skeletons, if the identifications are to be made with confidence. It is impossible to sex children, even with complete skeletons (Stewart 1979).

Four bones were used for sex assessment: the pelvis, the skull, and the proximal articular surfaces of the humerus and femur. For the first two, morphological observations were made, and for the latter two, measurements were taken. In the pelvis (Table 57), the shape of the sciatic notch, the sub-pubic angle, the presence of a pre-auricular sulcus, and the size of the acetabulum were the criteria used (Brothwell 1981, 62). The pre-auricular sulcus is not an exclusively-female feature, but it generally differs in degree from the male, being deeper and more obvious in the female. The male skull and mandible are usually more robust and have larger and more pronounced muscle insertions than the female, so that the size and shape of the glabella, the supraorbital margins, the mastoid processes, the occipital protruberance, and the mandibular ramus and chin were recorded (Table 58).

On the femora and humeri, the maximum diameters of the heads were measured (Tables 59–60). Use of these measurements depends upon the fact that the articular surfaces are relatively greater in area in the male than in the female (Stewart 1979). Stewart calculated that for the femur a maximum head diameter of below 44mm indicated a female, of above 46mm a male, with an indeterminate overlap area between 44–6mm. For the humerus, the comparable figures are below 43mm for a female, above 45mm male, with an overlap at 43–5mm. It should be remembered, however, that these calculations were obtained from a modern American sample. The data demonstrate that the skeletal parts of individuals of both sexes were present in both chambered areas. On a simple count, the representation of males exceeds females, but since so many of the relevant bones were too fragmented for use in sex assessment, the sexed proportion of the total individuals/bones is too small to be a certain guide to the overall situation.

Table 59 Sex determination from femora measurements

Find no	*Location*	*Side of body*	*Max head diam in mm*	*Probable sex (Stewart 1979)*
3598	S entrance	L, pair with 6953	47	male
4183	S entrance	L, pair with 4184	45	?
4184	S entrance	R, pair with 4183	47	?male
4746etc	N chamber	L, pair with 5871etc	41	female
4787	S passage	L, pair with 6810	47	male
5037-29	N entrance	L, skeleton 1	46	?male
5037-32	N entrance	R, skeleton 1	46	?male
6203	N chamber	R, pair with 5946	42	female
6810	S passage	R, pair with 4787	47	male
7465	S entrance	R, pair with 7655	45	?
7655	S passage	L, pair with 7465	45	?
7835	S entrance	R, pair with 7837	45	?
9554	S chamber	R, pair with 11035	42	female
11035	S chamber	L, pair with 9554	41	female

Metrical observations

For the purpose of this examination, measurements were needed for the estimation of stature (max lengths of longbones), assessment of age of non-adult postcranial bones (max lengths of diaphyses of longbones), and the sexing of femora and humeri (max diameters of the heads of these bones). In addition, certain cranial and postcranial measurements were used in indices for comparative purposes.

Table 60 Sex determination from humeri measurements

Find no	*Location*	*Side of body*	*Max head diam in mm*	*Probable sex (Stewart 1979)*
3663	S entrance	L, not paired	46	male
4172	S entrance	L, pair with 7509	46	male
4211	S entrance	L, pair with 7048	49.5	male
4781	S passage	L, not paired	48	male
5037-21	N entrance	L, skeleton 1	46.5	male
5617	N entrance	L, skeleton 2	44	?
6082	N chamber	L, pair with 6207	43	female
6207	N chamber	R, pair with 6082	42	female
7048	S entrance	R, pair with 4211	49.5	male
7292	S entrance	R, not paired	50	male
7509	S entrance	R, pair with 4172	46	male
8617	S chamber	L, pair with 9500	43.5	female
9460	S chamber	L, pair with 8626	48	male
9500	S chamber	R, pair with 8617	44	female
11387	S chamber	L, pair with 8647	56	male

Cranial index

Only three of the skulls, all from the south chambered area, yielded the measurements necessary for the cranial index (Brothwell 1981, 87) to be calculated (Table 61). The other skulls either were too fragmentary or had become too warped by post-mortem deformation for sufficiently accurate measurements. The latter was also true of all the skulls which could be reassembled from fragments. A cranial index of less than 75.00 is dolichocephalic: this is the case for all three of the Hazleton skulls, which is consistent with other British Neolithic skull groups (Brothwell 1973, 286).

Table 61 Cranial indices

Skull no	*Max length (mm)*	*Max breadth (mm)*	*Index*	*Location*
4786	184	134	72.83	south passage
4788	211	134	63.51	south passage
10494	190	134	70.53	south chamber

Platymeria

The other index calculated for these bones is the meric index designed to demonstrate differences in shape of the femoral shaft below the lesser trochanter (Brothwell 1981, 88). The index has a main division: platymeria below 84.9 and eurymeria between 85 and 99.9. Eleven femora from the south chambered area, including four probable pairs, and nine femora from the north area, including four pairs, could be used (Tables 62–3). Only one example of eurymeria occurred, on a right femur from the south chamber. Platymeria is the commonest form found in all British material, so these findings are not unusual.

Table 62 Meric index: north chambered area

Femur no	*Comment*	*FeD1*	*FeD2*	*Index*	*Location*
5037-29	L, skel 1	26	33	78.79	entrance
5037-32	R, skel 1	24	33	72.73	entrance
5089	L, pair with 5487	25	35	71.43	chamber
5487	R, pair with 5089	27	34	79.41	chamber
5696	R, skel 2	24	37	64.86	entrance
5874	L, pair with 5871	22	33	66.67	chamber
5946	L, pair with 6203	23	32	71.88	chamber
6203	R, pair with 5946	23	32	71.88	chamber
6672-16	L, skel 2	25	38	65.79	entrance

Table 63 Meric index: south chambered area

Femur no	*Comment*	*FeD1*	*FeD2*	*Index*	*Location*
3598	L, pair with 6953	28	36	77.78	entrance
4183	L, pair with 4184	26	32	81.25	entrance
4184	R, pair with 4183	26	32	81.25	entrance
4787	L, pair with 6810	24	34	70.59	passage
6810	R, pair with 4787	24	34	70.59	passage
7465	R, pair with 7655	23	34	67.65	entrance
7655	L, pair with 7465	23	33	69.70	passage
7837	L, pair with 7835	25	30	83.33	entrance
8663	L, pair with 9990	23	32	71.88	chamber
9554	R, pair with 11035	25	29	86.21	chamber
9990	R, pair with 8663	23	31	74.19	chamber

Stature

Stature can be estimated by measuring the longbones and using the resultant maximum lengths in the regression equations formulated by Trotter and Gleser (1952; 1958). Bone measurements with the least 'standard error' have been used where possible (Brothwell 1981, 102). Stature estimation was only attempted, however, for the individuals recovered as articulated skeletons or reconstructed from associated groups of bones (Table 64). The estimates obtained are not unusual for any other British population irrespective of period.

Table 64 Stature estimates

Individual	*Sex*	*Bones used*	*Maximum lengths*	*Stature metric*	*Stature imperial*
Skeleton 1	male	femur & tibia	447, 368	1698mm	5'6.75"
Skeleton 2	?male	humerus & ulna	322, 271	1725mm	5'8"
Individual A	male	radius	241	1708mm	5'7"
Individual C	female	fibula	341	1595mm	5'2"
Individual D	?male	humerus & radius	341, 260	1774mm	5'9"

Non-metrical observations

The presence or absence of certain non-metrical variables were observed for the cranial (Berry and Berry 1967) and the post-cranial skeleton (Finnegan 1978). The following paragraphs list the traits for which sufficient, well-preserved bones survived for observations to be made.

Cranial morphological traits

Metopism

This trait was displayed by only one skull out of six examined from the north chambered area and by none of the skulls from the south side; one frontal bone fragment from the north side appeared to be metopic, but, due to its small size and poor preservation, this was not certain.

Supraorbital foramen

From the north chambered area, five skulls were examined for this trait and three had bilateral notches, one had a foramen on each side, and one had a notch on one side and a foramen on the other. From the south side, 12 skulls were examined, of which 8 had notches, 1 had a foramen, and 1 had both; in 2 juvenile skulls, neither form was apparent.

Wormian bones or sutural ossicles

From the north chambered area, the sutures of seven skulls were examined: one had a bregmatic ossicle, one had ossicles in the coronal suture, one had an ossicle at the lambda, and one had ossicles in the lambdoid suture and the sagittal suture. None had occipito temporal wormian. From the south chambered area, 12 skulls were examined for wormian bones: 1 had a wormian at the bregma, 4 had ossicles in the coronal suture, 4 had ossicles in the sagittal suture, 2 had an ossicle at the lambda, while 6 had ossicles in the lambdoid suture. None had any occipito temporal wormians apparent. No other wormian bones were observed at any other point on any other skulls from the chambered areas.

Parietal foramen

Out of six skulls from the north chambered area, two had parietal foramina present, while 6 out of 12 from the south had this feature.

Mastoid foramen

Out of five skulls from the north chambered area, two had mastoid foramina present, while 6 out of 11 skulls from the south had this.

Torus

Five skulls from the north chambered area were examined for the presence of maxillary, palatine, and mandibular tori, but there were no instances of these traits. Nor were there any from the south chambered area, from where eight skulls were examined for the maxillary and palatine torus and 17 mandibles for the mandibular torus.

Pterion form

Only two skulls, one from the south passage and one from the north chamber (juvenile), could be examined for this feature and both displayed an H-shaped pattern.

Gonial eversion

From the south chambered area, 16 mandibles were examined, of which 10 displayed some degree of eversion. All the mandibles from the north chambered area which had a sufficient quantity of bone surviving for examination displayed a degree of eversion.

Post-cranial morphological traits

Atlas lateral bridge

No atlas vertebra from the south chambered area, out of 12 examined, had this feature, which was present on only one of five examined from the north chambered area.

Atlas posterior bridge

Out of 13 from the south chambered area, 3 atlas vertebrae had this feature, while one out of six from the north had it.

Supra-scapular area

From the south chambered area, ten scapulae were examined for the form of the supra-scapular area: seven had a pronounced notch and three had a shallow notch. Of 15 scapulae from the north side, 6 had a pronounced notch, 7 a shallow notch, and 1 pair of juvenile scapulae had no notch at all. No example of os acromiale was observed from either group of bones.

Septal aperture of the humerus

From the south chambered area, 22 distal humeri were examined for this feature and only 2 left septal areas were positive, while this was the case on none of the 16 examples examined from the north side.

Allens fossa of the femur

Four of ten femora from the south chambered area, and 4 of 17 from the north side, exhibited this trait.

Vastus notch of the patella

Eighteen of 27 patellae from the south chambered area, and 6 of 11 from the north side, had vastus notches present (Figs 184 and 233).

Tibial squatting facets

Eleven of 18 distal tibiae from the south chambered area, and four of six from the north, had this feature.

Discussion

There are many other morphological variables that can be observed, both in the skull and in the post-cranial skeleton, but, as Brothwell (1981, 90) has pointed out, it is still not clear how or whether these traits are inherited characteristics. Any attempt to calculate the frequencies of the different traits and to speculate on their significance in this sample is not justified because of the very small numbers. It is worth drawing attention, however, to the very high prevalence of the patella vastus notch, present on 66% of examples from the south chambered area and on 54% of examples from the north chambered area. A more common finding is a prevalence of between 25–30% (Brothwell 1981, 97) and can be compared with figures of 26–47% among different groups of American Indians (Anderson 1968). No other trait at Hazleton showed such a high frequency as this.

Dentition

Many of the teeth had become separated from their respective maxillae or mandibles and were recovered as single finds, quite often as a result of the final sieving process, which meant that they had no exact location, only a provenance to context. The maxillae and mandibles were matched to each other and to their respective skulls where possible, but, for reasons of time, no attempt was made to reassign loose teeth to sockets, although this would probably be feasible for a high proportion of cases.

The loose teeth were identified and counted, and the stage of development of the deciduous teeth was recorded. A note was also made of the presence or absence of caries. All other observations on dentition involved those mandibles and maxillae which had at least some teeth in place or on which a section of alveolar margin could be seen. The stage of attrition and the development and eruption of both the deciduous and permanent dentitions were recorded. The numbers of teeth lost ante-mortem and post-mortem (many of the post-mortem losses were presumably among the loose teeth) were also recorded. Further observations were made on the state of dental health, including the presence of abscess cavities (Fig 183), the occurrence and site of any caries, the presence of enamel hypoplasia, and the occurrence of any periodontal disease. Ante-mortem loss and abscess cavities can be recorded by examination and observation of the tooth sockets, so the occurrence of these features is expressed per observable tooth socket, whereas observations on caries and enamel hypoplasia are per observable tooth.

Tables 65–6 display the various dental features recorded in the maxillae, Tables 67–8 those in the mandibles, and Tables 69–70 those in the matched maxillae and mandibles. In general, there was very little occurrence of caries, but there was quite a high rate of ante-mortem loss and abscess cavities, possibly as a result of attrition of the teeth. The ante-mortem loss and abscess cavity prevalence increased with age, although there was one child from the south passage with two abscess cavities and another from the north chamber with one abscess cavity. This latter child also had enamel hypoplasia, as did one adult from the south chamber. Enamel hypoplasia is a result of interruption of the laying down of enamel during tooth formation and is often consequent to illness and fevers.

Loose teeth

From the south chambered area, a minimum of 104 identifiable loose teeth were recorded. Of these, 89 were permanent teeth,

Table 65 Maxillae dentition: north chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
4684(E)	–	12/14	0/14	0/1	0/1	adult
5142(C)	–	0/4	0/4	0/2	0/2	3–4
5199(E)	yes	5/16	1/16	0/4	0/4	over 45
5461(C)	–	0/5	0/5	0/2	0/2	under 6
5746(C)	–	6/6	0/6	0/0	0/0	adult
6242(C)	yes	0/15	0/15	0/8	0/8	17–25
6261(C)	–	0/5	0/5	0/2	0/2	12–16 months
10308(C)	–	0/4	0/4	0/2	0/2	12–16 months

Note: (E) = entrance, (C) = chamber. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

Fig 183 Partial view of a mandible, showing abscess cavities, attrition, and both ante-mortem and post-mortem loss (11456, south chamber) (photo: J Rogers)

Table 66 Maxillae dentition: south chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
3666(E)	yes	0/6	0/6	0/6	0/6	35–45
3792(E)	–	0/16	0/16	0/7	0/7	25–35
3978(E)	–	0/8	0/8	0/3	0/3	35–45
4018(E)	yes	12/13	1/13	–	–	adult
4228(E)*	yes	0/16	0/16	0/8	0/8	25–35
4786(P)	–	0/16	0/16	0/11	0/11	25–35
5358(P)	–	0/8	2/8	0/4	0/4	1–3
8754(C)	yes	7/16	1/16	0/3	0/3	over 45
10191(C)	yes	2/16	7/16	0/4	0/4	adult
10213(C)	yes	1/14	0/14	0/1	0/1	adult
10494(C)	yes	5/16	0/16	0/6	0/6	35–45
11039(C)+	–	1/16	0/16	1/15	1/15	33–45
11062(C)	–	0/11	0/11	0/4	0/4	5–6

Note: (E) = entrance, (P) = passage, (C) = chamber. *Also has congenital absence of the upper lateral incisors. +Also has caries cervical moderate. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

Table 67 Mandibular dentition: north chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
4118(E)	yes	6/16	0/16	0/3	0/3	adult
4365(E)*	–	0/5	0/5	0/5	0/5	under 6 months
8086(C)*	–	0/12	0/12	0/9	0/9	6 months
9025(C)	yes	0/4	0/4	0/4	0/4	adult
9698(C)	yes	0/5	0/5	0/1	0/1	adult
10336(C)	–	0/12	1/12	0/8	2/8	2–3
10414(C)	–	0/14	0/14	0/8	0/8	3–4

Note: (E) = entrance, (C) = chamber. *All teeth unerupted. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

Table 68 Mandibular dentition: south chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
3596(E)	–	6/16	5/16	0/4	0/4	adult
3793(E)	yes	0/16	0/16	0/15	0/15	25–35
3831(E)+	yes	4/16	2/16	0/9	3/9	35–45
4041(E)	–	8/16	0/16	0/2	0/2	adult
4169(E)	yes	0/16	0/16	0/13	0/13	adult
4806(P)	yes	3/16	4/16	0/8	0/8	33–45
6815(P)*	yes	1/16	4/16	0/6	0/6	over 45
7386(P)	yes	5/16	3/16	0/7	0/7	over 45
7656(P)	yes	0/13	0/13	0/8	0/8	25–35
8751(C)	–	0/3	0/3	0/3	0/3	25–35
8974(E)*	–	0/5	1/5	0/4	0/4	over 45
8976(E)	–	0/3	0/3	0/3	0/3	adult
9377(C)	–	0/10	0/10	0/5	0/5	1–3
9982(C)	yes	4/12	0/2	0/1	0/1	adult
10213(C)	–	0/10	0/10	0/6	0/6	25–35
11456(C)	yes	4/16	4/16	0/7	0/7	35–45

Note: (E) = entrance, (P) = passage, (C) = chamber. *Also has TMJ (temporal mandibular joint) disease. +Also has slight ridging of incisors from enamel hypoplasia. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

Table 69 Dentition of matched maxillae and mandibles: north chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
5037-1*	yes	6/32	4/32	0/25	0/25	33–45
5142(C)+	–	0/23	0/23	0/10	0/10	3–4
5880(C)	yes	1/24	0/24	0/19	0/19	17–25

Note: (C) = chamber. *Skel 1 in the entrance. +Individual G. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

Table 70 Dentition of matched maxillae and mandibles: south chambered area

Find no	*Perio-dontal disease*	*Ante-mortem loss*	*Abscess*	*Caries*	*Enamel hypo-plasia*	*Age*
4266/ 8701(E)**	–	0/32	0/32	0/8	0/8	12–15
4788/ 4839/4966(P)*	yes	16/32	5/32	0/3	0/3	over 45
9951/ 10188(C)+	–	0/28	0/28	0/21	0/21	9–10
12527(C)	–	0/24	0/24	0/12	0/12	6–9

Note: (E) = entrance, (P) = passage, (C) = chamber. *Also has bilateral TMJ disease. +Includes erupting teeth. **Individual E. Ante-mortem loss and abscesses recorded per number of tooth sockets; caries and enamel hypoplasia per number of teeth.

comprising 63 anterior and 26 molar. Three of the molars had carious cavities at the cement/enamel junction – one of the cavities being a large one. The 15 loose deciduous teeth consisted of 14 anterior and 1 molar. From the north chambered area, a total of at least 62 identifiable loose teeth were recorded, and, of these teeth, 48 were permanent, comprising 32 anterior and 16 molar. One of the molars had a large cavity on the occlusal surface and one possibly had a minor degree of enamel hypoplasia, also occlusally. Of the 14 deciduous teeth, 6 were anterior and 8 molar.

Evidence of bone disease and other abnormalities

Abnormal morphology or lesions in bones may be recognised easily on macroscopic inspection, but assigning a particular cause to such abnormalities and lesions is more difficult. Skeletal change may occur as a minor part of a disease or at a very late stage of a disease. Those changes that do occur are caused either by bone loss, by bone formation, or by a combination of the two. It is the pattern of the changes within each lesion, the distribution of the lesions around each bone, and the pattern of all changes within and around the skeleton in each particular disease that allow its recognition and, therefore, its possible classification (Rogers *et al* 1987). It follows that, without reasonably complete skeletons, attempts at diagnosis and classification are bound to be unsure. In this assemblage, apart from the two articulated skeletons and the eight other groups of bones tentatively assigned to individuals, virtually all the material was completely disarticulated. Among the latter, however, there were many lesions and abnormalities observed, and some of these will be presented here as evidence of the presence of certain categories of disease in the Hazleton population. Tentative diagnoses are made, but there is no calculation of percentages of bones affected by particular lesions.

Evidence of injury

All the evidence for injury was in the form of individual bones with healed fractures, which were recognisable on macroscopic inspection and confirmed by radiography. Ribs were the most frequent type of bone affected, two fragments being found from the south chambered area and three from the north chambered area; these may well have derived from two single individuals, but it was usually impossible to associate rib fragments with their immediate rib-cage neighbours, let alone to assign them to separate skeletons.

There were two wedge-shaped thoracic vertebrae, one from each chamber, which may have been distorted by crush fractures. From the south chambered area, there was a left distal radius fragment which may have been the site of a fracture, but this was uncertain because of the degree of post-mortem damage. The only other bone from the south chambered area with any evidence of injury was a left patella, with a line marking the site of a healed fracture running from a point just lateral to the most distal part to midway along the medial upper margin (Fig 184). There was no resultant interruption of joint function, as there was little evidence of joint disease on the articular margin.

Skeleton 1 in the north entrance had evidence of fracture in two bones: on the distal part of the left fibula, the site of an old fracture was marked by exostoses, and there was another old fracture on the proximal end of the shaft of the left second metatarsal.

Evidence of infection or other inflammatory disease

There was only one example of a definite infective process: in a fragmented femoral head from the south chambered area (Fig 185). Only the upper part of the shaft just below the trochanter was present, but was normal in appearance. The lesion had destroyed the greater trochanter and the base of the neck, leaving a large gap in whose base was a certain amount of rather disorganised reactive bone. This demonstrated that the lesion was definitely pathological and was present ante-mortem. It was impossible to tell what might have been the appearance of the head of the femur (ie affected or not by the adjacent lesion), because this part of the bone was missing.

Other evidence for the presence of infective or inflammatory lesions was confined to bones with slight periosteal reactions, which may have many causes and are very common in skeletal collections. Periosteal change was found on two rib fragments, two fibula shafts, one radial shaft fragment, and one acromial fragment from a scapula, all from the south chambered area, and on three juvenile rib fragments (possibly from the same individual) and one distal left tibia fragment from the north chambered area. Skeleton 2 in the north entrance also had a slight degree of periosteal new bone formation in both distal tibiae.

Evidence of joint disease

Joint pathology is the most frequently observable change in skeletal material (Bourke 1969; Wells 1962). There are many types of joint disease recognised clinically, but even in articulated

Fig 185 Head of a femur with an infective lesion (6832, south passage) (photo: J Rogers)

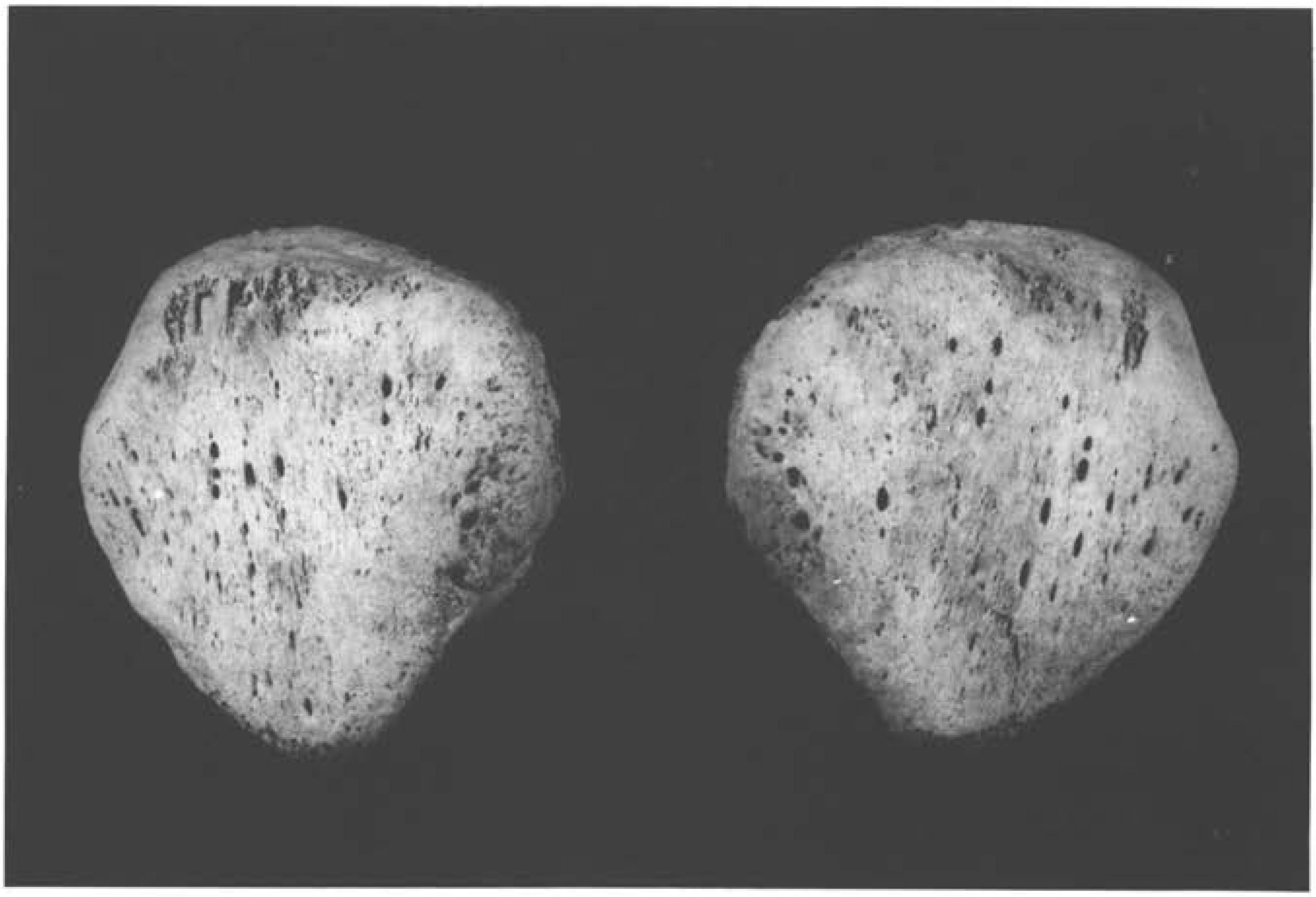


Fig 184 Pair of patellae with slight vastus notches, the left one (on the right) having a diagonal line marking the site of a healed fracture (10232 and 10234, south chamber) (photo: J Rogers)

Fig 186 Temporo-mandibular joint with osteoarthritic change, comprising alteration of the bony contour, pitting of the joint surface, and a marginal osteophyte (11456, south chamber) (photo: J Rogers)

skeletons difficulty is found in diagnosing the different types (Rogers *et al* 1985), so the evidence for joint disease in the Hazleton bones is presented here on the basis of the different types of change found in each joint.

Temporo-mandibular joints

Changes recorded at these joints are threefold: alteration in the contour of the joint; alteration of the surface by pitting or eburnation; and the presence of osteophyte around the margin (Fig 186). Both the mandible and the temporal articulation components of the joint were observed where possible, but usually only one side could be examined because of the fragmented nature of the material. From the north chambered area, there were two examples with the characteristic changes from the ten joint parts observed. Although one of these was from a skull and one from a mandible, they were from two different individuals. Six of the normal joints were from pairs from three separate individuals. From the south chambered area, 20 components were examined, of which 13 were normal, 2 of these being from the same individual, while 1 of the normal and 1 of the abnormal joints definitely came from the same individual.

The abnormalities always involved at least a degree of joint surface alteration, never osteophytic bone alone, and in five out of nine abnormal joints, there were contour changes. It is not clear whether these lesions observed at the temporo-mandibular joints were a result of alteration of mechanical loading in the joint, due to tooth loss or attrition for example, or whether it was due to pathological change and part of more general joint disease in the rest of the skeleton (Alexandersen 1967).

Peripheral joint disease

Three main types of change were observed for the peripheral joints: the presence of osteophytes around the joint margin without any other change; a combination of alterations to the contour of the articular surface, pitting and/or eburnation of the joint, and the presence of marginal osteophytes (changes characteristic of osteoarthritis and, in the context of this study, osteoarthritis is used as a descriptive term); and erosive changes, being lesions which are eroded either into the joint surface or the joint margin with or without proliferative new bone adjacent (Rogers *et al* 1985). Tables 71–2 display the different changes observed in the component bones of the various peripheral joints from the chambered areas. Some joints may have been recorded more than once, because both components will have been recorded unmatched. There were no examples of severe arthritic change to any of the large peripheral joints. Five glenoid components of the shoulder showed minor osteoarthritic change, as did one hip, two knees, 11 acromioclavicular joints (two belonging to skel 2 and one to skel 1), and six sternoclavicular joints, but no elbows and no wrists were affected. The most severe osteoarthritis occurred in the hand, most notably in at least two pairs of thumb bones, one from each chambered area (Fig 187). This is a pattern of osteoarthritis that is common today (Dieppe *et al* 1985). Also noteworthy in the hands and feet was the presence of erosive changes in some of the metacarpals and metatarsals with proliferative new bone.

Evidence of spinal joint disease

Many of the vertebrae recovered were damaged and fragmented, but, where possible, observations were recorded on the state of the surfaces of the vertebral bodies, on the vertebral body margins, and also on the posterior facet joints of the vertebrae. The latter are synovial joints similar to the peripheral joints discussed in the previous section, so the same changes were recorded. Figure 188 shows typical changes in 2 cervical vertebrae, with posterior joint osteoarthritis, some osteophytic lipping on the body margins, and some pitting and new bone on the surface of the bodies. These features are all consistent with what is currently termed spinal spondylosis or degenerative vertebral disc disease. It is very common and increases in incidence and severity with age. Given the disarticulated state of the Hazleton material, it is difficult to comment in detail on the distribution of the various changes in the spine, so Table 73 simply displays the numbers of vertebrae that demonstrate each type of change. Due to the fragmented nature of the bones, it is impossible to state how many vertebrae did not show any changes of these types.

In two instances from the north chambered area and one from the south, there were several lumbar vertebrae fused together with large smooth syndesmorphytes (Fig 189). The groups of bones from the north chambered area probably belonged to individual A and comprised a fused set of lumbar and first sacral vertebrae. A further pair of thoracic vertebrae, which may well have derived from the same skeleton, showed signs of incipient ankylosis on the right side of the vertebral bodies (Fig 190). If all these sets of

Table 71 Peripheral joint changes: north chambered area

		Type of change	
Joint	*Osteophytic*	*OA*	*Erosive*
metacarpal/phalangeal	–	3	2
carpal/metacarpal	–	2	1
carpal	–	5	1
phalangeal (foot)	2	1	1
tarsal	–	2	–
shoulder	3	2	–
elbows	2	–	–
wrist	2	–	–
hips	3	1	–
knees	4	1	–
acromioclavicular	–	4*	–
sternoclavicular	–	3	–

Note: *Includes one pair from skeleton 2.

Table 72 Peripheral joint changes: south chambered area

		Type of change	
Joint	*Osteophytic*	*OA*	*Erosive*
phalanges (hand)	2	4	1
metacarpal/phalangeal	–	3	1
carpal/metacarpal	–	3	1
carpal	1	1	–
phalangeal (foot)	1	1	1
metatarsal/phalangeal	–	1	2
shoulder	5	3	3
elbows	1	–	–
wrist	1	–	–
hips	3	1	–
knees	4	1	–
acromioclavicular	–	7	–
sternoclavicular	–	3	–

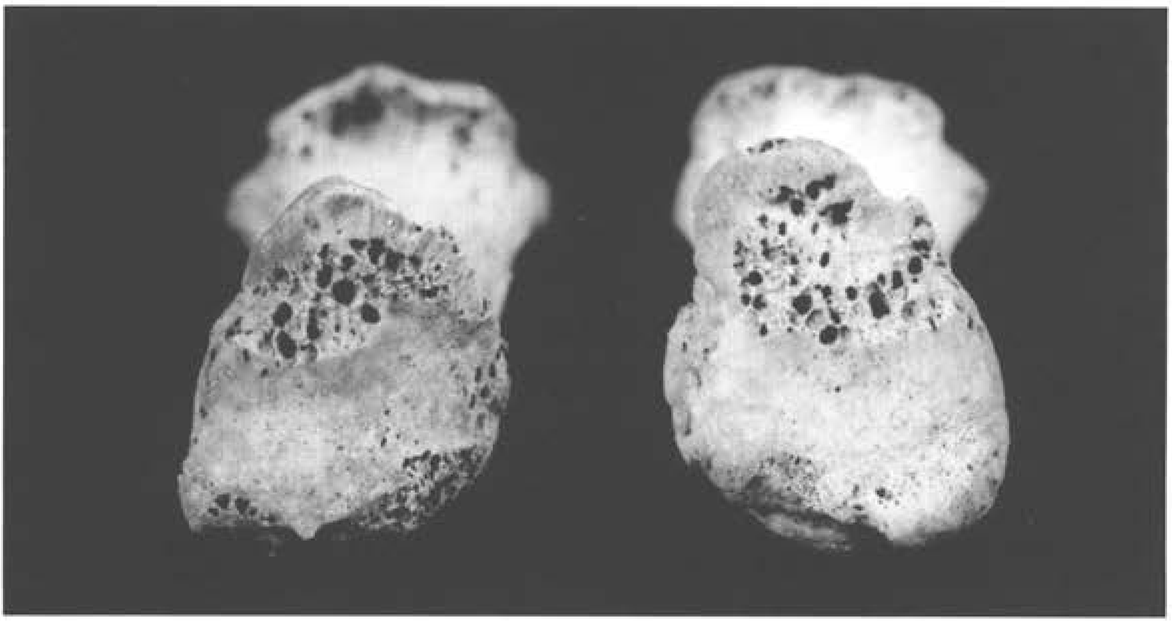


Fig 187 Osteoarthritic change in the base of a pair of first metacarpals (9315, 9948: south chamber) (photo: J Rogers)

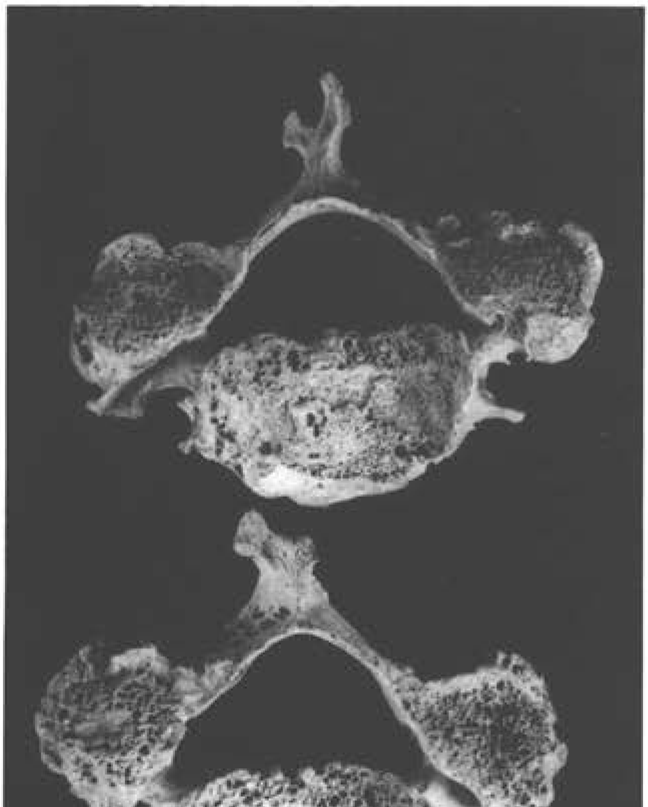


Fig 188 Examples from the south chamber of the typical changes in cervical vertebrae due to spondylosis (upper: 8610; lower: 9316) (photo: J Rogers)

Table 73 Changes in the joints of the spine

Vertebrae	*Location*	*Marginal osteophyte*	*Body surface*	*Posterior joint osteophyte*	*Posterior joint OA*
cervical	N chambered area	5	10	1	15
	S chambered area	5	17	1	21
thoracic	N chambered area	6	1	1	10
	S chambered area	3	5	3	8
lumbar	N chambered area	6	4	1	2
	S chambered area	10	6	5	3
sacroiliac	N chambered area	1	2	–	1
	S chambered area	1	1	1	–

Note: Any single vertebra may have more than one type of change present, so can figure in more than one column of the table.

vertebrae do belong together, then the changes displayed may be consistent with Forestier's Disease or Diffuse Idiopathic Skeletal Hyperostosis (DISH; *see* Rogers 1982). The other bones tentatively associated with this individual have many areas of new bone formation at sites of ligamentous attachment, which is also part of this condition. The sacroiliac joints from individual A were not identified, however, and they are essential for correct classification of the various varieties of spinal ankylosis, so the case is unproven.

In the other example of lumbar ankylosis from the south chambered area, the assemblage (individual D) does include the pelvic bones. The fused vertebrae involved are L4, L5, and S1 fragments and, on the left ilium, an area of bone extends from the sacroiliac joint to the sacrum. This could be another example of an individual with DISH, or it could be part of a spine with seronegative spondarthritis (Rogers *et al* 1985), which would be consistent with the erosive changes seen in the bones of the hands and feet possibly associated with this skeleton; this remains speculative, however, in view of the hypothetical nature of the associations.

Other spinal changes noted include five examples of Schmorl's nodes from the south chambered area and one from the north and arthritic change of the vertebral costal joints in one bone from the south chambered area and in six from the north.

One final joint change to be noted was a circumscribed area of bone necrosis on the medial condyle of a left femur with no other changes in the joint (Fig 191). This is a pattern of lesion seen in osteochondritis dissecans. The right femur, which was paired with the affected one, has no lesion. Osteochondritis dissecans is a variety of necrosis usually occurring in young adults or adolescents

Fig 189 A spinal group showing fusion of the lumbar vertebrae L1 and L2 (upper: 4117) and L3 and L4 (lower: 4125), from the north entrance (individual A) (photo: J Rogers)

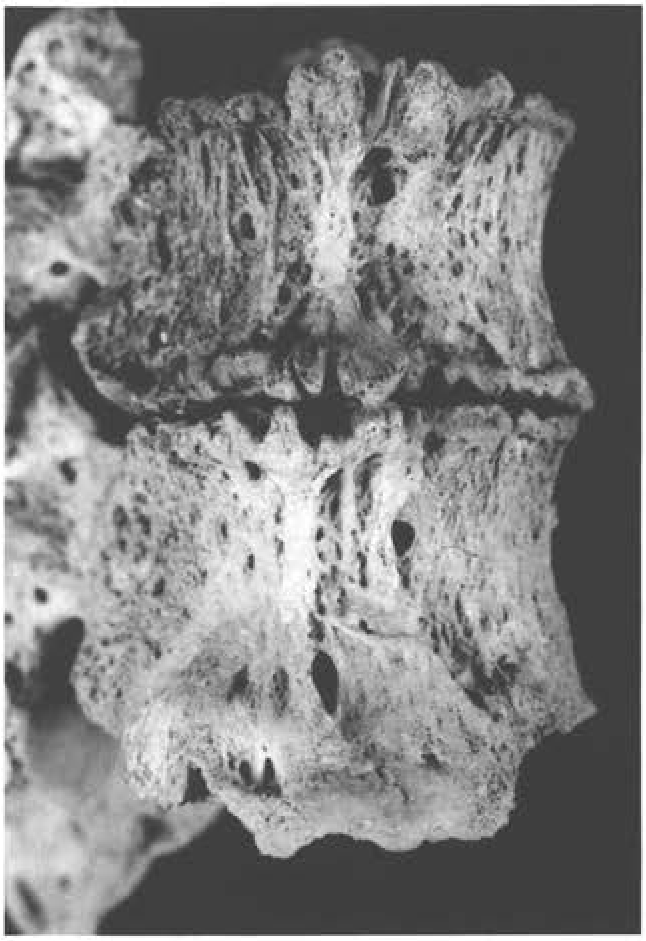


Fig 190 Two thoracic vertebrae, possibly showing an early stage of Forestiers Disease (4309 and 4356, north entrance, individual A) (photo: J Rogers)

Fig 191 Osteochondritis dissecans in a distal femur (7835, south entrance)

and is more common in males than in females (Ortner and Putschar 1985).

Evidence of other disease or abnormality

Osteoporosis

Many vertebrae and several other types of bone seemed to be of a lighter texture with a thinner cortex and a coarser trabecular pattern than the majority of bones found in the same areas (Fig 192). A test was carried out to see whether there was loss of bone mineral content from two lumbar vertebrae of 'abnormal' texture and two with 'normal' texture by Dr T Woolf of the Royal Hospital for Rheumatic Diseases in Bath. The bone mineral content was assessed in a dual photon absorption meter and the results expressed as total bone mineral content (BMC) and bone mineral content per unit length (LIN). There was a distinct difference in both measurements between the 'normal' and 'affected' vertebrae (Table 74). Osteoporosis is common today in older people, especially post-menopausal women, but it can occur as a result of many other conditions (Ortner and Putschar 1985). It is most likely in this collection, without other evidence to the contrary, to have been due to age.

Fig 192 Two vertebrae: the upper one is osteoporotic, the lower one is a normal example for comparison, showing the difference in texture (upper: 8531, south chamber; lower: 4657, south entrance) (photo: J Rogers)

Table 74 Bone mineral content of normal and affected lumbar vertebrae

Find no	*Location/context*	*Condition*	*BMC*	*LIN*
9268	S passage/323	normal	10.35	1.52
9405(?)	S chamber/412	affected	7.49	1.04
10457	S chamber/412	affected	3.84	0.87
11165	S chamber/412	normal	11.31	1.48

Orbital osteoporosis or cribra orbitalia

This condition takes the form of pitting in the bone of the roof of the orbit (Fig 193). Some authorities consider this to be a result of iron deficiency anaemia, but most consider the connection unproven (Ortner and Putschar 1985). In the illustrated skull of a 6–9-year-old from the south chamber (Fig 193), a similar pitting, though less marked, was present in the ethmoid bones, around the auditory meatus, and on the sphenoid bone; this was the most severely affected skull from the site. From the south chambered area, 3 of the 14 skulls examined for this trait were positive, including the skull discussed above. Of ten skulls from the north chambered area, three had this trait. Two skulls, one from each of the chambered areas, only had a slight trace of pitting.

Femoral cyst

One left femur from the north chamber displayed a circumscribed opening at the base of the neck (Fig 194). It was oval in shape with rounded ends that were slightly broader superiorily. The margins were also rounded. In X-ray, a translucent area (which was not caused by post-mortem damage) could be seen extending throughout the whole area of the neck and the greater trochanter. This was considered to be a definite example of a bone cyst (Ortner and Putschar 1985): a lesion occurring most often in adolescents and young adults. The location in this example is typical, since this is one of the most frequent sites of the condition to occur.

Congenital vertebral abnormalities

These are common and two examples of fused second and third cervical vertebrae were noted, one from each chambered area. There were also two examples of sacra with sacralized and fused fifth lumbar vertebrae, both from the south chambered area.

Fig 193 Cribria orbitalia in a child's skull (12527, south chamber) (photo: J Rogers)

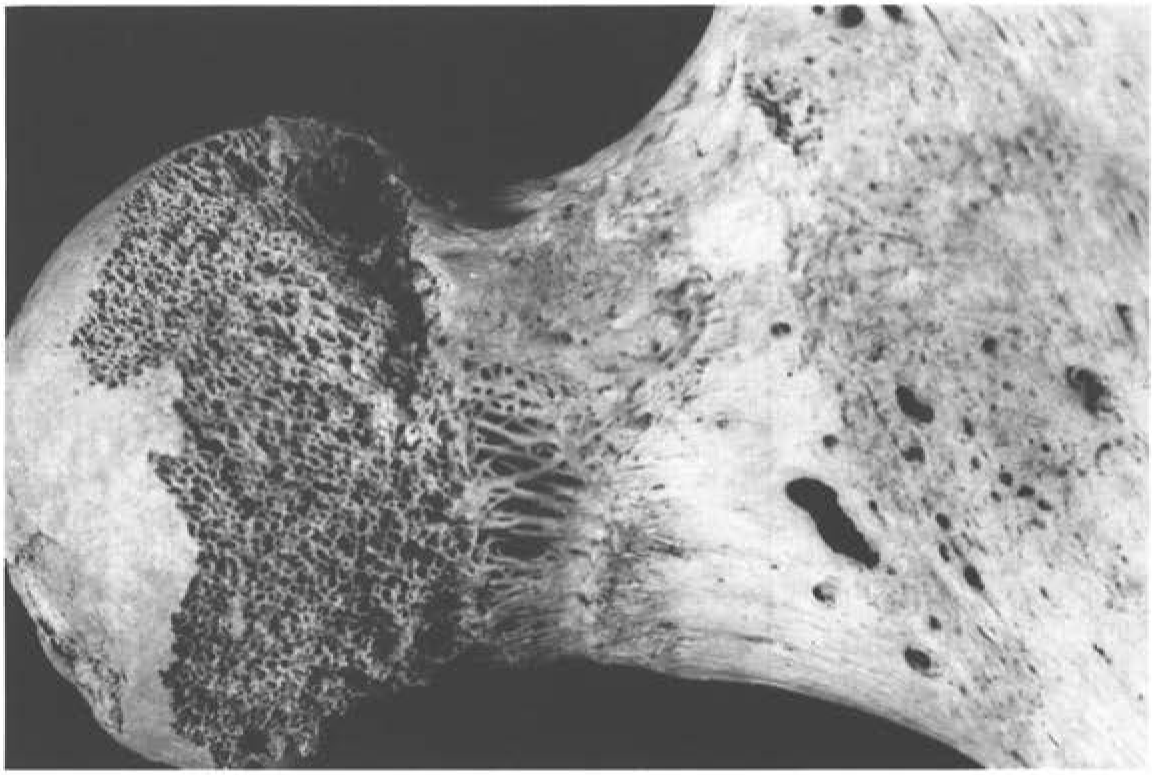


Fig 194 The opening of a femoral cyst (5874, north chamber) (photo: J Rogers)

Human bones from contexts other than the chambered areas

The sub-cairn soil

Three separate occurrences of skull fragments, of which two from below unit W were otherwise unidentifiable, while the third – fragments of occipital bone (for location, *see* Figs 20 and 195) – was used to obtain a radiocarbon date (OxA–646: Table 95). Otherwise, only two teeth were present: a premolar from beneath unit S and a molar exhibiting occlusal caries from beneath unit N.

The cairn

Bones from cairn contexts comprised a child's vertebra fragment and a spicule of unidentified longbone from the axial element (444) below unit U, a left distal phalanx from the axial element (461) beneath unit J/H, and three fragments of adult ribs from revetment 375 and adjacent rubble infill 378 in unit O. Otherwise, the only cairn bones were those from units K and L, which are assumed to have originated from inside the chambered areas and have been treated on that basis for the purposes of this report.

The south quarry

At least two separate individuals were involved in the very partial remains obtained from two distinct areas of the south quarry. Context 45 produced a single humerus midshaft, while context 328 produced fragmentary parts of a left humerus and another humerus, at least one tibia, a right radius, an ulna, an ilium, and a possible cranial fragment. It was not even possible to be sure that the two humeri from 328 formed a pair, because of their fragmentary state, although they did not match the humerus from context 45.

Lead analysis

Analysis of lead concentrations was undertaken for a number of rib samples from the north entrance. From context 267, 11 bones were used: 1 from each of the two articulated skeletons and 9 other rib fragments of adult size. The amount of lead in the bones of this sample of a pre-metalworking population was found to be significantly less than in a modern population (for further details, *see* Rogers and Waldron 1985).

Discussion

Any addition to the amount of Neolithic skeletal material available for study is noteworthy in view of the relative paucity of well-documented remains from this period. Neolithic human bones, because of this relative scarcity, are generally subjected to a closer scrutiny than later groups of a similar size and condition would warrant, especially if in a disarticulated state. The small number of reconstructable skeletons available from each Neolithic site and the potential date range of centuries or longer usually involved for the skeletons in each sample severely constrain the nature and quality of information that can, or should, be gleaned from such remains.

When Brothwell (1973) completed his survey of the biology of the British Neolithic skeleton, some 412 individuals were represented by the skeletal remains from Cotswold-Severn chambered tombs. Brothwell did not re-examine all the material, so his survey was based on very mixed data, extracted from excavations and reports of varying date, detail, and accuracy, involving small numbers of individual skeletons from each site. Nevertheless, at a general level it can be stated that the Hazleton evidence compares quite closely with Brothwell's, for example in terms of the total number of individuals from other tomb sites, in the range of ages present, and in the presence of both males and females. The apparent preponderance of males over females at Hazleton is similar to that of the whole Neolithic sample used by Brothwell, but dissimilar to that from some other Cotswold-Severn tombs, for example at West Kennet, where the ratio between male and female was apparently more even.

The metrical data available from the Hazleton remains are sparse and not necessarily representative of the whole assemblage, but the dolichocephalic cranial indices match the Neolithic norm, and the stature estimates compare well with available averages. Metopism occurred in 5.5% of the skulls (ie only 1 out of 18 examined) which is similar to the average figure of 7.5% quoted by Brothwell, and the presence of lambdoid ossicles in 52% of skulls compares with the 48% quoted for this feature by Brothwell, while, by contrast, the number of skulls with sagittal ossicles, 26%, was far more than the 9.6% found by Brothwell's survey. These findings are not unusual for British bone assemblages from all periods, but the Hazleton samples, and those from Neolithic England as a whole, are too small for proper comparisons to be made.

The classification of disease in skeletal material has been notoriously subjective (cf Rogers *et al* 1987), so the comparable data for the evidence of disease in Neolithic populations is even more unreliable than most other categories of evidence. Even with the high prevalence of arthritis noted in this report and the occurrences summarised for previous sites by Brothwell (1973), there is great difficulty in producing any meaningful statistical studies because of the disarticulated nature of the bone collections. However, it is perhaps possible to say that, compared with other Neolithic samples, there appear to be more instances of temporo-mandibular joint disease and less evidence for osteoarthritis of the hips at Hazleton. This may be due, however, to the fact that different varieties of arthritis were not differentiated in earlier reports.

Two other findings from the study of the Hazleton joints are worthy of note. First, there are no reports of erosive joint disease in any other Neolithic population, but this does not necessarily mean that Hazleton is unique. Earlier studies did not recover, or did not examine in enough detail, the joints of the small bones of the hands and feet in order to recognise these changes. Second, the case of osteochondritis dissecans on the condyle of a femur from the south chambered area can be matched by only one other Neolithic case reported from Denmark (Bennike 1985).

Evidence of fractures and inflammatory changes are said by Brothwell (1973) to be rare in the Neolithic, but, with 14 separate bones or fragments with evidence of healed fractures and a further 14 separate bones and fragments with possible evidence of inflammatory changes, the Hazleton skeletons do not appear to differ much from later populations. Two of the fractured bones are from the same individual (skel 1), and this may be the case with some of the others.

In all, the skeletal data from Hazleton cannot be said to differ in any significant way from those from previously excavated Neolithic sites in Britain or from any other British assemblage. The bones from Hazleton represent a small number of individuals (*c* 41), probably buried over an extended period (?as much as 300 years), and they cannot necessarily be said to be fully representative of a local population, let alone the Neolithic in general.

13 The non-human vertebrate remains

by Bruce Levitan

Introduction

The animal bones from the Hazleton North excavation were analysed with reference to a pre-arranged, problem-oriented strategy. This report, therefore, does not follow a traditional layout and analysis, but concentrates on specific aspects of the assemblage, under the following phase headings: pre-cairn activity, cairn construction, and cairn use. Reports on animal remains from intrusions into the cairn, including a major assemblage of small animal bones from the chambered areas, are in Appendices 11–12.

Advice on sampling was sought and acted upon during excavation, hence the bone assemblage provides a good indication of what was present, particularly because on-site sieving was carried out. That the assemblage benefited from the sieving undertaken is evident from the wide range of species represented (Table 75), especially the many small animals. For convenience, the subsequent tables have animals listed by their common name only: reference back to Table 75 will identify the correct species. The small size of the overall sample is the major drawback to the following analyses, which limits the drawing of wider conclusions, for example, about species exploitation. The possibility of small-sample error cannot be over-emphasised, and for this reason all conclusions and interpretations should be treated with caution.

Bones from the quarry floors, the lower quarry fills, and the upper cairn levels are generally severely weathered, with surfaces pitted and corrugated as a result of chemical leaching of bone (though the bone condition is better than that on many chalkland sites, where such weathering may be extreme). In contrast, bones from the sub-cairn surface and the basal cairn are not greatly weathered, suggesting that in these contexts chemical weathering was prevented by the cairn itself.

The term 'sheep' is used here where sheep/goat would be more correct. However, since only one bone was definitely identified as goat and 15 are definitely sheep, it would appear that most of the sheep/goat bones are from sheep.

Pre-cairn activity

The pre-cairn deposits included a concentration of Mesolithic flintwork at the western end of the excavated area and a major focus of Neolithic activity in the midden area to the west of the subsequent chambers. Most of the animal bones listed in Table 76 were concentrated in the midden area. The majority of these bones, 2497 in number (89% of the total), are not identifiable to species and are classified

Table 75 Species list of all non-human vertebrates identified

Fish
unknown species: Pr

Amphibians
Common frog (*Rana* sp.): P/W/Pr

Reptiles
Grass snake (*Natrix natrix*): P/W/Pr

Birds
Greylag goose (*Anser anser*): G
*Domestic fowl (*Gallus gallus*): D
Great tit (*Parus major*): P/W
Wren (*Troglodytes troglodytes*): P/W
Starling (*Sturnus vulgaris*): P/W/S

Mammals
*Hedgehog (*Erinaceus europaeus*): P/W/S/Sc/Pr
Common shrew (*Sorex araneus*): P/W/Pr
Pygmy shrew (*Sorex minutus*): P/W/Pr
Water-shrew (*Neomys fodiens*): P/W/Pr
Whiskered bat (*Myotis mystacinus*): P/W
Natterer's bat (*Myotis nattereri*): P/W
Common pipistrelle (*Pipistrellus pipistrellus*): P/W
Rabbit (*Oryctolagus cuniculus*): P(Pr)
*Squirrel (cf red squirrel) (*Sciurus* cf *vulgaris*): P/W/Pr
Bank-vole (*Clethrionomys glareolus*): P/W/Pr
Field-vole (*Microtus agrestis*): P/W/Pr
Wood-mouse (*Apodemus* cf *sylvaticus*): P/W/Pr
Harvest-mouse (*Micromys minutus*): P/W/Pr
House-mouse (*Mus musculus*): P(S/Sc/Pr)
Common dormouse (*Muscardinus avellanarius*): P/W/Pr
Dog (*Canis familiaris*): D
*Stoat (*Mustela erminea*): P/W
Weasel (*Mustela nivalis*): P/W
*Cat (*Felis catus*): P(D)
Pig (*Sus domesticus*): D
Red deer (*Cervus elaphus*): G/F
Roe deer (*Capreolus capreolus*): G
Aurochs (*Bos primigenius*): G
Cattle (*Bos taurus*): D
Sheep (*Ovis aries*): D
Goat (*Capra hircus*): D

Note: *Tentative identification. Species are allocated to economic/ecological categories: (D) domestic, (G) wild game, and (F) functional represent economically-exploited animals; (S) synanthropic, (W) wild, chance occurrence, (Sc) scavenger, and (P) post-activity intrusion represent the ecological catagories; and some animals may have been introduced as the prey (Pr) of others. In some cases, animals could (and probably did) fit more than one category. Small animals, in particular, might have been intrusive (in their own right or as prey), but some may have been contemporary (either living or as prey) with the Neolithic activity; thus, the designation (P) is, in all cases except rabbit, tentative.

as 'cattle-size' (which would include cattle, aurochs, and red deer) and 'sheep-size' (which would include sheep, pig, roe deer, and goat). A few small animal bones are also present, and, if these are truly contemporary with the pre-cairn activity, they do provide some indication of the local environment. Animal bones relating to the pre-cairn phase are therefore considered under three headings: the possible Mesolithic element, the main Neolithic assemblage, and the small animals.

The possible Mesolithic element

In view of the presence of Mesolithic flintwork, it might be supposed that some of the pre-cairn animal bones relate to

Table 76 Numbers of bones from pre-cairn contexts

Species	*Site*	*Sample*	*Totals*	*% (large mammals only)*
cattle	89 (6)	–	89 (6)	33.1
sheep	84 (4)	15 (5)	99 (9)	36.8
pig	71 (4)	9 (3)	80 (7)	29.7
aurochs	1	–	1	0.4
roe deer	1	–	1	
sheep size	1482 (599)	805 (627)	2287 (1226)	
cattle size	207 (38)	3 (2)	210 (40)	
human	5	–	5	
field-vole	2	3	5	
bank-vole	–	5	5	
wood-mouse	–	1	1	
shrew	–	1	1	
small mammal	5	23	28	
?fowl	1	–	1	
Totals	1948 (651)	865 (637)	2813 (1288)	

Note: Site = bones recovered manually and from on-site sieving. Sample = bones from samples sieved under laboratory conditions. Bracketed numbers = burnt bones. Roe deer = antler. Human = two separate teeth and 3 small groups of skull fragments. Small mammal = post-cranial bones which have not been identified to species level. All bones from context 211, except: (site) 1 sheep-size (context 329); 2 sheep-size (context 437); 1 sheep, 1 pig, 7 sheep-size (context 471); 1 sheep-size (context 474); (sample) 1 small mammal (context 474).

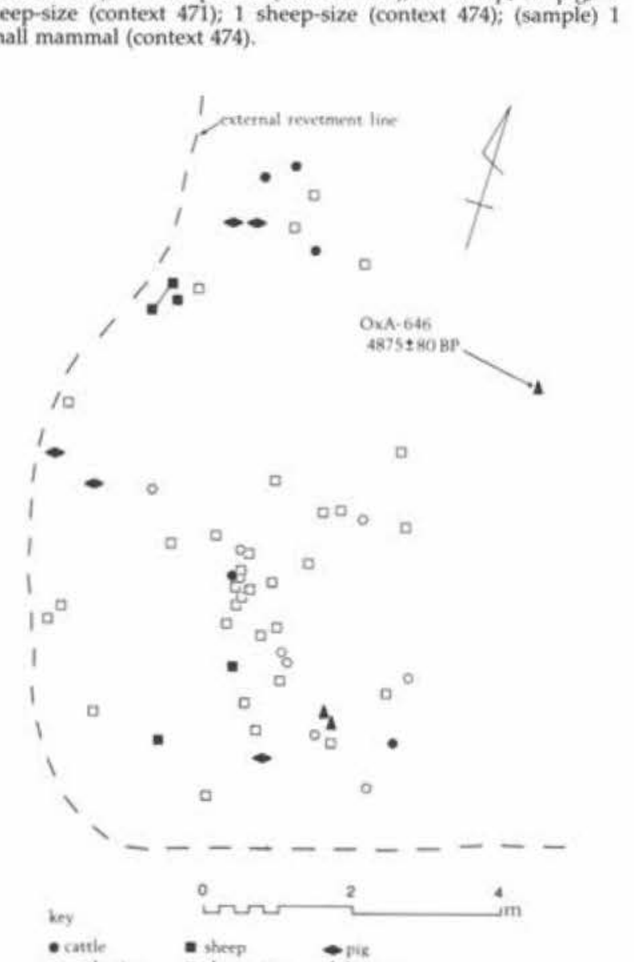


Fig 195 Distribution of the sample of animal bones from the sub-cairn soil beneath the south horn, in the area of the Mesolithic flint concentration

Mesolithic activity. To test this possibility, a sample of 77 bones was analysed (Table 77). These bones were in the sub-cairn soil within the area of Mesolithic flint concentration and securely stratified below the cairn at the south horn (Fig 195). The identifiable cattle, sheep, and pig bones cannot, conventionally, be Mesolithic, and the 61 unidentifiable cattle/sheep size fragments seem unlikely to include bones of Mesolithic date; in any case, such fragments would demonstrate nothing about the form of any Mesolithic occupation. It is concluded that Mesolithic activities did not involve any recognisable survival of animal bones on the sub-cairn soil and that the pre-cairn assemblage in Table 77 is essentially Neolithic.

The Neolithic assemblage

The sample of identifiable bones is small (269 large animal bones), and interpretations based on such a sample will inevitably be speculative. Cattle, sheep, and pig are present, in approximately equal proportions, with sheep in a slight majority and pigs just in the minority. The bones are generally very fragmentary and only in the case of cattle do bones more than a quarter complete outnumber those which are less than a quarter complete (Table 78). A high proportion of the identifiable bones are skull and limb extremity bones: for cattle 60.0% (54 bones), for sheep 40.4% (40 bones), and for pigs 65.8% (50 bones); but these results are misleading due to the fragmentation of the bones (ie there are many loose teeth) and because no weighting for the anatomical norm has been carried out. If these two factors are considered (weighting as in O'Connor 1982, 18–19; Levitan forthcoming; 1987), the results are very different (Table 78). Bones such as radii

Table 77 Assemblage of bones from the sub-cairn soil below the south horn

Species	*Number*	*Bones represented*
cattle	5	femur, metatarsal, radius, tooth, jaw
sheep	4	ribs (3), radius
pig	5	cranial (2), rib, vertebra, tooth
cattle size	12	
sheep size	49	
human	2	cranial fragments (2 groups)
Total	77	

Note: All bones from context 211, except two sheep-size fragments from context 437.

Table 78 Anatomical representation for the major animal species from pre-cairn contexts

Anatomy	*Cattle*			*Sheep*			*Pig*		
	N	*I*	*<25%*	*N*	*I*	*<25%*	*N*	*I*	*<25%*
skull	18	0	100	14	0	100	11	0	100
mandible	16	0.17	94	17	0.63	88	26	0.13	96
cervical	9	0.32	22	5	0.13	40	3	0.29	33
thoracic	1	0	100	3	0.05	0	–	–	–
lumbar	2	0.10	0	1	0.17	0	1	0	100
caudal	1	0	100	3	0.05	67	–	–	–
rib	3	0	100	15	0	100	1	0.02	0
scapula	–	–	–	1	–	100	1	–	100
humerus	3	0.50	67	6	0.75	67	4	1.00	50
radius	7*	0.96	29	4	1.38	0	1	0.25	0
ulna	1	0	100	2	0.13	50	4	0.92	25
sesamoid	4	0.24	0	1	0.06	0	–	–	–
metacarpal	3	1.00	0	–	–	–	–	–	–
pelvis	–	–	–	1	0	100	2	0	100
femur	3	1.00	33	4	0	100	2	0.50	50
tibia	6	1.08	33	14	1.63	50	4	0.50	75
fibula	–	–	–	–	–	–	2	0.50	50
astragalus	1	0.50	0	1	0.50	0	2	1.00	0
calcaneum	2	1.00	0	–	–	–	2	0.50	50
tarsal	3	0.31	0	2	0.33	0	–	–	–
metatarsal	4	0.92	0	1	0.25	0	–	–	–
metapodial	1	0	100	1	0	100	6	0.15	33
phalanx 1	1	0.13	0	2	0.04	50	2	0.13	50
phalanx 2	1	0.13	0	1	0.13	0	1	0	100
phalanx 3	–	–	–	–	–	–	1	0.13	0
Totals	90*	8.36	56	99	6.23	69	76†	6.02	68

Note: N = Number of fragments. I = Index value (Levitan forthcoming; 1987, 65–6; higher index values equal greater proportional representation of bones). <25% = Percentage of N less than quarter complete. Skull = includes upper teeth. Mandible = includes lower teeth. *Includes one aurochs bone. †Total of 80 in Table 76 includes four foetal bones.

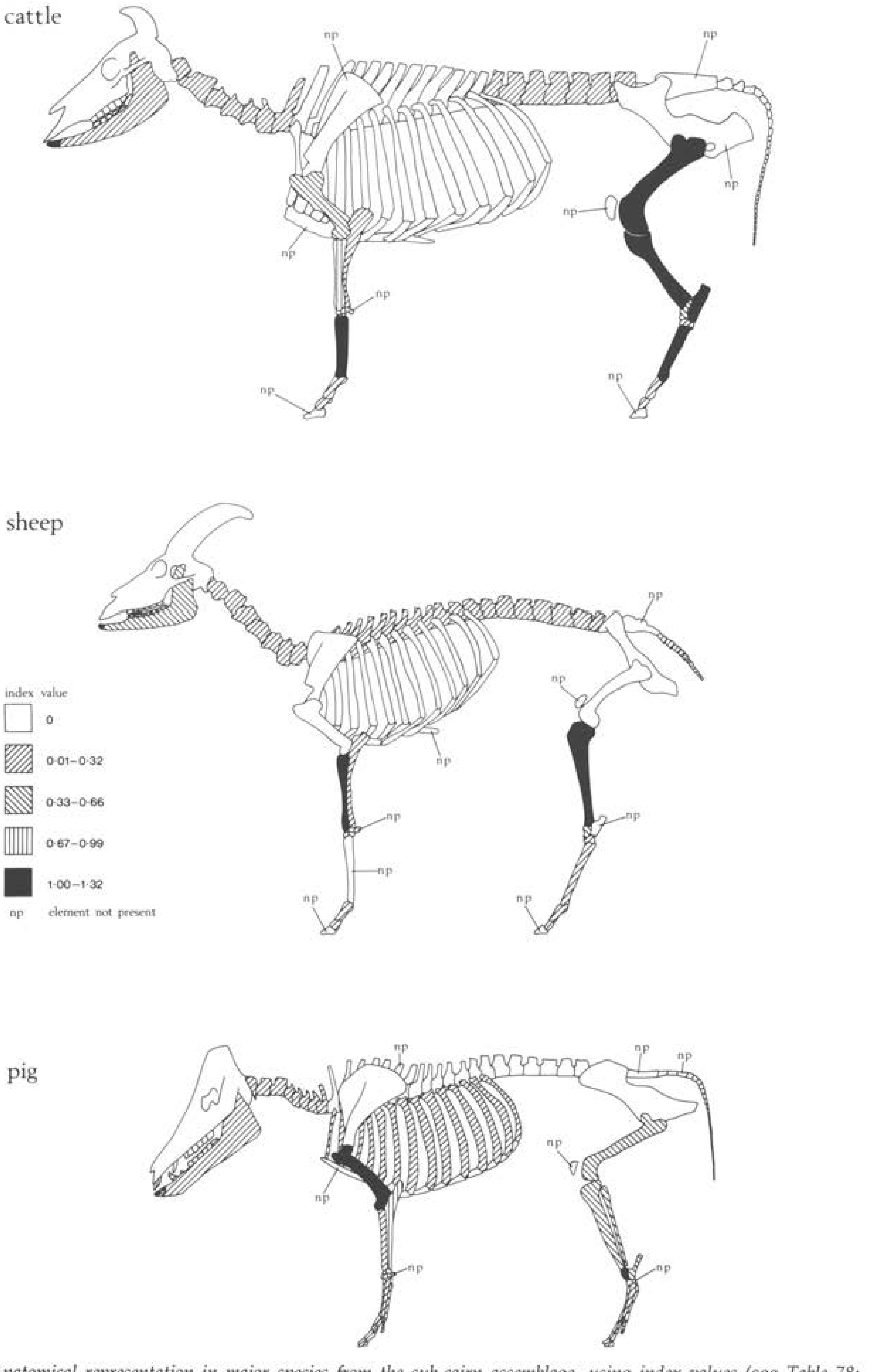


Fig 196 Anatomical representation in major species from the sub-cairn assemblage, using index values (see Table 78: higher index values equal greater proportional representation of bones)

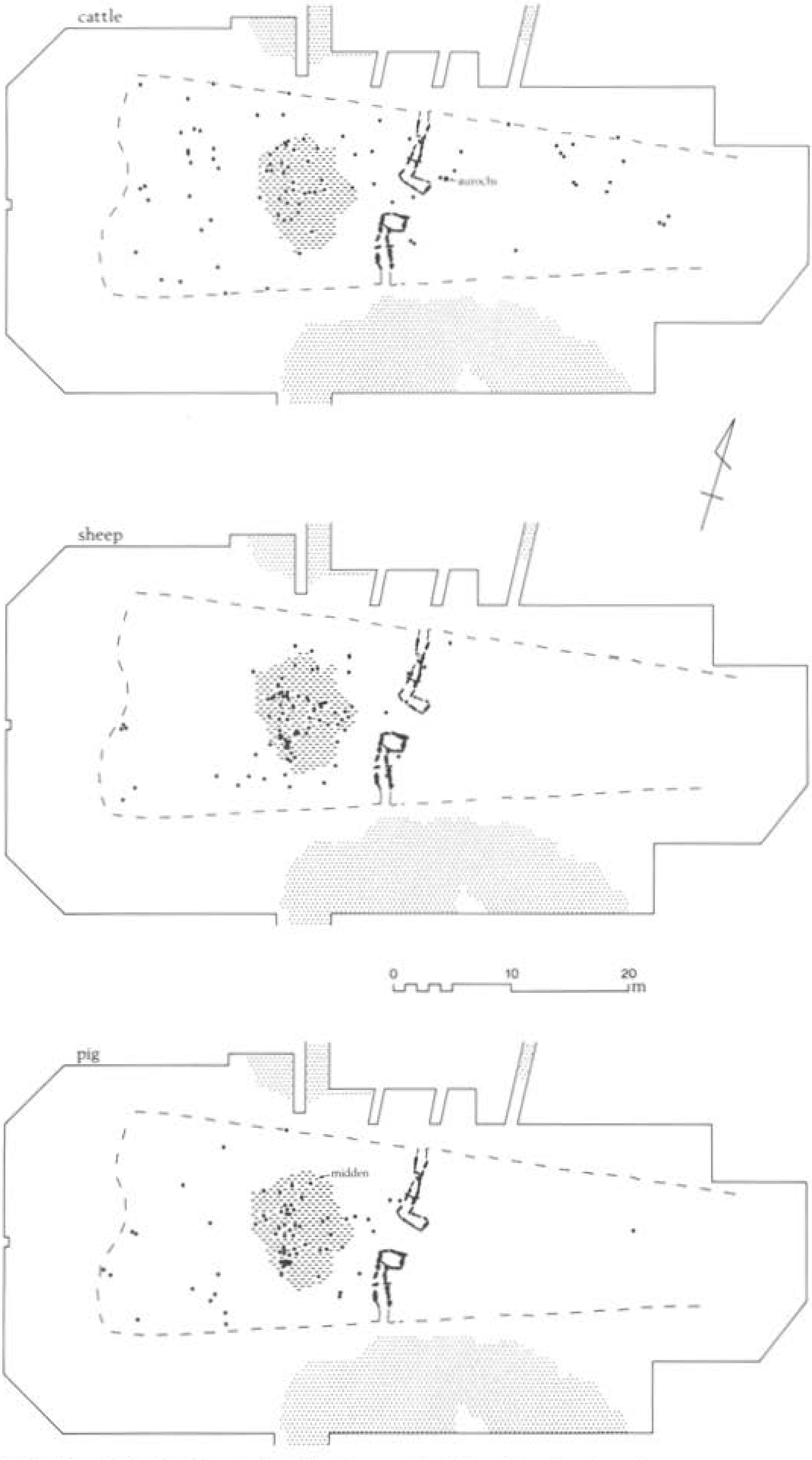


Fig 197 Distribution of identified bones of cattle, sheep, and pig from the sub-cairn soil

and tibiae become more frequent when this method is used. These results are illustrated diagrammatically in Figure 196, showing that the strongest bones are generally best represented (if allowance is made for poor representation of small bones such as carpals, tarsals, and phalanges). Such results indicate that differential preservation may be a major factor in producing this evidence.

Many of the bones are burnt (Table 76) and, of the larger mammals, 1288 (46.5%) fragments are burnt in varying degrees, from slight blackening to calcined white. The high proportion of burning indicates that the bones were probably burnt on site, and the concentration in the midden suggests that the activity may have been close-by. The cranial and extremity bones are not particularly frequent when weighted, but they are abundant enough to indicate that the animals were probably butchered (and slaughtered?) nearby. There is no evidence in the form of cutmarks from flint tools, and, although flint tools may have been used for much of the work, breaking-open of bones for marrow was probably performed by smashing and battering; many bones appear to have been broken in such a manner, but even minor weathering renders analyses of such factors difficult.

Ageing evidence was limited, as may be expected from so small a sample, but the results in Table 79 *do* give consistent results for epiphyseal fusion data. In the case of cattle, it seems evident that most were killed between middle-fusing and late-fusing age groups (ie at about three years old based on modern analogy), but perhaps as many as a third survived beyond the late-fusing group. There is no sexing evidence and, in the absence of this, it is difficult to attempt to interpret the ageing data in terms of exploitation patterns. The high kill-off of young adults might indicate that meat production was important. Ageing evidence from the sheep and pigs is generally similar and both appear to have been killed-off young, perhaps by the end of their second year in both cases. In pigs, this is a fairly typical pattern with kill-off as soon as economically viable. In sheep, such patterns almost certainly preclude exploitation for wool and suggest that meat was the main form of exploitation. (In fact, no Neolithic woollen textiles have yet been discovered and the earliest woollen textiles in Britain are of Bronze Age date, from Rylston, Yorkshire: Ryder 1983, 47–8.)

Table 79 Summary of ageing data for cattle, sheep, and pig from pre-cairn contexts

Age group	*Cattle*			*Sheep*			*Pig*		
	F		*NF*	*F*		*NF*	*F*		*NF*
early fusing	3		1	1		3	1		10*
%NF		25.0			75.0			90.9	
middle fusing	3		4	1		3	1		2
%NF		57.1			75.0			66.7	
late fusing	1		2	0		4	2		4
%NF		66.7			100.0			66.7	

Note: F = fused, NF = not fused; *includes four foetal bones.

Even if meat exploitation is the main form of husbandry reflected, this cannot be taken to be representative of the contemporary regional situation, both because of the small sample and because the nature of the pre-cairn occupation is unknown. Indeed, given the subsequent use to which the site was put, a ritual aspect to the formation of the midden cannot be wholly discounted (especially in view of the high percentage of burnt bone), with consequent implications for the accuracy of any conclusions about husbandry drawn from an assemblage biased in this way.

Few bones were preserved well enough for measurement, but none of the pig bones, measurable or otherwise, was large enough to indicate the presence of wild animals. Most of the cattle bones were also too small to indicate the presence of aurochs, the exception being the distal third of a radius (distal breadth 97.8mm; distal width 72.5mm), which almost certainly belongs to an aurochs. This specimen appears to have been deliberately broken just distally to the mid-shaft region, and thus aurochs appear to have been eaten, although the extent of this exploitation cannot be judged. The only other wild larger mammal present is roe deer, represented by a single shed antler. It cannot be said from this find whether or not roe deer were being exploited.

Analysis of the spatial distribution of the pre-cairn animal bones is based upon plots of bones recovered manually during excavation (Fig 197). Taken together, these plots show a concentration of animal bones in the area of the midden: a concentration which becomes even more marked if the cattle-sized and sheep-sized fragments are considered. The plots show a marked fall-off in the numbers of bones in the area east of the subsequent chambers. The bone distribution was also investigated using contours of density (Saville 1984a, fig 7 and arch drg 722) which reinforced the concentration in the midden. The burnt bone, as might be expected, was also concentrated in the midden.

When the distributions are considered separately by species, however, some contrasts are apparent, especially when sheep and pig are compared with cattle, since the distribution of the latter exhibits a much more general spread, with more identified bones outside than inside the midden. The interpretation of any significance to these differences by species is complicated by the differential ability to identify fragmentary bones, and, of course, by the small number of bones involved. Furthermore, hand-collected material may be biased in favour of larger pieces of bone, though the excavation procedures followed can be assumed to have minimised this potential bias. It is perhaps of note that the single aurochs bone was not located within the midden, but just east of the north chambered area (Fig 197).

In summary, the pre-cairn bones emphasise the concentration of material in the midden as a focus at the site, but the bones themselves do not throw any conclusive light on the nature or function of the midden. The animal bones appear to relate to selection for meat, and the abundance of burnt bones, plus the anatomical representation, indicate that processing of the animals occurred at, or close to, the site. It is impossible to say whether this assemblage was purely domestic or may have had any ritual character.

The small animals

The small mammal bones represent four species (Table 76): field-vole, bank-vole, wood-mouse, and shrew (species unknown). The identifications are on the basis of teeth (Corbet and Southern 1977; Lawrence and Brown 1974), except in the case of the shrew (a humerus). The other small mammal designations in Table 76 refer to post-cranial bones, most of which are probably from voles or mice. (No other shrew bones were present and the post-cranial bones of voles and mice are difficult to distinguish one from another.) The 40 bones include 4 burnt bones, 2 of which are from animals larger than the voles or mice and possibly of hare or a similar-sized animal. (An unburnt rib was also of this larger small mammal category.)

It is important to assess the provenance of these bones before any attempt at interpretation is made. Such tiny bones could have fallen through the cairn fabric during excavation (*see* Table 81 for the small mammals found within the cairn) or could result from completely modern intrusions following partial exposure of the pre-cairn surface in the course of excavation. Moreover, in the case of burrowing animals, the findspots of these bones relative to the cairn limits is clearly significant. In fact, as Figure 198 shows, only one bone (an indeterminate small mammal bone from beneath the north-east side of the cairn) was close enough to the edge of the cairn to be deemed peripheral and whose stratification could be questioned. The majority of bones are from the midden, beneath the greatest depth of the cairn, and it seems unlikely that animals would have burrowed so deeply (in excess of 2m) from the cairn surface. Furthermore, those small mammal bones from the sieved samples are unlikely to have been contaminants during excavation, since all samples were taken from carefully cleaned-off locations. This, coupled with the presence of burnt bones (admittedly only a very few), does indicate a distinct possibility of the small mammal bones being contemporary with the pre-cairn activity. These bones need not, however, be contemporary with the midden itself, since animals could have become incorporated in the midden after its accumulation, but before construction of the cairn, even if only a small gap is envisaged between these events. Even so, the possibility that these bones are modern intrusions must not be ignored entirely.

All four species of small mammal – field-vole, bank-vole, wood-mouse, and shrew – are commonly found today in association with human activities, particularly with cultivation, but they are species native to this country, so their presence could equally well reflect natural habitats. There is, however, some evidence that the sub-cairn soil had been cultivated (Chapter 15), and it also seems probable that the immediate locality was open (ie not totally forested) at the time the midden accumulated. The

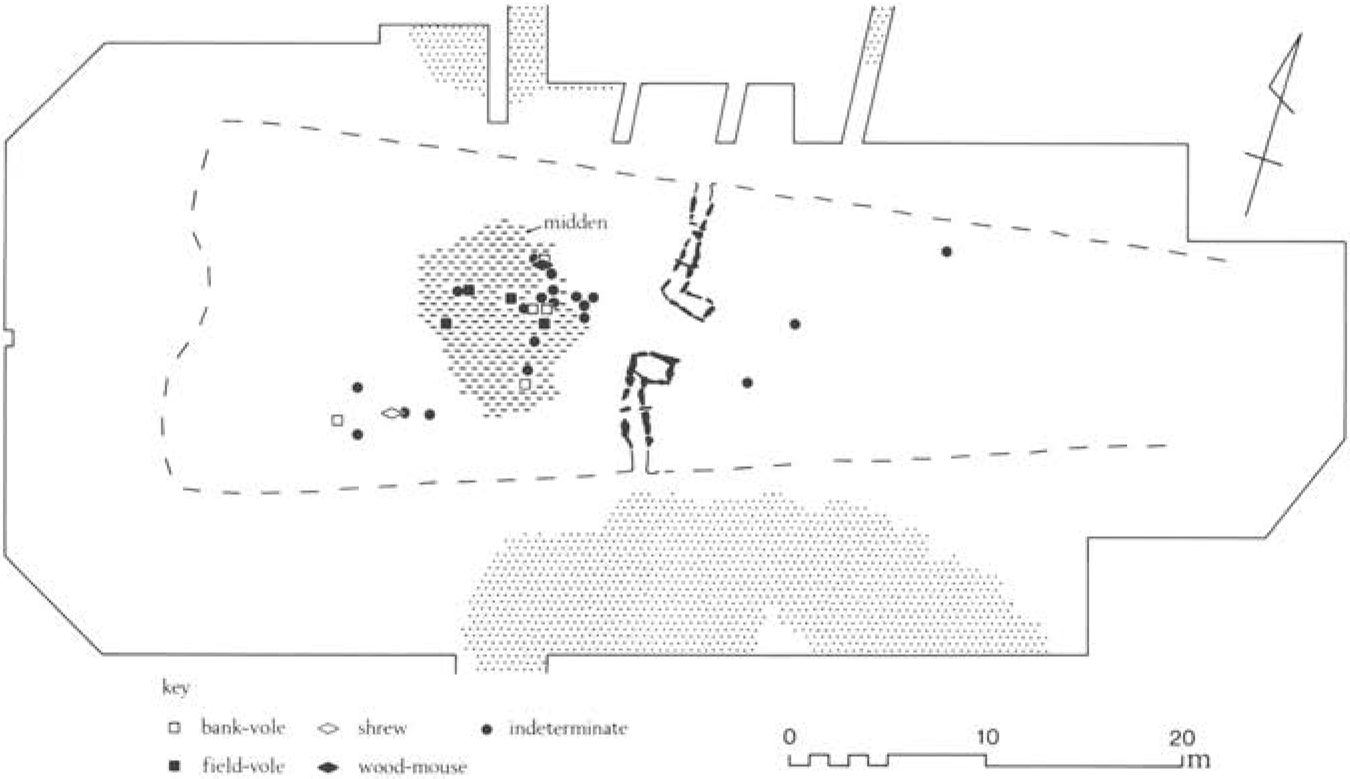


Fig 198 Distribution of small mammal bones from the sub-cairn soil

presence of wood-mouse and bank-vole on the other hand might be interpreted as indicating the presence of some cover nearby, since both prefer deciduous woodland or at least the protection of shrubs or hedgerows. Neither of these two species is likely to have fed directly on cultivated crops, though the field-vole may have done so (Corbet and Southern 1977). The possibility that the bones were introduced in the form of owl pellets should not be ruled out: this sample represents a high diversity for a natural death assemblage, but would be quite normal for owl pellets (O'Connor pers comm).

It would be dangerous to conclude much about the earlier Neolithic environment from the small mammal evidence, but on balance it seems that some form of nearby cover is suggested, and that perhaps cultivation is not reflected by this fauna. This would accord with the other environmental data from the site, which suggest that, although a phase of pre-Neolithic climax woodland was succeeded by pre-cairn clearance and disturbance, regenerating scrub cover did immediately precede the cairn construction.

Cairn construction

Animal bones directly associated with the cairn construction phase, by virtue of their inclusion in the cairn fabric, are very few (Table 80). Only those bones from basal cairn contexts can be regarded as securely stratified, but the sample is too small to draw firm conclusions. The representation of domestic species is equivalent (in ranking) to the pre-cairn contexts, but there are also differences, specifically the fact that aurochs and red and roe deer are not present in the cairn fabric. The single definite goat bone (first phalanx from context 229) comes from this group. Analysis of the location of bones within the cairn revealed no especial patterning, with bones spread throughout the cairn in an apparently random manner.

Table 80 Bones of larger mammals from within the cairn fabric

	Basal cairn: bones probably contemporary with cairn		*Cairn fabric: bones possibly intrusive*		
Species	*No of bones*	*Context*	*No of bones*	*Context*	*Totals*
cattle	2	293	1	226	5
			1	259	
			1	433	
sheep	1	309	1	229	9
			1	251	
			1	261	
			1	325	
			1	411	
			1	420	
			1	423	
			1	444	
pig	1	309	1	186	4
			1	302	
			1	341	
goat	–	–	1	229	1
red deer*	1	314	–	–	2
	1	463			
cattle size	1	269	1	341	6
	3	293			
	1	296			
sheep size	2	269	1	229	11
			3	254	
			1	261	
			1	332	
			1	334	
			2	444	
human	1	211/461	1	378	3
			1	444	
Totals	14		27		41

Note: *Red deer remains are antlers.

Table 81 Bones of small animals from within the cairn fabric (subdivided by depth in metres below the surface of the cairn)

Species	*0–0.5m*	*0.5–1.0m*	*>1.0m*	*Totals*
field-vole	18	20	–	38
bank-vole	–	1	1	2
rabbit	12	1	–	13
shrew	–	2	–	2
wood-mouse	–	14	2	16
bird	–	2	3	5
frog	1	–	–	1
indet small mammal	–	2	–	2
Totals	31	42	6	79

Note: The numbers of bones of each species found in different contexts are listed below (context nos in brackets):
field-vole: 6(15), 1(154), 15(229), 5(303), 3(379/493), 8(410/414)
bank-vole: 2(440)
rabbit: 10(379/493), 1(442), 2(444)
shrew: 2(229)
wood-mouse: 4(14); 9(186); 1(261); 1(448); 1(478)
bird: 2(261); 3(440)
frog: 1(290)
indeterminate small mammal: 1(254); 1(261)
For additional bones of field-vole and frog from cairn contexts 314, 389, and 390 adjacent to the chambered areas, *see* the notes accompanying Tables 107 and 108.

Attention was also given to the presence of the bones of small animals within the cairn fabric (Table 81). The identifications are subdivided according to their depth below the cairn surface as a crude guide to the possibility of intrusion or otherwise of the animals represented. The most obvious non-prehistoric contaminant is the rabbit, which is found only at a relatively high level within it. The other common species are the same as those in the pre-cairn assemblage. Three of the field-vole bones come from the same context as 10 of the rabbit bones, confirming the impression given by the high position of some field-vole bones within the cairn that this species is also intrusive. It cannot be concluded that this is the case for all field-voles, however, because of their presence in the lower cairn and in the sub-cairn soil, and because the field-vole is a native species. The type of bird represented by the bones from the lower cairn fabric has not been established.

The very few animal bones from the floor of the quarries do not warrant separate discussion, while the more numerous bones which do occur in the upper primary fill of the south quarry are discussed below under the heading of cairn use. The quarry floors and the lower primary fills of the quarries did, however, contain a considerable number of deer antlers. Although not directly tied to the cairn construction, the excavator regards these antlers as discarded tools associated with on-site quarrying and therefore circumstantially linked with the construction phase. Such an interpretation seems to be borne out by the following analyses, and for this reason all the antlers are discussed together.

The antlers

Two antlers of roe deer were recovered: one from the tertiary fill of the north quarry (context 48) and one from the sub-cairn surface. All the remaining antlers from the excavation are of red deer. At least 55 antlers are represented, 36 of which were fairly complete as *in situ* finds (Figs 202–3). Of the 36, all but 2 have been reconstructed. The remaining antlers were apparently incomplete when originally deposited or are so smashed and fragmentary that reconstruction was not considered worthwhile. The minimum number of 55 discounts the smaller pieces, which may be part of additional antlers. Besides the roe deer antlers, all but 4 antlers came from the lower quarry fills to either side of the cairn (Table 85). Two of the remaining 4 antlers came from early phases of the cairn construction (contexts 314 and 463), the other 2 were finds recovered from spoilheaps. The majority of the antlers were from the more extensively excavated south quarry. Figure 199 shows the horizontal distribution of the south quarry antlers, from which it may be concluded that they were preferentially scattered around the quarry edges.

The development of antlers follows a pattern whereby new tines are added in subsequent years during early life, but final stages of growth may vary considerably. The 'stage' of development is labelled according to the number of points the deer bears on its antlers. Eight points (ie four on each antler) may represent a mature individual, but some deer can develop 14 points or more (Lawrence and Brown 1974, 131; Staines 1980, 13). Such development cannot be used as an ageing sequence, since a deer with an antler of eight points could be the same age as one of 12 points and the points reduce in old animals ('gone back'). The stage of antler development is worth considering, however, since certain stages may have been preferentially selected by Neolithic people. Accordingly, this information is given in Table 82. Antlers of 10 or 12 points appear to have been preferred (based on the 54.5% of antlers for which a stage of development can be ascertained). Most antlers were shed: of the 23 antlers with coronets present, 3 (13%) were not shed (eg Figs 201: 9771 and 203); a result which is similar to those obtained from Neolithic antlers at Grimes Graves and Durrington Walls (Clutton-Brock 1984, 16; Legge 1981, 100).

Table 82 also records, where possible, whether the antlers are left or right specimens. This analysis suggests that no particular preference for left or right antlers determined their selection for tools. This agrees with the data collected by Clutton-Brock (1984, 25), but contrasts with the results from one sample of Grimes Graves antlers which showed a marked preference for left specimens (Legge 1981, 101).

Table 82 Stages of development in red deer antlers

*Stage**	*No of points*	*left*	*No of antlers right*	*unsided*	*Totals*
C or D	6–8	–	–	1	1
D	8	4	2	1	7
D or E	8–10	1	–	4	5
E	10	1	1	1	3
E or F	10–12	7	3	–	10
F	12	2	3	1	6
G	14	–	2	–	2
Totals		15	11	8	34†

Note: *Stages as defined by Schmid (1972, 89). †Comprises 2 antlers from the basal cairn, 6 from the north quarry, and 26 from the south quarry.

The antlers were generally very fragmentary, and all were very weathered. The former was mainly due to crushing by the weight of overlying quarry fill; wherever possible, *in situ* drawings and photographs were made during excavation and these allow an appreciation of the original state of the antler. In other cases, the antlers were damaged during excavation, but some breaks are definitely ancient and predated the deposition of the antlers. Seven antlers have tines broken off from the beam (representing 18.9% of those antlers where determination is possible), and 14 antlers are broken across the beam (37.8%). Thus, antlers seem to have broken across the beam fairly frequently, usually between the brow/bez tines and the trez tine, but the tines themselves were only infrequently removed or broken off. In this respect, these antlers are unlike those from Grimes Graves and Durrington Walls, which were manufactured into tools with most tines and tops removed, leaving beam and brow tine in an L-shaped pick form (Clutton-Brock 1984, 26: Legge 1981, 100). Antlers from these two sites also have zones of battering, emphasising their use as tools. One of the Hazleton antlers has an obvious battered zone on the beam near the top, and many are battered (or worn?) on the burr

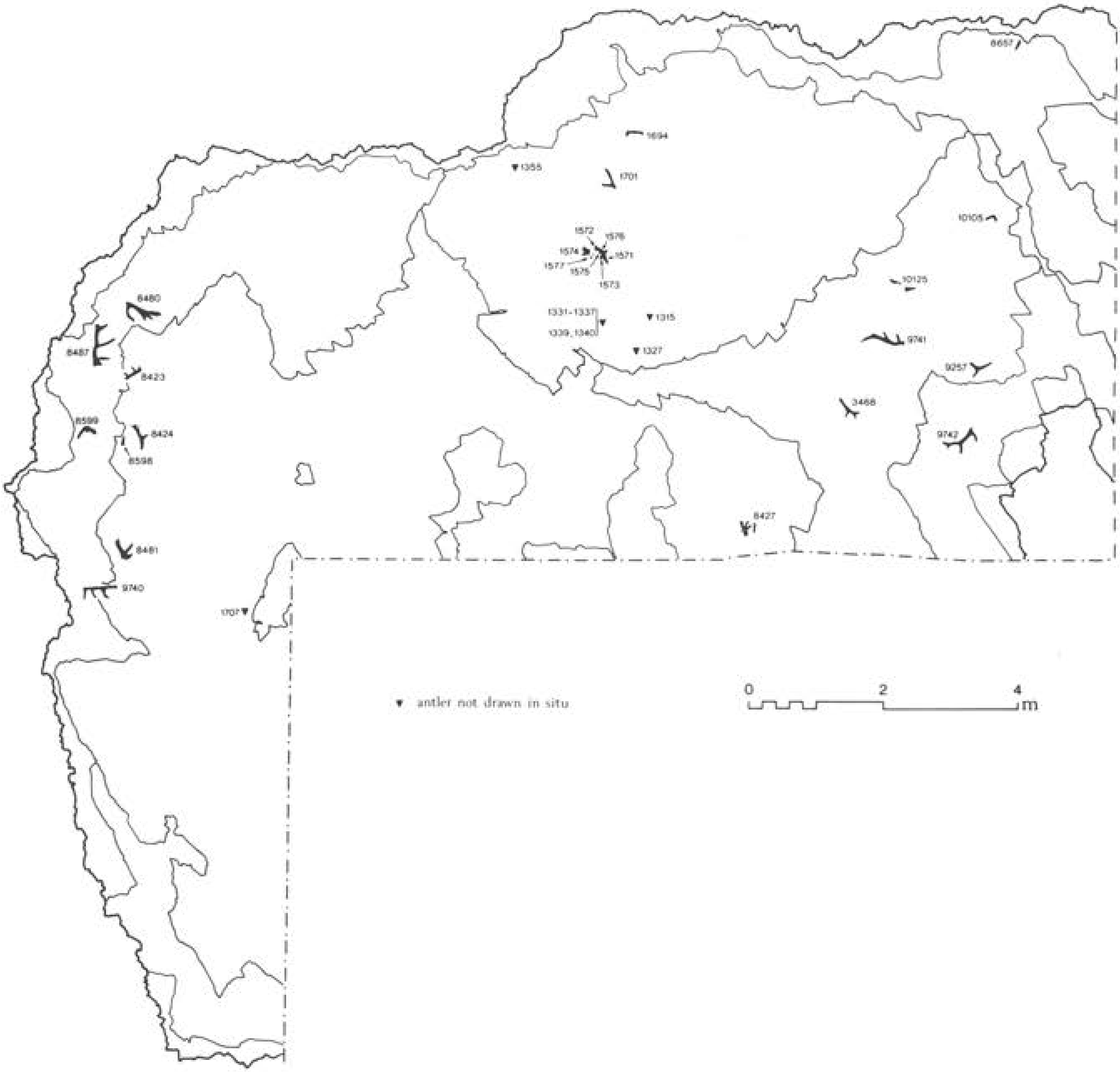


Fig 199 Distribution of red deer antlers and fragments in the lower fills of the south quarry

(11 out of 16). This latter pattern (Figs 200: 3325 and 201: 9740) corresponds with the battering on antlers from Grimes Graves and Durrington Walls, so it may indicate that a similiar manner of use is involved.

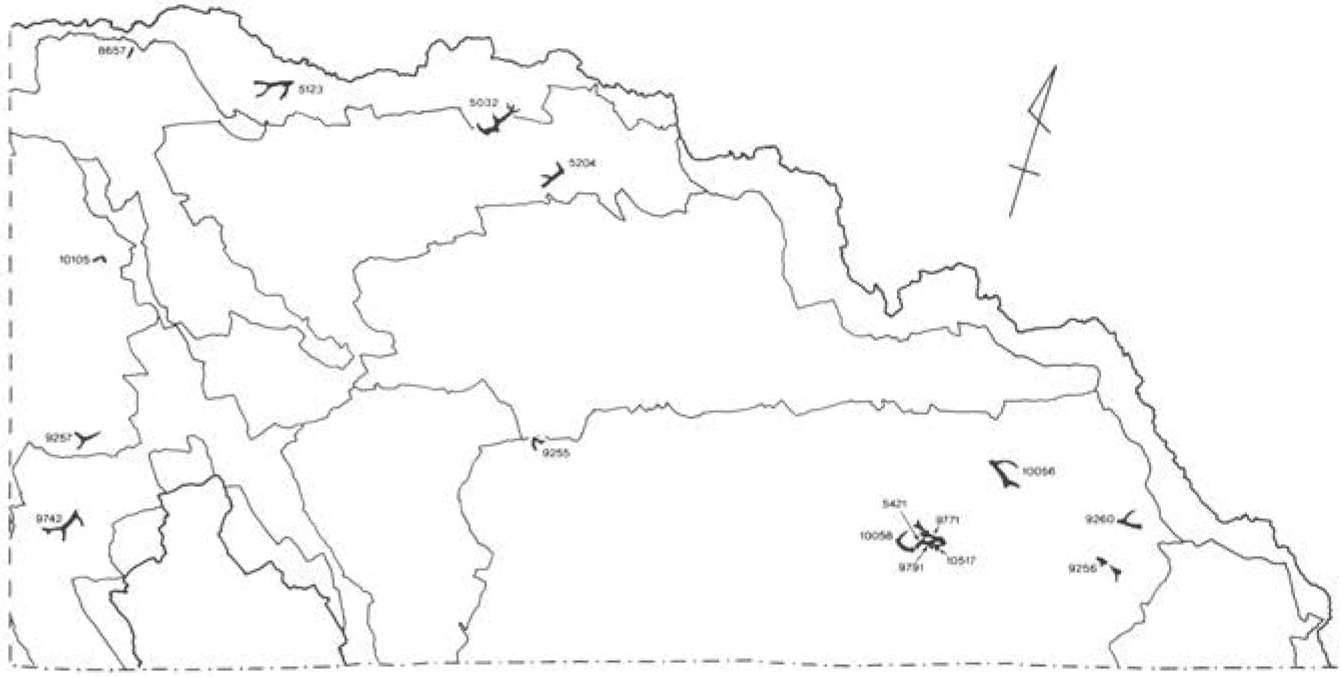
The antlers were not manufactured into picks, but seem to have been used in a fashion comparable to that in which the antler pick was used at some other Neolithic sites, as at Durrington Walls. In fact, only two antlers were obviously cut and worked: one with the brow tine and beam cut away (Fig 200: 1694), the other with the base of the pedicle worn smooth and the brow tine cut away (Fig 202). Others may also have been cut, but any evidence is masked by weathering and subsequent damage. Tine ends are often worn smooth (in 54.1% of 20 cases) and slightly polished (eg Figs 200–3), and this wear may have arisen from use of the antler as a tool of some kind, although it could equally reflect rubbing away of the tine tips while still on the animal. Examination of a small number of trophy antlers in the British Museum (Natural History) indicates that smoothing of the tops and tines can be quite extensive, an observation confirmed by other investigations (Legge pers comm). However, the severe wear observed on the brow and bez tines of many of the Hazleton antlers probably represents their use as tools.

Clutton-Brock (1984, 11) has defined a number of measurements of antlers, but only three of these are used here. The measurements taken are: the beam circumference between bez and trez

Table 83 Summary of measurements of 14 antlers, with comparative data from other Neolithic sites

Measurement (and no)*	*Hazleton range*	*mean*	*sd*	*cv*	*GG† range*	*mean*	*DW† range*	*mean*
beam circumference (9)	86–136	116.6	17.9	15.3	90–200	147.2	–	–
burr circumference (1)	145–250	189.4	30.5	16.1	133–280	213.0	103–260	198.5
burr diameter (2)	46–84	62.9	11.1	17.1	40–95	68.3	35–90	65.1

Note: *Measurement number in Clutton-Brock (1984, 11). GG = Grimes Graves, Norfolk. DW = Durrington Walls, Wiltshire. †GG measurement 9 from Legge (1981, 101); GG and DW measurements 1 and 2 from Clutton-Brock (1984, 19 and 27).



tines, the burr circumference, and the burr diameter. These are useful measurements, especially the beam circumference, since this was also used by Legge (1981, 101), but the battering on the Hazleton antlers prevented accurate measurement in all but 14 cases. The measurements are summarised in Table 83, which shows that the antlers from Grimes Graves are generally larger than those from Hazleton, though the ranges overlap, while those from Durrington Walls are intermediate between the two sites. Damage in the measurement zone on some of the larger Hazleton antlers, including the largest antler excavated, means that these are excluded from Table 83. If these measurements were possible, then the Hazleton mean figures would be higher – not so high as those from the Grimes Graves antlers, but possibly similar to those from Durrington Walls.

It is not feasible to give any accurate measurements for greatest length due to fragmentation and damage, but, in order to give an impression of the size range, the approximate coronet to tip measurements for the smallest antlers are *c* 350mm, and for the largest *c* 1000mm, while most antlers (stages E–G) are in the range *c* 800–1000mm.

When considering the conclusions which might be drawn from this assemblage, the following four questions seem of particular pertinence: were the antlers gathered when shed; what size/stage of antler, if any, was preferred; were the antlers worked or marked in any way; and what were the antlers used for?

It has been shown that most of the Hazleton antlers were shed, so red deer were generally not being killed in order to obtain them. It has also been shown that the majority were well developed (eight points or more). It is therefore possible to infer that the larger, better developed antlers were being collected.

From the above, it is also possible to infer that antler must have been reasonably readily available at no great distance from the site. The availability of well-developed antlers may be related to hunting pressure. If hunting pressure is low, the average life span will be high, so there will be a high proportion of fully-developed shed antler (Payne pers comm). However, since we cannot know what proportion of well-developed versus 'undeveloped' antler was actually available, it is dangerous to actually make conclusions about hunting pressure. If large antlers were preferred, these would be selected, presumably even if longer foraging journeys were necessary. Thus, it can only be suggested with reasonable confidence that larger antlers were deliberately selected and that enough shed antler was available for the quarrying requirements.

Antler is usually shed in the spring, but, unless the deer had a poor nutritive status (in which case they would eat their antlers), it can be assumed that collection could have taken place at almost any time of the year.

Antlers at Hazleton generally have not been manufactured into the kind of worked tools found at Grimes Graves and Durrington Walls. However, a few do appear to have been modified. Antler 8480 (Fig 200) has a definite cut mark across the beam, and antler 1694 (Fig 200) has also been cut. This, however, is something of an oddity compared with the rest of the antlers, being extensively modified and also quite small (it is very likely to be from an old individual where the antlers have 'gone back'). Possibly, it was used for a different purpose to the other antlers. Other antlers also show signs of modification (eg Fig 201), but weathering prevents positive identification of cut marks.

A few antlers have slight staining indicative of burning, but again the weathering has removed or obscured much of the evidence, so that a quantitative assessment would almost certainly underestimate the presence of burning. Antlers from Grimes Graves and Durrington Walls were burnt in order to facilitate the removal of tines or to smooth broken surfaces – apparently achieved by holding a red-hot stick against the antler so as to limit the extent of the area affected by heat application (Clutton-Brock 1984, 26 and pers comm). A similar activity may have occurred at Hazleton, but apparently only in the case of a minority of the antlers.

A closer similarity between the antlers from Durrington Walls, Grimes Graves, and Hazleton is provided by the evidence of battering on or just above the coronet: 65% of burnt and 71% of unburnt antlers from Grimes Graves, 96% and 90% respectively from Durrington Walls (Clutton-Brock 1984, 26), and the majority of the Hazleton antlers were battered.

In her study of the Grimes Graves assemblage, Clutton-Brock (1984, 25) concluded that the large, uniform antlers, carefully manufactured into picks, were selected and used by full-time, professional miners. This may largely account for the size difference between antlers at Grimes Graves and Durrington Walls (Table 83), since the excavation of the ditches at the latter site may have called for a less specialised workforce working on a larger scale, with an accordingly less rigorous selection of antlers. The scale of the work at Durrington Walls would have made well-formed tools advantageous, since the time spent in their preparation could be offset against improved efficiency. At Hazleton, the quarrying involved was relatively small-scale, and the workforce, as at Durrington Walls, was probably unspecialised. The Hazleton antlers were not manufactured into picks, since the small scale of work may not have justified the effort. Some of the Hazleton antlers may have been specialised tools (eg Fig 202), and the few tops represented (Fig 204) may have been used as 'rakes' (Legge 1981, 100), but most would probably have been used as 'picks' or 'levers'. The method of use may have involved the insertion of the brow or bez tine, or both, into a crack in the limestone, in some cases hammering the antler firmly in

Fig 200 Red deer antlers from lower quarry fills: 1694 (stage D, eight points) south quarry, context 44; 3325 (stage F, 12 points) north quarry, context 52; 8480 (stage G, 14 points) south quarry, context 214 (scale 1:3)

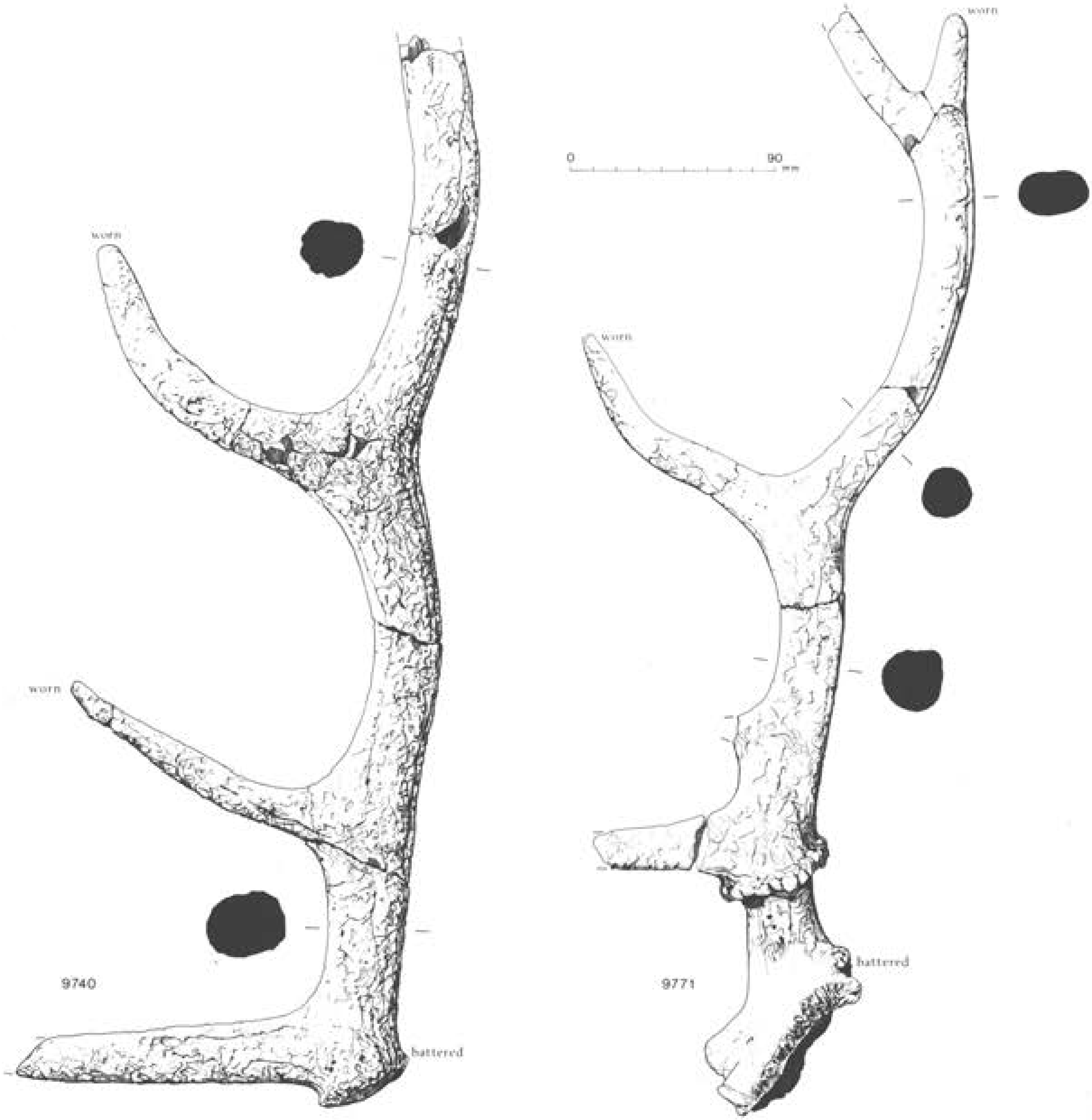


Fig 201 Red deer antlers from lower quarry fills: 9740 (stage D, eight points); 9771 (stage E, ten points), both south quarry, context 328 (scale 1:3)

(hence the batter marks), then using the antler (or several together) lever-fashion to loosen and remove a limestone block.

Cairn use

Animal bones from three separate zones of the excavation are thought to relate to the Neolithic use of the monument: the burial chambers, the flanking quarries, and the forecourt stonework.

Burial chambers

In addition to the numerous human bones from the burial chambers, a small number of larger mammal bones were present in the same contexts (Fig 205; Table 84), and these must have accumulated, or been deposited, at the time that the cairn was in use for funerary activity. The bones from the north chambered area are all small fragments, except for the dog bone which is a complete right scapula (selected measurements: HS 107.3, SLC 22.5, GLP 26.4, LG 22.4, and BG 15.5mm; von den Driesch 1976.) The south chambered area collection is more substantial. Of particular interest are fragments of a perinatal sheep (or goat) from the south chamber (comprising eight unfused elements of one skull, two teeth, one left mandible, three cervical vertebrae, one scapula, a pair of humeri, one left radius, one ulna, and one right metacarpal) and the bones from the lower forelimb of a roe deer from the south passage.

The perinatal skeleton appears incomplete, despite careful sieving of the deposits involved. The absence of any hind limb bones is particularly noteworthy. The bones were scattered, more probably as a result of incidental dispersal during continued use

Fig 202 Red deer antler (8487) in the south quarry (context 214), with worn pedicule and shortened brow tine; scale in 10 and 50mm divisions

Fig 203 Two red deer antlers (9771 and 9791) in the south quarry (context 328); the upper antler is not shed and burning marks on the skull fragment indicate how the temporal bone was removed; scale in 10 and 50mm divisions

Fig 204 Red deer antler 'top' (9257), possibly intended as a rake, in the south quarry (context 328); scale in 10 and 50mm divisions

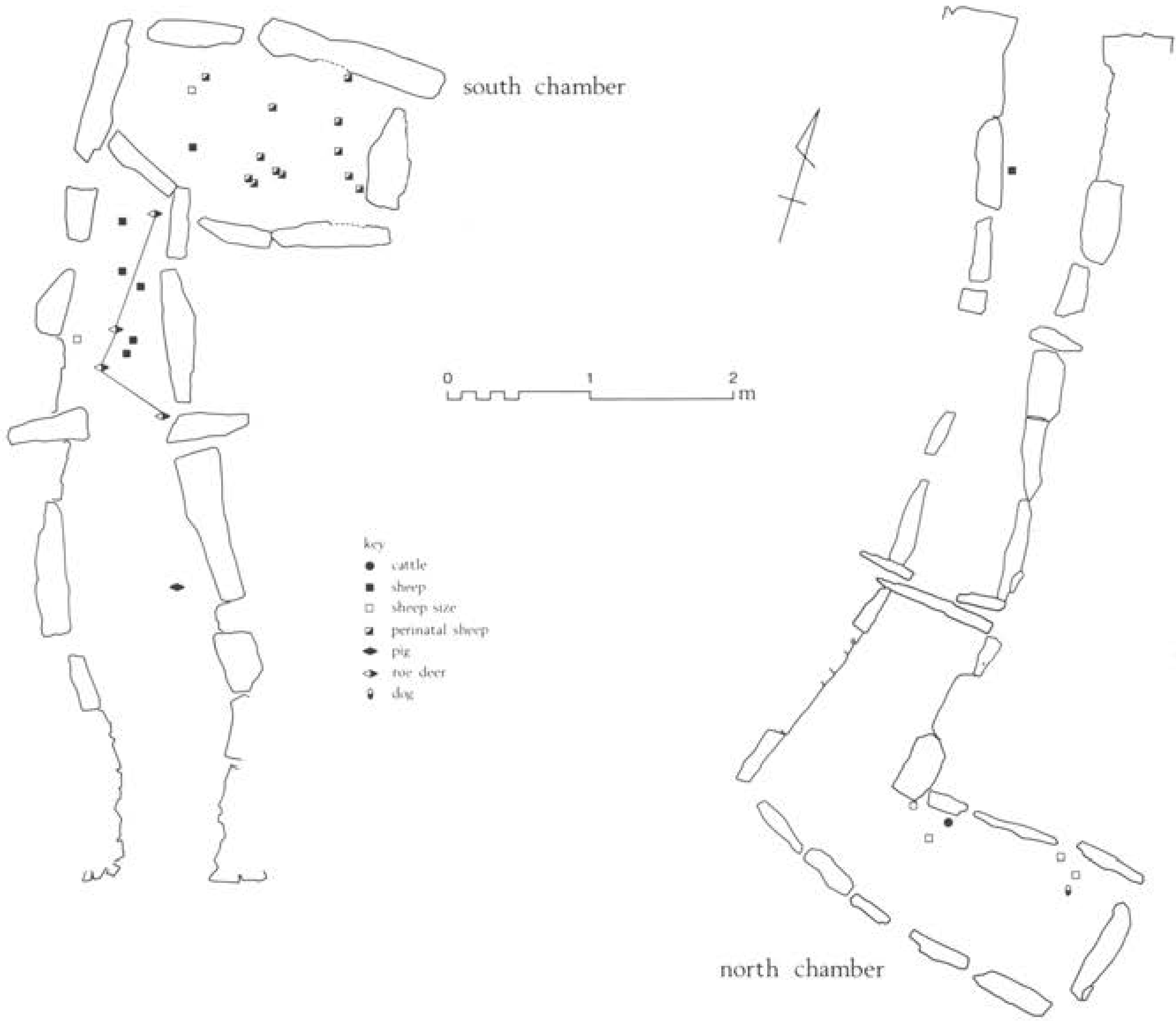


Fig 205 Distribution of bones of larger animals associated with human burial deposits in the lower fills of the chambered areas

of the chamber, after decay of the flesh, rather than because the bones themselves were deposited in a defleshed and disarticulated state. It seems likely, in fact, that these bones do represent an entire perinatal skeleton, some bones of which had decayed or been crushed beyond all recognition, some of which may have become stored with unidentifiable human bone fragments, or some of which were perhaps not recovered during excavation. The reason for the presence of this caprine is problematic. Ritual burial of animals, particularly perinatal/foetal individuals, often occurred in prehistory, but, to the author's knowledge, not often within cairn chambers. A notable exception occurred at the Neolithic tomb of Quanterness, Orkney, where, as well as the occasional joint of meat, at least 18 new-born and foetal lambs were placed in the tomb along with one new-born or foetal calf and one new-born deer, and the bones from very young horse and pig were present (Clutton-Brock 1979, 113 and 121). These bones have been tentatively interpreted as ritual offerings. Presumably, the perinatal sheep/goat at Hazleton was also of some ritual significance. The ritual offering of a perinatal animal would represent, of course, less of a material sacrifice on the part of those making the deposit than would the burial of an older animal. If the deposition of the perinatal caprine formed part of a particular interment episode, then it would suggest that this was a springtime activity (O'Connor pers comm).

The four roe deer bones (radius, ulna, carpal, and metacarpal) scattered along the south passage are from the same limb and presumably were articulated when first introduced. The lower forelimb is not a prime meat-bearing area, so, if this limb is interpreted as a ritual food offering, it was a fairly low-quality one.

Table 84 Non-human bones from the lower fills of the chambered areas, excluding small animals and bone artefacts

	North chambered area		*South chambered area*			
Species	*no of bones*	*context*	*no of bones*		*context*	*Totals*
cattle	1	336	–		–	1
sheep	1	267	6		323	21
			2		412	
			9	perinatal	412*	
			2	perinatal	452/453	
			1	perinatal	453	
pig	–	–	2	?perinatal	354	2
roe deer	–	–	4		323	4
dog	1	336	–		–	1
sheep size	4	336	1		323	6
			1		412	
Totals	7		28			35

Note: *The total of 9 perinatal sheep bones from context 412 includes 16 separate pieces, since 8 skull fragments thought to be from a single skull have been counted as one bone. Of these 8 skull fragments, all are from context 412 except one, which is from context 453.

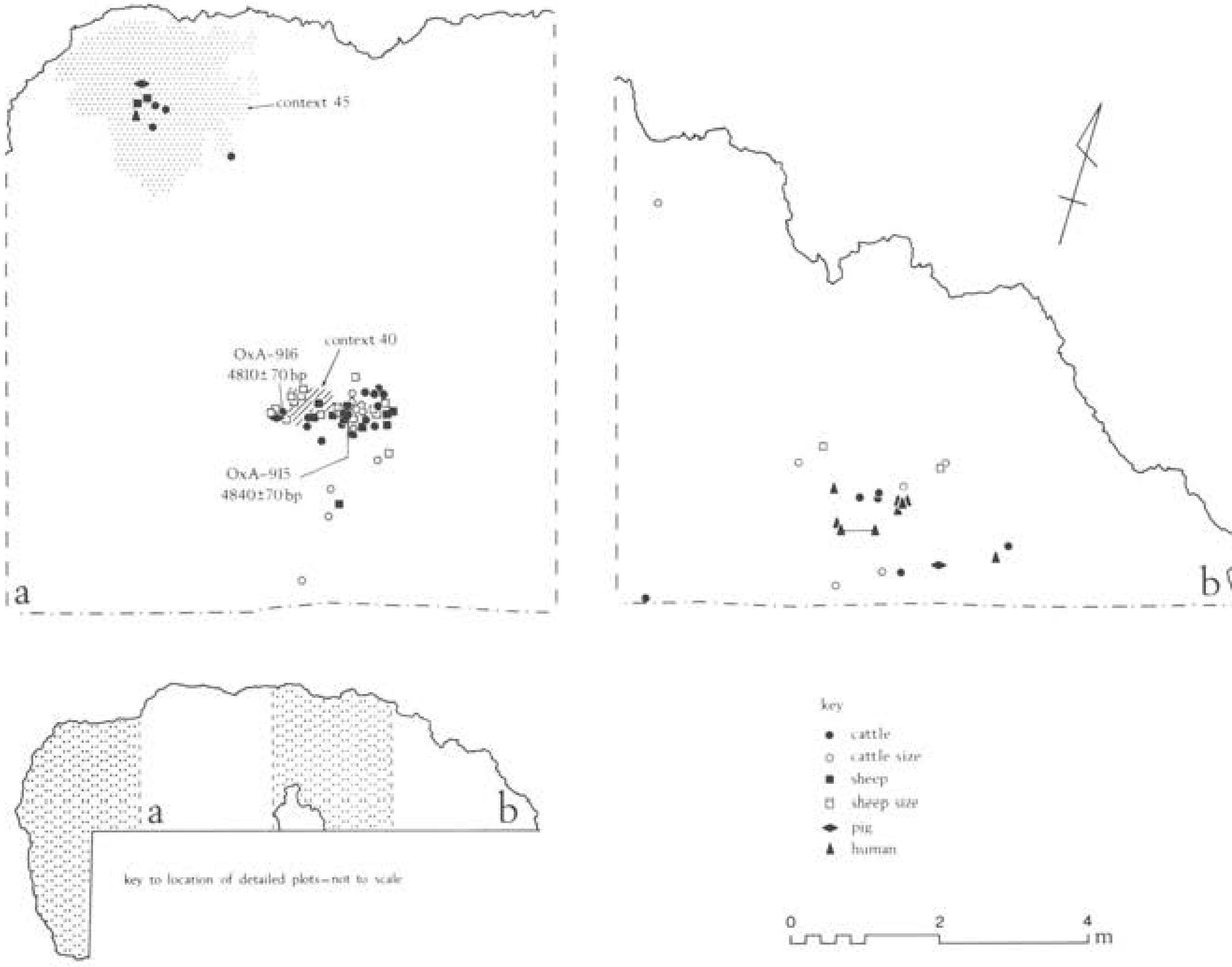


Fig 206 Distribution of bones of larger mammals (excluding deer antlers), in the lower fills of the south quarry (some symbols represent more than one separate bone when these are from the same findspot)

Nevertheless, it seems highly unlikely that this limb could have been an accidental introduction, so again some ritual significance is implied.

It should also be mentioned here that four bone beads were found within the chambered areas (Chapter 11) in association with the human burials (Figs 121 and 177). The bones represented by these beads are a sheep/goat phalanx, a probable sheep/goat tibia, an indeterminate animal bone, and, of most interest, a longbone of a greylag goose.

Quarry fills

The antlers, almost all from the lower primary fills of the quarries, are regarded as relating to the cairn construction phase (*see above*). All the other animal bones from the quarries derived mainly from the upper primary fills and their interfaces with the secondary fills (Table 85), and they are therefore thought more likely to relate to activities associated with cairn use rather than with cairn construction, although the possibility of residuality from the construction phase should be considered.

The very few bones from the excavated areas of the north quarry provide too small a sample to attempt any explanation of their presence. In the south quarry, three separate concentrations of animal bones warrant consideration (Fig 206). The first, near the east end of the quarry, is associated with eight human bones. The animal bones comprise mainly cattle (including a distal femur, two tibia shafts, a calcaneum fragment, a horncore, and cattle-sized fragments), but one pig bone is present. These bones do not seem particularly representative of the remains of a meal, and the deposit remains especially enigmatic given the presence of the human bones.

The second concentration occurred in a central area of the south quarry, in contexts associated with the fragmentary pottery vessel from the same location. This concentration contains a large number of sheep-sized fragments, 92.3% of which are burnt (n=530). In addition, a small number of identifiable bones are present (15 cattle, 8 sheep, and 1 pig). Although the sheep-sized fragments are numerically dominant, it is possible that some of these are actually from cattle, since the ascription of such tiny, charred fragments is difficult. Cattle bones are certainly the most frequent of the identified bones, and the grouping of a number of cervical vertebrae in one area indicates that these may have been articulated or were possibly part of a meal consisting of a 'neck'. The high proportion of burnt bones might relate to ritual activities (Payne pers comm). Cooking is an alternative explanation, but such a high proportion of burnt bone seems odd for this activity. In all, this deposit is again rather problematic.

The final concentration lay on the northern edge of the south quarry, at the junction of the primary and secondary fills, in a context (45) thought to relate to activity at the adjacent entrance to the south chambered area. This group of bones consists of five fragments of sheep/goat, five cattle cranial fragments, one cattle tibia, and one pig tooth. These bones do not appear to represent the remains of a meal, and it is noteworthy that again a human bone is included in the deposit.

Table 85 Bones of larger mammals from the lower quarry fills

Species	Primary fills no of bones	Primary fills context	Secondary fills no of bones	Secondary fills context	Totals
cattle	1	N 55	1	N 64	35*
	1	S 40	2*	N 573	
	1	S 40/166	1	S 144	
	6	S 45	1	S 568	
	1	S 143			
	12	S 166			
	3	S 214			
	5	S 328			
sheep	8	S 40	1	N 74	9
pig	1	S 40	–	–	3
	1	S 45			
	1	S 328			
red deer+	2	N 52	1	N 96	51
	1	N 55	1	S 568	
	1	N 59			
	3	N 66			
	1	N 85			
	2	N 102			
	1	N 171			
	1	S 44			
	5	S 46			
	2	S 138/141			
	1	S 179			
	9	S 214			
	1	S 216			
	19	S 328			
human	1	S 45	–	–	9
	8	S 328			
cattle size	1	N 66A	0*	N 573	26*
	1	S 46	3	S 338	
	1	S 142			
	1	S 143			
	10	S 166			
	3	S 214			
	4	S 328			
	2	S 404			
sheep size	2	N 171	1	S 327	544
	480	S 40	5	S 338	
	5	S 40/166			
	5	S 45			
	1	S 46			
	17	S 143			
	28	S 166			
Totals	660		17		677

Note: *Excludes 35 fragments which probably derive from a single bone already counted. +Red deer remains are all antler. N = North quarry context. S = South quarry context.

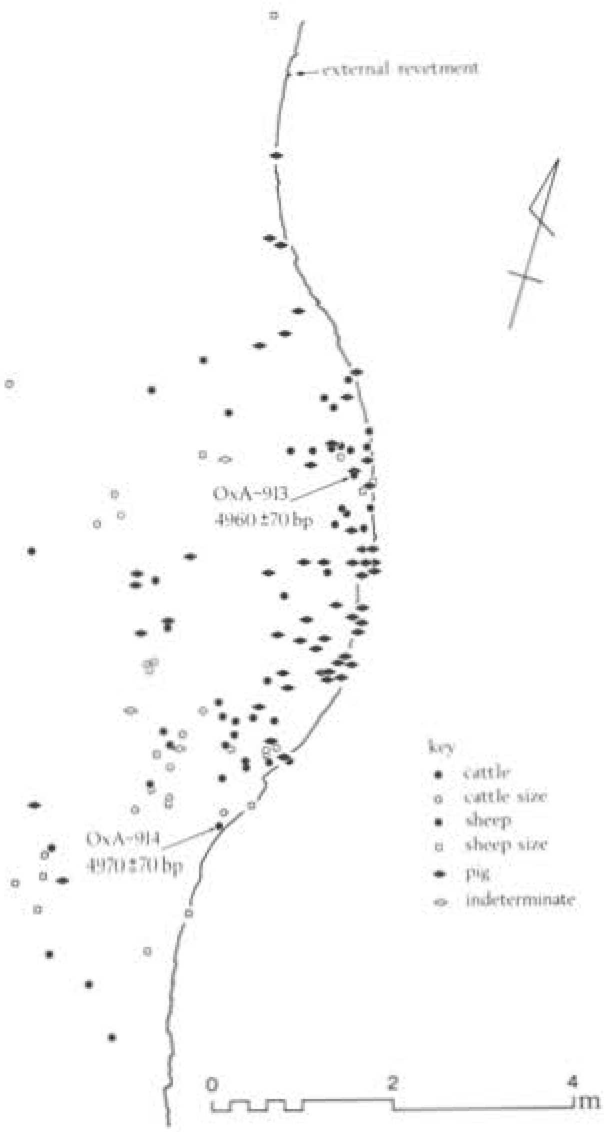


Fig 207 Distribution of bones of larger mammals from beneath or within collapsed stonework in the forecourt area beyond the west end of the cairn

Table 86 Animal bones associated with collapsed external revetment in the forecourt area and around the cairn perimeter

Species	Forecourt area no of bones	Forecourt area context	Rest of cairn perimeter no of bones	Rest of cairn perimeter context	Totals
cattle	44	155	1	24	54
	5	272	1	157	
	2	301			
	1	349			
sheep	3	272	–	–	3
pig	2	4/211	1	157	61
	42	155			
	4	211			
	7	272			
	5	349			
cattle size	19	155	–	–	26
	1	211			
	4	272			
	2	301			
sheep size	4	4/211	–	–	31
	22	155			
	1	156			
	2	211			
	2	272			
field-vole	6	301	–	–	6
indet small mammal	1	155/211	–	–	1
Totals	179		3		182

Forecourt

Also regarded as relating to the phase of monument use is a scatter of animal bone from the forecourt area at the west end of the cairn, from a variety of contexts beneath and within the collapsed forecourt revetment (Table 86). Cattle and pig predominate, the bones represented all being cranial except for single examples of a cattle tibia, femur, and pelvis. The pig bones comprise 4 jaws and 56 loose teeth, while there are 26 loose cattle teeth. When the identifications are considered in relation to their spatial distribution (Fig 207), there is a concentration of pig bones flanking the forecourt revetment at the centre of this bone scatter, with cattle bones to the north and south. Since the cattle and pig teeth and skull fragments need not derive from more than one or two individuals respectively, the distribution may reflect separate head/skull deposits. Such deposits are unlikely to represent food remains, but they might be primary butchery waste (in which case the animals would have been slaughtered nearby). This would seem, however, to be an odd location in which to undertake and to deposit the waste from domestic butchery, and a ritual interpretation is more probable. Perhaps these skulls were set on top of the forecourt revetment and were crushed when it eventually collapsed.

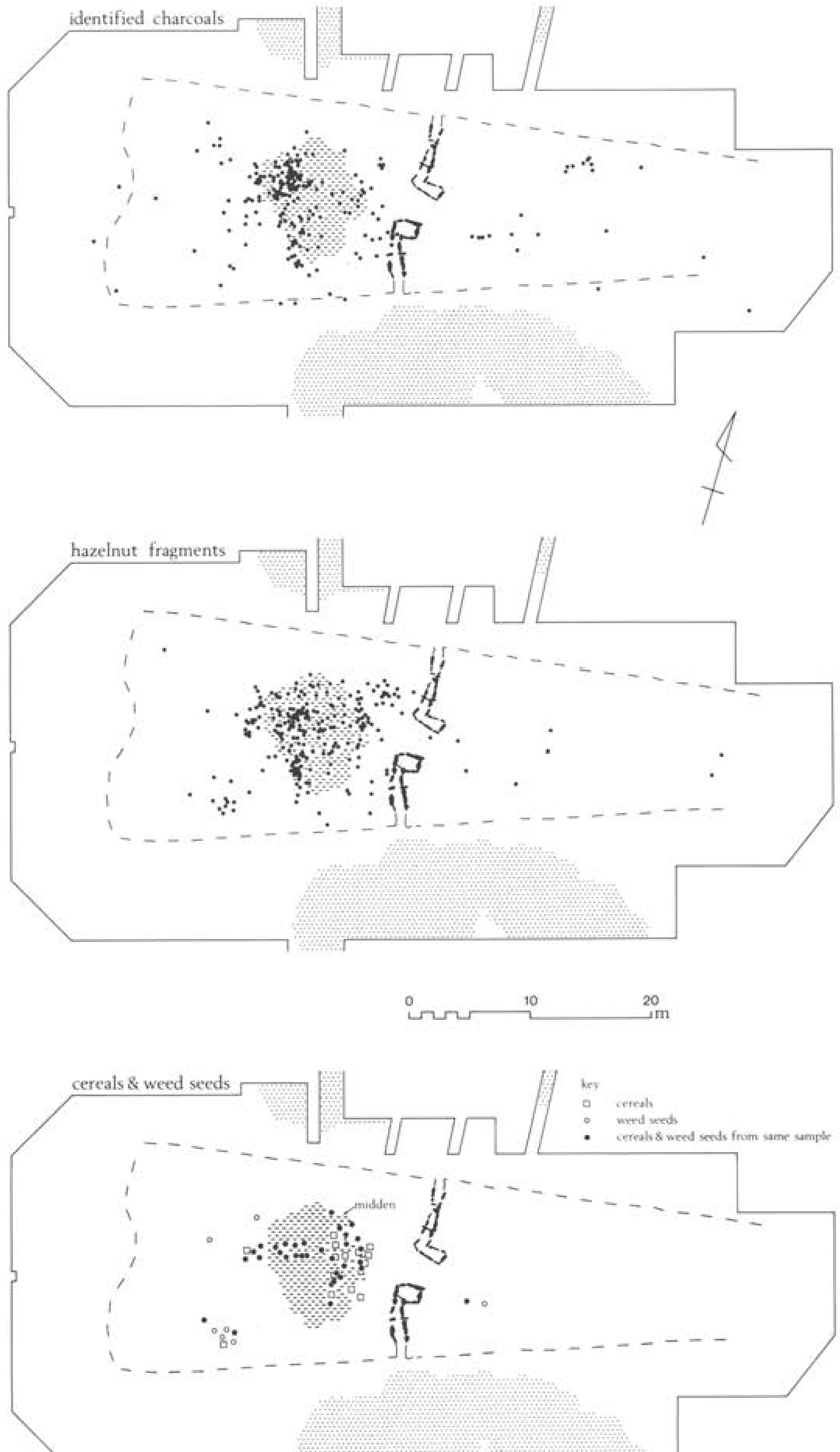


Fig 208 Distribution of identified charcoal, hazelnut shells, and carbonised cereal and weed seeds from the sub-cairn soil

14 Plant and molluscan remains

Carbonised plant macrofossils

by Vanessa Straker

Introduction

Extensive sampling for environmental analysis took place during the excavation, including bulk sieving of the soil beneath the cairn, particularly in the area of the midden and adjacent structure (Fig 12). This was carried out in addition to the manual recovery of charcoal and burnt nutshell fragments as the buried soil was removed by trowelling, the location of each piece being recorded three-dimensionally. This section considers the evidence for pre-cairn vegetation and agriculture from a study of the charcoal and other charred plant macrofossils. Since this report was written, more work has been done on charred plant remains from Neolithic sites; this is reviewed and the implications for arable agriculture discussed in Moffett *et al* (1989).

Charcoal

Charcoal was particularly abundant in the buried soil (Table 87). The manually-recovered fragments gave the opportunity to assess spatial variation across the buried soil area and so formed the core of the analysis. A randomly-selected 20% sample was taken, as the total quantity was too great to study in detail. Over 150 samples were examined. The species were distributed heterogeneously throughout the buried soil, with the greatest diversity in the midden area, where the concentration of identified charcoal occurred (Fig 208). As the bulk sieving retained those smallest fragments of charcoal not recovered manually, a 20% random sample from the sieving was examined for comparison. No new species were identified, and the range was smaller. Charcoal was also recovered from the cairn and the quarry fills. The species composition of this charcoal was similar, but more restricted than that from the buried soil, presumably a reflection of small sample size rather than of environmental change or selection. Some charcoal (15% by weight) was not identified: this category included the smallest fragments as well as distorted or poorly-preserved examples. Checks were kept on the smallest fragments, and it is considered that few (if any) species were left undetected.

The problems of the interpretation of charcoal assemblages are well known. Charcoal is robust and potentially able to survive as a residual contaminant from earlier deposits, and, as a fuel or other source of raw material, is open to human selection in a way that pollen or most molluscs may not be. Evidence of Mesolithic activity was present at Hazleton, so pre-Neolithic anthropogenic accumulation of charcoal on site was a definite possibility. However, residuality was thought to be of small account in the specifically Neolithic midden area, and it was felt that, alongside the other environmental data available from the buried soil, cautious use could be made of this substantial and carefully-recovered charcoal assemblage.

The method of quantification is also a problem in the study of charcoal (Thompson 1984). Merely to record presence/absence of species will mask any dominance of particular taxa, whereas counting of fragments can sometimes overrepresent species that are more breakable. It was considered that while volume (as described in Thompson 1984) was probably the most accurate method of quantification, it was also awkward and time-consuming to employ. Weight determination was selected as a sufficiently precise method for the present study, despite its inherent problems. Interpretation requires much caution, since wood densities vary, not only between taxa, but also according to location within the tree, and no method of calibration is available. Nevertheless, this method is probably adequate for calculating relative proportions of species in the sub-cairn soil.

Hazel (*Corylus avellana*) accounted for almost half of the charcoal examined, with the Pomoidae (a group in the Roseaceae family including hawthorn, apple, pear, etc) the next most frequent. Larger trees such as oak, elm, ash, and beech were also present, but in small quantities. The relative scarcity of large trees and the overwhelming dominance of hazel charcoal suggest that the vegetation in the vicinity of the site before the cairn was constructed may have been of hazel scrub. Hazel, with smaller amounts of Pomoidae, *Prunus*, and birch, would have been an effective secondary coloniser of the prehistoric brown soil of the Cotswold limestone. Ash, too, may form secondary woodland on chalk or limestone, often replacing elm and possibly lime (Rackham 1980, 214). Holly is an understorey species in woods and wood pastures, perhaps associated with relict stands of elm, oak, or ash (Rackham 1980). All the taxa shown are common on the limestone today, as well as being considered native to the area (Clapham *et al* 1962; Riddelsdell *et al* 1974). Beech, however, is generally regarded as being a latecomer in the postglacial sequence, and its native range is restricted to southern Britain (Rackham 1980). The Hazleton beech charcoal is of interest, therefore, as it confirms the presence of this species close to its northern limit early in the Neolithic period.

It is interesting to note that lime (*Tilia*) charcoal was not present in the assemblage, although lime pollen was recorded. Scaife (below) considers that the lime pollen may represent the former Atlantic climax woodland. This would certainly help explain its absence from the charcoal record, although observations by Sheldon (pers comm) imply that lime charcoal is much less robust than other taxa and may be underrepresented for this reason. Even if lime was substantially removed, relict stands may well have survived with other forest trees.

Table 87 Charcoal from the sub-cairn soil

Species	*From excavation* weight (g)	%	*From sieving* weight (g)	%
Corylus avellana L. (hazel)	41.26	47.0	2.13	9.4
Pomoidae (hawthorn type)	16.80	19.2	0.14	0.6
Quercus sp. (oak)	3.96	4.5	0.28	1.2
Fraxinus excelsior L. (ash)	3.13	3.6	–	
Betula sp. (birch)	3.10	3.5	–	
Ulmus sp. (elm)	1.97	2.2	0.11	0.5
Prunus sp. (sloe/cherry)	1.11	1.3	–	
Corylus/Alnus (hazel/alder)	0.88	1.0	–	
Ilex aquifolium L. (holly)	0.35	0.4	–	
Fagus sylvatica L. (beech)	0.08	0.1	0.69	3.1
indeterminate	15.09	17.2	19.33	85.2
Total weights	87.73		22.68	

Carbonised cereals and wild species

Bulk samples were collected from the sub-cairn soil (contexts 211 and 561) and wet-sieved on site to a minimum mesh size of 500µm, the flot then being retained. Both flots and residues were sorted under a binocular microscope. A total of 61 samples were wet-sieved (approximately 550 litres of sediment). Samples were taken principally, but not exclusively, from the midden and its vicinity. The distributions of cereals, wild species, and hazelnut shell fragments from bulk sieving are shown in Figure 208, which, in the case of the hazelnuts, includes the data from manual recovery as well. Table 88 gives the details of the cultivated and wild species identified from the bulk sieving. There were no impressions of cereal grain or chaff reported as present on the Neolithic pottery.

While the bulk sieving was successful in recovering charred cereal grains, cereal chaff was very rare and restricted to two spikelet forks and three glume bases of wheat. It is generally recognised that, if well preserved, cereal chaff will allow more reliable identification to be made than can be done on the basis of grain morphology alone, in particular where wheat is concerned. The chaff here was not well preserved and only confirmed the presence of emmer (*Triticum dicoccum*).

The cereal grains (principally wheat; barley was not identified with certainty) were separated into the groups given in Table 88 on the basis of grain morphology. It was noted that this can be variable to some extent within, as well as between, species, and for this reason classification was particularly tentative for some specimens. Most of the wheat was identified to the level of genus only, but a small amount, with a distinctive humped dorsal surface, was suggestive of emmer (*Triticum dicoccum*), and another smaller group with rounded caryopses and steeply-angled embryos was suggestive of hexaploid wheat of the *Triticum*

Table 88 Carbonised cereals and weeds from the sub-cairn soil

A: Cereals	*Common name*	*Component*	*No*
Triticum sp.	wheat	grains	182+
	wheat	spikelet fork	1
T. cf *monococcum*	einkorn	glume base	1
T. monococcum/dicoccum	einkorn/emmer	grain	1
	einkorn/emmer	spikelet fork	1
T. cf *dicoccum*	emmer	grains	49+
	emmer	glume base	1
T. dicoccum/spelta	emmer/spelt	grain	1
	emmer/spelt	glume base	1
T. spelta/aestivum s.l.	spelt/bread wheat	grains	3
T. cf *aestivum* s.l.	bread wheat	grains	33
Triticum/Secale	wheat/rye	grains	6
Triticum/Hordeum	wheat/barley	grains	3+
cf *Hordeum* sp.	barley	grains	3+
cereals gen. *et* sp. indet.			2++
	Sub-total A		288
B: Wild species	*Common name*	*Habitat*	*No*
Arrhenatherum elatius var. *bulbosum* (Willd.) Spenn.	onion couch (tubers)	A/G	++
Atropa bella-donna L.	deadly nightshade	S	2
Corylus avellana L.	hazel (nutshells)	S	+++
Cruciferae indet.			1
Galium cf *aparine* L.	cleavers	A/G	1
Gramineae	grasses	varied	30
Plantago lanceolata L.	ribwort plantain	G	1
Polygonum cf *aviculare* agg.	knotgrass	G	1
Polygonum convolvulus L.	black bindweed	A/W	1
Rumex acetosella agg.	sheep's sorrel	A	+
Rumex sp. (p.)	sorrel	varied	2
cf *Urtica urens* L.	small nettle	A/W	1
Vicia sp./*Lathyrus* sp.	vetch/tare	G	1
Viola sp.	violet/pansy	varied	1
unidentified			*c* 10
	Sub-total B		52
Grand total A and B			340

Note: A = arable land; G = grassland; S = scrub, woods; W = disturbed ground, waste places, etc.; + = fragments. Habitat information and nomenclature from Clapham *et al* (1962) and C Hubbard (1980).

aestivum (bread wheat) group. The limited chaff remains were of glume wheats, and unfortunately no rachis nor other chaff fragments were found to confirm the presence of a free-threshing bread wheat. Examples of these groups are illustrated in Figure 209. None of the grains were definitely suggestive of spelt wheat (*Triticum spelta*), although spelt from Hembury in Devon, possibly of Neolithic date, was identified by Helbaek (1952; cf Hillman 1981a, 187). Some intermediate grains were assigned to *dicoccum/spelta* or *spelta/aestivum* level only.

Due to the lack of cereal chaff and the fact that any assemblage of cereals of Early Neolithic date is a valuable addition to the crop record for this period, scanning electron micrographs of the transverse cell layers of the grains were taken as a potential aid to confirming the species of wheat present in the assemblage, following the technique developed by Körber-Grohne and Piening (1980; Körber-Grohne 1981). Although some transverse cells were preserved on the grains, measurements of length and breadth that could be made did not readily conform to the size ranges given by Körber-Grohne and Piening (1980).

A few grains resembled rye (*Secale cereale*), as they were somewhat 'bullet'-shaped, and these are entered on Table 88 as *Triticum/Secale*. They are, however, most likely to have been wheat. Jones and Chambers (1984) have pushed back the antiquity of rye in this country, possibly to the Bronze Age, but there is no evidence yet that rye was present in the British Neolithic.

The weed species associated with the cereals were limited in number. Certain species such as cleavers (*Galium* sp.), sheep's sorrel (*Rumex acetosella*), nettle (*Urtica urens*), and black bindweed (*Polygonum convolvulus*) can all be found growing as arable weeds. However, as the arable weed flora was small and rather limited, and as little cereal chaff was preserved, little information on crop-processing techniques or agrarian practice can be derived from the assemblage.

The presence of black bindweed, a twining species and frequent arable weed, implies that as far as harvesting techniques are concerned, straw was gathered with the crop (Hillman 1981b). The *Galium* (bedstraw) is probably *G. aparine* (cleavers), and this is often regarded as indicative of autumn sowing, a practice which was not thought to predate the Bronze Age (Jones 1981). Sheep's sorrel is

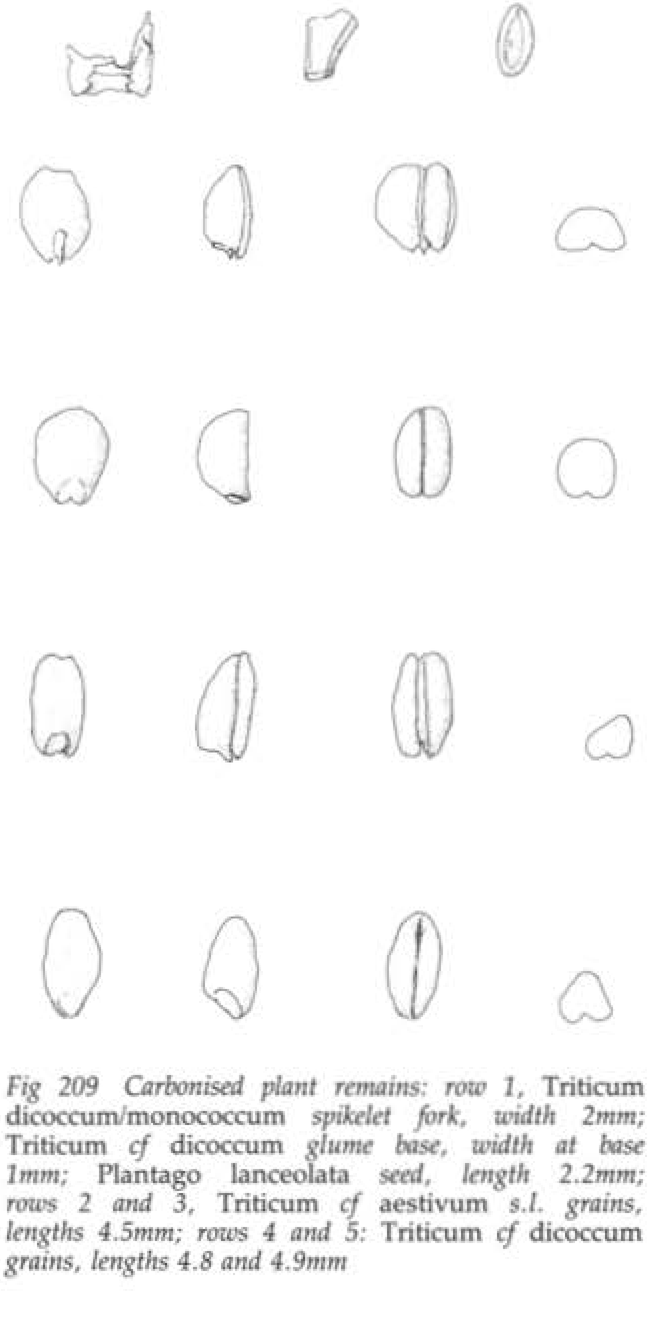


Fig 209 Carbonised plant remains: row 1, Triticum dicoccum/monococcum *spikelet fork, width 2mm;* Triticum *cf* dicoccum *glume base, width at base 1mm;* Plantago lanceolata *seed, length 2.2mm; rows 2 and 3,* Triticum *cf* aestivum *s.l. grains, lengths 4.5mm; rows 4 and 5:* Triticum *cf* dicoccum *grains, lengths 4.8 and 4.9mm*

usually associated with acid soil conditions, rather than calcareous substrates, but the decalcified nature of the buried soil at Hazleton was also apparent from the scarcity of molluscs and the soil analyses (below and Chapter 15).

Other charred seeds from the old land surface may be indicative of grassland and scrub. Deadly nightshade (*Atropa bella-donna*) and hazel are scrub/woodland edge species. As a source of wild food that was locally abundant, hazelnuts could have been a valuable part of the diet; indeed, early cereal cultivation may have supplemented the gathering of wild resources rather than *vice versa*.

The grassland component of the deposit is also of interest. Vetches (*Vicia/Lathyrus* sp.), grasses (Gramineae), knotgrass (*Polygonum aviculare*), and plantain (*Plantago lanceolata*) were present, as were the carbonised tubers of the onion couch (*Arrhenatherum elatius* var. *bulbosum*: Fig 210). This last species has been noted in several Bronze Age deposits (eg Godwin 1975, 404; Jones 1978, 101). Jones considered the grass as a possible food source, whereas Godwin suggested that it may have been a weed of cultivated land. Some botanists (eg C Hubbard 1980) seem to agree that *Arrhenatherum elatius* is a weed of cultivated ground, while others have also noted its tendency to spread in abandoned arable land. Tansley (1939, 293) cited an area of abandoned arable

Fig 210 Carbonised tuber fragments of Arrhenatherum elatius *var.* bulbosum *(onion couch); scale in mm (photo: V Straker)*

land at Rothamsted Experimental Station, where *Arrhenatherum* was noted in this respect. Before 1882, the plot carried an annual crop of wheat. The crop was not harvested in 1882 and by 1914 half of the area, which had remained untouched (and uncharted), supported '... oak-hazel wood with various herbaceous species'. On the other half of the plot, the woody species had systematically been removed after 1886, and by 1913 *Arrhenatherum* with lesser knapweed (*Centaurea nigra*) were dominant. Tansley suggested that these two species were maintained by constant removal of the woody plants, which effectively led to the maintenance of a grassland.

In the forthcoming National Vegetation Classification (Rodwell in prep), the section dealing with grasslands throws some useful light upon plant communities in what is termed *Arrhenatherum elatius* coarse grassland (*Arrhenatheretum elatioris*). This is also of assistance in trying to understand the grassland component of the Hazleton assemblage. The *Arrhenatherum elatius* coarse grassland community is one in which coarse-leaved tussock grasses, notably *Arrhenatherum elatius*, with, usually, smaller amounts of *Dactylis glomerata* and *Holcus lanatus* are generally dominant. Few of the numerous herb species mentioned by Rodwell as often present in this community were noted in the small Hazleton assemblage, but the grassland species, *Rumex*, *Vicia/Lathyrus*, *Plantago lanceolata*, and *Galium aparine*, can all be found in the *Arrhenatheretum*. *Galium* and *Plantago* are also possible arable weeds. The *Arrhenatheretum* '... is above all an ungrazed grassland', common throughout Britain in various habitats, including badly-managed pastures and meadows and on land abandoned after unsuccessful arable cultivation (Rodwell in prep). A vital factor in the development of the *Arrhenatheretum* is an absence or irregularity of mowing. It will stand occasional mowing, essential in stopping the invasion of woody species, and in these circumstances this community is a stage in the scrub/woodland succession. It flourishes on generally well-structured loams, but it will grow on a variety of circum-neutral soils. It is possible that such a grassland was present at Hazleton, but this can only be a tentative suggestion in view of the relatively small amount of carbonised material recovered and the fact that modern ecological studies should not be applied too literally to early prehistoric material.

At Hazleton, therefore, despite the restricted size of the assemblage, it is possible to suggest that cereal cultivation took place at or near the site and that the arable land may have been abandoned, though not grazed, and eventually reverted to scrub which was cleared for the building of the monument. The seeds from the arable and grassland communities have become mixed in the archaeological record. It may have been necessary for maintaining soil fertility to rotate cereal cultivation between different plots in the same area. If this was the situation, then it is possible that a mosaic of patches of arable, abandoned arable, and scrub existed in the area before the cairn was built.

Neolithic crop husbandry

While evidence for Neolithic arable cultivation in Britain has come indirectly from a number of sources, such as quernstones, cereal pollen in peats, and cultivation marks in buried soils, details of the crops grown are surprisingly scarce and still largely dependent upon work done many years ago, based principally upon impressions of plant material on Neolithic pottery (Jessen and Helbaek 1944; Helbaek 1952). Subsequent studies by R Hubbard (1975) and Dennell (1976) have exposed the biases in the evidence for crops provided by impressions on pottery and shown that this evidence was not necessarily representative of the economy on the sites at which the pottery was found.

The recovery of the actual remains of cereals and other plants from Neolithic contexts, following the development of wet-sieving and flotation techniques, promises to give a much more reliable picture of crop husbandry local to the sites which produce the remains. Hillman (1981a), in a survey of this newly-accumulating data, reiterated the fact that many of the questions concerning the development of crop husbandry in this country are still largely unanswered, although he concluded that, in general terms, emmer wheat, naked and hulled six-row barley, and smaller amounts of bread wheat, flax, and possibly einkorn wheat and pulses were cultivated.

The Hazleton assemblage, while modest in size, fits in with this general picture and is an important addition to the crop record for the early Neolithic, especially in view of the radiocarbon chronology for the site, which dates the plant remains from the buried soil to 2970±56 uncal bc (OxA–646/738/739) or earlier. Pulses at Hazleton may be absent, because they, like free-threshing cereals, tend to be underrepresented in the archaeological record. (The processing of pulses does not require heat, and they are therefore less likely to be preserved by being charred.)

The only other Cotswold-Severn tomb to have produced an assemblage of plant remains from bulk-processing of the buried soil is Gwernvale (Britnell 1984a, 49). As at Hazleton, despite the fact that large quantities of soil were examined, the cereal remains were scanty, consisting principally of emmer wheat with a small amount of barley, and there were low numbers of weeds and no swollen grass rhizome tubers. Hillman, who studied the Gwernvale remains, reached the conclusion that they could not be assigned to a particular crop product and may even have been the result of accidental burning of the sward (Hillman pers comm).

Pollen analysis

by Robert G Scaife

Introduction

Onsite examination of various sections was undertaken with a view to possible pollen analysis, and several samples were taken. These included samples from the area of the tree-throw hollow in the buried soil to the east of the south chamber (Fig 42, section 1), which proved on analysis to be devoid of pollen. Detailed analysis was restricted to a single, organically-rich sample from the buried soil at the western edge of the midden (Fig 42, section 3, soil thin-section sample 15). Even in this sample, the pollen was extremely sparse and, in the majority of cases, the pollen exines were badly degraded. This problem of low absolute pollen frequencies is common in the analysis of calcareous soils. Differential preservation of some types in the pollen spectrum from Hazleton has resulted in the disproportionately high quantities of some taxa. Pollen of *Taraxacum* type (Liguliflorae), monolete spores of *Dryopteris* type, and trilete spores of *Pteridium* are particularly resilient and therefore subject to overrepresentation in the pollen spectrum.

It is to be expected in a buried soil that faunal mixing, especially by earthworms, of the upper layers will have taken place, and agricultural activity may also have been a factor in soil disturbance here (Chapter 15). Pollen settling on such a soil surface would come to be distributed throughout the profile in a process of soil homogenisation. The pollen spectrum present in the upper soil layers should thus be similar to the spectrum lower down the profile (though not necessarily right at its base). As Dimbleby has emphasised (Dimbleby and Evans 1974, 119), all the pollen found in such a soil is more or less coeval and throughout the profile will be representative of the site vegetation just prior to the final act of burial, which in this case is the construction of the overlying cairn, with the possibility of an older, differentially-preserved, fraction of the spectrum remaining from earlier phases of pollen rain.

Results of the pollen analysis

A sample of *c* 10ml of soil was examined. A relatively small total count of 251 pollen grains and spores was obtained by counting six pollen slides (Table 89).

Corylus type (39.5%) is dominant. This pollen taxon also includes *Myrica*, if poor pollen preservation negates typological differentiation. *Myrica* is, however, a taxon of wetlands and is unlikely to have been important here. *Corylus* was, therefore, possibly abundant on or near to the site just before the cairn was constructed, an interpretation which accords with the macroscopic plant data (above). Hazel was probably growing as scrub and certainly in open light situations, allowing it to flower. Arboreal taxa are few in number and low in dominance in the spectrum. The pollen grains of *Tilia* (3.5%) are resilient and therefore possibly overrepresented due to the effects of differential preservation. *Tilia* might be expected to have been growing on the local limestone soils prior to any decalcification, and the pollen may thus relate to earlier woodland cover. Therefore, although lime is known to be an important constituent of the Neolithic landscape, its apparent significance here may simply result from bias in the pollen record.

Table 89 Pollen analysis

Trees	*Pollen count*	*Percentage of total pollen*
Betula	1	0.5
Quercus	4	2.0
Tilia	7	3.5
Alnus	2	1.0
Shrubs		
Corylus	79	39.5
Herbs		
Dianthus type	1	0.5
Chenopodium type	1	0.5
Rosaceae	1	0.5
Umbelliferae	2	1.0
Plantago lanceolata	20	10.0
Anthemis type	2	1.0
Artemisia	1	0.5
Taraxacum type	42	21.0
Gramineae	16	8.0
Cereal	4	2.0
unidentified	17	8.5
Total pollen counted	200	
Filicales		*Percentage of total pollen plus total spores*
Dryopteris type	30	12.0
Pteridium aquilinum	16	6.4
Polypodium vulgare	5	2.0
Total spores counted	51	

Of the herbaceous taxa present, *Taraxacum* type (21%), *Plantago lanceolata* (10%), and Gramineae (8%) are the most significant. Preservation of *Taraxacum* pollen was in the majority of cases poor, but sufficient to allow identification, attesting the differential preservation of this taxon. This may also be the case for *Plantago*, although Gramineae, being less robust, are likely to reflect contemporary growth at the time of burial. This latter point is emphasised by the relatively fine state of some of the pollen grains of Gramineae recovered. Overall, the diversity of herbaceous taxa is low, there being few types which are diagnostic of either pastoral or arable activity on a large scale. All three of the dominant taxa may be indicative in certain circumstances of an arable or waste ground environment, rather than the pastoral landuse with which they might more normally be associated.

Small numbers of cereal pollen grains were present (2%), identified by being of larger overall diameter and by having a porus and annulus diameter of greater size than those grains attributed to wild grasses. The pollen dispersion characteristics of early cereal varieties may be responsible for their underrepresentation in the pollen spectrum. Despite the diminutive numbers of cereal grains present, it is likely that at least some arable cultivation was being practised on or near the site. It is well known (Robinson and Hubbard 1977) that cereal pollen may be trapped in the structure of the 'ear' of grain, and its release during crop processing may have contributed to the pollen present in the Hazleton spectrum. The evidence of macroscopic caryopses of *Triticum* and *Hordeum* must be examined for clarification of this potential derivation.

Within the spore category, all types present can be overrepresented due to the effects of differential preservation or destruction. This is especially so with *Dryopteris* types and of *Polypodium vulgare*. *Pteridium aquilinum* (6.4%) may be an indicator of clearance, possibly by fire, after which it readily colonises, although Dimbleby has suggested that the occurrence of the spores of *Pteridium* in rendzina-type soils could result from manuring practices (Dimbleby and Evans 1974, 129–32).

Dimbleby has shown that, in certain circumstances, pollen diagrams can be constructed from areas of calcareous lithologies, and he has summarised some of the available evidence from Neolithic sites (Dimbleby and Evans 1974, fig 2). Pollen analyses of soils on calcareous substrates are more satisfactory when the soils have developed superficial clay cappings on the chalk or limestone as, for example, at Silbury Hill, Wiltshire (Dimbleby unpublished report: Institute of Archaeology library, University of London). It was not possible, however, to construct a more complete pollen sequence at Hazleton and the pollen data presented here are enigmatic: it is only by considering them in combination with the pedological and plant macrofossil data that the most valuable information can be obtained.

Some tentative comments on the environment portrayed here, and the environmental picture obtained from other Neolithic sites in southern England, can be made. At a number of those sites discussed by Dimbleby and Evans (1974), it is apparent from both pollen and molluscan data that open conditions shown in pollen spectra from lower down in the soil profiles were subsequently replaced by woodland and/or scrub recolonisation (eg at Durrington Walls and Knap Hill). Since only a single spot sample of the upper and most humic buried soil was found to contain pollen in countable quantities, no interpretation of temporal changes can be made at Hazleton.

At a number of sites (Ascott-under-Wychwood, Knap Hill, South Street), *Corylus* is shown to have been of importance (Dimbleby and Evans 1974, fig 2). This might be expected as hazel favours growth and flowering in open scrub on base-rich limestone soils and on superficial deposits on calcareous lithologies. At Ascott-under-Wychwood, it is interesting to note that *Tilia* was also relatively important. *Tilia* is entomophilous and as a consequence is generally underrepresented in pollen spectra (Andersen 1973). That *Tilia* had been a constituent of the Hazleton environment has been noted, but the effects of differential pollen preservation (ie its generally degraded state) suggest that the importance of *Tilia* here predates the *Corylus* dominance illustrated by the latter's high pollen percentage total and overall better state of preservation.

Dimbleby was able to show similar replacement of *Tilia* by *Corylus* at Ascott-under-Wychwood (Dimbleby and Evans 1974), and it is plausible that both there and at Hazleton this was a response to increased anthropogenic pressure prior to cairn construction. At other sites, by contrast, there is evidence from both pollen and molluscs for the colonisation of open herbaceous environments by *Corylus* scrub woodland (eg Avebury: Dimbleby and Evans 1974, table 3).

From this discussion, it is apparent that the dynamics of Neolithic vegetation vary regionally with differential effects of anthropogenic pressure creating open pastoral and arable environments, but with other areas undergoing forest clearance. The creation of scrub from either of these two situations is apparent. Furthermore, it is evident from the general importance of herb pollen at those sites noted above that closed, dominant woodland was rare or absent from the broad zone of central southern English chalk and limestone areas.

Conclusion

From the pollen data, it can be concluded that the vegetation environment which existed prior to construction of the cairn was one dominated by hazel scrub. For the flowering of hazel to have occurred, an open, light environment would have been likely. This fact is similarly attested by the relatively high proportions of herbaceous taxa recovered, which include *Plantago lanceolata*, Gramineae, and Compositae. As only a single spot sample of the uppermost part of the buried soil was found to contain pollen, it is not possible to state clearly what the character was of earlier vegetation on the site. It has been noted, however, that *Tilia* was present, but in a largely degraded form, which may be evidence of the final vestiges of the preceding vegetation. *Tilia* is recognised to have been of substantial importance in southern Britain in many areas until the later prehistoric period (Baker *et al* 1978; Greig 1982; Scaife 1980). Moreover, it is now clear that *Tilia* formed the dominant woodland over wide areas of calcareous lithologies and the limited evidence at Hazleton is at least commensurate with this view.

Due to differential preservation of fern spores (*Dryopteris* type, *Pteridium*, and *Polypodium*) and thick-walled pollen grains (*Plantago lanceolata*, Compositae spp.), totals of these taxa are high. While these indicate openness of the environment at the time of monument construction, some may be remnants of earlier phases of forest clearance. Evidence for cereal cultivation is sparse, but the small quantities of cereal pollen, considered in association with the charred remains found, illustrate that cereals were being cultivated and/or processed in the vicinity.

The land molluscs

by Martin Bell

Introduction

During the excavation, samples were taken from the following groups of contexts: the buried soil (column 6 and spot samples), the north quarry (columns 2 and 3), and the south quarry (columns 4 and 5 and spot samples). In addition, this report includes a brief discussion of shells recovered during onsite water-sieving and those collected by hand from selected contexts. Descriptive and quantitative terms concerning the sediment (eg moderately stony) follow Hodgson (1976), and soil colours are expressed in terms of the Munsell system, relating to samples when moist. The tripartite classification of ditch sediments is that outlined by Evans (1972, 321–8) and Limbrey (1975, 290–300). The methods of analysis are those described by Evans (1972), and the nomenclature follows Waldén (1976).

The main problem encountered was the low number of molluscs in many contexts. They were only preserved in a subsoil hollow and in the quarries close to the cairn, where masses of small limestone pieces had been loosened by physical weathering. Molluscs were not generally preserved in the old land surface, and the soil analysis (Chapter 15) showed that this was because it was strongly decalcified. Stabilisation horizons in the quarry fills, which were devoid of limestone pieces, produced low numbers of molluscs, again partly because of partial decalcification.

Since numbers were generally low, the mollusc diagrams (Figs 211–12) have been prepared as histograms of absolute numbers (rather than percentage diagrams). These histograms and the numbers of molluscs given on the left have been adjusted to numbers per 2kg of soil (actual numbers and soil weights are given in Tables 109–114: Appendix 13), but no further adjustment was made to compensate for differences in stone content. Instead, the effects of this factor have been summarised on accompanying diagrams (Figs 239–40: Appendix 13), which show the numbers of molluscs in 2kg of sediment compared to the numbers in 2kg of fine sediment (less than 0.5mm). The same diagrams give a graphical summary of the changes in particle-size composition.

Another factor to consider is the amount of rock-rubble on the site. Evans and Jones (1973) have demonstrated the existence of rock-rubble assemblages characterised by *Oxychilus*, *Vitrea*, and *Discus*. These live in skeleton-supported sediments in the vacuous interstices, for example between limestone blocks. At Hazleton, such sediments were found in the cairn and in the primary quarry fills. Matrix-supported sediments lack interstitial spaces, and their mollusc assemblages should reflect more general ecological conditions. At Hazleton, these sediments were the soil horizons and the secondary and tertiary quarry fills. For clarity, histograms of the rock-rubble species have been grouped on the diagrams. Also grouped are histograms for the '*Punctum* Group' (*Punctum pygmaeum*, *Euconulus fulvus*, *Nesovitrea hammonis*, and *Vitrina pellucida*: Evans 1972, 195), which sometimes plays a significant role in the colonisation of ditch fills and similar locations. It should also be noted that *Cecilioides acicula*, which was quite abundant in some samples, is a burrowing species of little palaeoecological significance.

Details of the analyses of all the samples studied are provided on microfiche (Appendix 13).

Conclusion

Some of the mollusc species are of interest when compared to evidence for their modern distributions, as mapped for example by Kerney (1976a). Attention has been drawn (Appendix 13) to the most striking instance: *Vertigo alpestris* from the subsoil hollow beneath the cairn. An interesting absentee is *Pomatias elegans* which today reaches the limits of its main British distribution on the Cotswolds (Kerney 1976a, map 7). This species was represented by a single non-apical fragment in a post-Neolithic layer at Condicote henge (Bell 1983a), and at Ascott-under-Wychwood (Evans 1972, 124) it was absent from Neolithic contexts, but present by Roman times. It was found at Nympsfield (Kennard 1938; Spencer 1979), some 33km to the south-west of Hazleton, but the

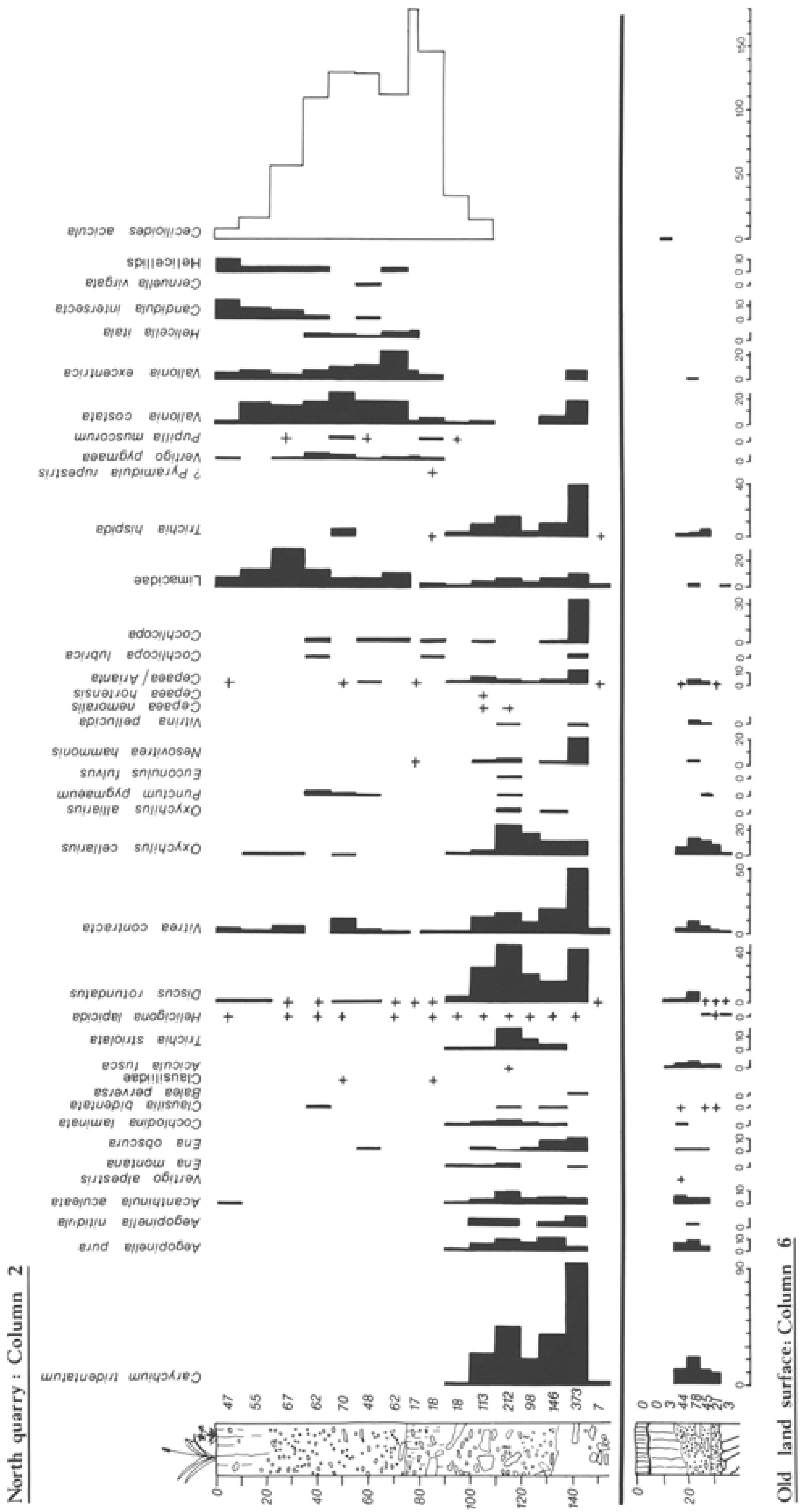


Fig 211 Mollusc diagrams for column 2, north quarry, and column 6, buried soil

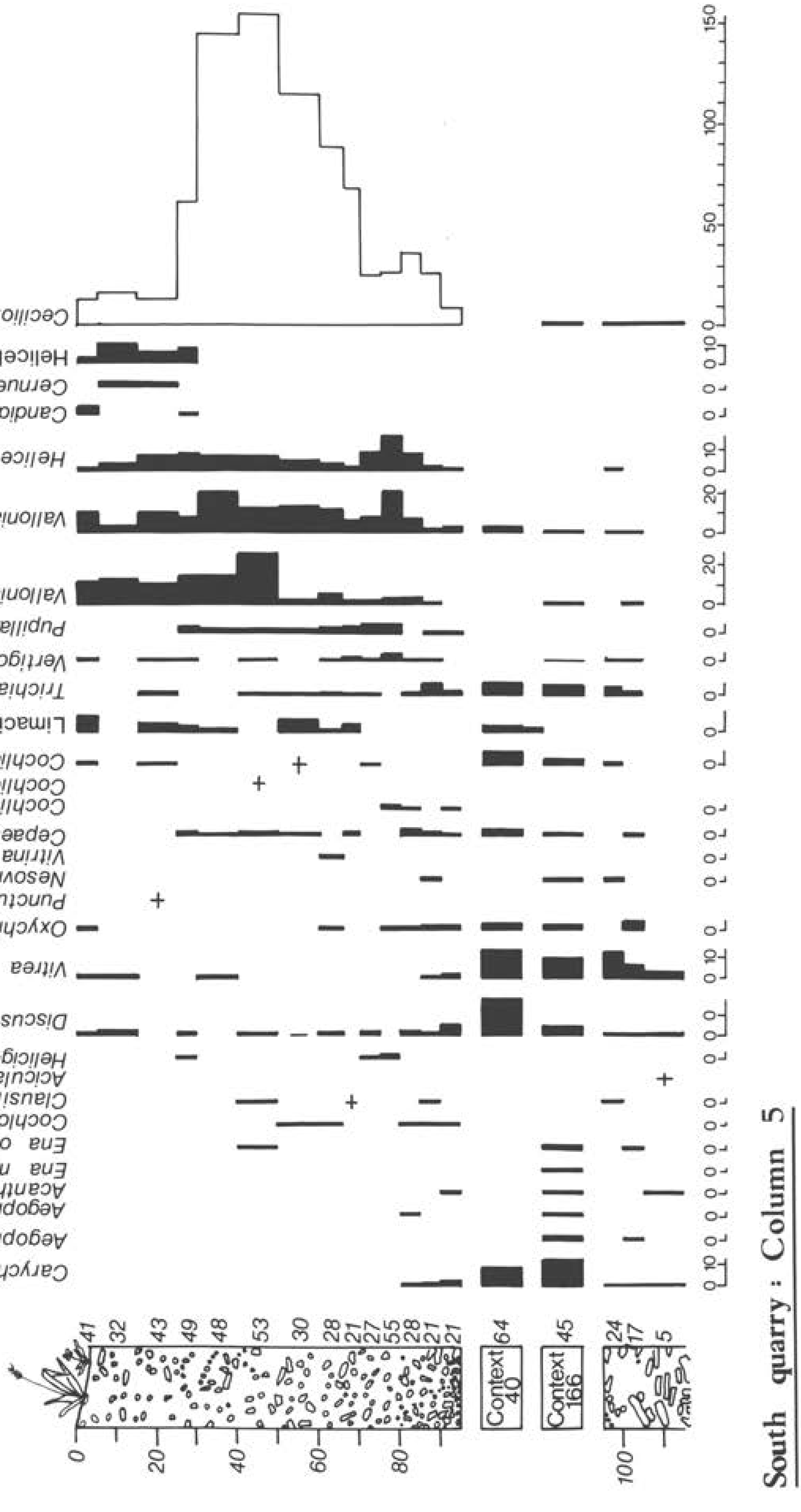


Fig 212 Mollusc diagram for column 5, south quarry

only reliably-stratified examples there were from an apparently natural sub-cairn feature (A Saville pers comm). The implications of these occurrences are that *Pomatias* may not have spread to the whole of the Cotswolds until post-Neolithic times (Evans 1972, 124) or, more probably, that this markedly calciphile species was excluded from certain sites and areas by strongly decalcified soils, such as existed at Hazleton before cairn construction. As soils thinned because of erosion, and limestone became incorporated in surface horizons by tillage, quite different, more calcareous soil profiles developed (Chapter 15). Under these conditions, certain species like *Pomatias elegans* could have become more widely distributed.

Pyramidula rupestris, which has a widespread distribution today including the Cotswolds (Kerney 1976a, map 61), is another interesting absentee from the Neolithic levels. The excavations produced only two, probably later, shells: one probably recent (glossy) shell from the south chamber and a possible non-apical fragment from the upper levels of column 2. This contrasts with assemblages from modern drystone walls around Barrow Ground Field. These were examined as analogues for the constructionally very similar Neolithic cairn and particularly its external revetment. Fine sediment was dusted from between the wall stones at four sampling points:

1 North face of wall north of the cairn; 36g; *Pyramidula rupestris* 69; *Trichia striolata* 2
2 East face of wall east of the cairn; 23g; *Pyramidula rupestris* 20; *Trichia striolata* 2
3 West face of wall east of the cairn; 33g; *Pyramidula rupestris* 46; *Trichia striolata* 1; Limacidae 1
4 West face of wall east of the cairn; 48g; *Pyramidula rupestris* 71; *Trichia striolata* 3.

Most of the molluscs were recent (shiny), but dead, and the predominance of *P. rupestris* is puzzling in view of the evidence from here and elsewhere (Evans 1972, 139) for its absence from what must have been very similar prehistoric habitats. The species does, however, occur in what seems to be a comparatively early woodland assemblage at Tornewton Cave, Devon (Kerney 1976b).

It has been noted that the mollusc sequence from Hazleton was an interrupted one: shells were preserved in sediments containing small limestone pieces from physical weathering, but they were absent in the decalcified old land surface. Furthermore, the very low numbers associated with stabilisation horizons at the top of the secondary fills in the quarries indicated that these too represent hiatuses of non-preservation. If this is accepted, then episodes of disturbance and cultivation are likely to be overrepresented by the surviving molluscan record, while stable grassland episodes, which may have persisted for long periods, leave little trace in the mollusc record. The same thing can be noted at Condicote henge (Bell 1983a) and at Winterbourne Steepleton, Dorset (Bell *et al* forthcoming). Clearly, these are important considerations on sites which are not ideal for mollusc preservation, because of the non-calcareous soils which they supported in prehistory. These instances should, however, prompt a consideration of whether this sort of selective preservation operates, but in a less easily recognisable way, on other sites. It is perhaps necessary to question, and if possible to find ways of assessing, how complete prehistoric mollusc sequences are and to what extent they represent all the Mollusca which have lived on the sampling site, and whether all the successive landuse regimes are equally well preserved in the record.

It is fortunate that at Hazleton a number of the gaps in the molluscan sequence are partly explained and to some extent filled by other sources of evidence, particularly the soils, pollen, and plant macrofossils. The earliest mollusc evidence is from the subsoil hollow and represents a phase of climax woodland which significantly predated the cairn and is probably pre-Neolithic. It parallels the feature below the Ascott-under-Wychwood long barrow (Evans 1971). Regrettably, at Hazleton there was no molluscan evidence from the upper levels of the buried soil to compare with the Ascott evidence for pre-monument clearance followed by grassland conditions. However, the other sources of evidence at Hazleton show that clearance was followed by tillage and hazel scrub development before monument construction. By the time the secondary fill began to accumulate in the surrounding quarries, the Mollusca indicate shady conditions. To some extent this might represent a more shady microenvironment within the quarries. If, however, the monument had been surrounded by open agricultural land, a greater representation of open-country species might be expected. As it is, the range of shade-loving species makes it more likely that, during the time of the secondary fill, scrub or woodland had again colonised the site. Molluscs were well-represented in the secondary fill in column 2 in the north quarry, but not from the south quarry, where column 5 had an erosion surface between the primary and tertiary fills and column 4 produced very low numbers of shells.

In the south quarry, shade-loving species were, however, quite abundant in the samples from contexts 40 and 166. The stabilisation horizon at the top of the secondary fill has been identified as a possible gap in the mollusc sequence. The subsequent deposits are quite different and consist of a restricted range of open-country species in colluvium derived from cultivation around, and eventually over, the cairn. The marked contrast between more recent conditions and those represented by the secondary fill is further emphasised by the occurrence of individual species in the secondary fill. *Ena montana* is today a species of old woodland: in the county of Avon, it is restricted to a few old woods in the Avon valley near Bath (P Tatersfield pers comm). Kerney (1968, 286) has suggested, however, on the basis of its occurrence on archaeological sites (including Nympsfield) that it was less of an anthrophobe in the past. *Arianta arbustorum* likewise suggests rather damper and more vegetated conditions, as do many other species from the prehistoric contexts.

Mollusc analyses from the Ascott-under-Wychwood quarries are not fully published, but Evans and Jones (1973, 116) briefly note that a second or third millennium uncal bc buried soil in the quarry fill produced a woodland assemblage, in which the predominant species were *Carychium tridentatum*, *Aegopinella*, and *Discus*, which quite closely matches the secondary fill in column 2 at Hazleton. A further profitable comparison is with Mollusca from the ditch of Condicote henge (Bell 1983a). Here, even the primary fill contained shade-loving species and there was a much richer assemblage of such species in the secondary fill than in any of the Hazleton samples. Better preservation at Condicote was probably due to geological factors.

At Ascott-under-Wychwood and Hazleton, it is known that there was a clearance episode before monument construction and, at Hazleton, this was associated with tillage. On all three Cotswold sites – Ascott, Condicote, and Hazleton – there is evidence of post-monument regeneration, and the general impression is that Neolithic clearance may not have been so extensive or long-term as was the case on the chalk in Wessex. Not all, even of the chalkland, was extensively cleared in the Neolithic, however. A range of Neolithic monuments on the South Downs seem to have been constructed within fairly localised woodland clearings (K Thomas 1982). Comparing the Cotswolds, Wessex, and the South Downs, it seems that, even within chalk and limestone country, there were quite marked contrasts in the history of Neolithic landscape evolution. If that is so, then it will be interesting to establish to what extent these contrasts were the product of cultural, as opposed to geological and other, factors.

15 The soils

by Richard I Macphail

Introduction and methods

This section summarises the study of the buried soils (Appendices 14–16) and includes a note on the auger transect and soil-pit survey carried out by Bell and Macphail. A fuller version of this report is available in the site archive, along with a series of colour photographs which illustrate the thin sections and other features of the analysis. Six areas of the buried soil, one present-day profile, and soil samples from the mound and north quarry (Table 90, Figs 213 and 214) were described (cf Avery 1980; Hodgson 1976) and analysed (cf Avery and Bascomb 1974). Thirteen thin sections were examined (cf Bullock *et al* 1985) and interpretations made following the experience of Courty *et al* (1989). The magnetic susceptibility (MS) of the soils was also measured (cf Tite and Mullins 1971; Longworth and Tite 1977). Thin sections from eight Neolithic soils investigated by Dr I W Cornwall were also reviewed (Appendix 16).

The modern soils

The area around Hazleton carries a modern soil cover of mainly shallow (50–100mm on upper slopes) to moderately deep (25–40mm on gently-sloping plateau areas), clayey brown rendzinas, with deeper (over 1m), clayey brown calcareous earths with limestone rubble on the colluvial slopes and in dry valley fills. These comprise the soils of the Sherborne Association (Courtney and Findlay 1978; Findlay *et al* 1983). The closest modern equivalent soil series to the buried Neolithic cover (*see below* and Table 92) are the argillic brown earths of the Tetbury and Ston Easton Series (Clayden and Hollis 1984), but these are apparently now locally absent from the modern soil cover and local dry valley fills.

The buried soils

Early Flandrian and Atlantic pedogenesis

The dark yellowish-brown to dark brown (7.5YR4/4–3/4) Neolithic clay soils are also shallow and vary from 100–200mm in depth. The field morphology of the deepest (400mm) subsoil hollow on the

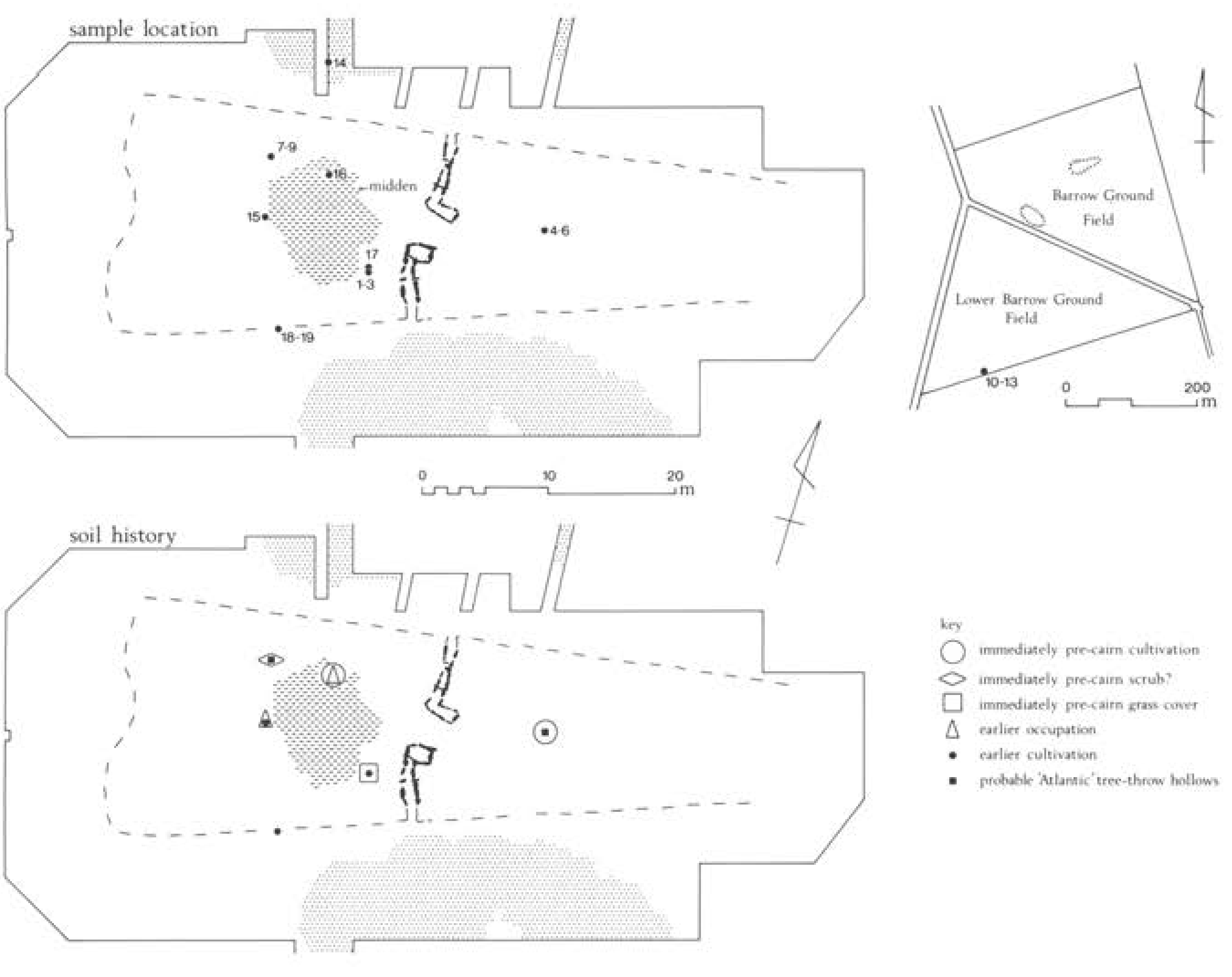


Fig 213 Location maps for soil samples 1–19 (upper); suggested interpretation of the sub-cairn samples in terms of soil history (lower)

Table 90 List of soil samples

Samples from the in situ *buried soil*	
1–3	thin sections of profile 1
4–5	thin sections of profile 2
6	bulk analysis only of 'marl' from profile 2
7–9	bulk analyses only of profile 3
15	thin section of midden, context 561
16	thin section of midden, context 561
18–19	thin sections of soil beneath collapsed stonework outside the external revetment
Sample from the basal cairn (dump)	
17	thin section of 'turf', context 286
Sample from the primary fill of the north quarry	
14	thin section of 'turf', context 55
Samples from the modern, recently arable, colluvial soil in Lower Barrow Ground field (NGR SP 07125 18590)	
10	thin section of Ap horizon in profile 4
11	bulk analysis only of B1 horizon in profile 4
12	thin section of B(g)2 horizon in profile 4
13	bulk analysis only of C2 'marl' in profile 4

site (Macphail 1987a, plate 3) suggests that it is a tree-throw pit (Lutz and Griswold 1939; Denny and Goodlett 1956) probably dating to an earlier 'Atlantic' woodland cover (Appendix 13). Microfabric analysis (Table 92) shows that reddish and moderately ferruginous (Table 91) beta B clay (Duchaufour 1982) weathered directly from the Hampen Marley Beds (Jurassic oolitic limestone). Further Flandrian pedogenesis took the form of mild leaching and probable clay translocation, producing yellowish-brown (B(t)) and pale yellowish-brown (Eb) clay loam soil. Tree-throw had the effect of turbating this Flandrian brown earth/argillic brown earth, so that soil material from the different horizons, including the humic A1 horizon, occurs as juxtaposed fragments between which are microlaminated void (closed vughs) infills (Macphail 1986). The fact that the turbation fabric was unworked by later biological activity suggests that the infill of the hollow was rapid and, from the evidence of several other comparable sites, this lack of reworking may relate to human activity (Macphail and Goldberg 1989), as indicated by the number of Mesolithic flints present in the soil at Hazleton.

In all of Cornwall's eight sites and four other comparable Neolithic soils studied by the author, no intact 'Atlantic/Sub-Boreal' Bt horizons (Weir *et al* 1971) have been found on shallow base rich soils, only on disrupted ones as at Hazleton. This indicates an ubiquity of shallow soil disturbance on occupied sites in early prehistory, as far as can be judged from present information.

Neolithic soils

The examination of soil material nearer the surface and in shallower subsoil hollows more closely reflects the Neolithic activity on the site. First, contemporary pedogenesis and Neolithic occupation have had the effect, in some ways, of homogenising the soil, and only few soil fragments occur which may be a relic of the tree-throw episode or a result of Neolithic clearance itself. The buried soil, however, was not at all uniform across the site.

The midden

One area in particular was dark brown with abundant fine and coarse charcoal and was designated a midden, because it contained cereal grains, hazelnut shells, wood charcoal, bones of domestic animals, quernstones, etc. It also included fragments of poorly birefringent reddish-brown, dense, cracked soil, which from experimental evidence (Courty 1984; Courty *et al* 1989) was concluded to be burnt. This material could be related to disturbance of the one hearth found on the site. The charcoal-rich soil material (fine charcoal worked into the soil by trampling) is

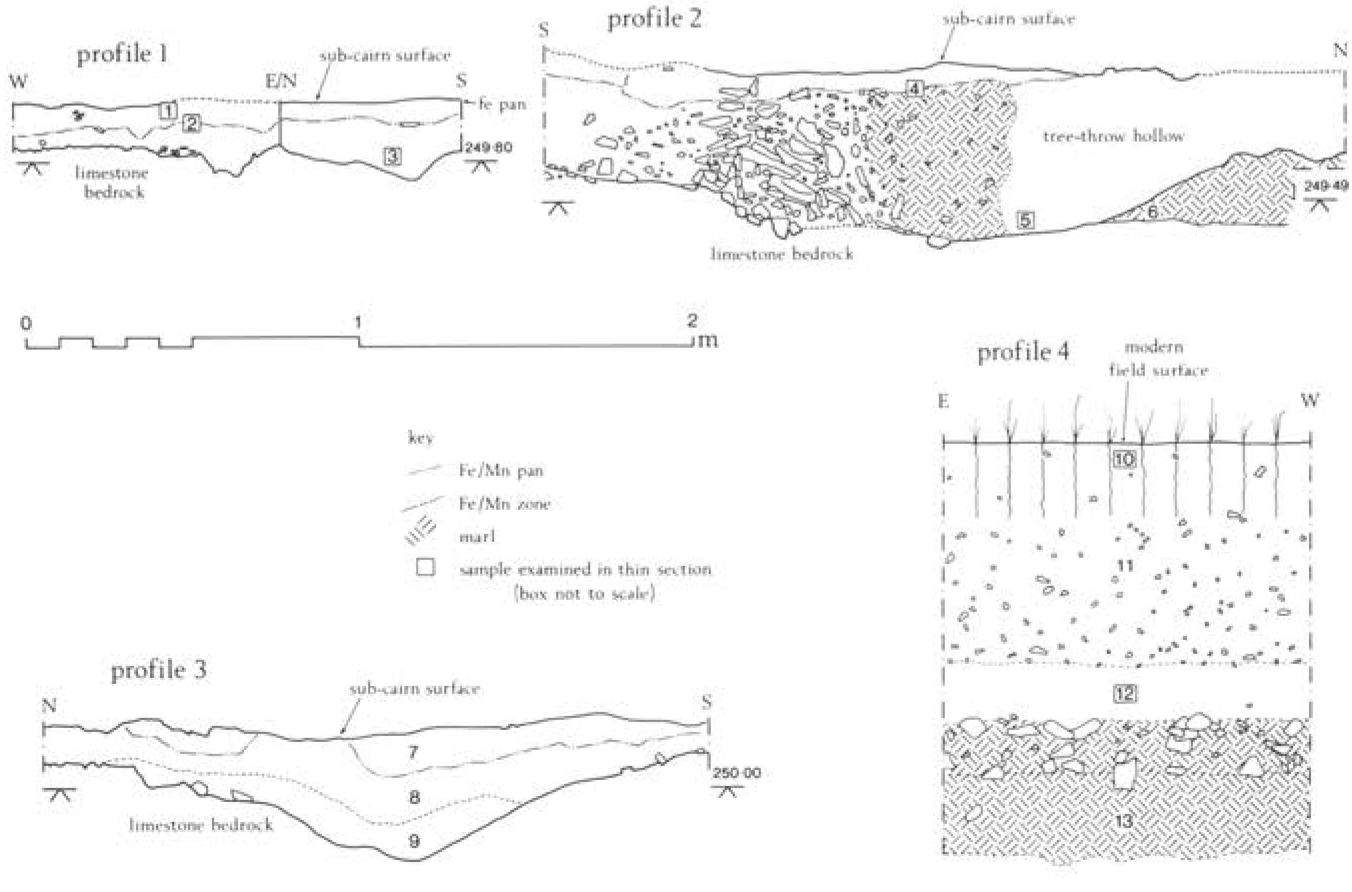


Fig 214 Sections at soil profiles 1–4, showing the vertical location of samples 1–5 and 7–13

Table 91 Soil samples: basic analytical data

No	Horizon	$pH(H_2O)$	Loss on ignition*	%C	Clay	Fz	Mz	Cz	Silt	VFS	FS	MS	CS	VCS	Sand	Texture
Profile 1																
01	bAg (turf)	6.9	5.16	0.90	35	8	17	12	37	22	3	1	1	0	27	clay loam
02	2bAg	7.4	5.28	0.80	37	13	24	7	44	11	4	2	1	0	17	clay
03	2bBt	7.4	5.64	0.50	52	6	20	8	34	6	2	2	2	1	12	clay
Profile 2																
04	bAg	7.7	3.58	1.22	–	–	–	–	–	–	–	–	–	–	–	–
05	bBt	7.8	3.71	1.15	–	–	–	–	–	–	–	–	–	–	–	–
06	C 'marl'	8.0	1.00	–	29	9	5	2	16	25	15	7	5	3	55	sandy loam
Profile 3																
07	bA	8.0	4.32	0.94	37	10	17	14	41	16	5	1	1	0	22	clay
08	bAg	8.1	4.13	0.92	37	11	13	22	46	11	4	1	1	0	16	silty clay
09	bBtg	8.1	3.83	0.84	44	8	14	13	35	17	3	1	1	0	22	clay
Profile 4																
10	Ap	7.7	11.24	3.48	43	10	14	10	34	13	4	2	2	2	23	clay
11	B1	7.8	8.33	2.18	37	11	13	7	31	17	6	2	3	3	31	clay
12	B(g)2	8.0	7.22	0.89	47	12	10	6	28	18	2	2	2	1	24	clay
13	C2 'marl'	8.0	2.40	–	38	11	18	16	45	14	1	2	1	0	17	silty loam
North quarry (context 55)																
14	–	–	–	–	44	9	19	13	41	7	5	2	1	0	15	clay
Midden (context 561)																
15	bA	8.0	3.75	1.06					–	–	–	–	–	–	–	–
16	bA	8.1	6.75	1.47					–	–	–	–	–	–	–	–
Basal cairn, dump (context 286)																
17	–	–	4.33	0.72					–	–	–	–	–	–	–	–
Soil beneath extra-cairn material																
18	bB(1)	–	3.63	0.35					–	–	–	–	–	–	–	–
19	bB(2)	–	3.44	0.84					–	–	–	–	–	–	–	–

Note: *over-estimated.

indicative of intensive human occupation (Courty *et al* 1989), as suggested by the midden and a possible hut on the site.

Cultivation

Elsewhere, soils were also apparently unvegetated and poorly worked by fauna, suggesting a low earthworm population. In many cases, the fabric was dominated by translocated dusty clay that coated most voids (Macphail 1987a, plate 5), indicating surface soil disturbance. At Fussell's Lodge, Wiltshire (Ashbee 1966), Nutbane, Hampshire (de Mallet Morgan 1959), and Ascott-under-Wychwood, Oxfordshire (also on oolitic limestone; Evans 1971), the buried surface soils have biological fabrics (Babel 1975) which are typical of *natural* surface horizons. In contrast, much of the surface soil at Hazleton is *unnatural* and more comparable to bare ground that has undergone tillage (Jongerius 1970 and 1983; Macphail *et al* 1987). In addition, parts of the buried soil have had their prismatic structure broken up into finer blocks which is one indication of tillage (Dexter 1976; Gebhardt 1989). Also, some dusty clay lines root channels and biological structures concomitant with intermittent plant growth/biological activity and soil slaking: a combination found in the presumed cultivated soil at Kilham, North Yorkshire (Dimbleby and Evans 1974; Manby 1976; Macphail *et al* 1987, fig 9). Therefore, the presence of poorly organic (compare the residual Neolithic 0.8–0.9% organic carbon with 3.5% organic carbon in modern local topsoils) and therefore poorly stable (Grieve 1980; Imeson and Jungerius 1976) surface soils, combined with this suggested cultivation, has apparently led to the translocation of dusty clay. Seed and pollen evidence may also imply onsite agriculture (*see* Straker and Scaife in Chapter 14).

Landuse pattern

It is evident from the soil study that cultivation was probably in small plots and that these shifted across the site. For example, one area of abandoned cultivated soil developed a shallow turf only to be buried by a more coarse clay loam colluvium. This possible ploughsoil colluvium in turn developed an herbaceous cover prior to cairn construction. Another area of the buried soil contains coarse (10–20mm) root holes and, because they are empty of soil (Macphail 1987a, plate 4), these are interpreted as evidence of shrubs on the site just before burial. The midden itself was physically reworked, and counting of the charcoal-rich clay

Table 92 Pedogenic and human history at Hazleton, based on soil micromorphology, chemistry, and magnetic susceptibility (MS) characteristics of the buried soil

Period	Soil data	Interpretation
Post-burial	Iron and manganese replacement of turf; Fe and Mn pan formation at 40–50mm; enhanced MS and iron content	Localised rise in soil water-table, anaerobic microbiological activity, movement of Fe and Mn ions in reduced form, and their precipitation as oxides
Neolithic (last phase)	Midden area: prisms broken into blocks; burnt soil fragments; fine charcoal in very dusty clay coatings; textural features concentrated in top 40–60mm; numerous pieces of charcoal	Pre-burial cultivation of midden area
	Coarse (10–20mm) root holes empty of soil; organic turf at top of 20mm of apedal soil containing dusty clay void coatings; this buries an earlier turf	Pre-burial scrub area; dumped soil or more likely burial by cultivation colluvium of previously revegetated tilled soil; pre-burial herbaceous cover
	Moderately poorly-structured areas, with dusty clay coatings, and few faunal-worked fabrics	Low earthworm population in mainly unvegetated previously-cultivated soil
Neolithic	Area of fine and coarse charcoal (wood, cereal grains, hazelnuts), bones, burnt soil fragments; subsoil: juxtaposed fine soil fragments from various horizons	Intensive occupation/midden (local hearth and possible hut); trampling; clearance
Atlantic (Mesolithic?)	Deep subsoil hollow: juxtaposed coarse soil (A1, Eb, B(t), beta B, oolite) fragments with fissures infilled by microlaminated dusty clay	Large tree-throw and rapid infilling of resulting hollow by disrupted soil, more rapidly than could be reworked biologically
Early Flandrian	Subsoil: enhanced MS; most iron and clay; reddish beta B fabrics associated with still calcitic oolite; (other fabrics are yellowish-brown or pale yellowish-brown)	Decalcification and weathering of Hampen Marly Beds; leaching and minor clay translocation forming slightly acid brown earth/argillic brown earth

coatings showed a concentration of these at 40–60mm depth, which from experiments (Gebhardt 1989) indicates arding, although Romans and Robertson (1983) have suggested deeper maximum effects. Lastly, there may be an association between the suggested low organic matter content of the cultivated Neolithic soils and the low earthworm population (Edwards and Lofty 1972 and 1975). The supposed poor organic status of the soils, which was possibly induced by this Neolithic subsistence agriculture (Romans and Robertson 1983), may have led to increasingly poorer crop returns, thus causing the last phases of cultivation on the site to shift to the more organic (1–1.5% organic carbon) and more nutrient-rich midden area. Elsewhere in England, onsite manuring for possibly the same reasons has been indicated (Scaife 1987).

Post-burial effects

The soil was affected by post-burial depletion in organic matter and localised hydromorphism, which enhanced buried surface soil MS, caused organic fabrics to be replaced by oxides of iron and manganese, and resulted in the development of iron and manganese pan 40–60mm into the buried soil because of a post-burial rise in the local water table (Allen and Macphail 1987).

Auger transect and soil-pit survey

by Martin Bell and Richard I Macphail

An auger transect and soil-pit survey were carried out in an approximately north–south direction across Barrow Ground and adjacent fields (Fig 215). The transect line ran across the plateau on which the cairns are located and down into the dry valleys to north and south (Fig 216). The aims of the transect were to provide data for comparison with the Neolithic palaeosols and to establish whether either of the dry valleys contained sedimentary sequences relating to the Neolithic monuments or subsequent phases of landscape history.

The transect consisted of 20 auger holes and five soil pits: pit B was on the plateau supplementing data from the excavation; pits C and E were on the valley shoulders; and pits A and D were in the dry valleys. Soil depth is shown schematically on Figure 216 by a solid black bar of appropriate length and is given numerically by the figures above each bar. Profile descriptions of the soil pits are given in Appendix 17.

In pit A, there was *c* 1.45m of colluvium containing oolite fragments, with evidence of charcoal flecks at the base. This overlay a stoneless, probably decalcified, palaeosol with evidence of translocated clay at its base, developed on oolitic limestone head. In pit D, there was a deep lower sequum of marl and limestone with only relatively deep (*c* 0.83m) colluvial brown deposits in the upper sequum. The lowest brown soil horizon at 0.67–0.83m (B(g)2), was not decalcified and had a microfabric which, in contrast to the Neolithic soils, had a few limestone fragments, a brown colour, and moderately high organic content. It included only rare, rounded (transported), reddish-brown pedorelics of soils comparable to the Neolithic cover. It also differed in having a more strongly enhanced magnetic susceptibility (Allen and Macphail 1987). It is thus considered to be a result of 'ploughwash' of probably much later date than the Neolithic period. In fact, the colluvium to 0.83m in this pit and to 1.45m in pit A seems to be associated with the erosion of rendzinas and brown calcareous soils of the Sherborne Association. These soils were produced after the erosion of the argillic brown earths, now only present under the long cairn and possibly below 1.45m in pit A.

Four samples were taken from pit A for molluscan analysis, as shown on the section (Fig 216). Only one mollusc was found and there were no artefacts to help date the colluvial deposits. Seven mollusc samples were taken from pit D and four have been analysed. The numbers of molluscs (*see* Appendix 17) were

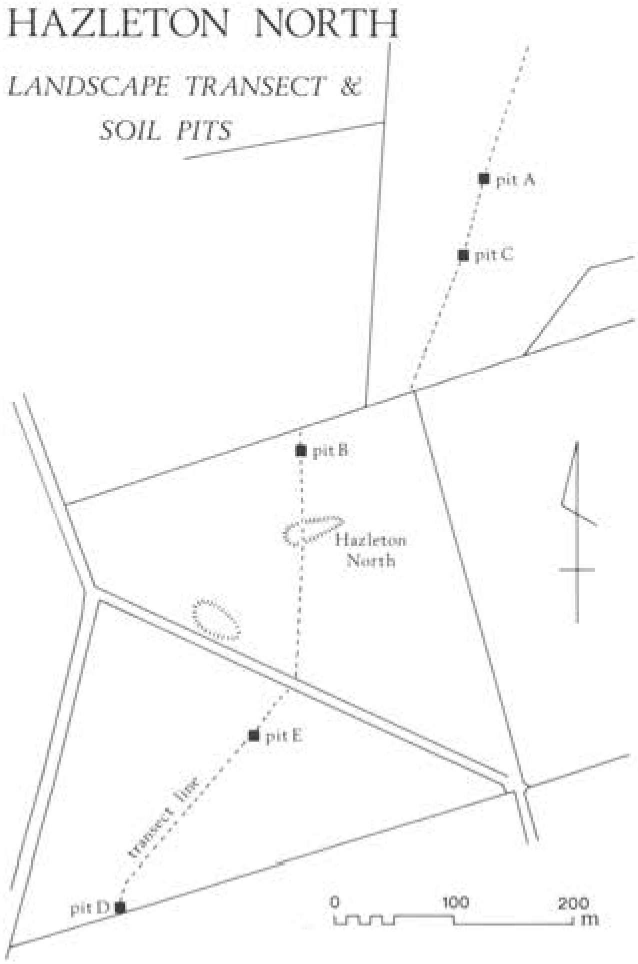


Fig 215 Location of auger transect and soil pits

insufficient for meaningful interpretation, except insofar as all the species are normally found in open habitats, and they also show that the medieval or later introduction *Candidula intersecta* is present down to *c* 0.75m. Thus, the Mollusca confirm the soil evidence in suggesting that the colluvium in pit D is late, probably post-medieval. In fact, it lies on the uphill side of a drystone wall which has an associated lynchet.

It is possible that earlier colluvial deposits had been removed by stream action. There are small springs in both valleys and the removal of early soils and sediments has been demonstrated in some chalkland valleys (Bell 1983b). On the other hand, it may be that the post-cairn soil changes, though occurring over a long period of time, became particularly marked as a result of post-medieval agriculture. Certainly, the absence of artefacts of all periods in the colluvium and the paucity of post-Neolithic artefacts on the site itself argue against much intensive landuse such as arable activity in post-Neolithic times. However, a scatter of Romano-British pottery and coins may relate to the manuring of arable in this period. With this possible exception, it may be that, following clearance of the secondary woodland represented by Mollusca in the quarry fills (Chapter 14), the area was open pasture for much of the time until enclosure and post-medieval agriculture.

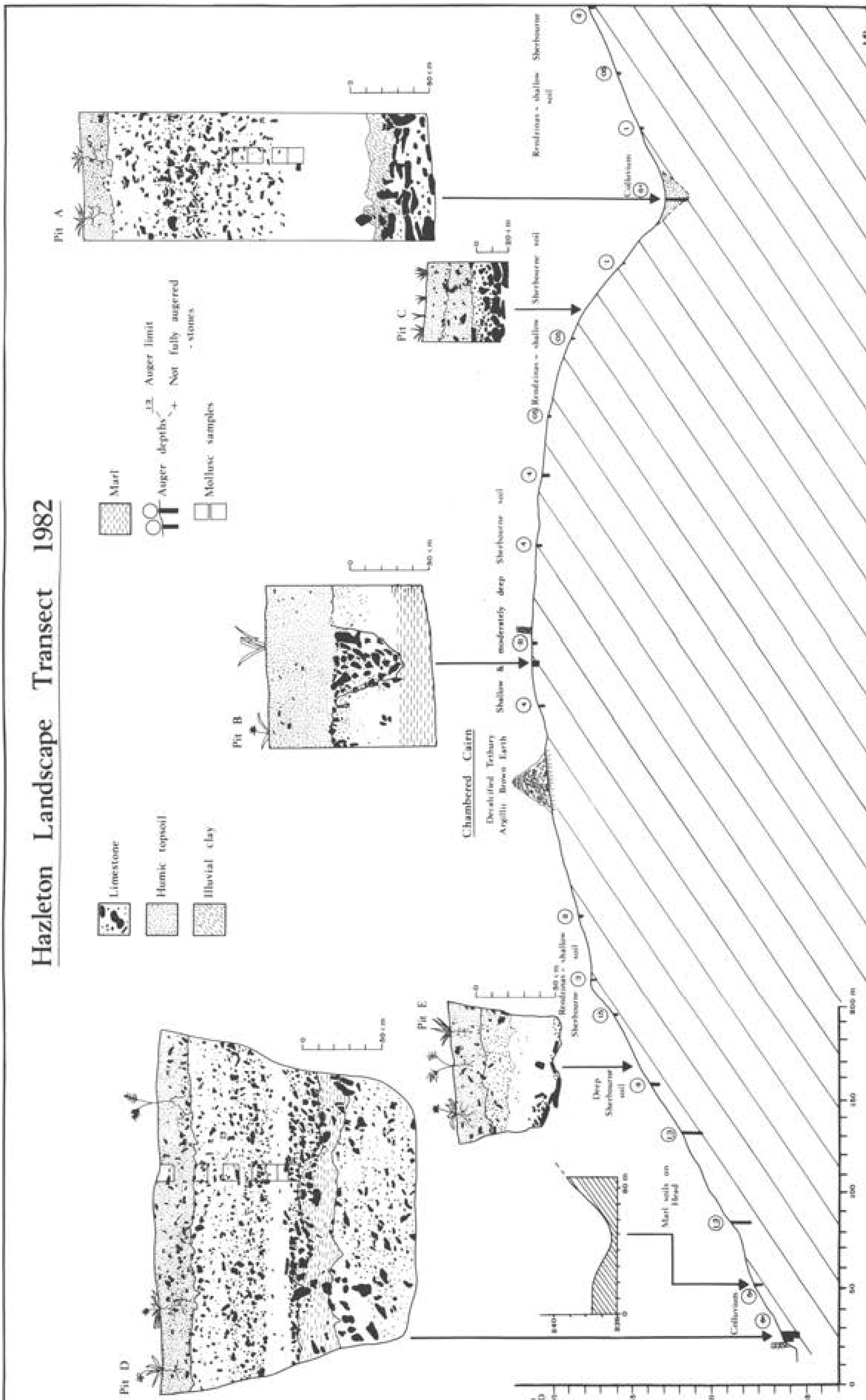


Fig 216 Transect profile and soil-pit sections

16 Geological aspects of the excavation

by Bernard Worssam

Introduction

This account is based in part on notes made during a visit to the excavation, when the writer was on the staff of the British Geological Survey and engaged on survey work in the Tewkesbury district. The notes are filed in the BGS records collection (Sheet SP01NE) and their publication is by permission of the Director, British Geological Survey (Natural Environment Research Council). Visits to check local stratigraphy were made to the Hampen Cutting (a Nature Conservancy Council geological SSSI) and to the Slade Barn quarry, Hawling, now a County Council waste-disposal area. Samples of lithic material from the excavation were examined in 1985, and detailed descriptions of these samples are given in the site archive. Fossils have been named by Dr H C Ivimey-Cook of the BGS Palaeontology Unit.

Geology of the site

The site of the cairn is on an outcrop of the Hampen Marly Beds. This formation is a subdivision of the 'Great Oolite' of the 1inch:1mile geological sheet 235 (Cirencester). The sheet is based on an original survey by E Hull in the 1850s, and the area around Hazleton has not been revised since then. Even at the time of survey, it was recognised (Hull 1857) that the Great Oolite includes a number of subdivisions, and subsequent work, summarised by Arkell (1933), has given these subdivisions the names shown in Table 93.

Table 93 Formations at outcrop in the vicinity of Hazleton

Sheet 235		*Hull (1857)*	*Arkell (1933)*	*Lithology*	*Approx thick-ness (m)*
Great Oolite	upper zone	upper beds	White Limestone	hard white limestone	>10
		marly beds	Hampen Marly Beds	interbedded marls and limestone	10
	lower zone	white oolitic freestone	Taynton Stone	yellowish-grey oolitic limestone	10
		Stonesfield Slate	Stonesfield Slate Beds	clays with beds of shelly and silty limestone	10
Fuller's Earth			Fuller's Earth	clays with beds of shelly limestone	>10

Figure 217 is a geological sketch-map based on small exposures to be seen around the cairn in June 1981. The most instructive exposure was in a waste-disposal pit (SP 07251898) on the edge of Barrow Ground field, about 100m north-west of the cairn (Table 94). The pocket-like features I and II on the section (Fig 218) are interpreted as the cores of involutions or festoons produced by periglacial frozen-ground processes. Folding, dying-out downwards, associated with the festooning is shown by the dashed line between the two parts of bed 4 and by bed 3, the latter being involved in a slight syncline under pocket I and in a pronounced anticline just to the north of it. It is envisaged that the festooning (which is unlikely to have affected bed 1) was followed by erosion, presumably an effect of slope-wasting, that produced the near-level surface cutting across the pockets of bed 5 rubble and extending, at the south end of the section, on to bed 4. Deposition of bed 6 followed later, perhaps after a late-glacial climatic amelioration. Narrow vertical markings through bed 4 are interpreted as root-holes.

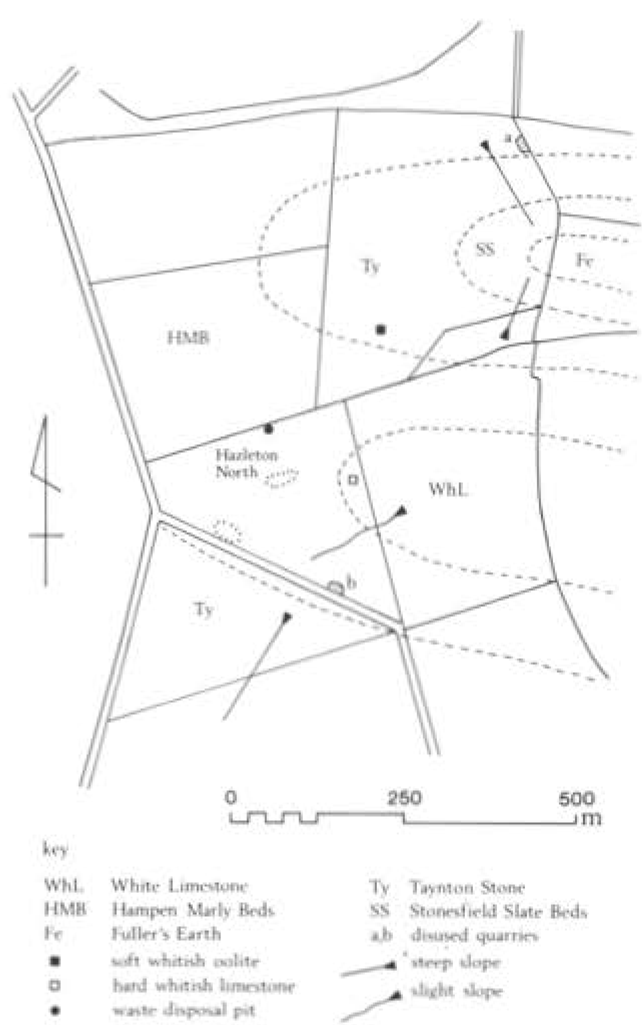


Fig 217 Geological sketch map of the Hazleton vicinity

Table 94 Bed descriptions for waste-disposal pit section (Fig 218)

Bed no	*Description*	*Average max thickness (m)*
7	Turf and topsoil, base indefinite	0.10
6	Loam, dark reddish brown (5YR 3/4), jointed, with a few included limestone fragments; probably a decalcification product that has undergone transport by slope-wash processes; base sharp and near-level	0.30
5	Limestone, silty, medium grey with a greenish tinge, occurring as pockets of rubble descending into the underlying marl and as fragments along the junction between the marl and overlying reddish-brown loam (bed 6); the rubble occurs in a matrix of reddish-brown loam	0.20
4	Marl, brownish-yellow (10YR 6/6), silty; in the upper part, above the pecked line shown in the drawing, it includes scattered limestone fragments	0.40
3	Marl, brownish-yellow (10YR 6/6), silty, packed with elongate ostreids – *Liostrea hebridica* (Forbes), including var. *elongata* (Dutertre); a specimen of *Pleuromya calceiformis* (Phillips) was also collected; in the southern part of the section, the lower part of this bed is less fossiliferous	0.10-0.25
2	Marl, yellowish-brown (10YR 5/6–10YR 6/6), silty; charcoal (or fossil wood?) flecks not uncommon	0.20
1	Limestone, hard, yellowish-grey, finely oolitic, forming the floor of the pit and proved at one point to...	0.15

Beds 2 to 5 can be assigned with confidence to the Hampen Marly Beds. Bed 1 was to all appearances identical with the limestone obtained from the cairnside quarries and used for construction of the cairn. This lithological match was confirmed by

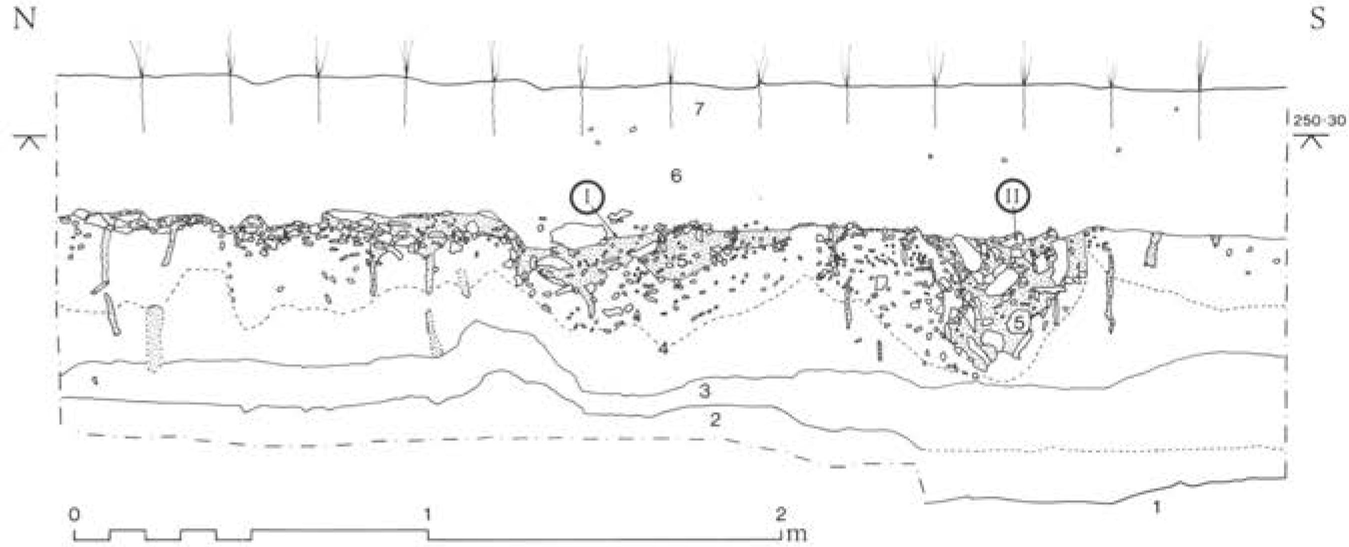


Fig 218 The east face of a waste-disposal pit on the north edge of Barrow Ground Field; see *Table 94 for layer descriptions*

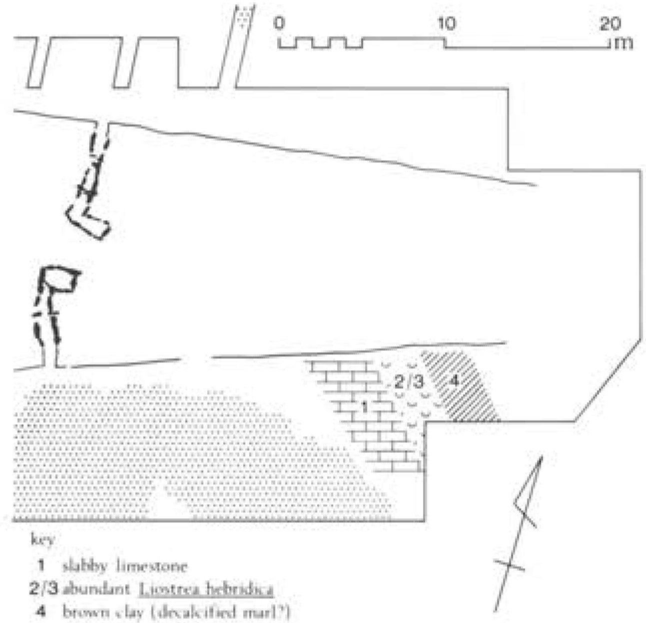


Fig 219 Sketch of exposures to the south-east of the cairn; numbers 1–4 indicate the inferred correlation with beds shown in Figure 218

exposures on the ground surface, bared of soil, on the south side of the cairn to the north-east of the quarry (Fig 219), which showed the rock types exposed in the pit repeated in order, as if at outcrop with a low easterly dip. About 100m east of the cairn, fragments of hard, fine-grained, whitish oolitic limestone were seen in the soil. These were of a lithology to be expected in the upper part of the Hampen Marly Beds or the basal part of the White Limestone, in either case tending to confirm a low easterly dip.

Assuming the equivalence of bed 1 and the limestone in the cairnside quarries, this unit of limestone can be inferred to have a total thickness of some 2.5m, of which the lower 2m were exposed in the south quarry. The limestone is not of a lithology that is common in the Hampen Marly Beds, and it has no obvious match in the type-section of the formation (Richardson 1929, 103–5) in the disused Hampen railway cutting (SP 060204). However, an oolite so fine-grained would not be typical of the Taynton Stone, nor would the presence of yellow-green marl, such as that touched on the floor of the south quarry, be expected in the Taynton Stone formation. On balance, therefore, the oolite in the quarries is regarded as part of the Hampen Marly Beds.

The south quarry face (Fig 220) showed the limestone to be cross-bedded, with some ripple-marked surfaces in its lower part, and with some intercalated pale yellow-grey marl seams up to about 50mm thick. Periglacial festoons, extending to a depth of about 0.6m, can be seen in the photograph.

Construction materials of the cairn

The main construction material of the cairn was the fine-grained, pale yellowish-grey oolitic limestone derived from the cairnside quarries. Six samples of stones from the external revetment of the cairn were examined and found to include four of fine-grained oolite of the type quarried on site, one of a coarser shelly limestone resembling some of the orthostats (*see below*), and one (14023) which is a grey crystalline limestone with *Liostrea acuminata*, probably from the Stonesfield Slate Beds.

The large stone (context 237), comprising the bottom course of the revetment across the south entrance, is an oolite of similar grain size to that from the quarries, but closer-grained, and pale yellow rather than yellowish-grey. It seems to be a Hampen Marly Beds type, but perhaps not from the cairnside quarries.

The limestone from the cairnside quarries was also used for some of the orthostats lining the burial chambers. Other orthostats were of a medium to coarse-grained, detrital-shelly, pale greyish-yellow oolitic limestone, with weathered outer surfaces having an orange-brown colour and a rough texture due to the etching-out in relief of included shell fragments. The coarse, shelly nature of the latter type of stone seems to preclude an Inferior Oolite source; two possible sources of it, both in the Great Oolite Group, are the Farmington Freestone and the Taynton Stone formations.

The Farmington Freestone is a locally-developed subdivision of the Stonesfield Slate Beds (Table 93). Its geological setting is described by Sellwood and McKerrow (1974), who use the term 'Farmington Member'. Its type locality is about 6km east-south-east of Hazleton. How far it extends from there is uncertain, although it was recognised 6km south-west of Farmington in the Stowell Park borehole (SP 084118), where it was logged as a white-buff, coarse shelly oolite (Green and Melville 1956). In the Geological Museum, London, a sample (MR13021) of Farmington Freestone from 'Farmington quarry' closely matches, in colour, grain-size, and texture, coarse oolite samples (eg 18386 from orthostat 207) from the Hazleton cairn. A further point of resemblance to Farmington Freestone is that at least one of the orthostats in the south chambered area showed abundant rhynchonellid brachiopods along one bedding surface. These brachiopods are more typical of the Stonesfield Slate Beds than of the Taynton Stone.

The Taynton Stone has a wide outcrop in the Cotswolds. Near Hazleton, it is exposed in the Hampen Cutting, where it is about 9m thick, and in the Slade Barn quarry, Hawling (SP 070216),

Fig 220 Part of the north edge of the south quarry, viewed from the south; scale in 0.5m divisions

2.7km north of the Hazleton barrow, where a thickness of 5.5m (17ft 11in), the top not exposed, was recorded by Channon (1950). The Taynton Stone in these localities is rather finer-grained than the coarse oolitic limestone of the orthostats. The 'Salperton quarry' samples (18565–7), described in the archive, were collected in 1981 from a small quarry (SP 07852131) about 800m east of the Slade Barn quarry. This quarry can be presumed to be in the Taynton Stone. The stone is similar to that of the orthostats, but a closer match with the latter is provided by Taynton Stone from Windrush, about 11km east of Hazleton. A sample of this stone, under the name 'Windrush Hard', in the Geological Museum, London, has almost exactly the pale yellowish-grey colour of freshly-broken surfaces of the coarse orthostats, as well as a similar texture. Arkell described Windrush Stone as having a pleasant cream colour (1947, 73). Taynton Stone from Taynton itself tends to be more coarsely shelly and of a darker, more nearly brownish-yellow, colour.

On balance, both because of the relative proximity of stone of appropriate coarseness to the Hazleton site and because of the occurrence of rhynchonellids in more than one of the orthostats, the Farmington Freestone is regarded as more likely than the Taynton Stone to have been the source of the coarser-grained orthostats.

The pronounced and extensive surface etching of some of the coarser orthostats, the tapering towards their edges, and the fluting reminiscent of that occurring in natural limestone pavements that some of the orthostats show, all point to solution effects operative beneath a soil cover. Almost the whole of one surface of some orthostats, eg 317, is coated with a thin (3–5mm) tufa deposit, such as commonly collects on the underside of limestone slabs close beneath the ground surface.

Stones from beneath the cairn

Pebbles

The great majority of the pebbles from the old land surface (Worssam 1987) are of quartzite or vein quartz, with one or two flint and one possible dolerite. Many of the pebbles have a rounded dreikanter shape, characteristic of ventifacts (from wind action in the Triassic or Quaternary or both). Some show a little fine-grained tufa incrustation, presumably a result of recent soil processes. One or two show signs of artificial abrasion, but these are the larger, slightly heavier stones that might be expected to have been picked up and used for casual hammering purposes. The wide range of grain sizes, with some pebbles 10mm or less in diameter, suggests a natural origin. Pebble assemblages of this type are widespread on high ground in the Cotswolds and are classed as Northern Drift (Richardson 1929, 133–34; Kellaway *et al* 1971, 3; Hey 1986). The pebbles at this site do not in any sense constitute a gravel deposit, for only 92 were present in an area of some 872sq m, an average of one pebble per 9.5sq m. Nor is there any suggestion that they rest on an erosional bench. They appear instead to represent a sparse lag deposit remaining from Quaternary cryoplanation. Their distribution in the sub-cairn soil (arch drg 780) does not show any significant pattern.

Among the pebbles are a number of ironstone or ferruginous siltstone. These are likely to have come from Lias Group clays (ie from the upper part of the Lower Lias, the Middle Lias, or the Upper Lias), presumably of the Vale of Moreton. They may be a constituent of the Northern Drift. Ironstone pebbles like these occur as a minor constituent of low-level oolite gravels of the Cotswold margins. If those at Hazleton are of Northern Drift origin, their survival could result from resistance to the decalcification that can be presumed to be responsible for the complete absence of erratic limestone pebbles in the drift.

Comments on miscellaneous stones, including some fragments of flint, are included in the detailed descriptions in the archive.

Fine-grained quartzitic sandstone

Angular fragments of fine-grained pale-grey to brownish-grey quartzite from beneath the cairn (Figs 175 and 176: 17304) are of sarsen. Some show worn surfaces. They are all likely to have been brought to the site, presumably from the Salisbury Plain area. A rounded hammerstone/pounder (Fig 174: 15628) is also of a very fine-grained quartzite or quartzitic sandstone and is lithologically very close to a sarsen.

Coarse quartzitic sandstone

A coarse quartzitic sandstone, found as large and small fragments on and in the sub-cairn soil (Fig 175), many of them with worn surfaces and in all probability broken pieces of querns (Fig 176: 15293 etc), is of uncertain provenance. The rock, in a fresh condition, contains a high proportion of pink grains, probably feldspars, as well as rounded clear quartz grains; in weathered samples, the feldspar is replaced by a whitish clayey mineral. Some samples (eg 17990) show a sharp boundary between more and less weathered rock, marked by a deposition of iron and, possibly, manganese oxides in a narrow (1–2mm) band. It is presumed that this weathering took place at the outcrop of the stone, before it was quarried.

The brownish colour of fresher, less weathered samples of the stone gives some suggestion of the Old Red Sandstone, while from its texture it could be a Carboniferous rock. Dunham (*in* Grimes 1960, 75) described what appears to have been a very similar rock, discovered as a saddle-quern fragment incorporated in the Burn Ground cairn at Hampnett, not far from Hazleton (Fig 1). He gave as the nearest possible source the Coal Measure sandstones of the Bristol-Somerset coalfield. Dr G A Kellaway, to whom some of the Hazleton samples were sent for examination, is of the opinion, however, that there is no quartzite of this type among the Palaeozoic rocks of the Bristol district. Mr W Barclay, of the British Geological Survey, considers that the Hazleton samples are too hard for Tintern Sandstone and not pebbly enough for Quartz Conglomerate (both of these being Old Red Sandstone formations of the Forest of Dean), while too coarse and dark in colour for the South Wales Millstone Grit, which is a white orthoquartzite. A source other than Bristol, the Forest of Dean, and South Wales must therefore be sought. Dr Kellaway suggests as a possibility the basal Cambrian quartzite of the Malvern Hills, which is recorded (Hatch and Rastall 1965, 115) as providing a characteristic British example of an arkose (ie a feldspar-bearing sandstone). Such a rock would have a very restricted outcrop, as the bulk of the Malvern Cambrian Quartzite is a white orthoquartzite. Geological Museum (London) specimens further suggest that Cambrian quartzites of the Malverns and other outcrops further north, eg in Shropshire, are finer-grained in their matrix, while being more compact and harder than the Hazleton sandstone. The May Hill Sandstone, of Silurian age, from the Malverns area, is a possible source in that it is in parts coarse-grained and feldspathic. It is, however, also glauconitic, and in a detailed description by Sweeting (1927) there is no mention of a siliceous cement.

If there is no objection on archaeological grounds for so distant a source, a match for this stone could possibly be found among Millstone Grit sandstones of the Pennines. These are of similar coarseness to the Hazleton stone, have a siliceous cement which gives them a cherty fracture like that of the Hazleton samples, and are feldspathic, as well as being of proven quality for grinding purposes. Against such an origin, it has to be admitted that these Millstone Grit sandstones are commonly pale grey when fresh, weathering to a rusty colour; the writer is not aware of records of a sandstone with pinkish feldspars like the Hazleton samples. Not all sandstone beds within the Millstone Grit were necessarily suitable for making millstones. The Ashover Grit (Frost and Smart 1979, 110) and the Kinderscout Grit (Stevenson and Gaunt 1971, 354) are two beds that have been used. Descriptions of the petrology of Millstone Grit sandstones have been given by Harrison (*in* Smith *et al* 1967, 267–76).

17 Geophysical survey

by Alister Bartlett

Introduction

The survey began with an investigation of the north cairn in September 1979, before the start of the excavation. In September 1980, it was continued to provide similar magnetic and resistivity coverage of the south cairn, as well as a magnetic survey of part of the surrounding field. The resistivity survey of the north cairn was extended in September 1982 in pursuit of further evidence of the plan of the quarries. The magnetic plot (Fig 221) is a reduced-scale representation of traverses plotted at 1m intervals, using a fluxgate gradiometer and chart recorder. The computer-drawn resistivity plots (Fig 222) are based on readings taken at 1m intervals using the twin electrode probe configuration and a probe spacing of 0.5m. The survey was located on a grid of 30m squares, offset from the site survey base points established for the excavation.

Hazleton North

The cairn

The surviving stonework of the cairn produced strong and very disturbed resistivity readings (Fig 222: (i) squares H and I), which on further treatment appear to reflect superficial variations in the profile of the mound or its soil cover, rather than its internal structure. Figure 222: (ii) represents the data from squares I and H plotted with a non-linear vertical scale after smoothing with a low-pass filter. There is some falling off in the readings on the north side of the cairn near the west end and on the south towards the east, which could mean slight degradation of the stonework or increased depth of cover, but no indication of the side chambers or cellular construction of the cairn can be seen. There is a slight indication of the eroded eastern section of the cairn in each plot, and at the western end a very faint depression represents the modern trench carrying the waterpipe, which is seen clearly in the magnetic survey.

The stonework of the cairn is non-magnetic and not visible at all in Figure 221. There are, however, two weak positive linear magnetic anomalies (marked by red outlines), which conform to the trapezoidal plan of the cairn and which must represent silting outside the stone revetments along each side of the cairn. The excavation demonstrated linear concentrations of charcoal (context 5a) in the same position as the more clearly defined anomaly along the south side of the cairn, possibly representing accumulations from stubble-burning.

No other magnetic features can be identified within the cairn. The pit-like anomaly circled in square 23 only affects a single traverse and could be spurious, and none of the indications of burning found in the excavation (eg reddened stones in the fill of the south chambered area) appears to have been of sufficient magnitude to cause magnetic anomalies. A soil discolouration, possibly containing burnt material, was noted beneath stone accumulation in the forecourt area during excavation (contexts 349 and 356), as was a hearth (context 474) and much burnt material

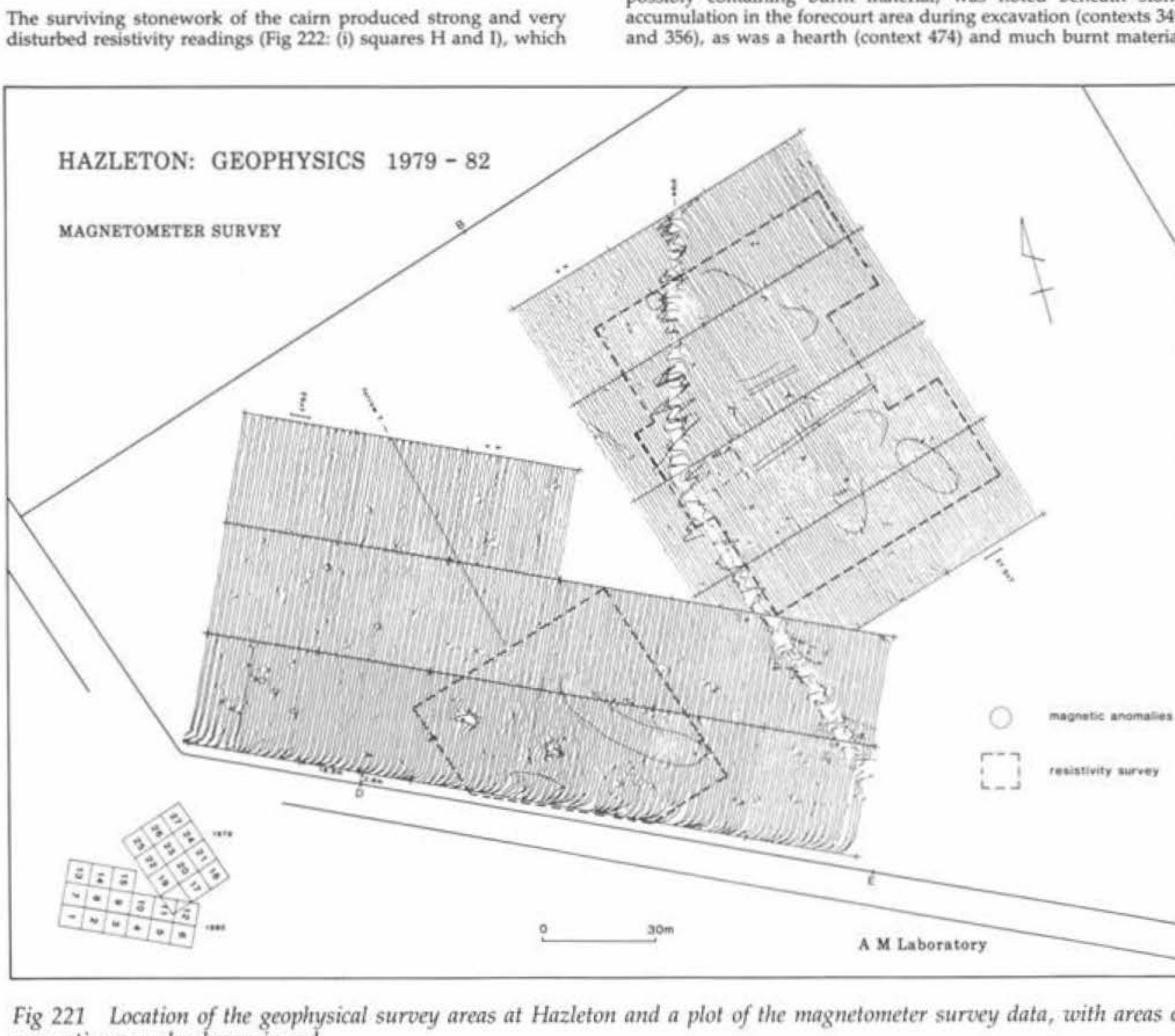


Fig 221 Location of the geophysical survey areas at Hazleton and a plot of the magnetometer survey data, with areas of magnetic anomaly shown in red

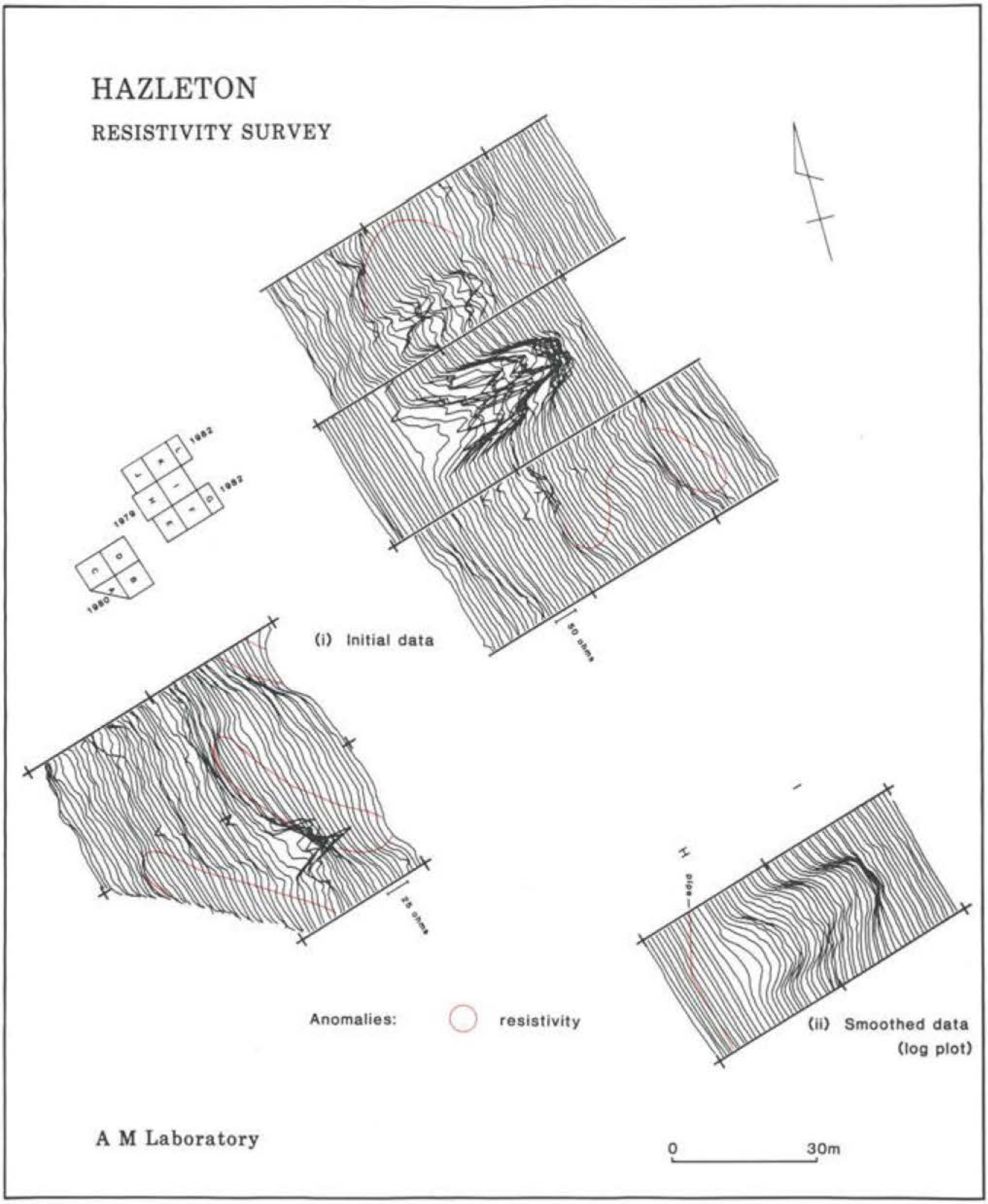


Fig 222 Plot of resistivity survey data from Hazleton North and South; see *Figure 221 for the location of these areas within the field; resistivity anomalies are shown in red*

on the buried soil beneath the cairn. The survey does not indicate any detection of these features through the overlying soil and stonework.

The quarries

The quarries proved difficult to detect with any precision, but they are visible in both the magnetic and resistivity surveys. An attempt has been made to fix outlines (marked on the plots by red lines), which are reasonably consistent between the two surveys and which can also be reconciled with the sections excavated to the north and south of the cairn, but they are necessarily incomplete. The results are perhaps more satisfactory on the north side of the cairn, where a fairly well-defined northern edge to the quarry is visible in both surveys. In the magnetic plot, the edge is marked by a weak (2–3nT) discontinuity in the traces, and there is no significant response within the area of the quarry. This might in part be the effect of the differential magnetometer, which tends to suppress broad features. The western limit of the quarry is obscured by the anomaly from the waterpipe.

In the resistivity plot, there is a distinct area of uniformly low readings within the northern half of the quarry (squares J and K), but the southern part of its assumed extent is very 'noisy'. The excavated sections showed a ridge of unquarried bedrock within the quarry, but this was at some depth and not as extensive as the disturbance seen in the survey, which is more likely to represent the effects of levelling the site after the excavation.

The south quarry area is irregular in shape, but it has a reasonably clear southern limit. There is some uncertainty towards the south-east, but in both surveys an eastern limit can be fixed which corresponds to that found by excavation. There may be another smaller pit to the south-east of the main quarry, but the resistivity anomaly is no stronger than background variations seen elsewhere in the survey. The magnetic anomaly is fairly well-defined. The magnetic survey failed to define a western limit to the main southern quarry pit, but this is known from the trench, the backfilling of which is visible as an anomaly (T on Fig 222) in the later resistivity survey (unlike the long trench through the north quarry which was not detected). The weak magnetic response from the quarries is perhaps surprising given the strongly magnetic topsoil of the site (magnetic susceptibility = 109×10^{-8} SI units/kg), but this might be because the fill is relatively non-magnetic. (Fill of northern quarry at 1m depth: 65×10^{-8}; sample from bottom of the quarry: 9×10^{-8}. These values are for unsieved soil.)

Hazleton South

Surprisingly little evidence for the cairn itself appears on the surveys, but the quarries, which here appear to resemble flanking ditches rather than irregular pits, are clearly visible as negative anomalies in the resistivity survey. When superimposed on the contour plan of the site, the anomalies can be seen to be symmetrically arranged to either side of the low mound. The quarry on the north-east side is clearly confirmed by the magnetic survey, but the south-west one is largely obscured by magnetic interference from the metal fence at the edge of the field. Another area of low readings is visible at the north-east corner of the resistivity survey, but there is no corresponding feature in the magnetic data. The strong resistivity anomaly in square B was found on excavation to be related to the position of a lateral entrance and passage. A second trench across the mound to the north failed to confirm the presence of the cairn, which is consistent with the low resistivity values obtained. Additional plots of the Hazleton South resistivity survey data are given in Chapter 8 (Figs 153–4).

Barrow Ground Field

The field in general appears to be magnetically undisturbed. On a soil as magnetic as this, any substantial remains associated with past settlement should have been detectable. The importance of the few weak pit-like features which appear at the west of the field (in squares 1, 7, and 8) is difficult to assess. These features might be no more than soil 'noise' and, if they represent occupation features, they are unusually weak for a site on Jurassic limestone. The only other features detected are a north–south linear anomaly, which could be a superficial furrow (squares 9 and 14), and a possible ditch in square 22.

Conclusions

The quarries proved to be only marginally detectable by magnetometer, and, apart from the silting at the edges of the north cairn, few other features were seen. The resistivity survey was in most places fairly responsive to the quarries, but the areas alongside the north cairn were not surveyed until after the excavation and so the results are affected by trenches and debris. There was a strong resistivity response to buried stonework, and both the surviving structure of the north cairn and the chamber of the south cairn could be seen to contrast clearly with areas where little of the stonework apparently remained.

Results similar to these were obtained previously in a survey of the long barrow at Rodmarton, Gloucestershire (English Heritage: Ancient Monuments Laboratory Report 3136). There the side quarries were also traced by resistivity, but again they could not be clearly detected by the magnetometer. The present survey has shown, however, that limited magnetic evidence in conjunction with resistivity results can still provide some indication of the major features of the site.

18 Radiocarbon dating

Introduction

A major series of radiocarbon determinations was undertaken by the Radiocarbon Accelerator Unit of the Oxford University Research Laboratory for Archaeology and the History of Art. Formal lists of these dates, which were all obtained from small-sized samples using accelerator mass spectrometry, have already appeared (Gillespie *et al* 1985; Gowlett *et al* 1986a, 1986b, and 1987; Hedges *et al* 1988), as have discussions based upon some of the dates (Saville 1986; Saville *et al* 1987). In addition, two conventional radiocarbon determinations were carried out at the Isotope Measurements Laboratory at Harwell and will be listed in the journal *Radiocarbon*.

The radiocarbon determinations are tabulated below with full details of the identification and provenance of the samples, presented with reference to the major phase subdivisions of the site. The site location of the samples is shown in Figures 223–4. Table 95 lists all the determinations in sequence of their laboratory numbers. The radiocarbon dates are quoted initially in terms of their age in radiocarbon years before present (BP), but the uncalibrated bc equivalents of the means are given in Table 95, and the plots (Figs 225–6) show the determinations against both BP and uncal bc scales. Table 95 also gives the cal BC ranges for each date at both 1 and 2σ, as determined by the calibration program of Stuiver and Reimer (1986). The dates are thus presented in two forms: one equivalent to the past practice of bc for uncalibrated radiocarbon determinations (expressed as uncal bc), and the other in line with the recent international convention (expressed as cal BC, cal BP, and BP; Stuiver and Kra, 1986). This is done to assist the reader during the period of transition between conventions and to enable comparison with previously published dates.

The radiocarbon determinations

Pre-cairn phase (sub-cairn soil)

Find no	*Sample*	*Context*	*^{14}C age BP (1950)*	*Lab no*
10053	grape-pip	211	144±1%	OxA–678
13151	human cranial frags	211	4875±80	OxA–646
15875	cattle calcaneum	561	4970±80	OxA–738
16215	pig humerus	561	4915±80	OxA–739

The dated human cranial fragments were pieces of occipital bone from within the upper surface of the buried soil beneath the edge of dump 309, below the area of unit U on the south-west side of the monument. These were the largest pieces of three occurrences of human skull fragments in this region of the sub-cairn soil (their location is shown on Fig 195). None of these fragments was in association with any feature. They were probably too far from the chambered areas for their presence to be explained as a result of animal burrowing and must be accounted for as part of the deposits left by pre-cairn human activity. The two animal bones were from the area of the midden and formed part of the Neolithic deposit in that area, being directly associated with the main concentration of pre-cairn pottery and Neolithic flintwork. The modern grape-pip is discussed in Appendix 18.

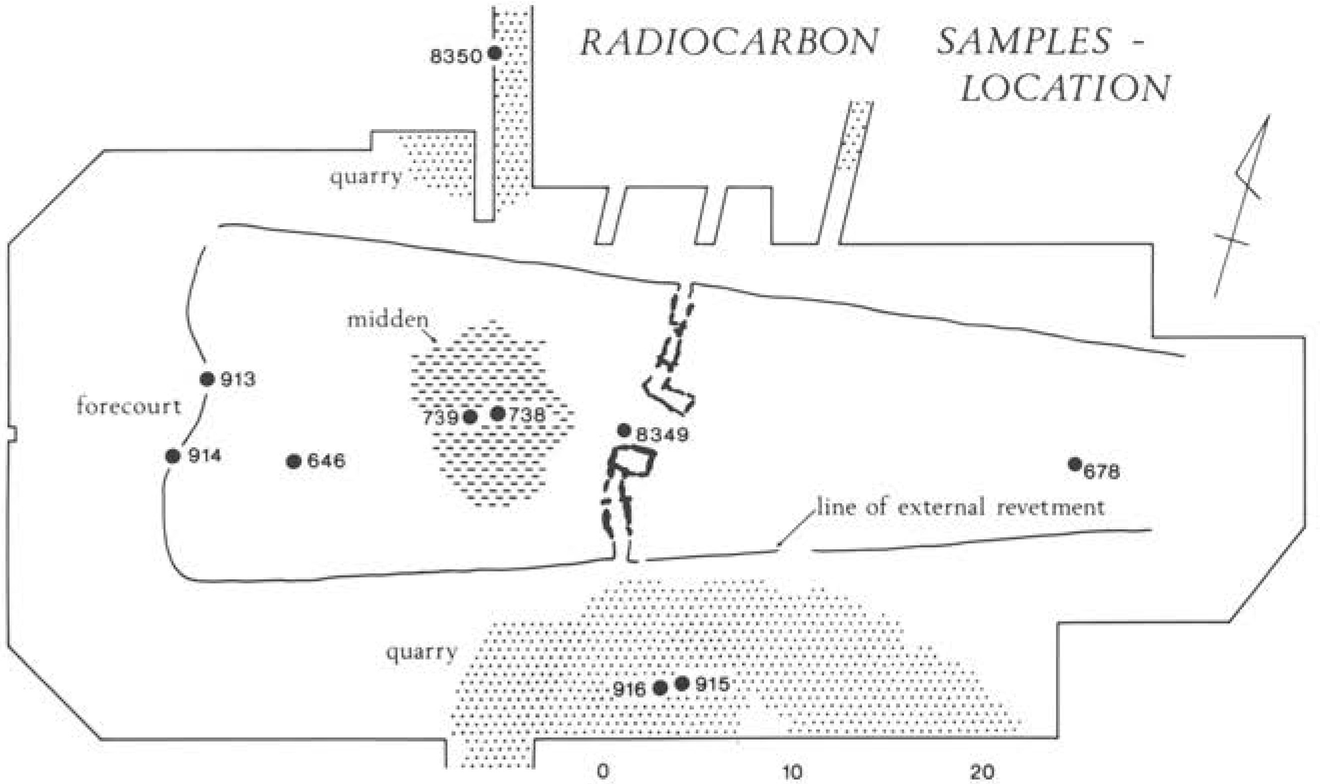


Fig 223 Location of radiocarbon-dated samples from the quarries, cairn, and sub-cairn surface; samples are identified by their laboratory number (see Table 95)

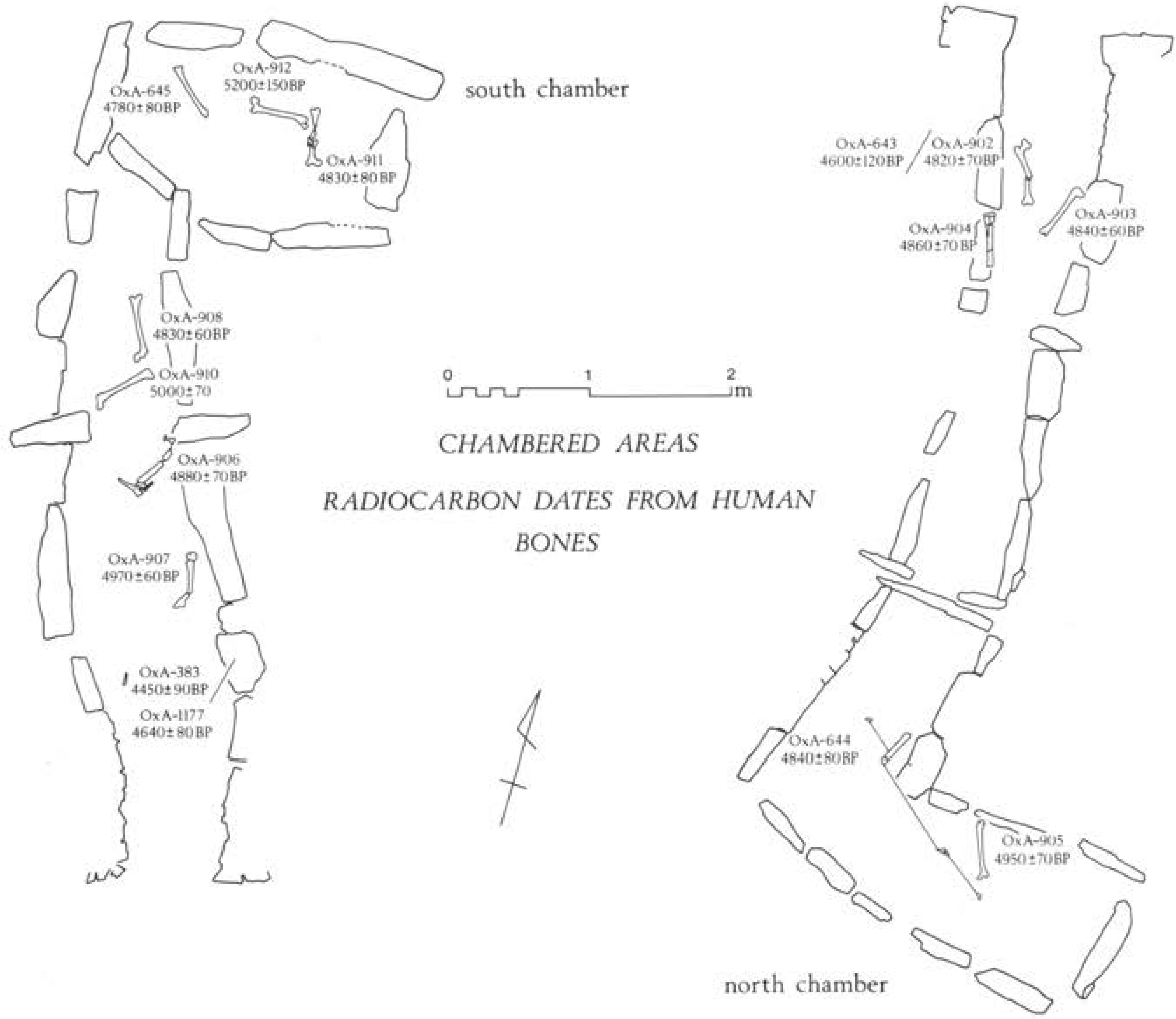


Fig 224 Location of radiocarbon-dated human bones from the chambered areas; all dated bones are femora except for a rib from the south entrance

Monument construction phase

Find no	*Sample*	*Area*	*Context*	*^{14}C age BP (1950)*	*Lab no*
3129	red deer antler	north quarry	85	4950±60	HAR–8350
13926	red deer antler	primary dump	463	4830±60	HAR–8349

Antler 3129 came from the primary fill of the western cutting through the north quarry, at about 150mm above the quarry floor (Fig 32) and must relate to a very early phase of the quarry infill. Circumstantially, the antler is presumed to have been a discarded quarrying tool and therefore directly associated with the constructional process. The other dated antler came from the dump deposit 463, representing the initial construction phase in the axial zone between the two chambers, subsequent to the erection of the orthostats. This antler was therefore directly associated with the cairn construction. There was nothing to indicate any ritual connotation to its occurrence, and it is assumed, as with the previous antler, to have been a discarded tool. A third antler (8481), from the primary fill of the south quarry, was also submitted to Harwell, but in this case no date was obtained from the sample.

Monument construction/use phase

Find no	*Sample*	*Area*	*Context*	*^{14}C age BP (1950)*	*Lab no*
3423	cattle rib	south quarry	166	4840±70	OxA–915
3488	cattle femur	south quarry	40	4810±70	OxA–916

These associated contexts occurred near the base of the central fill of the south quarry to the south of the entrance to the south chambered area (Fig 28) and the positions of the dated bones are shown on Figure 206. The bones are interpreted as the *in situ* remains of human activity on the floor of the slightly-silted quarry. They postdate the working of this part of the quarry, predate the main secondary infill, and are most probably part of a deposit formed during the period of monument use. It is possible, however, because of uncertainty over the quarrying sequence, that the bones were contemporary with extraction continuing elsewhere in the south or north quarries and thus they could relate to the construction phase. The rib, like most of the bones from context 166, retained signs of burning, whereas the femur, despite the burnt nature of the context 40 deposit within which it was embedded, was not itself burnt. Apart from the significance of

Table 95 List of Hazleton radiocarbon dates

Lab no	*Sample*	*Area*	*^{14}C age BP*	*uncal bc*	*cal BC: 1σ*	*cal BC: 2σ*
Oxford University Radiocarbon Accelerator Unit						
OxA-383*	human rib	south entrance	4450±90	2500	3340–2925	3370–2910
OxA-643⁎	human femur	north entrance	4600±120	2650	3510–3100	3640–2925
OxA-644	human femur	north chamber	4840±80	2890	3770–3525	3790–3380
OxA-645	human femur	south chamber	4780±80	2830	3685–3385	3775–3370
OxA-646	human cranium	buried soil	4875±80	2925	3780–3540	3920–3385
OxA-678	grape-pip	buried soil	144±1%	modern		
OxA-738	cattle calcaneum	buried soil	4970±80	3020	3935–3695	3980–3545
OxA-739	pig humerus	buried soil	4915±80	2965	3785–3640	3950–3520
OxA-902⁎	human femur	north entrance	4820±70	2870	3695–3520	3780–3380
OxA-903	human femur	north entrance	4840±60	2890	3700–3535	3780–3385
OxA-904	human femur	north entrance	4860±70	2910	3775–3540	3790–3385
OxA-905	human femur	north chamber	4950±70	3000	3895–3690	3950–3545
OxA-906	human femur	south entrance	4880±70	2930	3775–3545	3900–3515
OxA-907	human femur	south entrance	4970±60	3020	3905–3700	3960–3640
OxA-908	human femur	south passage	4830±60	2880	3695–3530	3780–3385
OxA-910	human femur	south passage	5000±70	3050	3945–3705	3980–3650
OxA-911	human femur	south chamber	4830±80	2880	3770–3520	3780–3380
OxA-912	human femur	south chamber	5200±150	3250	4235–3815	4350–3700
OxA-913	cattle skull	forecourt collapse/OLS	4960±70	3010	3905–3695	3960–3630
OxA-914	cattle skull	forecourt collapse/OLS	4970±70	3020	3930–3695	3970–3640
OxA-915	cattle rib	south quarry	4840±70	2890	3770–3530	3780–3385
OxA-916	cattle femur	south quarry	4810±70	2860	3695–3515	3780–3380
OxA-1177*	human rib	south entrance	4640±80	2690	3510–3345	3630–3100
Isotope Measurements Laboratory, Harwell						
HAR-8349	red deer antler	primary dump	4830±60	2880	3695–3530	3780–3385
HAR-8350	red deer antler	north quarry	4950±60	3000	3785–3695	3945–3640

Notes: *same bone, ⁎same bone. All calibrated values have been rounded to the nearest five years.

these dates for the general relationship of this deposit and the quarry stratigraphy, they provide a date for the associated decorated pottery vessel (Fig 157: 32). These two bones could have belonged to the same skeleton, in which case it would be especially valid to consider the date of 4825±50 BP obtained by combining the two results (Saville *et al* 1987, 113).

Monument use phase

South chambered area human burials

(Samples all teenage/adult femora except 3705)

Find no	*Sample*	*Area*	*Context*	*^{14}C age BP (1950)*	*Lab no*
3705	rib fragment	entrance	11/354	4450±90	OxA-383
3705	rib fragment	entrance	11/354	4640±80	OxA-1177
6810	pair with 4787	passage	187/323	4830±60	OxA-908
6953	pair with 3598	entrance	354	4970±60	OxA-907
7655	individual D	passage	323	5000±70	OxA-910
8291	pair with 4664	entrance	354	4880±70	OxA-906
8663	pair with 9990	chamber	412	4830±80	OxA-911
9993	not paired	chamber	412	4780±80	OxA-645
11035	pair with 9554	chamber	412	5200±150	OxA-912

The rib fragment (3705) was dated as an exploratory sample to test the viability of the Hazleton bones for accelerator dating. Although securely associated with the main burial deposits, this rib was very close to the edge of the disturbed area in the outer south entrance, where the surviving burial deposits lay relatively close to the modern ploughsoil. Since the initial date proved to be anomalous within the series, in that it was virtually adrift from the rest of the dates even at two standard deviations (Saville *et al* 1987, 111), the date was re-run on the sample residue, to yield a date, which though still young, does overlap the other south chambered area dates at a single standard deviation. However, the combined value for these two dates is 4556±60 BP (OxA-383/1177) and could theoretically suggest a genuinely late position among the south side burials (Hedges *et al* 1988, 160).

North chambered area human burials

(Samples all teenage/adult femora)

Find no	*Sample*	*Area*	*Context*	*^{14}C age BP (1950)*	*Lab no*
4113	individual A	entrance	267	4860±70	OxA-904
5037-32	skeleton 1	entrance	267	4600±120	OxA-643
5037-32	skeleton 1	entrance	267	4820±70	OxA-902
5946	individual C	chamber	336	4950±70	OxA-905
6672-16	skeleton 2	entrance	267	4840±60	OxA-903
8816	not paired	chamber	336	4840±80	OxA-644

The initial date obtained for the right femur of skeleton 1 had a very wide standard deviation, which made it difficult to use in comparison with the other dates from the human bones. Since it was held to be vital to obtain as accurate a date as possible for this Neolithic burial, a further determination was obtained from the same bone, resulting in a date much closer to the others from the north chambered area and with a much reduced standard deviation. However, combination of these two dates gives a determination of 4760±60 BP (OxA-643/902), which is still apparently late in the sequence of north side dates (Saville *et al* 1987, 110).

Monument use/decay phase (below collapse in forecourt)

Find no	*Sample*	*Context*	*^{14}C age BP (1950)*	*Lab no*
5926	cattle skull frags	155/211	4960±70	OxA-913
6067	cattle skull frags	155/211	4970±70	OxA-914

Both of these pieces of animal bone were recovered from the base of the extra-cairn material 155, close to the surviving external revetment in the forecourt and just above the surface of the protected buried soil. The bones were found over 4m apart (Fig 207) and were not thought to have belonged to the same skeleton, though this remains a theoretical possibility, since neither belonged to a reconstructable skull. Like the other bones associated with extra-cairn deposits in the forecourt, these cattle skull fragments were interpreted as relating to activity associated with the use of the monument and providing a *terminus post quem* for the initial collapse of the forecourt revetment. The combined age obtained from these two dates is 4965±50 BP (Saville *et al* 1987, 113), which is older than the combined age of the three pre-cairn dates of 4920±56 BP (OxA–646/738/739), but these dates are not actually statistically separable.

Discussion

In order to make the above dates more visually intelligible, and to take account of the due weight which must be attached to their associated errors, the dates are plotted out in Figures 225–6 at two standard deviations. In Figure 225, all the dates are shown in chronological order according to the mean obtained for each sample, and in Figure 226 they are subdivided into the site phases as above.

The series as a whole is extremely compact, virtually all the dates overlapping in a very marked way, around a central point at *c* 4900 BP (2950 uncal bc), with only a few eccentric dates at either end of the sequence. The single exception at the beginning of the series is OxA–912, from the south chamber, which has a mean of 5200±150 BP. This date has an excessively wide standard deviation, however, and its range is statistically compatible with the rest of the sequence, so it does not necessarily have any implications for the presence of early burials (Saville *et al* 1987, 110–11).

At the end of the sequence are three determinations poorly matched with the rest. One of these is OxA–643, the first determination obtained for skeleton 1. This date has a wide standard deviation and must be compared with the re-run date on the same bone, OxA–902, which is more in line with the main series. The other two are the determinations on the rib bone from the south entrance, OxA–383 and OxA–1177. These dates are both very late, the most recent one being adrift from the whole series, and combination of the two dates only just provides an overlap with the other south chambered area dates. While a theoretical case could be made for late burial activity taking place in the south entrance, this would involve special pleading simply to accomodate these late dates. Without any confirmation of such late burial activity from any of the other dated human bones, and without other indication from the series of any activity on site after *c* 4750 BP (2800 uncal bc), these south entrance rib bone dates are regarded with suspicion and seen as probably spurious.

There are grounds, therefore, for regarding the main series of dates around 4900 BP as homogeneous and the earliest and latest determinations as anomalous. The compactness of this series encourages confidence in the validity of the Hazleton dates and is suggestive of a very limited time range for all the activity under consideration.

The plotting of these dates in their contextual phase groups (Fig 226) reveals how little there is in the way of strong internal patterning. Since it is clear that a sequence of events *is* involved, the conclusion to be drawn from the dates as a whole is that the timescale of events under investigation is simply too short for a relatively small number of radiocarbon dates, with their associated error terms, to subdivide

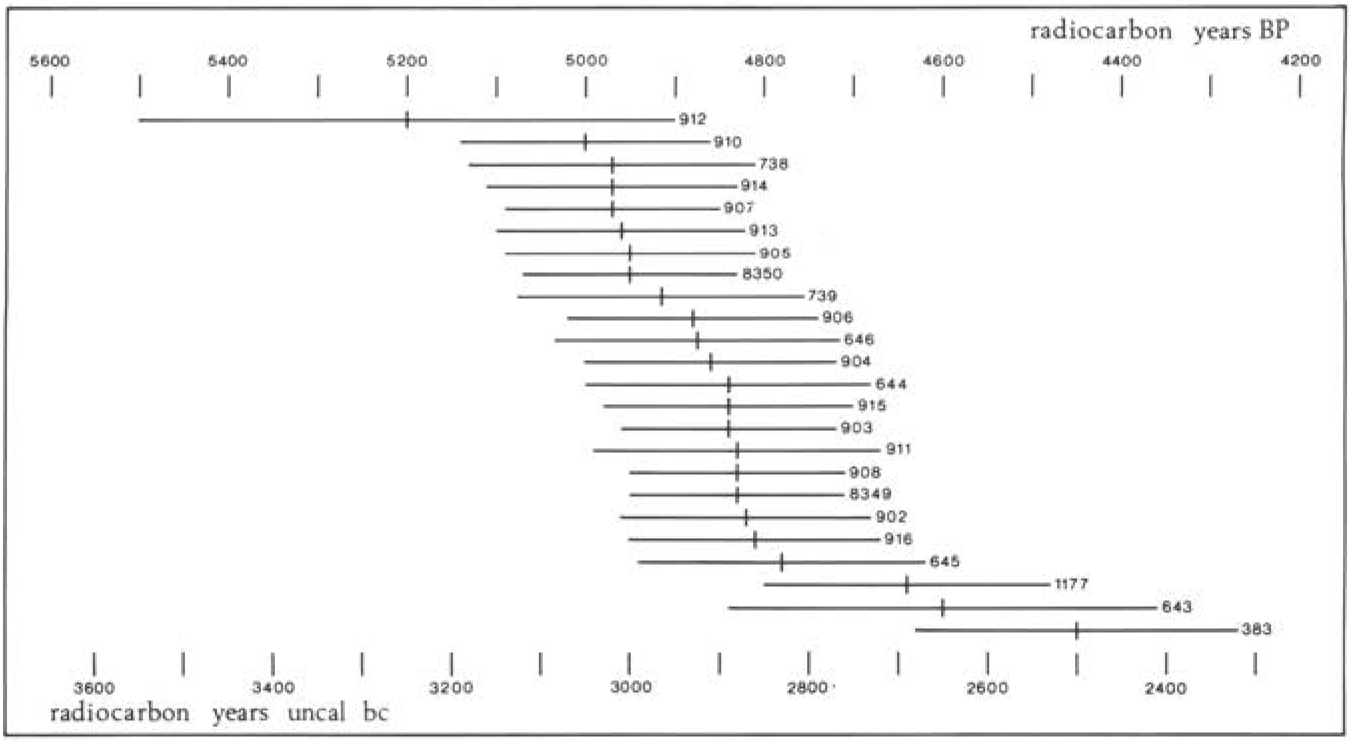


Fig 225 Diagram of the Hazleton radiocarbon dates shown at two standard deviations, with the dates arranged in chronological order according to the means obtained for each sample

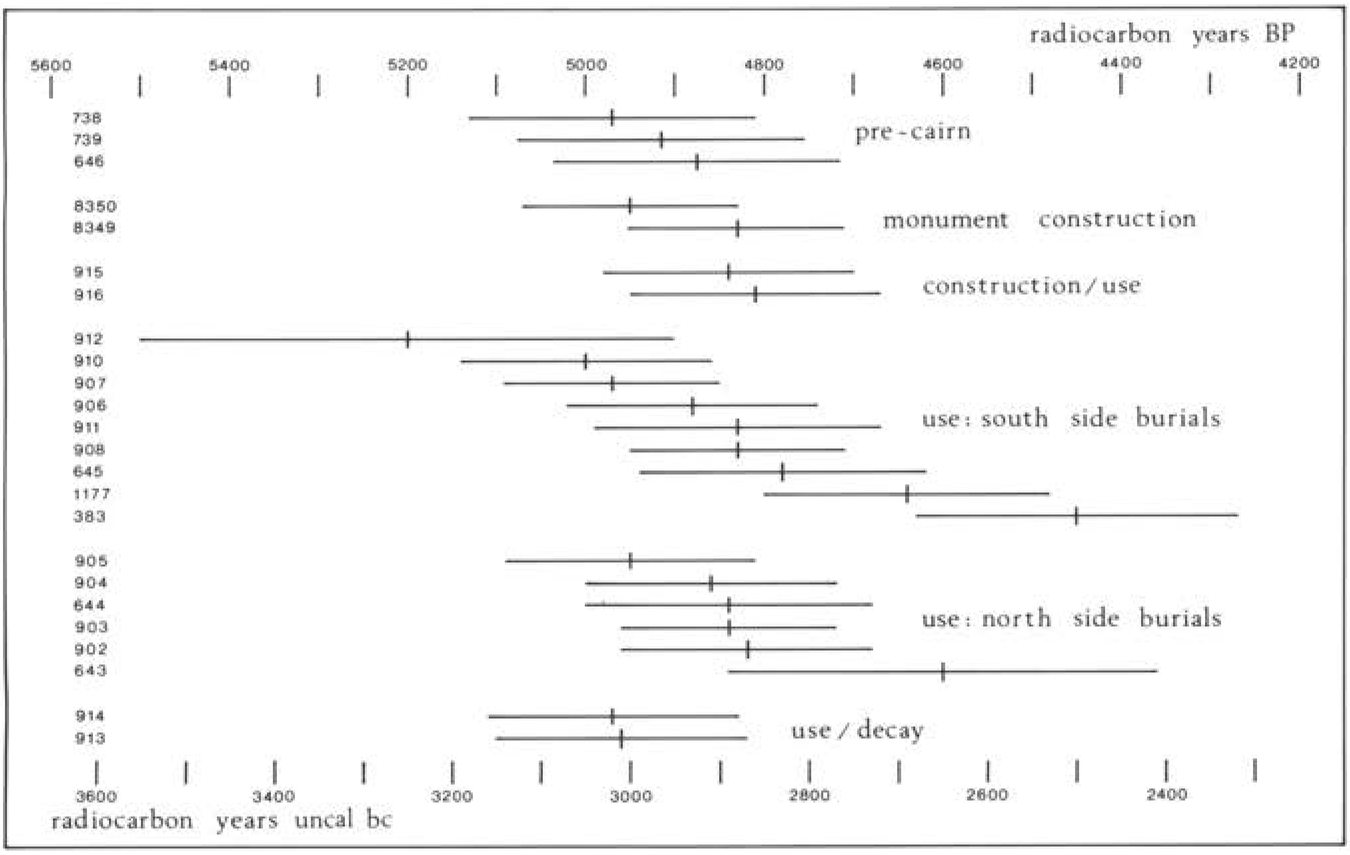


Fig 226 Diagram of the Hazleton radiocarbon dates shown at two standard deviations, with the dates arranged in phase groups

satisfactorily. This is particularly evident from the fact that the pre-cairn and monument construction dates are individually indistinguishable from most of the burial dates.

This is not to say that patterning does not exist, since there is, for example, potential confirmation of the site stratigraphy in that the north entrance dates can be combined (4816±36 BP; OxA–643/902/903/904) to give a date which in radiocarbon years is about 100 years later than the combined dates (4920±56 BP; OxA–646/738/739) for the samples from the pre-cairn surface (Saville *et al* 1987, 113). Nevertheless, the apparent closeness of the respective pre-cairn and north entrance events being dated emphasises the need for caution in interpreting the radiocarbon determinations. Attempting to seriate a sequence of events taking place over a timescale of perhaps years rather than centuries at such a remote period is expecting too much in view of the inherent limitations of the radiocarbon method. In terms of radiocarbon years, the Neolithic events under consideration are essentially coeval.

A complex multi-optional conversion for the calibration of most dates of this period exists depending on where they fall when plotted against the calibration curve (Pearson *et al* 1986; cf Saville *et al* 1987, fig 4). Detailed consideration of the existing Hazleton radiocarbon dates suggested that a 'minimum' range of *c* 3780–3640 cal BC and a 'maximum' range of *c* 3800–3500 cal BC were indicated by the central spread of dates (Saville *et al* 1987, 115). Statistically, however, the radiocarbon dates are not separable and we cannot validly determine 'minimum' and 'maximum' ranges; instead, we can eliminate outliers (OxA–383 and OxA–1177), combine the values for groups of dates, and then the groupings themselves to give an overall value of 4891±33 BP, calibrating to 3780–3640 cal BC. Thus, the calibration only produces a slight broadening of the period of activity at Hazleton when considered in calendar rather than radiocarbon years.

19 Synthesis and discussion

Introduction

The facets of the monument have been presented, the finds and bones discussed, the environmental material laid out, and the chronology outlined: it remains to draw together the threads of discussion for these aspects into a single account of the construction and use of the monument to form the basis of a wider discussion of Cotswold-Severn tombs in the final chapter.

The pre-cairn and post-cairn environments

During the early Flandrian period an argillic brown soil was developed over the Hampen Marly Beds facies of the Great Oolite at Hazleton. This soil would have supported changing arboreal regimes during the Flandrian. Tree-throw in the context of Atlantic forest cover and later forest clearance are seen as probable reasons for the subsoil disturbance noted in soil analysis. The pre-cairn soil contained no real stratification, and most of the environmental evidence is assumed to relate to the immediately pre-monument Neolithic.

The soil itself suggested a mosaic of small-scale landuses, including cultivation and scrub regeneration, with some evidence for cultivation post-dating the remains of Neolithic occupation in the midden area. Macroscopic plant remains point to hazel scrub being the dominant vegetation cover around the site, and to the existence, on the site or in the vicinity, of the cultivation of cereal crops, principally wheat. This picture of limited clearance, followed by cultivation and regeneration prior to monument construction, is supported to a certain extent by pollen and molluscan analyses, but the poor preservation of these data hinders their use in interpretation.

Following monument construction, molluscan evidence from the secondary quarry fills suggests scrub or woodland colonisation rather than continued clearance and cultivation. Some cultivation occurred probably in the Iron Age and Romano-British periods, but the predominant landuse otherwise appears to have been pasture. Arable cultivation intensified only in modern times, beginning before the 1880s and continuing to the present day.

Mesolithic evidence

Pre-cairn Mesolithic activity is indicated purely by characteristic later Mesolithic flint artefacts. These finds were concentrated in the area over which the western end of the cairn was subsequently erected. This coincidence of location is probably fortuitous. The size and composition of the flint assemblage suggested a short-lived occupation, perhaps a forward hunting camp at which retooling of equipment took place. There is no independent dating evidence associated with this activity, except that the typology of the artefacts suggests a date after the seventh millennium uncal bc. It is possible that Mesolithic hunters were attracted to the spot by small-scale clearance occasioned by tree-throws.

Pre-cairn Neolithic occupation

Evidence for Neolithic activity comprised both artefacts and features sealed by the cairn. The features consisted of an agglomeration of postholes and stakeholes, in association with a hearth, and a midden-like spread of occupation debris. The former probably defined the existence of an indeterminate pre-cairn timber structure, only one side of which was recovered. A small piece of daub with a withy impression was the only indication of the nature of a possible superstructure.

The midden was an irregular ovoid area, 10×9m, defined by the darker soil colour and by a concentration of artefacts. It was not a true midden, since it had no height above the general pre-cairn surface, although it was midden-like in the composition of domestic debris. The probability that the area had been cultivated after the debris was deposited may explain its occurrence within, rather than on top of, the buried soil. It may possibly have represented the floor of a former activity area, or even a hut, similarly transformed by cultivation, but there were no structural features associated with the midden.

Predominant artefacts were flint implements and debitage, animal bones, pottery sherds, and quernstone fragments. The abraded and comminuted state of the potsherds and quernstones, the fragmentary state of the flints and animal bones, and the conjoining pattern of the flint and quernstone fragments, all pointed to an interpretation of the whole deposit as secondary rubbish. This occupation was directly dated by two radiocarbon determinations on animal bones from the midden, which combined gave an age of 2990±80 uncal bc (OxA-738/739). The few fragments of human bone from the pre-cairn soil need occasion no surprise on a Neolithic settlement site. That the radiocarbon date obtained from one of these fragments has a mean (2925±80 uncal bc; OxA-646) later than the midden dates need not imply separate phases, since statistically the dates are of essentially the same age.

The pottery sherds from the buried soil, comprising the remains of at least 25 vessels in the form of cups, bag-shaped bowls, and carinated bowls, represent drinking, cooking, and storage vessels appropriate to domestic occupation, probably all made locally, but from five different clays and tempers. Fragmentary remains of quartzitic sandstone saddle-querns and rubbers, and of sarsen mauls, are the evidence for crop-processing onsite. The crop remains permit the species of cereals to be identified. The marked concentration of burnt nutshells in the midden area indicates collection and consumption of hazelnuts by the Neolithic inhabitants. Animal bones from the midden indicate the rearing of sheep, cattle, and pigs, with each species raised for its meat product, and the character of the faunal assemblage suggests the slaughter and consumption of these animals nearby. The flint assemblage associated with the midden consisted mainly of broken waste, the few tools not pointing to any particular functional aspect; most distinctive were the polished axehead fragments.

While any post-depositional pre-cairn cultivation may have exacerbated the fragmentary and dispersed state of the artefacts in the midden area, their character, as the conjoining data from flints and querns confirm, indicates redeposition of rubbish accumulated elsewhere. The origin of the rubbish could be the structure to the south-west of the midden, and the refitting of flints from the two locations offers some credibility in this regard. The nature of the Neolithic settlement is unknown and the remains preserved beneath the cairn could be merely a part of a more extensive settlement in the surrounding area. Nevertheless, the pre-cairn evidence does represent the existence at Hazleton of the settlement of an early Neolithic farming group.

Subsequently, a long cairn was constructed on the same spot. The soil analysis suggests that in the intervening period cultivation took place, at least over the midden area. The pre-cairn structure certainly had no superstructure when cairn construction commenced. One of the first stages of construction was the fixing of a roughly east–west axial longitudinal line, which served as the reference point for all subsequent building. There are no obvious parameters to the selection of this alignment or its position, other than that it overlay the previous settlement. The very central occurrence of the midden is difficult to interpret. Was there any sense in which the cairn was positioned with regard to this feature, or was its central location quite fortuitous? There are no unequivocal links between the occupants of the pre-cairn settlement and the builders of the subsequent tomb, other than the locational coincidence of their activities. It cannot simply be assumed that this locational coincidence implies continuity of the human group involved. The settlement could have been abandoned entirely, only its cleared nature providing the link between the two aspects of Neolithic activity. The radiocarbon chronology suggests near contemporaneity of pre-cairn and cairn-use phases, but it does allow for the possibility of a gap of 50 or so years between the two.

Quarrying and labour requirements

The two extensive quarry areas to the north and south of the cairn are assumed to be the source of most of the material of which the monument was constructed. The coarse-grained orthostats and other coarser limestones used in the construction must have been brought to the site from elsewhere. Otherwise, all the remaining materials could have been obtained from the flanking quarries.

Quarrying in solid limestone requires the exposure of a face, which is then worked on a front, following the suitable stone as required. In plan, the Hazleton North quarries seem to have been very irregular, perhaps partly due to an extraction method whereby several separate quarry faces were exposed and followed, resulting in a series of adjacent and only partially-interlinked quarry pits. On both sides of the cairn, the quarrying was carried very close to the eventual sides of the monument. This proximity was presumably for the sake of practical convenience.

Why quarries did not exist in the areas to the west and east of the cairn is not known. The marly nature of the quarry floors on the west could have deterred further extraction, or there could have been a desire to keep these areas level for reasons connected with the use of the tomb. During the period of tomb use, the quarries would have remained as large open pits, although rapid primary silting occurred from the exposed edges. There would have been a contrast between the appearance of the carefully-constructed cairn and that of the irregular, presumably unkempt, quarries. The length of time that the tomb was in use is relevant here, since, if left undisturbed, the growth of vegetation in the quarries would be minimal over a few decades, but it would probably have covered them within a century.

The quarries seemed to have been little used after quarrying ceased. A possible hearth at the base of one quarry was associated with a decorated pottery vessel and animal bones, dated to 2875±50 uncal bc (OxA–915/916). Contemporaneity with tomb use is suggested, although the deposit is ostensibly domestic. Two separate occurrences of human bones, both in association with animal bones, have no obvious explanation, although one of these could have been related to the postulated secondary disturbance of burial deposits in the south entrance. All the red deer antlers in the primary silts are assumed to be quarrying tools, abandoned haphazardly; one of these yielded a radiocarbon date of 3000±60 uncal bc (HAR–8350).

On the basis of the projected quarry limits (Fig 35), the approximate extent of both quarries (north 554sq m; south 396sq m) is a total quarried area of 950sq m. If the overall mean depth of the quarry is taken as 1.0–1.5m, this gives an extracted volume of between 950 and 1425cu m of stone, marl, and soil.

The estimated quarry volume can be compared with the estimated volume of the cairn. Taking the ground plan of the monument to be trapezoidal, 55m long and tapering from 19m to 8m, then the area covered is approximately 742sq m. Assuming the cairn to be box-shaped, and assuming the height to vary regularly from 1.5m to 0.5m, then the mean volume would be 742cu m. More sophisticated calculations were made, based both on the estimated final form of the monument and on the extent and shape of the excavated stone spread: these suggested that 742cu m could be an underestimate by various amounts up to a maximum of about 200cu m. The point of such calculations is not to achieve a spurious accuracy, but to gain approximate orders of magnitude.

The fact that the hypothetical volumes of the cairn and quarries do not entirely match is not necessarily incompatible, because not all of the quarry material need have been used in the construction. In the later stages, only good stone would be required and much wastage of quarried material could have occurred. Either way, it can be concluded that the projected extent of both quarries would be sufficient to provide all the local material required for the cairn construction. The resistivity survey showed that the Hazleton South cairn probably had its own pair of flanking quarries.

Discussion of the size of cairn and quarries leads on to considerations of the work input involved. Such considerations are very hypothetical, however, and it is proposed here to indulge in the minimum of calculations necessary to be able to place the quarrying and construction activities within a potentially appropriate perspective of time and labour. The way in which the Hazleton limestone was dug remains elusive, but exposing the stone to natural weathering could have been part of the technique, introducing an unquantifiable time factor which is not allowed for in the following calculations. Wooden spades could have been used for clearing the topsoil, but the creation of a face within the bedrock would have been the most difficult task, perhaps involving wooden wedges and levers. Once a face was exposed, then antlers could be used to prise up blocks of limestone along natural fracture- and bedding-planes. Baskets, buckets, bags, or pallets of some kind must have been used for transporting soil and smaller rubble from the quarries to the cairn site, but individual blocks of stone would have been carried or rolled.

No work-study rates for oolitic limestone are known to the writer, so those available for the exploitation of chalk bedrock have been adopted, with the proviso that considerable under- or over-estimates may be involved, depending on the respective methods of working. The data acquired at Overton Down suggested an overall work rate in chalk using 'primitive' tools of '3 cu ft per man-hour' (Jewell 1963, 58). Converting this to 0.085cu m per person per hour as an estimate for quarrying, and assuming a quarried total at Hazleton North of 950cu m, a figure of 11,176 work-hours is obtained. Other estimates for working in chalk assume a rate nearer to 5cu ft (0.142cu m) per hour (Startin 1982, 153), which would give a figure of 6690 work-hours.

The input required to transport the quarried material from the quarries to the cairn site was calculated using the formula of one person being able to move 30lb (13.6kg) across 4ft (1.2m) in a second (Startin 1982, 154). (The speed involved in this formula seems optimistic, but is balanced by the the very light weight.) The return trip from the quarries to the cairn was averaged out at 40m and could therefore be accomplished in 34 seconds. Taking the 950cu m of the quarries to represent in the region of 2400 tonnes, the result is approximately 1667 work-hours.

To the above two sets of figures must be added estimates for the work involved in actually building the cairn, remembering that this required the selection of appropriate stone and the careful construction of the various drystone elements. A completely arbitrary estimate of 1000 work-hours is adopted for this. As for the imported orthostats, there is no way of realistically estimating their transport time without knowing their origin, so again an arbitrary estimate of a further 500 work-hours is given.

It may be objected that even though the lowest estimate for the volume of the quarries was used, this is still too high, and that it would be more realistic to use the size of the cairn for this calculation. If so, using the same formulae as above, a volume of 742cu m would give totals of 5225 or 8729 work-hours for the quarrying and 1288 work-hours for the carrying.

Adding all these figures together gives four separate totals for the quarrying and construction work at Hazleton of 8013, 9857, 11,517, and 14,343 work-hours. Given all the gross uncertainties involved in these calculations, a working hypothesis of between 8000 and 14,500 work-hours for the construction of Hazleton North is proposed.

The minimum workforce to be envisaged at Hazleton is dependent on the minimum number of persons required to perform the most labour-intensive single task. This must have been the transport and erection of the heaviest orthostat, which was assessed as being orthostat 19, the most uniformly massive stone. The irregular shape of the other large orthostats made them easier to manoeuvre, since they were more readily gripped and pivoted.

The weight of orthostat 19 was calculated as between 0.495 and 0.554 tonnes, by assuming its mass to be 0.198cu m and its specific gravity between 2.5 and 2.8. This weight range can be expressed as 500–600kg (10–12cwt). The weights of the other large orthostats, calculated on the same basis, fall within the range 330/370–500/560kg (6½–11cwt). Orthostat 19 could be manoeuvred by three people by rolling and pivoting. Indeed, because of its compact form, it was not practical to use more people to move it. Three people, therefore, could have erected all the other orthostats, once the stones were on site. Transporting the larger stones to the site would have posed much more difficulty, but some kind of timber sledge could have been used. Arbitrarily, it was estimated that at least six people would be required to transport the largest orthostats when any sustained pulling was involved.

On a basis of six people, and assuming a continuous seven-hour working day, seven days per week, then the range of 8000 to 14,500 work-hours is equivalent to 190–345 days or between 6–11 months. Minor increases in the length of the working day, or in the number of people involved, would markedly reduce these periods, but the assumption of continuous seven-day week working is highly unlikely, and the work would presumably be phased over rather more extended periods of time.

This postulated work requirement seems to fall well within the potential of the kind of small-scale farming communities usually envisaged for the British Early Neolithic. If the quarrying and building programme was spread out over five years, then its completion by a small group would not be impractical, in addition to the normal demands of food-production. The mobilisation of six able-bodied persons would surely be within the capacity of a group of 20 to 30 individuals.

Monument construction sequence

Exactly which part of the monument was, or began to be, built first is not known. This is because of the difficulty of relating the chambered areas to the other early cairn elements and because of the impossibility of determining precedence between one end of the cairn and the other. On balance, it is concluded that the orthostats were erected near the beginning of the sequence, but that some construction work had started prior to their erection. Quarrying to obtain the fine-grained orthostats would have produced considerable spoil, which would have been used for the construction of the primary dumps, rather than simply heaped to one side. Movement and erection of the orthostats would, however, have been simpler, if the immediately surrounding ground were unencumbered, so dumps at one or both ends of the monument are envisaged.

Such judgements, on grounds of presumed practicality, are unavoidable. There is no necessity for the construction of an ancient funerary monument to proceed by means which would seem most logical today; ritualised conventions may have been the determining factors and speed of construction of no consequence. Nevertheless, because of the evident skill of the builders in neatly solving constructional problems and because ritually-determined behaviour in prehistory is so difficult to isolate, modern considerations are used to determine the options followed by the builders. In the case of the most striking element of the cairn construction, the cellular units, there is no reason to see these as anything other than a structural concomitant of building in mass with fissile limestone. These revetted, basically rectangular, blocks solved the problem of holding together heaps of soil and stone in such a way that the required height and shape could be achieved in durable fashion. The elegance and strength of this solution testify to the craft-skill of the builders and to their understanding of the raw materials. Other elements of the cairn construction can be explained by reference to the same combination of practicality and skill. The primary dumps can be seen as exploiting the material acquired in stripping the quarries and thereby avoiding any wasted effort. The dumps function as a complement to the axial elements, providing a suitable foundation for the opposed pitching of the slabs carried to the top of the cairn as the axial ridge.

A scenario for the cairn construction sequence is shown in Figure 227. This sequence is simplified and partly hypothetical, since there were often no data available by which elements could be interrelated. The 12 stages shown are themselves somewhat arbitrary and for the convenience of explanation. There was no indication of significant interruption in the building sequence. The analogy of a modern building-site, on which work may proceed on numerous different aspects at the same time, should be kept in mind. The main purpose of Figure 227 is thus to show the general sequence of the elements involved in the construction, rather than the actual sequence in which the whole monument was built. The 12 stages can be individually discussed.

1 The two chambered areas are shown as present from the start, despite the absence of hard evidence for this. Considerable portions of the cairn could theoretically have been built before the orthostats were erected. It is anticipated, however, that the orthostats were in place at an early stage. The imported, larger, coarse-grained orthostats could have been erected in advance of the fine-grained ones, and their erection could have preceded any quarrying. Indeed, it could be argued that, since substantial orthostats were a *sine qua non*, no building-work would have been done before the availability of such orthostats was assured. To allow for this eventuality, the diagram shows only the coarse-grained orthostats in place at this stage.

Nevertheless, the orthostats could possibly be a much later feature. From the later stages of the sequence, it will be observed that the units (K and L) which enclose the orthostats and support their roofing, are necessarily very late in the cairn sequence, since they cannot predate the existence of the units to either side. This fact could be used to suggest that the chambered areas themselves were not built until a very late stage, empty units being reserved for them until the east and west ends of the cairn were more or less complete. There is, necessarily, uncertainty on this issue.

Whatever the precise point at which the orthostats were erected, the initial act of the cairn construction must have involved the establishment of the axial alignment. The alignment was established by the lowest course of slabs forming the foundation of the axial revetment. These slabs were apparently laid in concert with the initial dumping of heaps of rubble and soil over the existing ground surface, since these dumps were keyed into the axial alignment. Knowledge of the intended extent of the cellular construction stages is implied from the outset, since the dumps only extend as far as the limits of the inner stone cairn. The stage diagrams ignore the individual complexities of the dumps and the way in which they were often composed of quite distinct dumped deposits in each area.

The primary dumps shown as present at this stage are those on the north-west and north-east sides. There is no certain basis for determining precedence between them, except that the dumps beneath C/E/G/I are all of soil, whereas a primary stone rubble dump was present beneath units R/T/V. This might just possibly suggest that an earlier stage in the quarrying process produced the spoil for the north-eastern dumps, but this would only be of relevance if a single quarry pit was in operation, and such details are unknown. Thus, although both the north-east and north-west dumps must each have been present, or started, before their corresponding dumps to the south side, there is no reason to suppose that all dumps to the west end might not have preceded those to the

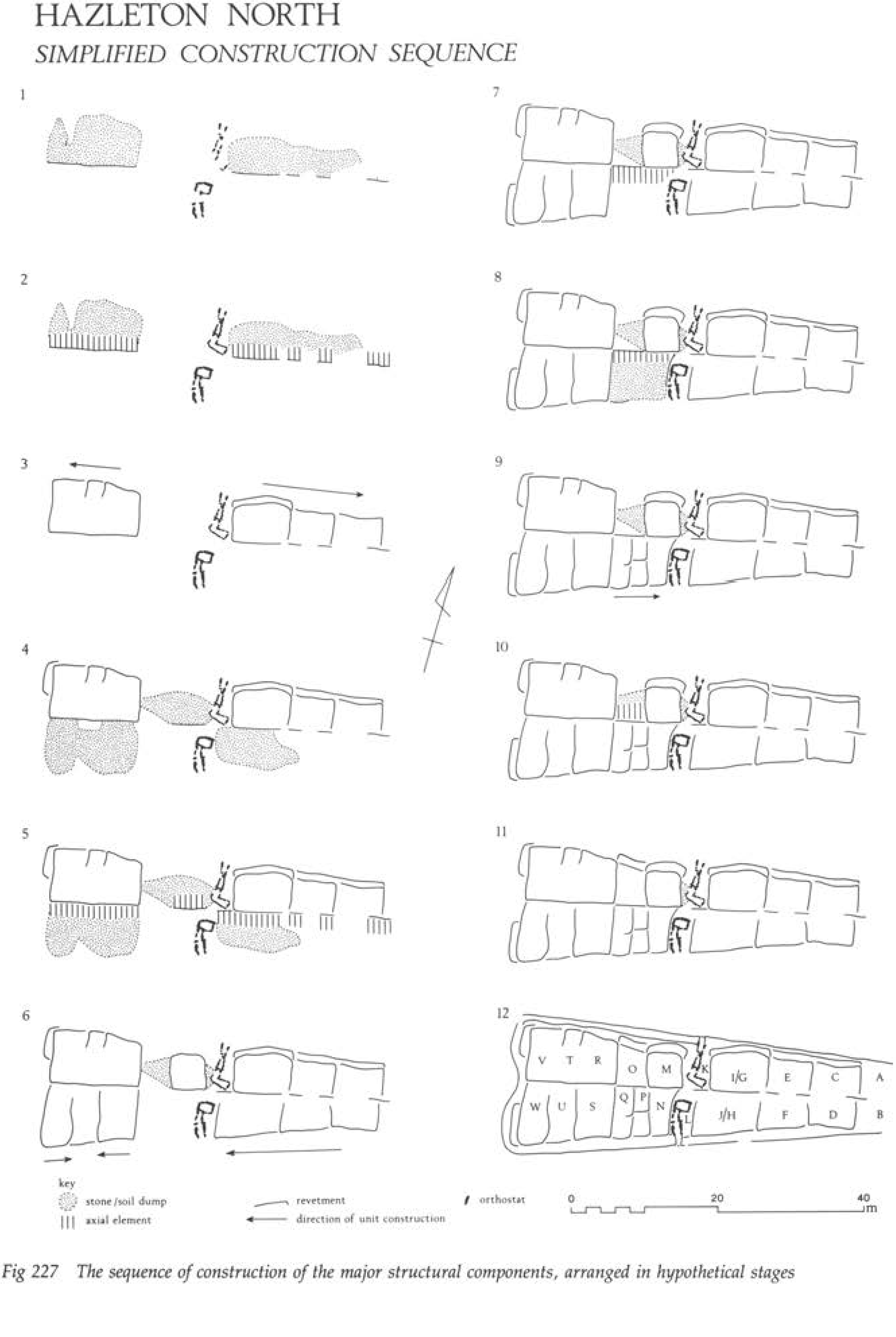


Fig 227 The sequence of construction of the major structural components, arranged in hypothetical stages

east end, or vice versa. The same applies to subsequent stages of the cairn construction, since, until the infilling of the central cairn immediately surrounding the orthostats, the construction of each end of the monument could have proceeded completely separately. Thus, the whole block of units R/S/T/U/V/W and their underlying dumps at the west end of the cairn could have been constructed as a single entity, completely independently of the rest of the monument.

2 The initial cairn element overlying the primary dumps (in all areas except units N/P/Q) was the axial element, a triangular wedge-shaped mass, including substantial slabs of quarried stone, revetted on the axial alignment. At the north-west and north-east parts of the cairn, it was clear that the north side of the axial element, with a south-facing revetment, had been constructed before the south side. Deposition of the south side primary dumps on the south-west and south-east, however, could have begun prior to the construction of the axial elements shown here.

3 Once dumps and axial elements were in place, the construction of the cellular units of the inner cairn began. These units are the roughly rectangular-shaped, revetted masses of stone and soil, which constitute such a distinctive feature of the construction technique. Units R/T/V and I/G/E/C were definitely built before their matching units to the south, and could also be seen to have internal sequences of construction from east-to-west and west-to-east respectively, as demonstrated by the butting arrangements of their revetments. By the same token, the northern extension to unit I/G must have predated the completion of unit E.

4 The south side primary dumps beneath units S/U/W and J/H are shown as present by this stage, and they certainly postdate the axial revetments to their north. Also shown is the primary dump on the north side between the north chamber and unit R. While the latter dump does genuinely appear to postdate at least three of the orthostats, its relationship to unit R is much less clear. It does appear to postdate the dump beneath unit R, but it could have been deposited before either the axial element beneath unit R or the eastern revetment of the unit.

The inner north horn extension to unit V and the northern extension to units C and E are shown as present. There is no evidence to place these accurately within any sequence between the inner and outermost cairn construction, but they could have been added as soon as the units to which they are appended were in place.

5 The axial elements are shown superimposed on the primary dumps in units S/U/W, M, and J/H, and directly overlying the pre-cairn surface in the area of units F and D, where there were no primary dumps. The axial element beneath unit J/H continues westwards beyond the limit of unit I/G and so changes character at that point, becoming a temporarily freestanding axial revetment with a face to the north.

6 South side units S/U/W and D/F/J/H are shown as in place, with their internal sequences indicated. On the north side, the almost square unit M was apparently constructed as a single freestanding block over the segment of axial element shown in stage 5. The regularity of the block of units (R/S/T/U/V/W) at the west end of the cairn, particularly the flush eastern face of units R and S, may be an indication that this block was constructed as a separate entity.

7 The north extension to unit M and the inner south horn are shown, since these could immediately follow the construction of units M and W. The northern extension of unit M certainly preceded the construction of unit O to the west and any infilling of unit K to the east. The axial revetment beneath units N/P/Q is an exception to the normal rule, in that it was founded directly over the pre-cairn surface without any primary dumping. South of unit M, this revetment is built against the south-facing axial alignment forming the southern limit of unit M, but, between unit M and unit S, this axial element changes character and becomes temporarily freestanding with a north-facing axial alignment.

8 Dumped material like that of the primary dumps elsewhere is deposited in the area beneath units N/P/Q, but in this case overlying the tail of the axial element already in place. Initial revetments were possibly added on the south side of unit Q and the east side of unit N, in phase with the dump deposition.

9 Units Q, P, and N are added in sequence from west to east. Units Q and P were apparently subdivided internally, at their upper levels at least, into two small, rectangular units each, the northern parts being constructed before the southern parts. The infilling of unit L around the southern orthostats could have begun as soon as the adjacent revetments to units N and J/H were in place.

10 The axial element in unit O was the last one to be laid, built against the face of the axial alignment forming the northern limit of units P and Q.

11 Unit O was constructed between units M and R, with a northern extension added at some stage prior to the construction of the outer cairn.

12 A slight northern extension to all the units on the north-west side was added, linking up with the north entrance orthostats and so pre-

sumably defining the stage at which unit K around the north chambered area could be filled in. The outer skin of cairn fabric, with its carefully-built outer facade, was constructed all around the cairn, there being no indication of the sequence or direction in which this outer skin and facade were laid. Units A and B were added at this stage, the external facade presumably originally being continuous at the eastern tail of the cairn, giving a rounded or squared end.

The paving of the chambered areas could have been laid at any stage subsequent to the erection of the orthostats, and the intercalary revetments started thereafter. The entrance and roofing arrangements could not have been constructed until after the infilling of units K and L, which in turn could not be achieved until the adjacent units were in place to either side. The nature of the infill of unit L around the south chamber suggested that it was constructed right from ground level as a unitary support for the roofing, presumably built in one operation.

External appearance of the monument

The Hazleton North cairn was designed to be seen with its outer revetment fully exposed, and it is suggested that the entrances to the lateral chambered areas were roofed and probably lintelled. For reconstructing the uppermost level of the cairn, however, there is little evidence, and the final appearance of the completed monument remains entirely speculative. A fundamental question must be whether the surface of the monument was covered with stone, or with timber, or soil and turf. The former is here considered more probable, partly because this was essentially a cairn, and the upper surface is most likely to have matched the sides, and partly because suitable stone was readily available on site.

The maximum height to which the cairn survived was 1.6m. The minimum height loss since the monument was built must be more than 0.5m, and the original maximum cairn height was perhaps 2.5m. The original internal heights of the chambers are estimated as between 1.1 and 1.3m. Adding the thickness of corbelling and roofing slabs, and assuming the roofing arrangements were covered by some cairnstones, then a height of at least 1.5 to 2.0m must have obtained in the chambered area of the cairn. The maximum surviving height of the facade in the forecourt area was 0.8m, but the stonework of the inner cairn just behind the facade stood at 1.0m. The central forecourt was probably originally at least 1.5m to 2.0m high.

The forecourt revetment decreased in height towards the horns, but not to less than 1m, and 1.5m is estimated as a likely maximum height at the corners. The floor-to-ceiling height of the inner entrances is estimated as 0.9–0.7m, with the height decreasing to the outer entrance. The maximum height of the outer revetment at the outer entrances is estimated at 1.0m, in view of the evidence from the extra-cairn sections. At the cairn tail end, the stonework could have been extremely low (perhaps not exceeding 0.3m).

Given the basic parameters of a longitudinally-tapering profile, and a cross-section with its highest point at the centre, a great variety of cairn shapes could be envisaged from the above dimensions. Figure 228 attempts to demonstrate some of these possibilities. In terms of the longitudinal elevation, there is perhaps less scope for variety. Basically, the long axis profile could have been angular (1–3), or slightly curved (4), and could have had its highest point at the forecourt (2–3), or closer to the chambered area (1 and 4). The transverse profile could equally have been angular (A, C–D) or curved (B), and plain (A–B) or more elaborate (C–D). The visual difference between curved and angular would have been slight in any case.

The cross-section of the cairn contains a double-pitched or ridged aspect throughout. There is no basis for assessing how marked this ridged effect would have appeared at the surface, although it was decided that a stepped transverse profile would be unlikely. A combination of shapes 1 and A was selected as the preferred option for the original form of the cairn. The isometric reconstruction (Fig 229) follows elevation 1 and transverse profile A, but would in fact have hardly appeared any different had elevations 2–4 or transverse profile B been selected. Only the more extreme transverse profiles C and D would have made a marked visual contrast at this large scale.

The monument would not retain for long the bright, creamy-grey appearance of freshly quarried stone. The uppermost cairn stones would soon become weathered and moss-covered. This would have happened within the lifetime of the use of the monument.

Finally, and purely hypothetically, there is no reason why detailing could not have been included in the upper outer stonework of the facade or the surface.

The chambered areas and the entrances

The components of the chambered areas identified during excavation were the orthostats, the sillstones, the paving, the intercalary revetments, the cross-piece, the blocking slab or slabs, and the incipient corbelling. The roofing was nowhere intact, but, in the absence of evidence for any substantial capstones, was assumed to consist either of large slabs laid across the reduced spaces created by the corbelling or of completely corbelled vaulting. Figures 230–31 attempt to show the various components in place by means of isometric drawings, which partially reconstruct some of the above elements.

The intact blocking slab (between the north passage and chamber) not only demonstrated how

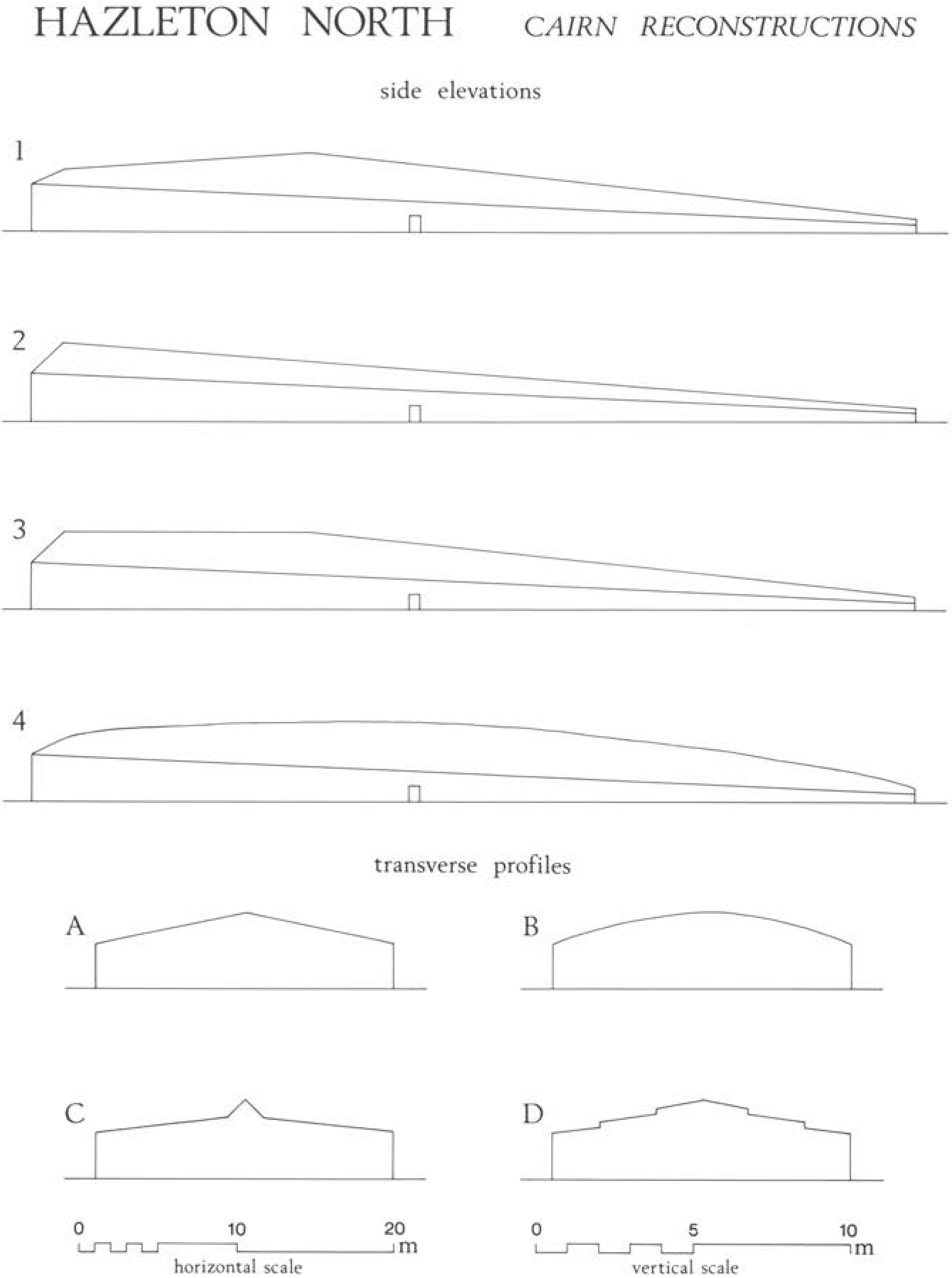


Fig 228 Hypothetical shape reconstructions for the cairn when first built; the longitudinal side views are true elevations; the transverse views are profiles of the cairn viewed end-on

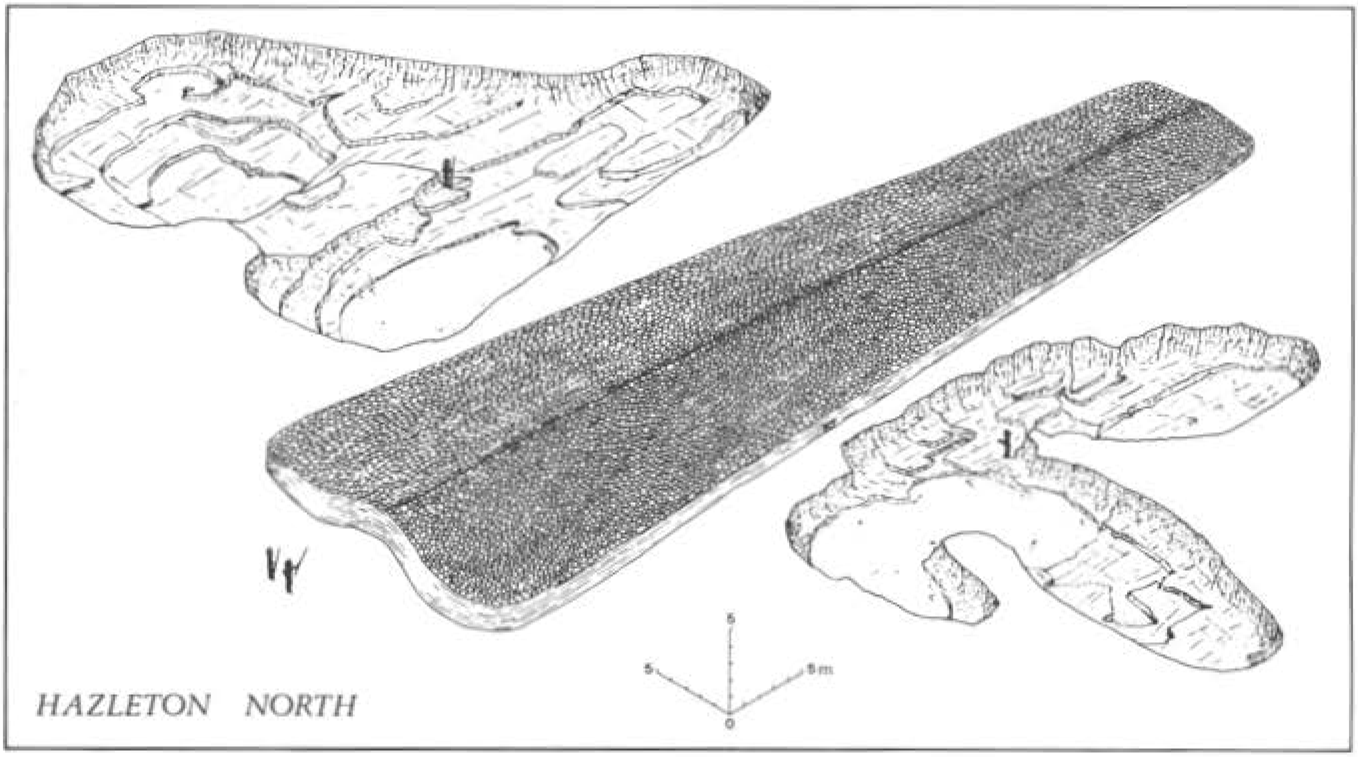


Fig 229 Isometric sketch reconstruction of the external appearance of the completed cairn in relation to the supposed extent of the two quarries

these tombs were internally sealed when still in use, but indicated an architectural explanation for the device of transverse orthostats and possibly for sillstones as well. The lateral projections of the transverse slabs, and the upward projection of the sillstone, ensured a more secure closure with the blocking slab in place. Since the blocking slab rested against these projections, it would resist pressure from without. At the junction of the south entrance and passage, there was no sillstone, but an upper crosspiece appears to have served a similar function.

Another blocking slab could originally have been located at the junction of the north entrance and passage, in association with the transverse slabs there. It is less easy to see the sillstone at the junction of the south passage and chamber acting as the stop associated with a blocking slab, because there were no projecting transverse slabs at this point.

Such projections into the throughway naturally had a significant effect in constricting the access space. Reduction of the gap on the south side to about 0.5m square, for example, must have had considerable implications for the way in which the tomb was used. On the other hand, the fact that access for burial was obviously achieved despite such constrictions makes it possible to see the space available elsewhere within the chambered areas as quite commodious. The bearing which the construction of the chambered areas had on the methods of tomb use is considered further in discussing the burials themselves.

Evidence for the way in which the entrances were covered and closed was scanty and equivocal. The rear parts of both entrances were undoubtedly roofed, but this was not clear for the zones beyond the portal orthostats. If skeleton 1 in the north entrance was not simply an irregular final deposition before closure, and if the normal practice was for burial deposits to extend to the limits of the entrances, then it would seem highly likely that the entrances were completely roofed. This would have involved upward continuations of the drystone revetments flanking the outer entrances to support roofing slabs and presumably a lintel spanning the gaps of up to 0.8m. There would seem to be no particular difficulties in such a construction. The possibility is increased by the knowledge that constrictions of about 0.5m square were negotiated by the tomb users, thus the entrance roofs could have been kept low, perhaps as low as 0.5m in the outer entrances, and still have been functional.

A lintelled outer entrance could be closed by inserting drystone walling flush with the outer facade up to the level of the lintel. Re-entry and resealing could be effected by dismantling and rebuilding this wall as necessary. The evidence from the north entrance did indicate the probable presence of such an inserted entrance blocking wall, although what survived can only be regarded as a base for the blocking proper. The reconstruction of the north entrance in Figure 232 follows the above, but it is hypothetical. In particular, no evidence existed for a lintel slab; the lintel could even have been in timber. Presumably, it would also have been possible to have corbelled the outer entrance as an arch, although in drystone this would have been a fragile structure.

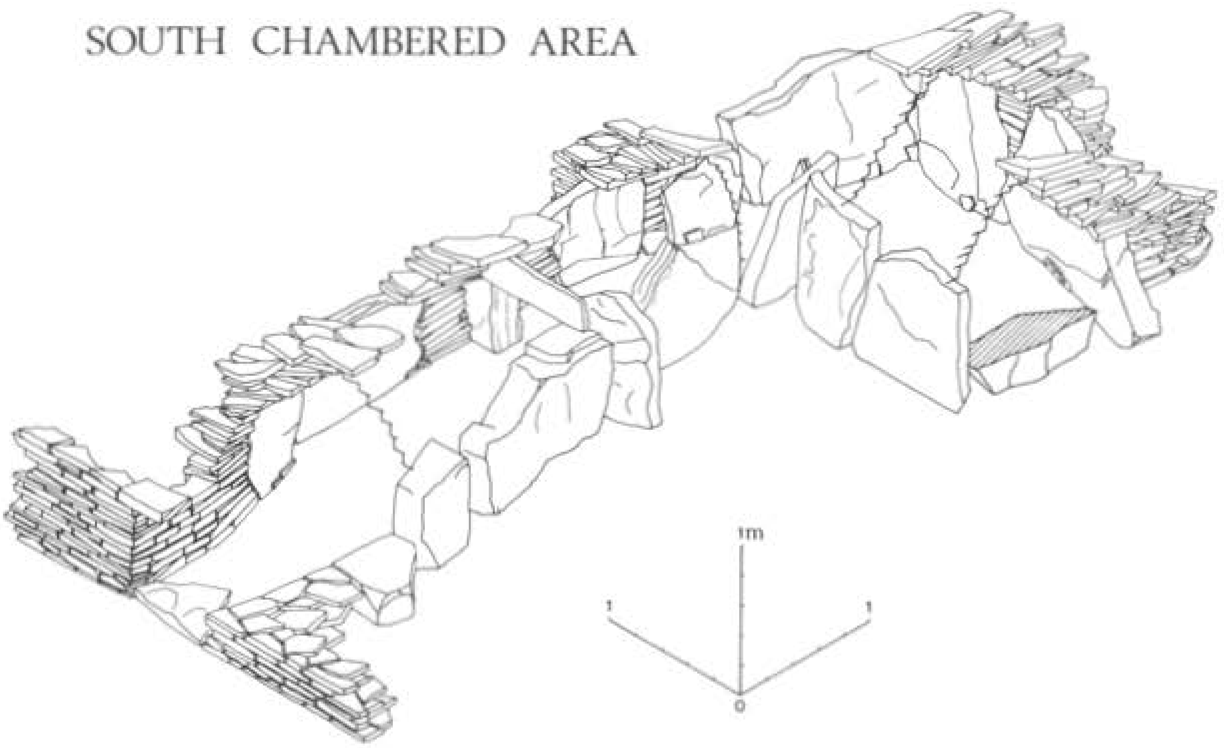


Fig 230 Isometric projection of the south chambered area; various features, such as the entrance revetments, the crosspiece in front of the transverse orthostats, and the corbelled vaulting are reconstructed; the terminal chamber orthostat is artificially truncated for greater clarity, and the paving is omitted

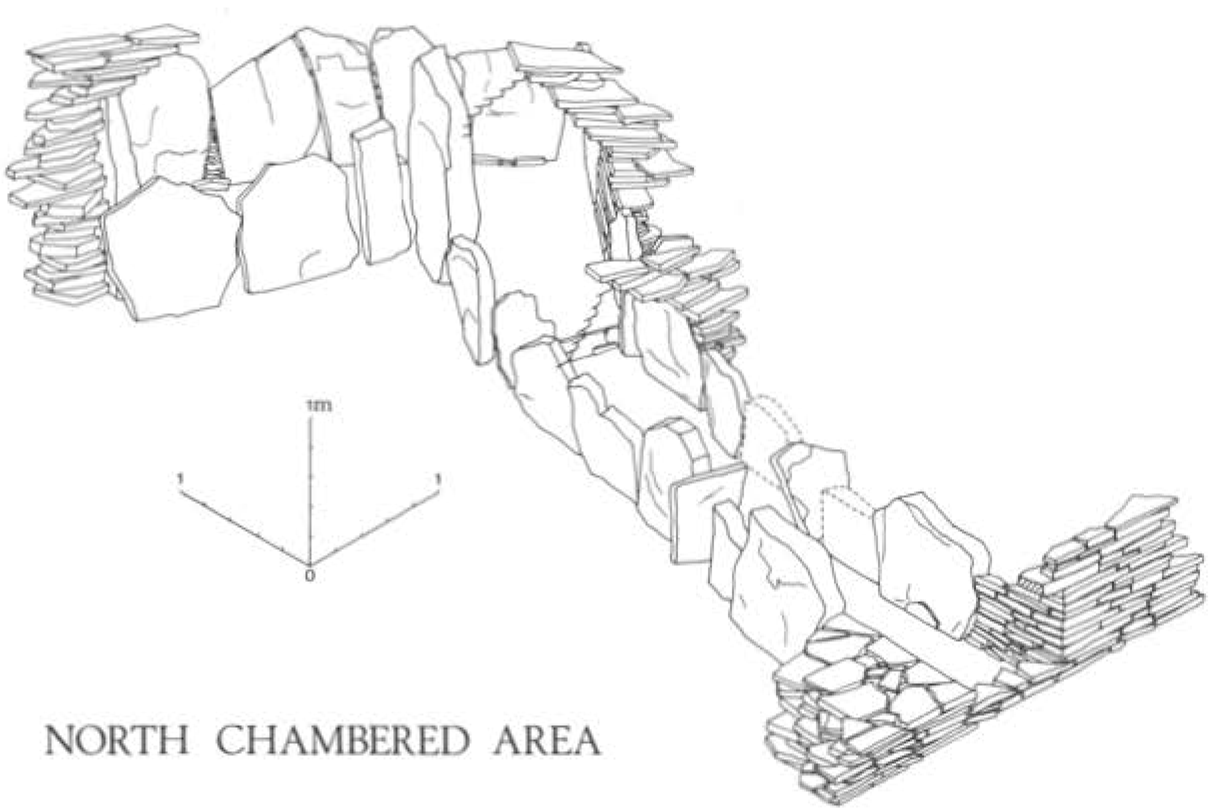


Fig 231 Isometric projection of the north chambered area; the orthostats shown in dashed outline are reconstructed, as are the entrance revetments and the corbelled vaulting; leaning or fallen orthostats in the passage and chamber are shown upright; the blocking slab associated with the sillstone has been omitted, as has the paving

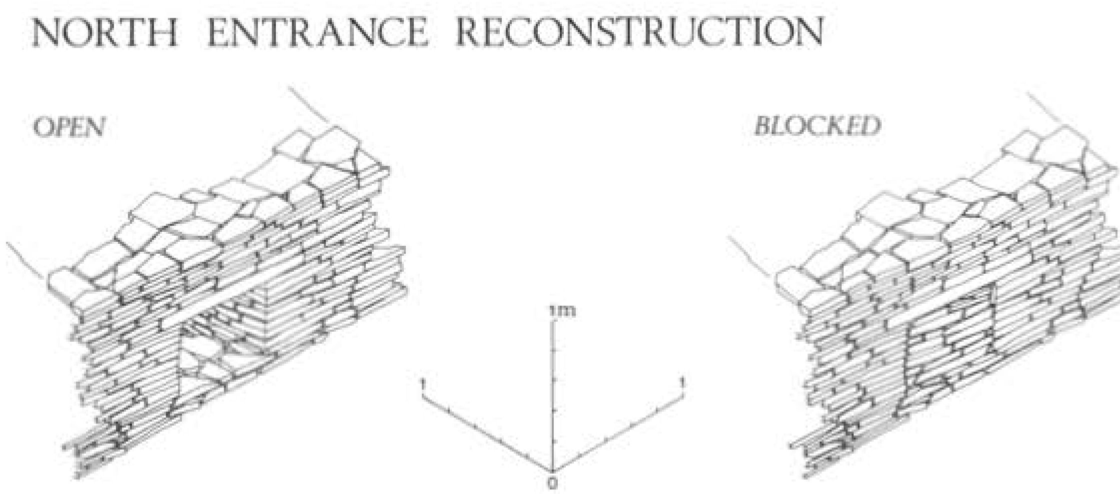


Fig 232 Isometric reconstruction of the appearance of the outer north entrance; open as when in use and closed as when blocked between burial episodes; the lintel slab is entirely hypothetical

The burials and burial rites

Both chambered areas at Hazleton North were used for collective human burial, and evidence from the north entrance indicated the practice of successive interment. The decipherment of this rite elsewhere within the chambered areas and the identification of the individual skeletons were hampered by the disarticulated state of most of the bones, by post-depositional damage and decay, by disturbance, and by the limitations of the analyses undertaken.

The south chambered area contained remains relating to 14 separate adults, between 6 and 11 pre-adults, and a possible 6–7 month-old foetus. The bones of these individuals were very dispersed, but basically fell into two groups: one concentrated in the chamber and the passage, and the other in the entrance. The adults included eight probable males and two probable females. Female bones were only definitely present in the chamber and passage, and bones of pre-adults were rare in the entrance. Adults were split more or less evenly between the two groups. The partial skeletons of two disarticulated individuals, D (adult) and E (juvenile), were identified on the basis of the distinctiveness of their bones. In the case of longbones, some evidence was available for bones being absent from the deposit. Possible ordering of some of the bones was noted from the location of skulls in groups against the edges of the chambered areas. In general, the disarticulated bones were more scattered in the chamber than the entrance, and articulations, though rare, were more common in the entrance. There was some evidence from the apposition of bones to indicate the possibility of at least two articulated adult inhumations having formerly been present in the entrance.

The north chamber contained disarticulated remains (partly intact, partly disturbed), relating to four adults (?two male, ?two female), between four and six pre-adults, and a foetus of four–five months. Four probable individuals (two adults, two children) were isolated from the general spread of bones, their bones being disarticulated, but nevertheless showing some concentration in separately located groups.

The north entrance burials included one complete, extended adult male inhumation, the lower part of the crouched inhumation of another probably male adult, and disarticulated remains of another adult male and two pre-adult inhumations. In addition, there were cremated bones belonging to at least one adult and one pre-adult. The nature of the remains in the entrance made it clear that a minimum of two burial episodes were involved, since the extended skeleton overlay the crouched one. Deliberate ordering of the remains was evident from the placing of two skulls over the top of collapsed stonework.

The total number of individuals represented, therefore, ignoring the two possible foetuses, was 21 adults and between 12 and 19 pre-adults, plus a further adult and a further pre-adult on the basis of cremated bones, giving an overall minimum of 35 and a maximum of 42. At least 12 to 13 of these individuals were probably male and 2 to 3 probably female. The adults included seven individuals aged 35 or over (of whom two were aged over 45/50 years), while the pre-adults exhibited a complete range of ages from six months upwards.

The bones in the north entrance provided a high quality of information because they were undisturbed, following the final burial episode. They indicated the following aspects of burial procedure: the rites of inhumation and cremation were being practised concurrently; intact corpses were being inserted into the tomb; both extended and crouched inhumation were practised; the bones of previously-inhumed corpses were moved subsequent to their *in situ* decomposition, or partial decomposition, and before a further burial episode; and special attention was given to the placing of disarticulated skulls.

It is important to consider how valid the evidence from the north entrance is likely to be for burial interpretation as a whole, since the special circumstances of the blocked junction may have created an abnormal situation. The burials in the north entrance were clearly late within the sequence of north-side burials, but were they any later than the Hazleton burials as a whole? The radiocarbon evidence would suggest not. A major difference is that cremation was not present elsewhere among the burials, but this alone is not sufficient reason to disregard the north entrance burials when considering the rest.

It seems probable that the north entrance burials are only different insofar as they are undisturbed following the final inhumation and in that there was no opportunity for the bodies or bones to be taken further into the tomb. From this it is possible to create a scenario at Hazleton, whereby the norm was for burials to be introduced as intact corpses into both chambered areas, with or without personal gravegoods. Subsequent to decomposition, the bones or body parts and any gravegoods were moved around within the chambered areas to provide space for further inhumations and to facilitate access. The articulated or juxtaposed nature of certain skeletal parts suggests movement within the chambered areas of some body parts prior to total decomposition. At least two skulls seem to have been moved as heads with attached mandibles. Some of the bones, particularly the skulls and the longbones, were given special attention in the way that they were placed within the tomb. Some longbones and probably some skulls were removed altogether.

It was previously suggested that corpses were left to decompose in the entrances (Saville 1984a, 22). However, no skeletal parts belonging to the north chamber burials were noted among the loose north entrance bones, and the articulation and pairing patterns on the south side indicated a distinct subdivision between chamber/passage and entrance.

There is little in the Hazleton evidence to refute the burial scenario given above. In particular, there is nothing to suggest the introduction of partial corpses and/or bones, obtained from previous burials or exposure elsewhere (except the north entrance cremations). The contrary is supported by the instances of actual articulation, by the presence of so many tiny skeletal parts (including hyoids, sesamoids, pisiforms, etc), and by the numbers and distribution of pairing and formerly articulating bones. The north entrance burials suggest very firmly that the *intact* corpse was accorded the respects of burial, whereas the decomposed corpse and bones were treated rather unceremoniously.

On the north side of the cairn, the initial phases of funerary activity involved the introduction of burials into the chamber. The evidence is not incontrovertible, but is not inconsistent with the introduction of intact corpses. The tentative identification of individuals in the chamber suggested that the previous remains may have been placed in discrete areas; the zone immediately inside the sillstone seems to have been unused for burial. It would be expected, since the north chamber was found sealed, that given the above scenario there should have been an intact inhumation in the chamber, rather than a scatter of disarticulated bones. However, subsequent disturbance, most disruptive in this area, prevented any conclusions on this point.

The absence of bones in the north passage is important, since it shows that, while the north chamber was in use for burials, none were taking place in the passage, and, unlike the situation in the south chambered area, there was no 'drift' of bones from the chamber into the passage. The reason for this contrast could be that the use of the south chamber was more intensive and that had it been possible for burials to continue in the north chamber, the same situation would have arisen. However, the intact blocking slab and the probable blocking stonework beyond it show that, in the early stages of chamber use at least, considerable effort was made to restrict the burial remains to the north chamber, and it is possible that the sillstone on the south side marked a similar point of initial demarcation.

On the south side, the information from the pairing bones has pointed to a dichotomy in the distribution, which otherwise appeared as a virtually continuous deposit of bones from the entrance to the chamber. The radiocarbon dates are of no help in phasing the south side burials, but logic suggests that the chamber burials are likely to have preceded those in the entrance.

It can be proposed, therefore, that the initial phases of burial activity on the south side involved the successive interment of corpses within the chamber, with a blocking slab at the junction of the entrance and passage, and possibly some form of closure at the junction of passage and chamber, being removed and replaced with each new interment. At some stage, it was decided to cease burials in the chamber and to commence successive interments in the entrance, with the blocking slab in place at the transverse slabs. The burial deposits in the chamber may have been relatively undisturbed and restricted to the chamber at this stage, or the sillstone demarcation may already have been abandoned and the bones become spread into the passage. Towards the end of the use of the tomb, the blocking slab was taken down and the entrance bones were scattered across the recumbent slab and into the passage. The chamber may have now been re-entered, and possibly it was at this stage that some of the chamber bones were scattered in the passage; there is no evidence, however, in the form of intact skeletons, that any further burial activity took place in the chamber.

There can be no doubt, in view of the north entrance remains, that the successive nature of the burial activity created the dispersed, disarticulated state of the bones, with clearance of sufficient space for each new corpse requiring the previous bones to be pushed and placed to the edges of the chamber, perhaps without undue ceremony. There is some evidence from the north chamber to suggest that bones belonging to separate individuals were placed in discrete groups, but these groups would become less distinct after a while, if further clearances for new corpses were required. The point to be emphasised is that the situation in the south chambered area reflects the final state in which the burial deposits were left when the tomb was abandoned (excepting the areas of disturbance), and that this final palimp-

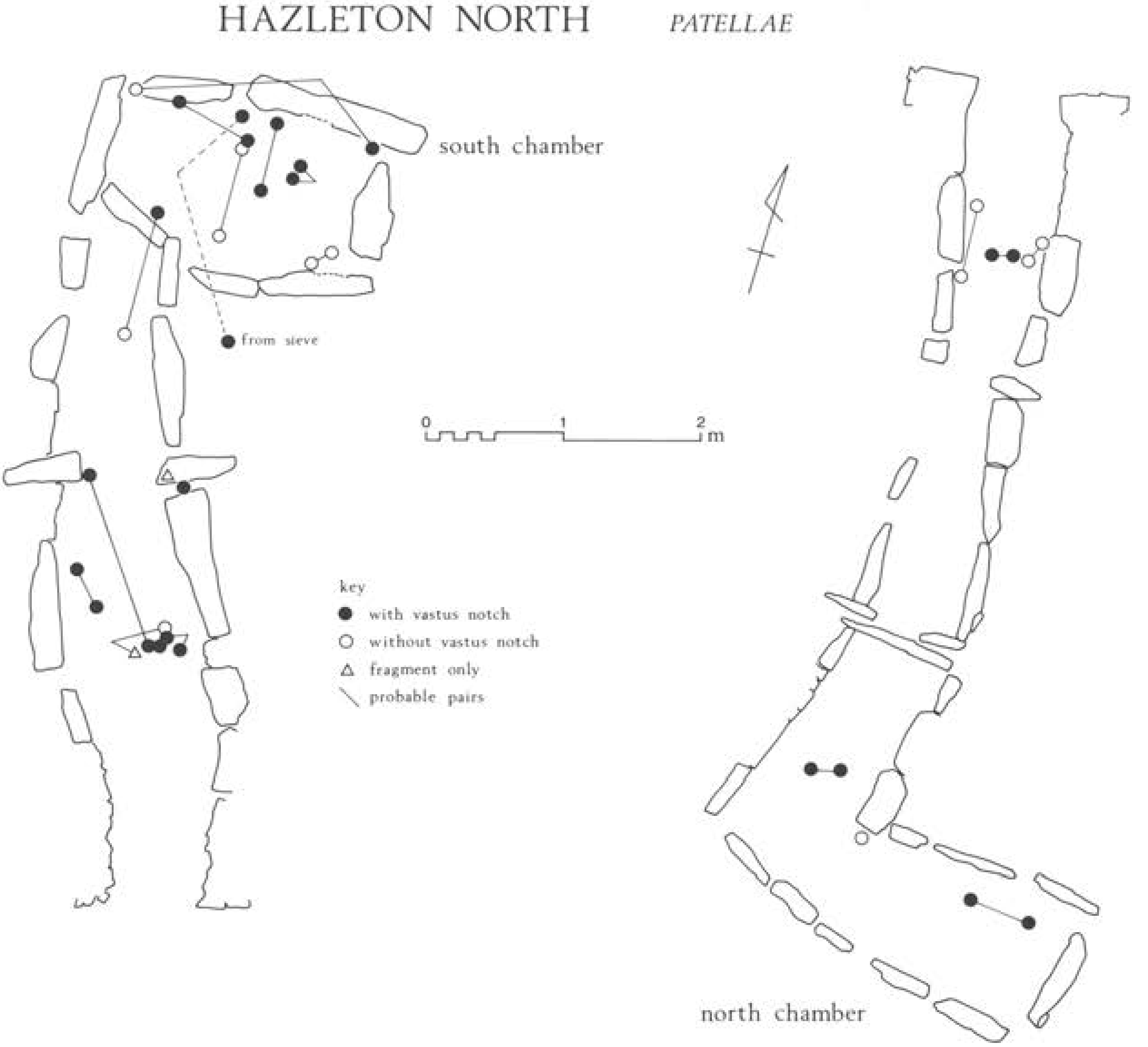


Fig 233 Distribution of human patellae within the chambered areas, showing the presence/absence of the vastus notch trait

sest of bones was achieved by a continual transformation of the deposits during the use of the tomb.

Undoubtedly, it would be the case that on some, if not all, occasions that the tomb was re-entered, there would be partially-decayed corpses as well as skeletal ones. The previously-interred material would be liable to be moved again and again, in its various states of decay, and it must be remembered that the spaces were confined and the level of lighting would probably be poor. On the basis of the evidence from the north entrance, it seems entirely possible that the final phase of burial activity on the south side would have involved the placing of one or more intact inhumations just inside the entrance, but this supposition cannot now be verified because of the removal of deposits by later disturbance.

The data available on the bones are not sufficient, nor are enough individuals represented, to support any demographic interpretation of the population or social group involved. It is tempting to suggest that a natural population could be represented by these burials, but this must remain hypothetical. Neither can too much weight be placed upon the extremely tentative kinship indication supplied by the prevalence of the vastus notch on the patellae. It is potentially of interest, nevertheless, that the vastus notch trait is present within both chambered areas (Fig 233). It has been postulated above that the burials within each of the chambered areas were successive, those in the chambers on both sides basically predating those in the entrances. However, the radiocarbon dates do not permit any chronological separation between the use of the two burial areas, any more than they do between the use of chambers and entrances on each side, and there is no way of telling if the two were used contemporaneously or successively. The vastus notch trait is conceivably indicative of the same kinship group receiving burial in both chambered areas, but it is the only clue and there is nothing else to substantiate it. Regrettably, therefore, the implications of the presence of two separate chambered areas must remain speculative.

20 Hazleton North in context

Introduction

Serious archaeological study of the chambered tombs of the region was initiated in the nineteenth century by Thurnam (1869), and the Cotswold Neolithic tombs were first considered in detail as a separate group by Crawford (1925). Since Crawford's work, numerous authors have sought to collate and discuss the available information on what has been called variously the Cotswold-Severn or Severn-Cotswold group of tombs. The most important works of synthesis have been those by Daniel (1950), Clifford (1950), Piggott (1954), O'Neil and Grinsell (1960), Grimes (1960), Corcoran (1969), Darvill (1982), and Britnell (1984b). Much of the information used in these studies is derived from accounts of partial, and potentially very misleading, explorations of tombs during the nineteenth century, and the subject has tended to become unduly concerned with theoretical questions of typological development of cairn and chamber architecture, a trend which shows no sign of abating (Lambrick 1988, 114–18).

More significant has been the publication of new evidence from reasonably extensive modern excavations at: West Kennet, Wiltshire (Piggott 1962); Burn Ground, Hampnett, Gloucestershire (Grimes 1960); and Gwernvale, Powys (Britnell 1984a). Smaller-scale modern investigations at Sale's Lot (O'Neil 1966) and Nympsfield (Saville 1979b) in Gloucestershire, at Lanhill (Grant King 1966) and Luckington (Corcoran 1970) in Wiltshire, and at Penywyrlod (Savory 1984) and Pipton (Savory 1956) in Powys, while important for some details, have been generally less informative. The study of Cotswold-Severn tombs has also been hampered by the absence of any detailed publication of the evidence from two major excavations: at Wayland's Smithy, Oxfordshire, excavated in 1962–3 (Atkinson 1965), and at Ascott-under-Wychwood, Oxfordshire, excavated in 1965–9 (Selkirk 1971; Benson and Clegg 1978).

This final chapter seeks to place the Hazleton results into the perspective offered by existing knowledge of the Cotswold-Severn group and to comment on the wider implications for the study of the Neolithic period in the Cotswolds and beyond.

Pre-cairn activity and cairn location

The pre-cairn Neolithic assemblage at Hazleton has been seen as of 'domestic' character, in that there was evidence for an accumulation of discarded artefacts, together with the remains of edible flora and fauna, in apparent association with a probable structure with a hearth. The 'structure' is so ill-defined that it is very difficult to look for specific Neolithic parallels. There is no obvious comparison with the forecourt post-settings at Gwernvale and some other funerary sites (Britnell 1984a, 140). The existence of a hearth indicates that it does not belong to a mortuary structure. A closer comparison may be the post-setting at Sale's Lot (O'Neil 1966), which Darvill (1982, 60) has convincingly reinterpreted as belonging to a pre-cairn structure. The domestic rather than mortuary status of the Sale's Lot structure would depend, however, upon the uncertain association of the hearth with the postholes.

The artefacts from Hazleton compare closely in general terms with those from other Early Neolithic sites in southern England, even if the domestic character of other assemblages, particularly those from causewayed enclosures, is disputed. In terms of what is known of the material culture of the Cotswold-Severn tomb users and their local Neolithic antecedents (Clifford 1950; Piggott 1954), Hazleton offers few surprises. Only the import into the north Cotswolds of objects of sarsen, presumably from Wiltshire, is new, but even so does not alter the network of resource acquisition previously recognised (Darvill 1984, 97–8; Saville 1982c).

Any specifically local aspect to the earlier Neolithic material culture of the Cotswolds is as yet inadequately defined. There are no radiocarbon dates available for the Neolithic enclosure on Crickley Hill, but those obtained from an adjacent Neolithic enclosure, Peak Camp (Darvill 1986), suggest a chronological overlap between the use of such enclosures and the deposition of burials in chambered tombs. The presence of a few human bone fragments in the pre-cairn soil at Hazleton, as with similar finds at Gwernvale (O'Connor 1984), is probably of no relevance to the later use of the site as a tomb, since scattered human bones are a frequent occurrence on Early/Middle Neolithic sites.

The environmental evidence is difficult to assess, both because of the small samples obtained and because of the lack of comparable data from elsewhere. Thus cattle, sheep/goat, and pig are all well represented in the pre-cairn assemblage at Hazleton, but it is not possible to say how important each species was or exactly what role these animals played in the farming regime. The cereal remains, however, represent a significant advance in the knowledge of the local Neolithic economy, demonstrating directly for the first time the cultivation of wheat on the Cotswold limestone. Hazelnuts were also important in the Neolithic diet (Fig 208). The discarded antlers in the quarries demonstrate the prevalence of red deer and serve as a reminder of their importance in the Neolithic economy (Clutton-Brock 1984, 39).

The picture of pre-monument landuse at Hazleton is in some ways remarkably similar to that glimpsed at a comparable period on the chalk of southern England, with clearance and hazel scrub regeneration preceding monument construction (Ashbee *et al* 1979, 278 and 296). What is not so clear is whether any large-scale Early Neolithic clearance should be envisaged on the Cotswolds, as it has been in other regions, especially the Wessex chalkland (cf Mercer 1981c, x). The very limited data available from Hazleton and elsewhere (Bell 1984, 87 and 1987, 5) tend to indicate restricted clearance and it is questionable if suggestions of '... intensive mixed farming settlement in the Cotswolds exploiting varying soils in conveniently narrow valley cross-sections, associated with long barrows' (Case 1986, 35), can yet be substantiated. Perhaps a less intensive, more mobile, and cyclical pattern of clearance and cultivation would be more applicable (cf Britnell 1984a, 141).

The construction of Cotswold-Severn tombs over previously occupied land surfaces has been noted elsewhere (eg Ascott-under-Wychwood and Gwernvale), and it is a feature of the excavated non-megalithic long barrows as well (eg South Street, Wiltshire: Ashbee *et al* 1979, 264). At Ascott-under-Wychwood, the pre-cairn Neolithic activity was interpreted as representing a settlement, or a series of settlements, abandoned to open grassland before the tomb was built (Evans 1971; Selkirk 1971, 10). At Gwernvale, the evidence was interpreted as representative of both small-scale settlement and ceremonial structures, the latter immediately previous to the cairn construction (Britnell 1984a, 139). At Hazleton, the pre-cairn Neolithic activity is seen as domestic and possibly not immediately prior to the construction.

More fragmentary evidence, such as the Neolithic sherds from the buried soil at West Kennet (Piggott 1962, 11) or the possible postholes beneath the cairn at Nympsfield (Saville 1979b, 72–3), needs to be treated with caution, because it is difficult to discriminate between evidence which could belong to cairn construction activity and that which is clearly pre-cairn. Nevertheless, these hints suggest that the phenomenon of tomb construction over areas of previous occupation is a recurrent one. There seem to be two alternatives for this phenomenon: either the superimposition was quite deliberate, in that the builders wished to locate the tomb over remains which they recognised as those of previous settlement, or the superimposition was coincidental. In the former case, the action could be seen as ritually motivated, perhaps to commemorate a formerly important settlement of the tomb builders or to negate the land claim implied by the settlement of another group. If coincidental, then the determining factor is likely to have been that the area of the previous settlement was relatively open.

Whichever of the above explanations applies, it can be maintained that the existence of previous occupation was directly or indirectly the chief determinant of tomb location. The only natural constraint on location was the availability of building material, and limestone is so ubiquitous on the Cotswolds that this consideration is probably irrelevant. It is possible that some kinds of limestone were better suited for cairn construction than others, or that some limestone was more easily quarried, in which case prospection would be required before tomb construction. Such prospection would be most feasible in areas which were already open, like former settlements, or prospection could rely on the local knowledge obtained by inhabitants in the course of posthole and pit-digging on former settlements; in either case, this adds further weight to the notion of previous settlement as the determining factor for tomb location.

Stone suitable for orthostats was not ubiquitous, but coúld, as at Hazleton, be imported. Therefore, the availability of orthostats cannot be assessed as a constraint on location. Local topography does not appear to be a determining factor in the siting of the Hazleton cairns, as is similarly the case with many of the Cotswold-Severn tombs. Attention has often been drawn to the scarp-edge siting of some of the Gloucestershire tombs, and it is true that a very few examples, like The Toots long cairn near Stroud (O'Neil and Grinsell 1960, 83), do today constitute landscape features visible from the Severn Valley. Such visibility relies on a cleared landscape and is unlikely to have been a factor in Early Neolithic times. More probably, the scarp-edge locations relate to the ready access to stone.

Previous writers have tended to stress the proximity of Cotswold-Severn tombs to prehistoric trackways as the causal factor in their location (Crawford 1925, 11; Clifford 1936, 133), the cairns supposedly forming landmarks which helped to establish the tracks. The existence of well-established tracks or paths is certainly likely to be an element in the continuity of use of cleared areas (Lambrick 1988, 111), but there is obviously a danger of circular argument in identifying the location of trackways from the presence of the cairns and an archaeological problem, in that trackways are incapable of verification.

Even more problematic than the relationship between cairn location and Neolithic settlement is the relationship between the Neolithic evidence beneath Cotswold-Severn tombs and the Mesolithic evidence from the same locations. At Hazleton, the Mesolithic and Neolithic occupations have spatially separate foci, but there is no indication of the precise date of the Mesolithic material, other than that it is of later Mesolithic facies, nor of by how much, if at all, it precedes the Neolithic. At Ascott-under-Wychwood, the environmental evidence suggested a phase of dense woodland and new soil formation intervening between the Late Mesolithic and the Early Neolithic (Evans 1971, 40). At Gwernvale, there was no evidence to separate the Mesolithic and Neolithic artefacts, which had identical distributions in the areas examined (Britnell 1984a, 131), although a radiocarbon date of 4945±80 uncal bc (CAR–118; Table 97) has tentatively been linked with the later Mesolithic activity (Britnell 1984a, 50).

In view of the absence of topographic distinction mentioned above, and remembering that neither Hazleton, Ascott-under-Wychwood, nor Gwernvale were immediately adjacent to springs, what could be the reason for continued reoccupation of the same sites over periods which could extend into millennia? The only advantage these locations would appear to have is that they had previously been used for settlement by Mesolithic people. Whatever the factors determining their original selection, these locations, once cleared, became marked by the deposition of cultural debris, particularly discarded flint, and by their incorporation within the local network of paths. Such locations would remain visible, even when partially overgrown, and recognisable as an established place of human occupation.

This concept of continuity of reoccupation does have chronological implications, however, since there are limits to the length of time for which former occupation sites would remain visible if unused. On this basis, 100 years (over three generations) could be too long for a site to remain known and visible without being reused. Following this argument, the implication would be that the chronological gap between Mesolithic and Neolithic occupations at Hazleton should not be much more than a century, suggesting that some or all of the later Mesolithic flintwork dated to the second half of the fourth millennium uncal bc, perhaps as late as *c* 3200–3100 uncal bc. There are, however, no other sources of evidence to support such a late date, current radiocarbon chronology indicating a gap of some 700 years between the latest Mesolithic and the earliest Neolithic in southern England (Bradley 1984a, 8).

Assuming that the occurrence of Mesolithic and Neolithic activity at the same location is not fortuitous, it follows that near contemporaneity of these two cultural strategies is potentially implied by the artefactual evidence from beneath Hazleton North. If so, then there are various possibilities to explain reoccupation, ranging from the Neolithic acculturation of Mesolithic people (so that essentially the descendants of the same people reused the site, but with changed technologies), to the colonisation of Mesolithic territory by Neolithic groups (cf Saville 1986b). The contrast in the two lithic technologies and inventories at Hazleton might support the notion of separate populations rather better than rapid acculturation, but the regular invisibility in the archaeological record in southern Britain of Mesolithic assemblages coeval with Neolithic ones presents a serious interpretative problem.

The quarries

Hazleton North is the first Cotswold-Severn tomb on limestone to be shown to have quarry pits on either side. The concept of flanking quarries is well known from the example of some Cotswold-Severn tombs on chalk, such as West Kennet (Piggott 1962) and Wayland's Smithy II (Atkinson 1965), and from non-megalithic long barrows in general. On the limestone, however, Crawford's (1925, 22–3) explanation, following Thurnam (1869, 209), of shallow surface clearance of the upper limestone layers to obtain the cairn material appears to have been accepted as the normal method. While it appears that not all Bronze Age round barrows on the Cotswolds have encircling quarry ditches (Drinkwater and Saville 1984, 135), it is difficult to see how sufficient stone of suitable quality for the construction of a monument the size of a long cairn could be obtained without quarries on the same scale as at Hazleton. It is now clear, not only from Hazleton, but also from the substantial ditches of enclosures like Crickley Hill, that the excavation of solid limestone was perfectly possible using the simple tools available.

Hazleton-type quarries will therefore be present at most, if not all, Cotswold long cairns. Such quarries have not been located at previously excavated sites because of the limited extent of excavations, which have purposefully avoided going far from the cairn. At Burn Ground, however, Grimes (1960, figs 17–18) had trenches extending 10m and 14m from both sides of the cairn, apparently without meeting any sign of quarries, and the contour plans do not suggest the existence of any quarries close to the cairn. A possible explanation for the apparent absence of quarries could be that, since the Burn Ground cairn had been much depleted by erosion and cultivation, the uppermost levels of the quarries were completely filled and level with ploughsoil. The exploratory trenches would not have revealed the quarries, unless they were fully cleared to the bedrock surface, and the report suggests that this was not the case. At Hazleton, the originally unsuspected quarries were located first at the point where the quarry closely approached the cairn. At sites where the quarries are set further back from the cairn, the cairn edge deposits could be cleared without exposing the bedrock surface, and this was usually the case with the older excavations.

Quarry pits are reported from Ascott-under-Wychwood (Benson pers comm), although these seem to be rather small compared to Hazleton North. Part of a quarry excavated at Swell 8 round barrow, Cow Common, Gloucestershire (Saville 1979a, 90 and fig 2), lay very close to the south-west tail of the Cow Common long cairn. At the time, this feature was interpreted as a modern quarry, but reconsideration suggests that it is more likely to be connected with the long barrow; only the upper part of the quarry contained modern infill. The existence of this quarry was not suspected from the surface, nor did it emerge from the contour survey. In addition, there is the enigmatic case of Saltway Barn, Gloucestershire, where the cairn was apparently constructed within a large quarry (Grimes 1960).

The red deer antlers, which were recovered from the basal fill of the Hazleton quarries and interpreted as quarrying tools, are unlike the antler digging implements so well known from Neolithic sites on the chalk of southern and eastern England (Clutton-Brock 1984), in that they have not been converted into picks by the removal of most of their tines. This difference is perhaps most likely to relate to the method of use. Whereas on chalk an antler tool could be used in a 'pick-like' fashion to break the bedrock into blocks, as was clearly done in the mineshafts at Grimes Graves, this technique could not have worked on the harder limestone. At Hazleton, the antlers could more probably have been used as levers and wedges, inserted into natural fractures to prise up blocks of limestone, in which case they did not need to be converted into specialised tools, and the greater number of tines might even be advantageous in giving each tool a longer life.

Cotswold-Severn tomb architecture

Within the Cotswold-Severn group, while there are certain standard design features, each monument for which there are reasonable records is different in some detail. Hazleton North shares its basic 'trapezoidal' plan, its concave forecourt and convex horns, its orthostatic chambers, and its drystone external revetment with virtually every other known long cairn in the group. Comparison of the basic elements of internal construction is more difficult in view of the partial excavation or recording of other sites, but internal revetments and axial alignments also seem to be standard features. The most obvious differences between monuments of the group are in the number, position, and plan of the chambered areas, which exhibit contrasts in every case.

Architectural typology has undoubtedly been overemphasised in previous studies of Cotswold-Severn tombs, and it is not proposed here to chase every possible parallel or contrast, nor to speculate on architectural influences or derivations. In particular, no attempt is made to cite parallels from the continent of Europe. The comprehensiveness of the excavation reported here means that the architectural details of Hazleton North are now better known than those of most other Cotswold-Severn tombs, and there is a real danger of unjustifiably imposing the Hazleton data onto the interpretation of all the other sites. Nevertheless, it is considered that there were some general constraints, at least when building in the same raw material, which must have operated in the construction of most of the other monuments and probably determined the use of such devices as internal revetments.

The degree to which there was a 'design concept' for the Cotswold-Severn tombs, or how such a concept may have been communicated in practical terms, are difficult questions. One definite factor is apparent in the plan of the cairns. There was clearly a fixed design as far as the trapezoidal plan was concerned, since, despite the differences in details of the shape and size of horns and forecourts, this basic plan is ubiquitous, and appears to have a correlative size parameter. The variation in size of Cotswold-Severn tombs has been exaggerated in the past (Daniel 1950, 78; Darvill 1982, 10), due to the acceptance of misleading measurements from poorly-recorded sites or from surface dimensions. Admittedly, there are few monuments for which the dimensions can be accurately tabulated (Table 96), but the available data show a remarkable uniformity of size, at least in overall length. This uniformity reinforces the notion of a design concept which dictated an optimum size. The obvious exception to this clustering of cairn lengths at about 50m is West Kennet, where the chalk mound is usually assumed to be as long as 100m (Piggott 1962, 11). The true length and uniformity of construction of the West Kennet cairn and flanking ditches have not, however, been tested by excavation.

Table 96 Basic dimensions of some Cotswold-Severn cairns

Site name	*Approximate dimensions in metres* Length	Max width	Min width
Gwernvale	45+	17	6.5
Ascott-u-Wychwood	49	15.5	7.5
Penywyrlod	52	22	11
Belas Knap	53	19	10
Hazleton North	53–56	19	9–8
Wayland's Smithy II	54	14.5	6

Hazleton North is apparently atypical in terms of its westerly orientation. The predominant easterly or south-easterly orientation of the broad ends of both long cairns and non-megalithic long barrows has frequently been noted (Daniel 1950, 80; Ashbee 1970, 28–30). The probable westerly orientation of Hazleton South indicates continuity of intent, however, and raises the question of how many of the Cotswold cairns, the easterly orientation of which is assumed from surface indications only, are in reality facing the other way?

Further comment on architecture in this chapter is limited to those features of Cotswold-Severn tomb construction which in the past have been controversial or poorly understood and about which the Hazleton data can offer some positive clarification.

The cairn facade and 'extra-revetment'

The most obvious of the controversial features is the 'extra-revetment', discussion of which has loomed so large in previous studies (Grimes 1960, 52–9). For this reason, much effort was devoted to the cairn edges during the preliminary work at Hazleton North, and the incontrovertible evidence from this site at least is that all the extra-cairn material results from the decay of the monument. On reviewing the evidence, it is clear from the cairn edge at Burn Ground (Grimes 1960) that all aspects of the extra-cairn material were comparable with Hazleton North. Grimes regarded the 'V-shaped trench' beneath the outer revetment as artificial and the outward lean of the external revetment as a deliberate constructional feature. 'Extra-revetment' stonework was in Grimes's view built up against the outside of this leaning revetment as part of the same phase of construction, the external revetment and the 'extra-revetment' constituting a single structural element (Grimes 1960, 76–90). Grimes's counter to the obvious objection that the external revetment was rendered completely redundant in his reconstruction was that '... the purpose of the whole arrangement can only have been concealment. The outlining of the cairn was ... a matter partly of tradition, partly of ritual necessity' (Grimes 1960, 90). As Grimes himself recognised, the interpretation hinged in large part on the outward tilt of the basal courses of the external revetment, which he claimed '... could not be produced by the outward pressure of the mound nor by the downward pressure of a vertically-built wall' (Grimes 1960, 53).

Grimes did not demonstrate, however, that his 'V-shaped trench' was an artificial feature. At Hazleton, where an identical V-shaped depression existed, it was apparent that this could only be a natural impression created by the slabs removed from it and was *not* a dug feature (cf Britnell 1984a, 62). Its existence only beneath the outer revetment was explained by this being at the foot of an exposed outer facade, where differential weathering and stress came into play.

The same explanation applied at Hazleton to the extra-cairn material in the forecourt; there was nothing to suggest that the forecourt area was 'blocked'. Nor was there any persuasive reason to assume the existence of 'blocking' outside the side entrances. The situation found outside the north entrance at Hazleton can be compared with that outside the south entrance at Burn Ground (Grimes 1960, 57, fig 23 and pls 16c–17a). A close parallel with Grimes's 'false wall' is revealed, but here interpreted as collapsed revetment and blocking wall. The quality of the recording at Burn Ground was such that a remarkable stretch of collapsed external revetment can be seen extending right across the exterior of the south entrance. The concertina-like collapse of the revetment is evident in plate 17a, yet Grimes uses this same evidence to support his notion of 'extra-revetment' as an original part of the construction, in spite of the fact that the photograph shows the supposed 'false wall' to be stratigraphically part of the revetment. The *idée fixe* of 'extra-revetment' as an intentional construction has here dominated the interpretation.

At Hazleton, the carefully-built outer revetment was a facade which was meant to be visible when the monument was in use. This was the opinion held by Ward at Tinkinswood (Ward 1915, 298, n1), by Berry at Belas Knap (Berry 1930, 150), and has recently been re-stated by Britnell at Gwernvale (Britnell 1984a, 147). The whole concept of ritual concealment as part of the original structural design of Cotswold-Severn tombs, forcefully advocated by Grimes, can now be rejected in favour of the view that these monuments were intended to be seen in all their architectural splendour.

While accepting that the outer revetment at Gwernvale was the true facade of the monument when in use, Britnell (1984a, 150) concluded that at some subsequent stage the forecourt and parts of the lateral exterior of the cairn were 'blocked' by the heaping up of freshly-imported stone and the raking down of stretches of revetment. The main arguments for this are the presence of quartzitic sandstone (apparently rarely used elsewhere in the cairn) among the forecourt debris (Britnell 1984a, 64) and the nature of the 'cairn blocking' at one point on the north side of the cairn (Britnell 1984a, 91–2, fig 29). Neither argument is wholly convincing, however.

Britnell (1984a, 150) and Darvill (1982, 47) have both sought to explain the function of 'blocking' as a deliberate archaising device, designed instantly to transform a freshly-abandoned monument into the appearance of one already long disused. This presupposes a 'long chronology' for the construction and use of Cotswold-Severn tombs. It can be doubted whether any of the 'blocking' claimed to exist around Cotswold-Severn tombs is deliberate and not the product of natural decay.

Forecourt design

The forecourt at Hazleton North had an apparently absolutely blank drystone revetment. The more familiar arrangement for a laterally-chambered cairn with a concave forecourt is that it should have a 'false portal' or 'blind entrance', like Belas Knap and other Gloucestershire sites (eg Rodmarton and West Tump), and now known at Gwernvale in Powys. However, the discovery of blank forecourt revetments at Ascott-under-Wychwood (Selkirk 1971) and Hazleton North has prompted reconsideration of some earlier excavations of sites with the same feature. Daniel (1950, 74) and Corcoran (1969, 54) rightly drew attention to these, the main possibilities being Poles Wood South (Greenwell 1877, 521), Poles Wood East (Rolleston *in* Greenwell 1877, 525), Eyeford Hill (Rolleston 1876, 153), and, less certainly, Cow Common (Rolleston 1876, 140), all in the adjacent parishes of Swell and Upper Slaughter in north-east Gloucestershire. At none of these sites, as at Hazleton North and probably at Ascott, can it be proved that some kind of distinctive feature was not incorporated into the forecourt facade at a higher level. This could have been a patterned effect within the drystone work, a false lintel or ledge, or even a niche or aumbrey. Such a feature would not be recognisable after the collapse of the upper revetment.

It is puzzling that monuments with blank forecourt facades in each case exhibit a concave forecourt between two convex horns. Corcoran (1969, 97) suggested that the blank facade could be a skeuomorph of a timber facade, adopted from the external form of contemporary non-megalithic long barrows, but there is no reason to suppose that timber facades were entirely blank either. Whatever the explanation, forecourts are a persistent feature of megalithic tomb architecture and must have served as a ceremonial focus. At Hazleton, there were no indications of any forecourt features to demonstrate indubitable forecourt activity, except for a concentration of animal bones recovered from the forecourt floor. Deposits, in which skulls, jaws, and teeth of animals, especially pig, apparently feature prominently, have been noted before in the forecourts of Cotswold-Severn tombs, for example at Rodmarton (Clifford and Daniel 1940, 140) and Uley (Thurnam 1854, 320), and cattle and pig bones were present in the forecourt 'blocking' at Gwernvale (Britnell 1984a, 64). The concept of such animal remains representing the debris of 'funeral feasts' is a long-established one (Thurnam 1869, 228). Kinnes (1985, 36) recently expressed a preference for interpreting the heaps of pig jaws associated with the non-megalithic long barrow at Hanging Grimston (Mortimer 1905, 103) as possible evidence for ritual involving conspicuous consumption, rather than any other explanation, such as totemism. The cattle and pig remains from the Hazleton forecourt belong to domestic animals, so they are unlikely to be totemic, and the suggestion in this report that the spatial and stratigraphic evidence might accord with animal heads being placed on, or attached to, the forecourt facade, could be viewed in the context of an association with some kind of ritual slaughter and feasting.

Internal cairn construction

This subject was thoroughly reviewed by Grimes (1960, 75–90), who correctly identified such common elements as the axial 'spine' of pitched slabs, the internal revetments, and the cellular units. The primary dumps revealed at Hazleton North are new features, which have not specifically been noted before at Cotswold-Severn tombs, but are likely to be recurrent wherever adjacent quarries are used. Such dumps were encountered at Belas Knap, where the lowest blocks of the axial revetment were noted as resting obliquely '... on the edge of a mound of clay and small stones' (Berry 1930, 146), and some of the published photographs of previous excavations, as at Sale's Lot (O'Neil 1966, pl 1), reveal similar features. The same technique of piling up superficial material from quarry ditches to form the basal mound has been noted in non-megalithic long barrows (Startin 1982, 154). No parallel for the basal 'paving', suggested by Grimes, was found at Hazleton, but this was not clearly defined at Burn Ground either, having '... decayed to rubble' in many places (Grimes 1960, 65).

Grimes was not specific about the inclusion of a long axis revetment as a part of a 'spine', but clear parallels for the situation at Hazleton had already been demonstrated at Randwick, where Witts (1884, 156–7) described an alternately north- and south-facing axial revetment in the central cairn, and at Belas Knap, where a vertical west-facing revetment was revealed towards the tail of the cairn (Berry 1930, 125, figs 26 and 47). The use of large pitched slabs placed against internal revetments at Hazleton probably finds parallels in the numerous references in previous reports to pitched slabs inside the cairns and is surely the explanation for the pitched slabs placed against the revetment of the 'dome' at Notgrove (Clifford 1936, 126 and pl 31.2).

The cellular effect of the internal revetments is a well-known feature of Cotswold-Severn cairns, but Grimes (1960, 87) argued that the cellular units had some special significance, because they tended to occur on one side of the axial alignment only. The Hazleton North evidence clearly contradicts this, since cellular construction was present throughout. At Burn Ground, despite Grimes's interpretation, his detailed plan of the cairn (Grimes 1960, fig 20) does show definite indications of north–south revetments on the south side of the monument, both east and west of the lateral entrance. Thus, in these two cases where a Cotswold-Severn cairn has been extensively examined, cellular construction can be said to be normal throughout. Saltway Barn is another, albeit more irregular, instance (Grimes 1960, figs 6–7). In fact, on the basis of the picture obtained at Hazleton, it can be predicted that internal revetments will be found throughout the interior of all the long cairns built with Cotswold limestone. The stone bank of the Neolithic enclosure on Crickley Hill, presumably contemporary with use of the Cotswold-Severn cairns, has now been shown to have exactly the same kind of cellular construction (Dixon 1988, 82 and fig 4.4). This reinforces the argument for a functional nature for this building technique.

Single-phase construction

The Hazleton North cairn was essentially a single-phase construction, the chambered areas being built as integral parts of the whole. This was clear, even in the case of the south chambered area, where the surrounding infill did have some resemblance to a beehive-like structure. A similar situation no doubt pertained at Belas Knap (Berry 1930, 140), Nympsfield (Clifford 1938, 199), and other sites where evidence for independent elements of cairn construction around chambered areas has been claimed.

This is important, because much speculation has been given to the possibility of multi-phase construction, with cairns going through various separate phases before the final trapezoidal form was reached, perhaps covering separate chambered monuments of divergent plan (Corcoran 1970, 53–4). The known complexities of internal construction of Cotswold-Severn cairns now mean that no instance of suggested multi-phase construction should be accepted without complete documentation. This includes Notgrove, recent interpretations of which have unreservedly identified a multi-period construction involving an initial 'rotunda' cairn with an enclosed cist (Corcoran 1969, 83–4; Darvill 1984, 86–7 and 1987, 37; Megaw and Simpson 1979, 114), and Sale's Lot, where a separate 'rotunda grave' and simple passage grave are supposed to have preceded the long cairn (Darvill 1987, 52–3). These interpretations go far beyond the evidence demonstrated by excavation, which at both Notgrove and Sale's Lot revealed only segments of curved revetments, not complete separate circular structures. This is not the place to pursue counter-arguments in detail, but it is worth repeating the need for extreme caution when attempting to impose reinterpretations on poorly-recorded monuments.

The chambered areas

The chambered areas of laterally-chambered Cotswold-Severn tombs range in plan from small, simple chambers as at Belas Knap (chambers C and D), through extremely elongated and irregular chambers as at Pipton, to the straight cross-passage as at Burn Ground. The Hazleton North chambers are similar to the Belas Knap (northern chamber pair) and Rodmarton types, in that they are more or less symmetrically back-to-back within the same part of the cairn (cf Daniel 1950, 72; Britnell 1984a, 144) and the two chambers have basically the same ground plan. The L-shaped plan of the two Hazleton chambers has no known exact parallel within the Cotswold-Severn group, but the plan of one of the chambered areas at Gwernvale (chamber 1: Britnell 1984a, fig 18) is similar. A parallel for the way in which the south entrance at Hazleton tapered towards the exterior is provided by chamber B at Belas Knap (Hemp 1929, pls II and IX). The dimensions of the Hazleton chambered areas are equally unexceptional, either in terms of their plans or their suggested internal heights.

The use of sillstones and transverse slabs within the chambered areas at Hazleton is of considerable interest, not least because of the association between the *in situ* blocking slab and these features at the southern end of the north passage, which gives a practical, functional explanation for their presence as part of the blocking mechanism. That they also served as a partitioning device is evident from the fact that initial burials in the north chambered area were restricted to the chamber proper and did not extend beyond the sillstone into the passage. By the time burial ceased in the south chambered area, neither the sillstone between chamber and passage, nor the transverse slabs with associated crosspiece between entrance and passage, provided any demarcation between burial deposits. This need not always have been the case, however, and the contrary has been suggested on the basis of the recumbent slab interpreted as a former blocking slab in the south entrance.

The occurrence of these demarcating and constricting devices in the throughways of chambered areas in Cotswold-Severn tombs has been collated by Darvill (1982, 48–53), who concluded that the internal constrictions were more concerned with demarcation than blocking. It can be argued, however, that the two concepts are inseparable, since the blocking device will, *ipso facto*, be positioned at or beyond the limit of the deposit to which access is prevented. Moreover, a sillstone alone could provide demarcation if that was the chief requirement, whereas the combination of elements in use at the junction of the north passage and chamber at Hazleton implies that blocking was the main priority. A parallel for the use of an internal blocking slab is provided by the north chamber at Rodmarton (Davis and Thurnam 1865, XXVII, fig 3), where a large stone was used to block the porthole entrance; the same method of closure seems to have applied to the outer entrance to the terminal chamber at Tinkinswood (Ward 1915, 305 and fig 9). In view of the Hazleton evidence, it is pertinent to query the status of the slabs used to shut off what are often referred to as closed cists within some lateral chambered areas. Might, for example, the 'sealing slab' (Savory 1984, 18) in the NEII chamber at Penywyrlod have originally been a blocking slab, fixed in place once that part of the chambered area was abandoned?

The reduction of the throughway space to 0.45m square at some points at Hazleton does not appear unusual for Cotswold-Severn tombs. The entrance to the NW chamber at Lanhill was constricted by two transverse slabs and a sillstone to an irregularly-shaped gap about 0.4m high by 0.45m wide in maximum dimension, and experiments by the excavators confirmed the feasibility of appropriate access through such a gap (Keiller and Piggott 1938, 128). The reasons for such intentional constrictions of the access spaces, which are a recurrent characteristic of Cotswold-Severn and other chambered tombs, remain obscure. The fact that the constrictions do assist in the blocking or closure of the chambers has been demonstrated at Hazleton, and in this sense they can be seen as practical devices, but this cannot be the whole story.

The outermost entrances

The outermost entrances of lateral chambers in Cotswold-Severn tombs have never been found completely intact or at least have never been fully recorded. The way in which they functioned is therefore a continuing theoretical problem. Grimes (1960, 93–7) concluded that, while in a few cases, such as West Tump and Belas Knap, the evidence was consistent with simple horizontal entry, at others, such as Burn Ground, it was more likely that there was 'vertical access', either through the 'extra-revetment' or through a drystone-revetted outer entrance. Grimes made the same suggestion of vertical access for the terminal entrance to the transepted chambered area in the forecourt at Burn Ground. His reasoning was influenced by his regarding the 'extra-revetment' as an original structural entity. This led him to overlook the sillstones and orthostatic jambs, which are probably decisive indicators of true horizontal entrances.

In his reconstruction of the entrance to chamber 3 at Gwernvale, Britnell (1984a, 147–8) modified Grimes's 'vertical access' into a more plausible form. At Gwernvale, it seems quite possible that the outer revetment was not roofed as a passage, the roofing stopping on a line with the inner longitudinal revetment and the outer orthostats. Entrance through the outermost part of the cairn was by means of a simple gap which was completely emptied and refilled with stones every time access was made. The plausibility of this at Gwernvale hinges on there being no orthostats beyond the limit of the internal revetment, aligned with transverse orthostats in the case of chamber 3. Britnell (1984a, 147) also cited as circumstantial confirmation of his reconstruction that: 'At not a single Severn-Cotswold tomb where evidence of double walling has been recorded, have capstones been found covering the outer passage...', and he went on to state that there was '... more or less general agreement that roofing was normally confined to this inner part of the structure – the outer walled passage having been unroofed' (Britnell 1984b, 7).

Hazleton North is not the only cairn in which there are lateral entrances with orthostats positioned beyond the internal cairn, as defined by the internal longitudinal revetments. Burn Ground is one example, and Penywyrlod another. At the latter site, the entire entrance to chamber NEII was roofed, since the incipient corbelling on one side was still intact when excavated (Savory 1984, pl 7c; cf Britnell 1984b, 8). The evidence from Luckington showed that the entrance to chambered area A apparently retained an outer lintel resting on top of drystone revetments on either side of the entrance, with inserted drystone blocking across the entrance beneath the lintel (Corcoran 1970, 42).

Luckington appears to offer an exact parallel for the reconstruction of the north entrance at Hazleton (Fig 232), which (in contrast to Gwernvale) is seen as having a lintelled and roofed horizontal entry through the outer revetment alignment. The entrance at Luckington was not fully cleared and recorded, however, and it cannot be unequivocally established whether the lintel was on line with the outer revetment or with an inner one. Even so, Luckington does establish a precedent for a roofing slab laid across drystone revetments rather than orthostats; it establishes a precedent for drystone blocking beneath a lintel; and it demonstrates an entrance gap with a vertical height of only 0.4m. Corcoran cites the north 'lintel' at Gatcombe Lodge (Crawford 1925, 98–100) as a further parallel, but there is no evidence of where this capstone lies in relation to either the inner or outer revetments. A better additional parallel is provided by the entrance to chamber B at Belas Knap, where Hemp (1929, 268) was adamant that the outer entrance passage was roofed by corbelling springing from lateral revetments.

Part of the argument against the lateral entrances functioning as simple horizontal accessories has always been that the 'external revetments' are frequently found to be continuous across the entrances (Britnell 1984a, 147; 1984b, 8), as for example at Penywyrlod (Savory 1984, pls 7c and 9b) and Belas Knap (Hemp 1929, 268 and pl IX.13). The same is true for the north entrance at Hazleton, where it has been shown that the continuous element was only a couple of courses high, providing an outer sill at the same level as the internal paving. Above this level, the blocking wall was not bonded with the outer revetment and the outer revetment terminated on both sides of the entrance in such a way as to create proper corners. This outer sill provided no hindrance to access, therefore, and there is no reason to assume that the situation was different at other sites.

The external appearance of the cairn

The problems of reconstructing the external appearance of Hazleton North have been considered in a previous chapter, where the preferred option was a cairn with a gently-pitched upper cross-section and a bidirectionally-sloping longitudinal profile from a highest point of 2.5m, just to the west of the chambered areas (Figs 228–9). Relatively little consideration has been given to this by previous writers, although Grimes (1960, 90) speculated on a paved appearance created by a thick covering layer of slabs, and Corcoran (1969, 78) deduced a ridged upper cross-section. The latter suggestion has been disputed by Savory (1984, 35) on the not very convincing evidence from Penywyrlod for a rounded (or flat?) upper cairn, while Britnell (1984a, 144) seems to accept the possibility of a ridged profile for Gwernvale. In short, there have been few proposals for the original appearance of a Cotswold-Severn tomb.

The Hazleton North reconstructions (Figs 228–9) may be somewhat conservative in the overall height of the cairn. The maximum height suggested is 2.5m. At Gwernvale, it was suggested that the height of the cairn above chamber 1 could be 2.5–3.0m and the height at the tail end *c* 0.5m (Britnell 1984a, 143), and thus much the same as at Hazleton, but there are hints from other sites that much greater heights were possible. At Randwick, Witts (1884, 156) reported the internal axial revetment as still standing to 10–12ft (3.0–3.6m); at Penywyrlod, the cairn stonework apparently still stands to *c* 2.4m and the portal slab would have stood at *c* 2.2m (Savory 1984, 22 and fig 7); at Pipton and Rodmarton, portal heights of *c* 2.4m and *c* 2.9m respectively have been suggested (Britnell 1984a, 143); and at West Kennet, the mound still stands to *c* 3m and must have risen to higher than this, if the capstones at the east end were covered. The massive cairns at Boxwell-with-Leighterton and Coberley in Gloucestershire are assessed from the present surface evidence as standing about 6m high (O'Neil and Grinsell 1960, 73 and 76). Increasing the maximum height of the Hazleton North reconstruction (Fig 229) would have the effect of making the transverse profile more pitched and would allow for a more markedly angular appearance to the longitudinal profile.

Cotswold-Severn mortuary activity and its interpretations

The general circumstances of the interment of human remains within Cotswold-Severn tombs are well known (Daniel 1950, 98–106), although few modern excavations have encountered burial deposits as well preserved as at Hazleton North. Various aspects of the Hazleton burials are considered here in the light of earlier data and explanations.

Cremation

The best parallel for the cremated bone at Hazleton (north entrance) is the discrete scatter of the cremated remains of two individuals over burial II in the NE chamber at West Kennet (Piggott 1962, 21–4). Cremated bones are also reported from Ascott-under-Wychwood (Benson and Clegg 1978, 137) and are occasionally mentioned in some of the early accounts of tomb excavations, as at Tinkinswood (Keith 1916, 269). There appears to be an association between the presence of cremated bones and the final stages of burial activity at Hazleton and possibly at West Kennet (Piggott and Atkinson 1986, 144).

Charring

Charred bones were noted at West Kennet and described as the result of accidental burning (Piggott 1962, 68). It is probable that fire was introduced into burial chambers to provide light and the single charred femur from the south-side deposits at Hazleton could have resulted from a dropped torch. When the charring or burning of bones is referred to in early accounts, as at Randwick (Witts 1884, 160), even when cremation is specifically disavowed, as at Nympsfield (Thurnam 1865, 190), it is impossible, since the bones do not survive, to be sure of the degree of burning which was involved.

Complete, articulated inhumations

The inclusion of whole corpses within the chambered areas is recorded at Ascott-under-Wychwood (Benson and Clegg 1978, 135–6) and at Lanhill (Keiller and Piggott 1938, 127) and is referred to in many earlier accounts, for example at West Tump (Witts 1880–81, 207), Poles Wood South, and Poles Wood East (Greenwell 1877, 521–5). The posture of these inhumations, when recorded, is crouched, as at Ascott (Benson and Clegg 1978, 136), Lanhill (Keiller and Piggott 1938, 127), Notgrove (Witts 1912, 45), West Kennet (Piggott 1962, 23), and Poles Wood South (Greenwell 1877, 523). Daniel (1950, 104–5) was unable to cite any instance of extended inhumation, so skeleton 1 at Hazleton is unusual. This may be due simply to the rarity of well-preserved entrance deposits, since the normal crouched posture was probably dictated by limitations on manoeuvrability and space, rather than by a specific rite (cf Keiller and Piggott 1938, 128).

Burials on paving

Burial deposits on paving slabs are noted at several sites, of which Lanhill (Keiller and Piggott 1938, 125) is a well-attested example. The paving at Penywyrlod provides one of the best parallels for the Hazleton paving, although the burial deposits there were largely absent (Savory 1984). Published records rarely provide adequate documentation of such paving, however, and there are cases where an early record of paving is not confirmed by subsequent observations (eg at Rodmarton, where paving in the north chamber was recorded by Lysons, but of which there was no trace upon re-excavation in 1939: Clifford and Daniel 1940, 136 and 139). At Pipton, small bones were recorded beneath paving stones and interpreted as foundation deposits (Savory 1956, 14), but, as at Hazleton, these bones had almost certainly simply slipped down gaps between the paving stones.

Numbers of individuals buried

The calculation of minimum numbers from disarticulated and fragmentary remains is not as straightforward as many past reports have implied. The figures of 21 adults and 12–19 pre-adults at Hazleton can be compared with some confidence with those of 36–7 adults and 10 pre-adults from Ascott-under-Wychwood (Benson and Clegg 1978, 135), and with the (often misquoted) figures of 20+ adults and 13+ pre-adults (excluding the west chamber and cremations) from West Kennet (Wells 1962, 80). Figures from all earlier investigations must be rejected because of partial excavation, previous disturbance, or inadequate analysis, except for the probable representation of nine individuals in one Lanhill chamber (Keiller and Piggott 1938, 127) and seven from one Luckington chamber (Corcoran 1970, 48). Nevertheless, despite the invalidity of previous accounts, very large numbers of individuals have never been observed. Unlike the recently excavated examples of Neolithic chambered tombs (of comparable age) in Orkney, which have yielded the remains of hundreds of individuals (Hedges 1983; Renfrew 1979), there are no indications that Cotswold-Severn tombs ever contained more than 50 individuals (Daniel 1950, 100).

Sex of burials

The sexing of disarticulated skeletal material is inherently unreliable and for pre-adult remains impossible. The identifications at Hazleton, of 12–13 probably male and 2–3 probably female adult individuals, should be treated with considerable caution (Rogers pers comm), and the implied ratio of males to females ignored. Dogmatic statements about the sex-ratios in all other Cotswold-Severn tombs should be viewed very sceptically, because re-evaluation of the criteria used in the past for sexing individual bones has shown them to be inadequate (Rogers pers comm). At West Kennet (Wells 1962, 80) and Ascott-under-Wychwood (Chesterman 1977, 24), both male and female adults were present, but no sex-ratio can be extrapolated. It follows that suggestions of a culturally-determined sex bias in favour of males in British Neolithic burial populations (Brothwell 1973, 284) must also be rejected, because of the inclusion of suspect data from disarticulated samples.

Age of buried individuals

The determination of ages for disarticulated skeletal material is even more controversial than sexing. While the indicators available for children are reliable, they are not necessarily compatible between different parts of the same skeleton (Chapter 12), thus absolute accuracy is impossible. At Hazleton, consideration of pre-adult tooth eruption and long-bone diaphyseal length suggests the presence of children of all ages in the south area, but only up to five years in the north area. The ageing of adults from disarticulated material is not reliable. To judge from the experience of the Hazleton bone analysis, claims to have identified the average age at death from similar bone assemblages, as for example at Ascott-under-Wychwood (Chesterman 1977, 24), will be difficult to substantiate, and even cautious extrapolation from such age-at-death averages (eg Case 1986, 24) will be without real foundation.

Kinship

No real evidence could be produced for or against the family relationship of the individuals involved, although there was a possible hint of an inherited trait provided by the patellae. Cave (1938, 147–8) maintained that the remains from the NW chamber at Lanhill did represent a family group and drew particular attention to the frequency of Wormian ossicles, but his findings were refuted by Brothwell (1973, 293). Suggestions, based on recurrent skeletal peculiarities, of family relationships among Neolithic burial remains in the Orkney tombs of Quanterness and Isbister have been made (Chesterman 1979, 100; 1983, 128–30), while a statistical method using the mesiodistal crown diameters of permanent teeth has been claimed as successful in identifying kinship among prehistoric burials (Hanihara *et al* 1983), but it has not yet been used on European material. Until some scientific method of verifying kinship is evolved and applied to the remains from Cotswold-Severn tombs, the key question of family relationships among burials within and between chambers cannot be approached.

Animal bones among human burials

Reference to the finding of animal bones with the human remains from Cotswold-Severn tombs is common in the older literature (Daniel 1950, 98), but it is difficult to be sure that the bones were contemporary with the burials. A potential parallel for the perinatal sheep/goat from the south chamber at Hazleton North is provided by foetal pig remains from the SE chamber at West Kennet (Piggott 1962, 54), but these were from layer 9, just above the human burials, and interpreted by the excavator as a secondary introduction. Nevertheless, cattle, pig, sheep/goat, and red and roe deer appear to have been among the primary deposits at West Kennet, and chamber D at Luckington had cattle and sheep bones in the main burial deposit (Denston 1970, 61). Eyeford Hill (cist D) contained cattle and sheep bones, as well as those of a dog (Rolleston 1876, 157), and Notgrove had an almost complete skeleton of a young calf in chamber E (Clifford 1936, 130). The reason for the apparently deliberate introduction of animal remains into chambered tombs along with human burials is not obvious and cannot be simply provision of food for the deceased. This latter would not explain the presence of foetal animals, nor the presence of odd single bones, like the dog scapula from Hazleton. It cannot be proved that all the animal remains at Hazleton were humanly introduced, but if they were, then some ritual use of animal remains in connection with burial activity must apply (Clutton-Brock 1979, 113; Renfrew 1979, 161).

A small animal fauna comparable to that at Hazleton, though much more restricted in species, was recovered from West Kennet, where badger, polecat, frog/toad, and blackbird were recorded from the primary layers, and rabbit, bat, fox, vole, mouse, and jackdaw from secondary contexts. Piggott (1962, 54–5) concluded that the small animals found in the primary contexts had gained access to the chambers while the tomb was in use for burial, or at least before its chambers were filled in, and therefore that they dated to the Neolithic period. At Hazleton, where the chambers were not artificially backfilled, the small animal bones could date from any time at which the chambers still contained accessible spaces.

The arrangement of the human bones

The way in which bones were disposed within the chambered areas was rarely well recorded, and some tantalising accounts from the early barrow openings are difficult to rationalise in the absence of plans or photographs. At West Kennet, there were numerous groupings of bones, including the collection of vertebrae in one corner of the NW chamber and the skulls against the rear wall of the SW chamber (Piggott 1962, 25–6). At Lanhill, the skulls were found against the east and west sides of the chamber, while many of the longbones were grouped together in a parallel fashion (Keiller and Piggott 1938, 125–7). The realisation that bones inside the chambered areas were moved aside to create space for subsequent burials was recognised at an early stage (Rolleston *in* Greenwell 1877, 527) and has been confirmed by numerous observations since. A combination of factors would seem to be involved. There is undoubtedly the deliberate arrangement and placing of some bones, as with the two skulls in the north entrance at Hazleton, and probably the skulls in the middle of the north side of the south chamber. On the other hand, there are fortuitous patterns created by the chance apposition of bones during the casual setting aside of bones (skulls would tend to roll towards the edges of the chambered areas) and by the operation of entirely natural factors, such as structural collapse.

Burial rite

For Hazleton, it has been concluded that the burial rite was generally one of successive interment of whole corpses, accompanied by the inevitable disruption of previous interments. Some evidence pointed to the probable removal from the tomb of a few disarticulated longbones (and possibly some skulls), while the monument was still in use for burial. Debate on the rites indicated by the burial remains in Cotswold-Severn tombs has fluctuated between the theory of successive interment and the ossuary theory (Rolleston 1876, 134), the latter requiring the exposure or burial of corpses away from the tomb and the bones subsequently being collected for redeposition in the chambered areas. The problem appeared to have been resolved in favour of successive interment at West Kennet (Piggott 1962, 65–8), but it has recently been rekindled by Chesterman's claims for excarnation at Ascott-under-Wychwood (Chesterman 1977, 30–32). The excavator of Ascott has convincingly refuted the arguments for bleaching and fracture which Chesterman adduced in favour of excarnation, but concluded, without presenting any supporting evidence, that '... some degree of delay between death and final burial in the mound' was involved (Benson and Clegg 1978, 137). Until evidence from Ascott is forthcoming, this writer can see no reason for doubting that successive interment could explain all of the burial remains in Cotswold-Severn tombs. Secondary arguments about the practice of excarnation in the British Early/Middle Neolithic, derived from the excavation of other types of site (Mercer 1980, 63–5), do not affect this conclusion, nor is the case in favour of excarnation at other British chambered tombs as convincing as has been maintained (Renfrew 1979, 166–8).

Gravegoods

Hazleton North appears to be the first Cotswold-Severn tomb at which the specific association between an individual burial and personal gravegoods can be substantiated (Fig 234), excepting the possibility of a flint blade with a crouched interment at Lugbury (Thurnam 1856, 170). Apart from the Hazleton 'flintknapper' burial, other items from the burial deposits could not be related to any particular individual. In other Cotswold-Severn tombs, an assortment of artefacts and ornaments, usually few in number from each tomb, have been recorded as scattered among the burial deposits in much the same way as the majority of items at Hazleton. It has been assumed at Hazleton that these finds do represent personal gravegoods, which were originally deposited with particular corpses, but which subsequently became dispersed.

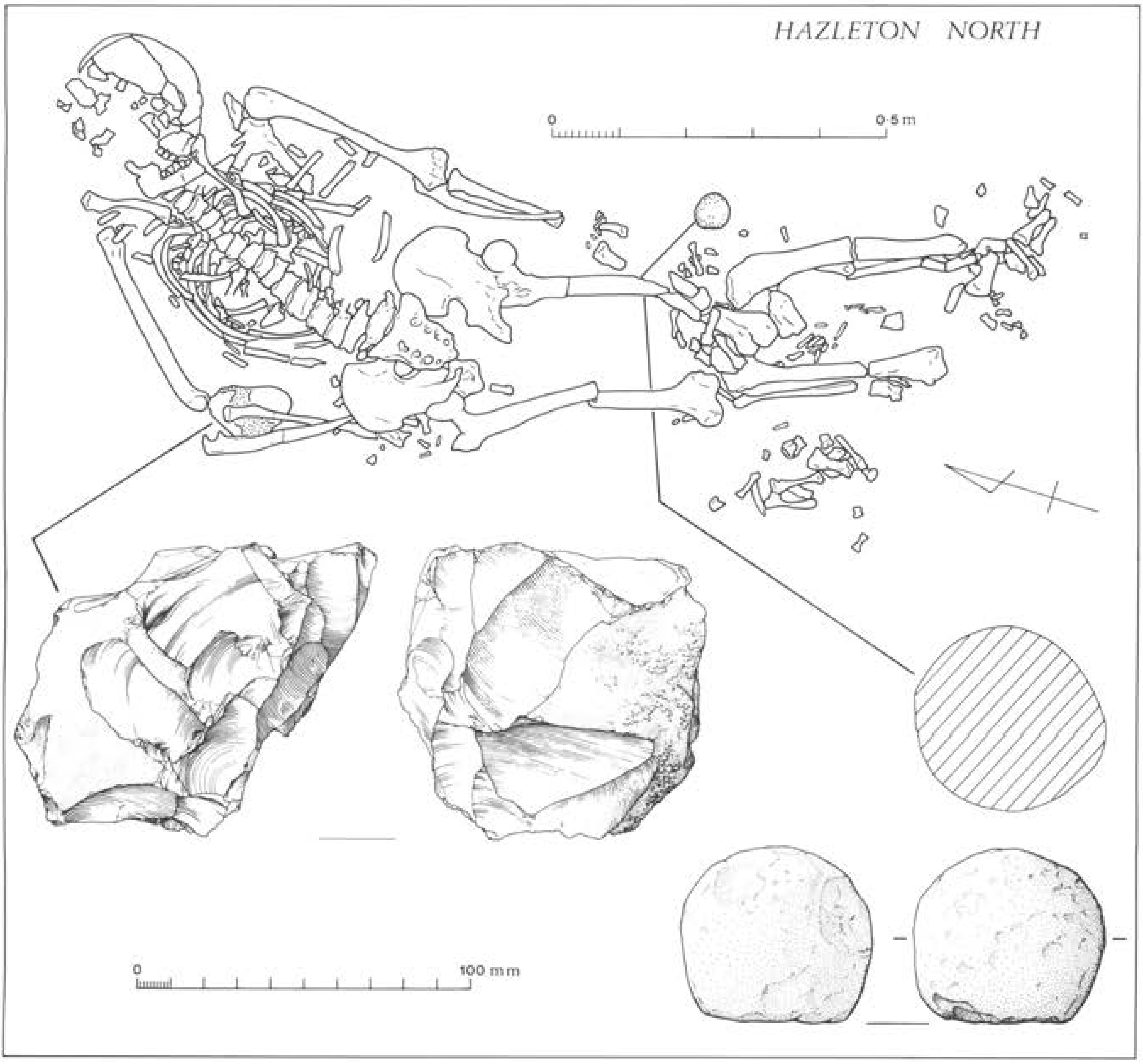


Fig 234 The 'flintknapper' burial in the north entrance

There are not enough finds, at Hazleton or elsewhere, to provide gravegoods for the minimum numbers of individuals involved. This paucity of objects was initially ascribed to tomb-robbing (Thurnam 1869, 229), but more recently has been linked with the concept of the burial deposits in Cotswold-Severn tombs being reburials, for which gravegoods were not so appropriate (Savory 1984, 35). If all the Hazleton burials are primary introductions, then either some burials were made without gravegoods (as seemingly at Lanhill; Keiller and Piggott 1938, 127), or gravegoods were removed during subsequent re-entry.

Subjectively, it seems in accord with the suspected ethos of burial activity at Hazleton, that any gravegoods that could usefully be reused would be collected once the corpse of their owner had decayed. Those gravegoods which remain in the tomb would thus be those which were either unusable (like a pottery cup which had fragmented), or valueless (like animal bones), or irrecoverable (like flint tools and bone beads which had become concealed in dark corners), or still in association with the last burial to be inserted (as with the 'flintknapper'). This is conjectural, but consideration of the other objects found in association with Cotswold-Severn burials, particularly those classes of objects not found at Hazleton, does not contradict the hypothesis that they can be regarded as purely personal possessions. These range from shale beads and bone rings (Clifford 1950) to pottery spoons (Kinnes and Longworth 1985, pl 229). The only possible communal items found in Cotswold-Severn tombs might be the larger pottery vessels. Not only are these pots few in number, but it could be argued that it was the contents, rather than the vessel, which accompanied the burial.

Leaf-shaped arrowheads found in Cotswold-Severn tombs could be different. It has been suggested that the arrowhead tip recovered from the north entrance at Hazleton could have been introduced inside one of the corpses. Certainly, the rest of this arrowhead was not present, and the removal of a useless broken arrowhead during contemporary re-entry would be unlikely. An arrowhead embedded in the lumbar vertebra of a corpse at Ascott-under-Wychwood confirms this possibility (Selkirk 1971, 8). A similar explanation was offered for the complete leaf-arrowhead found in the throat region of burial II in the NE chamber at West Kennet (Piggott 1962, 25). Other leaf-arrowheads possibly from burial deposits in Cotswold-Severn tombs are recorded from Notgrove (Witts 1912, 45), West Tump (Witts 1880–81, 206), Rodmarton (Clifford and Daniel 1940, 143), Sale's Lot (O'Neil 1966, 30), Adam's Grave (Thurnam 1869, 230), Ty-isaf (Grimes 1939, 130), and Penywyrlod (Savory 1984, 26). Some of these arrowheads may represent the cause of death, rather than being gravegoods, and thus would complement other indications of the hostility between Neolithic communities (Mercer 1980, 65; Bradley 1984b, 35).

Demographic implications

Following Renfrew's (1979, 162–6) consideration of the human population represented by the Quanterness burials, very elaborate demographic analysis has been undertaken by Hedges (1982; 1983, 273–85) on the basis of the collective burial remains from the Orkney chambered tomb at Isbister. This kind of analysis has been challenged (Fraser and Kinnes 1982). The crucial factor is the difficulty, if not impossibility (Bocquet-Appel and Masset 1982), of estimating accurately the structure of deaths in a skeletal population, even if it were possible to estimate reliably the age at death of each of the individuals involved. Such calculations are not possible on the data available for the Hazleton burials, nor for those from any other Cotswold-Severn tomb. Further research on certain aspects of the Hazleton remains, for example the teeth, would enable more specific statements to be made about age at death, but it would still be impossible to undertake meaningful demographic reconstruction from such a small sample. Any suggestions about the population represented by the Hazleton burials are therefore speculative and based upon general archaeological considerations.

Are the surviving human remains representative of the total number of burials involved? At Hazleton, while some longbones, and perhaps skulls, were missing from the deposits, there was no indication of extensive bone removal. Theoretically, it is possible that a complete clearing out of the chambered area could have taken place during the lifetime of the tomb, but this is improbable. It seems more likely that removal would be partial and would leave behind masses of small bones and fragments. This does not appear to have been the case, the bones in the chambered areas being compatible with the number of individuals envisaged. Thus, a total burial population of some 35–42 individuals is apparent, comprising adults and pre-adults, males and females.

Structured deposition

Shanks and Tilley (1982) have made far-reaching claims for patterned deposition of burials, based partly on an interpretation of burial deposits at Lanhill and Luckington. Such interpretations are purely hypothetical, because the published data from these two sites are inappropriate for the analyses which they sought to undertake. Without studying the actual bones, it is impossible to appreciate all the practical limitations in dealing with such fragmentary, disarticulated remains. At Hazleton, there was insufficient research time for any presentation of the total numbers of all the individual skeletal parts, since this would have involved an extremely lengthy refitting exercise, especially with the very fragmentary skulls. It has, however, been possible to present quite comprehensive data on the longbones. Such complete data are not available for any other Cotswold-Severn tomb.

Nevertheless, the Hazleton data are sufficient to dispute any suggestion of bias in favour of the deposition or arrangement of either left- or right-side bones (Shanks and Tilley 1982, 147). The sex of disarticulated bones in the Lanhill and Luckington reports must now be regarded with deep suspicion in view of current specialist caution. Even the more limited patterning suggested for the West Kennet burials (Kinnes 1981a, fig 6.10; Thomas and Whittle 1986) cannot be endorsed, because without reference back to the bones themselves, the published identification of individuals and sexes there must now be considered unreliable.

The patterning that Shanks and Tilley propose is very difficult to equate with the practical possibilities of burial activity within the cramped conditions of the majority of Cotswold-Severn chambers. Even where conditions were better, as in the Hazleton north entrance, the organisation of the deposits appears to owe more to convenience than to an imposed structure, with the exception of skulls placed on a natural shelf and possibly the cremated bones with skeleton 1. Elsewhere at Hazleton, the patterning which exists does not seem to be conditioned by such concepts as sidedness, but rather to relate to the remains of individual corpses.

Thus, from the north chambered area at Hazleton, there is the suggestion that bones belonging to individuals were, initially at least, heaped in separate piles after the corpses became skeletal. On the south side, where there were more burials, there was no indication of this. There was an impression of continued access leading to a random pattern, predetermined only by the bones from individual skeletons being set aside near the original position of the corpses. Even if there were any structure in the way that the bones of individuals within the south chambered area were set out after decomposition of the corpse, this structure would have become obscured by the palimpsest effects of subsequent burials and by physical damage during re-entry (cf Kinnes 1981b). Further transformation of any patterning would result from animal activity within the chambered areas and any post-depositional human disturbance.

The Hazleton burials give the overriding impression that the disarticulated bones were essentially in a state of disorder. This was conditioned only by the constraint imposed by the former presence of intact corpses and the arbitrary redistribution of those corpses, once in skeletal form, in the most convenient way.

The Hazleton North burials may represent '... an assertion of the collective' (Shanks and Tilley 1982, 150), in that the place of burial was communal, but it was only after the decay of the flesh that the bones themselves became fully integrated into the anonymous ancestral commune. As the 'flintknapper' burial demonstrated, individuality was not denied at the time of death.

To return to the Hazleton population, the burial evidence is interpreted as being consistent with the interment of individuals, irrespective of age or sex, within the chambered areas at or soon after the time of their death. The skeletal remains were kept within the tomb, except for the occasional removal of certain bones, but they became increasingly jumbled due to the insertion of each successive burial and to re-entry activities. There is no general indication that the remains of any one interment were accorded more attention than another, or that any interment may have had more significant gravegoods than another, and therefore no indication of overt stratification within the buried sample. Considering that the construction of the monument was within the capacity of a small group and that the use of the monument could have been fairly short-lived, there is no need to envisage the Hazleton burials as anything other than the collective dead of a small-scale local community.

Chronology, social context, and function

The radiocarbon determinations from Hazleton North are the first from a tomb in the Gloucestershire heartland of the Cotswold-Severn group (Fig 1), although there are dates from another laterally-chambered tomb on the edge of the distribution at Ascott-under-Wychwood, Oxfordshire (Table 97). None of the dates on human bones from the primary burial deposits at Ascott is yet reliable (Tite *et al* 1987), but the dates from charcoals from the buried soil and barrow construction are compatible with Hazleton. The other dates for Cotswold-Severn tombs all derive from sites in groups separate from the main Cotswold concentration, either from the Welsh Black Mountains group, from the Avebury group, or from the Berkshire Downs outlier. One of the Black Mountain dates (from Penywyrlod) is on human bone, as are the four from West Kennet, and all five dates are directly comparable with those from the Hazleton burials. The two most recent dates from Gwernvale seem to relate to post-monument activity (Britnell 1984a, 88).

Insofar as they can be taken to be representative, the available dates match those from Hazleton and are also compatible with the same restricted period of tomb construction and use. The number of dated

Table 97 Radiocarbon dates from Cotswold-Severn tombs

Ascott-under-Wychwood, Oxfordshire (Burleigh *et al* 1976, 19–20 and 1983, 45)

BM–491b	4893±70 BP	(2943 uncal bc)	charcoal from pit beneath cairn
BM–492	4735±70 BP	(2785 uncal bc)	charcoal from pre-cairn surface
BM–832	4942±74 BP	(2992 uncal bc)	charcoal from timber within cairn
BM–833	5020±92 BP	(3070 uncal bc)	charcoal from timber within cairn
BM–835	5198±225 BP	(3248 uncal bc)	charcoal from primary quarry fill
BM–836	4445±61 BP	(2495 uncal bc)	charcoal from upper quarry fill
BM–837	4714±166 BP	(2764 uncal bc)	charcoal from upper quarry fill
BM–1974*	4430±130 BP	(2480 uncal bc)	human humerus from chambered area
BM–1975*	3480±50 BP	(1530 uncal bc)	human femur from outside outer cist
BM–1976*	4535±40 BP	(2585 uncal bc)	human femur from chambered area

Note: *These three dates fall within the series of determinations from the British Museum for which a potential laboratory error has been identified (Tite *et al* 1987). The dates as given are probably too recent.

Wayland's Smithy II, Oxfordshire (Atkinson 1965, 132)

I–2328	4770±130 BP	(2820 uncal bc)	charcoal from pre-cairn surface

West Kennet, Wiltshire (Gowlett *et al* 1986c)

OxA–449	4825±90 BP	(2875 uncal bc)	skull, skeleton II, NW chamber
OxA–450	4700±80 BP	(2750 uncal bc)	femur, skeleton II, NE chamber
OxA–451	4780±90 BP	(2830 uncal bc)	femur, skeleton IV, SW chamber
OxA–563	4780±90 BP	(2830 uncal bc)	femur, skeleton I, NW chamber

Penywyrlod, Powys (Savory 1984, 29)

HAR–674	4970±80 BP	(3020 uncal bc)	mixed human bones from NE II chamber

Gwernvale, Powys (Britnell 1984a, 152)

CAR–113	5050±75 BP	(3100 uncal bc)	charcoal from pit beneath cairn
CAR–114	4390±70 BP	(2440 uncal bc)	charcoal from pit outside cairn
CAR–116	4590±75 BP	(2640 uncal bc)	charcoal from pit outside cairn
CAR–118	6895±80 BP	(4945 uncal bc)	charcoal from pre-cairn hearth

sites is insufficient to conclude that all Cotswold-Severn tombs share the same early fourth millennium cal BC date range as Hazleton North, but the dates that are available, the limited cultural evidence from securely-contexted gravegoods, and also perhaps some architectural similarities do not contradict such a contention. A possible working hypothesis is that all Cotswold-Severn tombs were built and used within the time bracket of 3800–3500 cal BC and that the actual use of individual tombs may have spanned as little as 100 years (three to four generations) or less within each community. This hypothesis would allow paired tombs like Hazleton North and South to be successive, but to still fall within the maximum time bracket. If Hazleton North had been filled to capacity with burials, this would provide a reason for the building of Hazleton South by the same community, or vice versa.

A short chronology for Cotswold-Severn tombs runs against current consensus, which envisages the tombs continuing in use for long periods of time – as much as 600 years for individual tombs, such as Gwernvale (Britnell 1984a, 150), and almost 1500 years for the Cotswold-Severn group as a whole (Darvill 1982, 26). This adherence to a long chronology is directly linked to the concept of restricted access for burial, the theory being that '... only certain privileged members of the community were deposited in these tombs' (Megaw and Simpson 1979, 117; cf Kinnes 1975, 26). At Hazleton, however, the burial evidence could be consistent with the interment of all the members of a single community.

The Hazleton skeletal evidence does not provide a basis for estimating an average lifespan, and it is debatable whether this can be demonstrated from any other site (*contra* Chesterman 1977, 24), but for the purposes of this discussion this can be estimated as between 20 and 30 years (cf Saville *et al* 1987). If the total number of individuals buried at Hazleton North was 40, and the tomb was used for 100 years, then this would imply a community of 8–12 people, or, for 50 years, 16–24 people. Accepting as inevitable that, for various fortuitous reasons, not all of the deceased of the community received tomb burial, and that infant deaths in particular are underrepresented, then it is just feasible to envisage the Hazleton burials as those of a single community, which, although small, would have provided sufficient labour to construct the monument. On this basis, the Cotswold-Severn tombs could be the community vaults of small, essentially self-contained, local groups. Such groups could not be completely self-sufficient, nor self-perpetuating without exogamous interchange, perhaps undertaken within the network of contacts provided by the importation of raw materials and artefacts (Saville 1982c).

The work-study estimated that between 8000 and 14,500 work-hours would have been required for the quarries and cairn. This can be compared with the estimates for the construction of two Early Neolithic tombs in Wiltshire: Fussell's Lodge at 6900 and West Kennet at 15,700 work-hours (Startin and Bradley 1981, 292), while Case (1986, 24) has suggested some 7000 for the Ascott-under-Wychwood tomb, Renfrew (1979, 214) around 10,000 hours for Quanterness, and Lambrick (1988, 50) 4000 hours for the Whispering Knights stone setting. Ascott-under-Wychwood and Quanterness are more suitable for comparison with Hazleton North, in that the most labour-intensive tasks were on the same relatively small-scale, and the minimum of six workers suggested for Hazleton is of the same order as the 5–10 workers suggested for Quanterness (Renfrew 1979, 214).

The kind of societies here envisaged for the Cotswold region when the tombs were being built and used is similar to the small-scale segmentary, acephalous societies defined by Renfrew (1976, 205; 1979, 219–20). Much discussion has been given to whether the complex form of Cotswold-Severn tombs is a reflection of the segmentary character of the contemporary societies. The writer agrees with Thurnam (1869, 210) in seeing no significance other than structural in the internal cellular plan, nor any reason to explain the cellular units as segments apportioned to separate families or work-teams (*contra* Case 1986, 24; Startin 1982, 155; Ward 1915, 315). There is, however, the question of why laterally-chambered tombs have more than one chamber, and a strong case could be made for these chambers reflecting some kind of division within a society (Fleming 1972, 62). The Hazleton evidence does not indicate any obvious difference between the north and south chambered areas in terms of age, sex, or status of the individuals buried, but a kinship difference is quite feasible.

The Hazleton North cairn clearly was a place of burial, but, like most other Cotswold-Severn tombs, the size of the chambered areas compared with the size of the cairn was disproportionately small, and an additional monumental function is implied (Fleming 1973). It will probably never be possible to elucidate the relative importance of the role of burial in the construction and function of these monuments, but there can be little doubt that the cairns did provide a focus for the ritual activities of their users. The various explanations which have been proposed for the monument aspect of chambered tombs were conveniently summarised by Fleming (1973, 189). The most popular explanation has been that the tombs served as territorial markers, as '... the emblems of the social groups which constructed them, signalling group identity, and validating the control and use by the group of the land within whose confines they lay' (Renfrew 1979, 221). Other writers have explored the territorial theme further, by considering the relevant anthropological evidence in relation to ancestor cults and agricultural versus hunter-gatherer societies (eg Chapman 1981, 73).

If the Cotswold-Severn tombs are a short-lived phenomenon of the early fourth millennium cal BC, and if it is correct to assume that they served as territorial markers, how is this sudden rise and fall of monument building to be explained in a local context? There are two main alternatives for the circumstances in which the tombs may have been built. Either these were monuments erected by incoming farming groups in a colonising situation, perhaps to create territorial rights in opposition to those which might be claimed by other incoming groups or by existing (Mesolithic?) communities, or they were erected by established Neolithic communities, perhaps under pressure in a situation of land or resource competition and population growth.

It has been argued that monument building is much more likely in a stable, established Neolithic context than in a pioneering one (Case 1969, 181; Renfrew 1976, 219), but is there any evidence for a pre-monument Neolithic in the Cotswold region? Purely on hypothetical grounds, the Cotswold-Severn tombs have been seen as Middle, rather than

Early Neolithic (Case 1986; Darvill 1984 and 1987), despite the continuing non-appearance of this early phase. The pre-cairn Neolithic activity at Hazleton can barely predate the tomb and cannot be ascribed to a totally separate Early Neolithic phase in the region; it could conceivably be occupation contemporary with an earlier use of Hazleton South. The enclosures of the region are likely to be of the same date as the tombs (eg Peak Camp radiocarbon dates: Darvill 1986), and there seems no archaeological reason to dissociate either class of monument from the first farmers. It might instead be suggested that the reason for the cessation of monument building in the region was precisely the attainment of stable conditions on the part of the Neolithic communities. Once territorial identity was established within a local status quo, the absence of a threat to the legitimacy of the groups involved may have diminished the need for recourse to ancestor cults.

Finally, Hazleton North is unusual among Cotswold-Severn tombs in that it has provided no indication of activity dating to the Middle or later Neolithic. West Kennet has clear evidence of secondary use in the later Neolithic, but as ritual activity involving the infilling of the chambered area, not for burial. The period of burial activity at West Kennet, centred on *c* 2800 uncal bc, was, like Hazleton North, '... too short for its duration to be perceptible in radiocarbon terms' (Piggott and Atkinson 1986, 144), and the very late ceramics from the secondary infill imply that there was a gap of many centuries during which the tomb was abandoned, with the chambers left empty (and decaying: Piggott 1962, 16), except for the burial deposits on their floors. Elsewhere within the Cotswold-Severn group, the association of later Neolithic pottery with post-monument 'blocking' episodes is well documented, for example at Gwernvale (Britnell 1984a, 88) and Nympsfield (Saville 1979b, 76). The link between Peterborough ceramics and primary burial and monument construction of terminally-chambered tombs has often been claimed (Darvill 1982, 25), but the specific instances, all from early excavations or badly-disturbed sites, do not generally stand up to rigorous tests of association.

Rather than the Cotswold-Severn tombs serving as ritual foci for many centuries after they ceased to be used for burial, it could be maintained that the evidence supports another scenario: the tombs were abandoned and left to decay for centuries without any human attention, before a rekindling of interest in them, which took the form of the infilling and blocking of the burial chambers, particularly those which retained the most obvious and accessible chambers. Other monuments, like Hazleton, may have been so decayed and overgrown by the Middle to Late Neolithic that they were ignored for these secondary rituals. Thus, the Cotswold-Severn tombs, after centuries of disuse, and perhaps without the secondary users having any inkling of their original meaning, may have become caught up in the peculiar efflorescence of later Neolithic ritual activity, most manifest in the construction of henge monuments and stone circles, marking another period of change in which monuments themselves again became of particular social importance.

Summary

Hazleton North, an Early Neolithic chambered long cairn of the Cotswold-Severn group, situated in Gloucestershire 16km to the east of Cheltenham, was totally excavated between 1979 and 1982. The site had been recorded as a Neolithic funerary monument since the nineteenth century, but had seen no previous archaeological investigation. It was selected for excavation from a number of similar sites on arable land in Gloucestershire, after a survey showed continued damage from ploughing.

Excavation revealed a trapezoidal long cairn, aligned roughly west–east, 53m long and 19m wide at the broader west end (originally about 56m long and 8m wide at the east end). Hazleton North is an example of the laterally-chambered type of Cotswold-Severn tomb, with two very similar L-shaped chambered areas near its centre, entered from opposite sides of the monument.

Almost all of the material used to build the cairn was obtained from two quarries flanking its north and south sides. Red deer antlers found on the floors of the quarries are interpreted as quarrying tools.

The method of construction was revealed in considerable detail, showing the cairn to have been built using multiple internal revetments to give structural cohesion. The two chambered areas were incorporated within the long cairn as part of the original design, the whole monument being of single-phase construction.

The exterior of the cairn was formed by a fine drystone revetment, higher at the broader west end, where a slightly recessed forecourt area was set between two projecting horns. The forecourt revetment was blank with no large, upright slabs of 'false entrance' type.

Both of the chambered areas contained extensive deposits of human bones, mostly in a disarticulated and scattered condition. The south chambered area had bones throughout its length. These represented the remains of some 14 adults and 6–11 pre-adults, with both sexes present. In the north chambered area, human remains were found only in the chamber and the entrance, separated by a totally empty passage. This was caused by contemporary collapsed stonework, restricting further burials to the entrance area. A blocking slab was placed at the junction of the passage and chamber. The north chamber contained the disarticulated bones of four adults and four–six pre-adults, but these had been partially disturbed. The north entrance was undisturbed and contained some of the most significant burial evidence yet recovered from a Cotswold-Severn tomb. The final burial here was that of an adult male with associated gravegoods. The previous inhumation of another adult had been partly cleared away. Disarticulated bones cleared to the side and rear of the entrance represented another adult male and two children. Cremated bones from at least one adult and one pre-adult were also present. Two adult skulls belonging to previous burials had been placed on a ledge formed by a collapsed slab.

The total number of burials was 21 adult and 12–19 pre-adult inhumations, plus one adult and one pre-adult cremations. The north entrance showed the burials to be successive, and the burial rite to involve the deposition of intact corpses within the chambered areas, followed by movement of the earlier skeletal remains to make way for subsequent access and burial. For the first time in the study of a Cotswold-Severn tomb, a detailed analysis of the distribution of the human bones has been undertaken. This information suggested no particular structure in the dispersal of the disarticulated remains.

Gravegoods were few, comprising a single pottery cup, some bone beads, stone tools, and flint artefacts, most of which were probably introduced as personal possessions along with individual corpses.

Beneath the cairn, the buried soil produced evidence for both Neolithic and Mesolithic activity. The Neolithic evidence represented part of a settlement, including a posthole setting with associated hearth – presumably part of a small dwelling house – together with a midden area containing flint artefacts, pottery sherds, and quernstone fragments. Animal bones, together with carbonised plant remains, demonstrated a full Neolithic economy with domesticated cattle, sheep/goat, pigs, and crops, among which wheat was predominant. Hazelnuts were collected in large numbers.

The Mesolithic evidence, found in a separate area from the Neolithic finds and features, consisted only of flint artefacts. These were of later Mesolithic character and indicated a small hunting station. The report on the flint artefacts includes a study of conjoining pieces, showing the Mesolithic flint scatter to result from flint-knapping on the spot and the Neolithic scatter to involve secondary rubbish deposition.

The analyses of soil, pollen, molluscan, and plant remains suggest that the tomb was built in a landscape of small-scale clearances, with cultivation followed by the regeneration of hazel scrub preceding the tomb and further woodland colonisation following its use.

Numerous radiocarbon samples, mainly from human bones but also from antler and animal bones, showed the pre-cairn Neolithic activity and the construction and use of the monument to be essentially of the same Early Neolithic date. These dates have profound implications for British Neolithic studies, suggesting that the whole phenomenon of Cotswold-Severn tomb construction and use may have been shortlived, with each tomb serving as the burial place for the whole of its local community for perhaps as little as 50–100 years.

A second long cairn, Hazleton South, is located only 80m to the south-east of Hazleton North. Trial excavation showed the presence of at least one lateral chamber and the probable existence of flanking quarries.

This report pays particular attention to the two aspects which make Hazleton North of outstanding importance for the study of Neolithic chambered cairns in Britain: the details of the cairn construction and the burial remains. The account of the excavations is supported by a full range of specialist studies and is concluded by a discussion of the results

of the excavation and its significance for the study of Cotswold-Severn cairns and the earlier Neolithic of the region.

Résumé

C'est entre 1979 et 1982 qu'on a complètement mis au jour le site de Hazleton nord, un cairn longitudinal à chambres appartenant au type Cotswold-Severn et datant du début du néolithique. Il se situe dans le comté de Gloucestershire, à 16km à l'est de Cheltenham. On savait depuis le dix-neuvième siècle que ce site consistait en un monument funéraire du néolithique, mais on n'avait jamais tenté auparavant d'en explorer les richesses archéologiques. On a choisi d'y entreprendre des fouilles, de préférence à un certain nombre d'autres sites similaires, également situés sur des terres arables du comté de Gloucestershire, après que des études aient indiqué que les labours provoquaient des dégâts continuels.

Les fouilles ont révélé un long cairn trapézoïdal, orienté approximativement d'ouest en est; il mesure 53m de long sur 19m de large à l'extrémité ouest, la plus large des deux, (à l'origine, du côté est, ses dimensions sont d'environ 56m de long sur 8m de large). Hazleton offre un exemple de tombe de type Cotswold-Severn à chambres latérales; il contient, dans sa partie centrale, deux chambres presque identiques, en forme de L, auxquelles on accède par les côtés opposés du monument.

Ce sont deux carrières, qui flanquent les côtés nord et sud du cairn, qui ont fourni presque tous les matériaux utilisés pour sa construction. On a expliqué la présence de bois de cerfs sur le sol des carrières par leur utilisation comme outils d'extraction.

Le mode de construction a été mis en évidence dans ses moindres détails; il est apparu que le cairn avait été construit en utilisant de multiples murs internes pour donner de la cohésion à l'édifice. Les deux aires contenant les chambres faisaient partie du long cairn dès le plan d'origine, l'ensemble du monument ayant été construit en une seule phase.

L'extérieur du cairn consistait en un mur de minces pierres sèches, plus élevé à l'extrémité ouest, la plus large; à cet endroit se trouvait une avant-cour légèrement en retrait, insérée entre deux cornes saillantes. Le mur de l'avant-cour était nu et ne comprenait pas de grosses dalles pour dissimuler une entrée.

Les deux aires à chambres recelaient d'importants dépôts d'os humains, pour la plupart désarticulés et éparpillés. La partie à chambre du côté sud contenait des os sur toute sa longueur, ceux-ci correspondaient aux restes de quelques 14 adultes et 6 à 11 pré-adultes, les deux sexes étaient représentés.

Quant à la partie nord, on y a découvert des restes humains uniquement dans la chambre et dans l'entrée, elles étaient séparées par un couloir complètement vide. C'était la conséquence d'un éboulement de pierres qui, à l'époque, avait interdit l'accès à la chambre; après cette date les inhumations s'étaient faites dans l'entrée. Une dalle avait été placée à la jonction de la chambre et du couloir et obstruait le passage. Dans la chambre nord, on a retrouvé les os désarticulés de quatre adultes et de quatre à six pré-adultes, mais ils avaient été en partie dérangés. L'entrée nord était intacte et révéla certains des plus significatifs vestiges funéraires jamais extraits d'une tombe de type Cotswold-Severn. Là, la dernière inhumation avait été celle d'un adulte masculin, il était accompagné d'objets funéraires. On avait en partie écarté les restes de l'inhumation précédente, un autre adulte. Des os désarticulés, qui avaient été poussés sur le côté et au fond de l'entrée, provenaient d'un autre adulte masculin et de deux enfants. On a aussi découvert des os incinérés provenant d'au-moins un adulte et un pré-adulte. On avait placé, sur le rebord formé par une dalle tombée, deux crânes d'adultes appartenant à des inhumations antérieures. Le nombre total d'inhumations atteignait 21 adultes et entre 12 et 19 pré-adultes, auxquels il faut ajouter un adulte et un pré-adulte incinérés. L'entrée nord prouvait que les inhumations avaient été successives et que le rituel funéraire se déroulait ainsi: on déposait les corps intacts à l'intérieur des aires à chambres, puis on déplaçait les restes des squelettes précédents afin de laisser de la place pour le passage et pour les inhumations suivantes. Pour la première fois au cours des études des tombes de type Cotswold-Severn, on a entrepris une analyse détaillée de la répartition des os humains. Les renseignements obtenus n'ont révélé aucun ordre particulier dans la disposition des restes désarticulés.

Le mobilier funéraire était pauvre, il ne comprenait qu'une seule coupe en poterie, des perles en os, des outils de pierre et des objets façonnés en silex; la plupart de ces trouvailles constituaient sans doute des objets personnels et avaient été introduits avec l'un ou l'autre des cadavres.

Les sols enfouis sous le cairn ont livré des preuves d'activité au néolithique, aussi bien qu'au mésolithique. Les vestiges néolithiques témoignaient de la présence d'un village; ils comprenaient un emplacement de trous de poteaux accompagné d'un foyer – probablement une partie d'une petite habitation – ainsi qu'un dépôt de déchets contenant des objets façonnés en silex, des tessons de poterie et des fragments de meule. Des os d'animaux, ainsi que des restes de plantes carbonisés témoignaient de l'existence d'une économie néolithique complète, avec animaux domestiques, moutons/chèvres, porcs et cultures, parmi celles-ci le froment était prédominant. On a ramassé un grand nombre de noisettes.

Les preuves d'une activité mésolithique furent trouvées dans un emplacement du site différent de celui où furent découverts les vestiges et les faits topographiques néolithiques, et elles ne consistaient qu'en objets façonnés en silex. Ceux-ci avaient été débités sur place et dataient de la fin du mésolithique; ils indiquaient la présence d'une petite communauté de chasseurs. Le rapport sur les objets en silex comporte une étude d'éclats adjacents; la manière dont les éclats sont éparpillés révèle qu'au mésolithique le débitage se faisait sur place, alors qu'au néolithique la taille impliquait le dépôt des débris dans un endroit différent.

Les analyses des sols, des pollens, des mollusques

et des restes de plantes conduisent à penser que la tombe avait été construite dans un paysage où le défrichement se faisait sur une petite échelle, la construction de la tombe avait été précédée par des cultures suivies par la repousse des noisetiers, après la fin de l'utilisation du monument, l'endroit avait été reconquis par la forêt.

De nombreux échantillons de radiocarbone, provenant principalement d'os humains mais aussi d'os et de bois d'animaux, montrèrent que l'activité néolithique avant le cairn, de même que la construction et l'utilisation du monument, appartenaient essentiellement à la même période, le début du néolithique. Ces dates ont de sérieuses conséquences pour les études du néolithique en Grande-Bretagne; elles suggèrent qu'il est probable que tout le phénomène de construction et d'utilisation des tombes de type Cotswold-Severn n'ait été que de courte durée; chaque tombe aurait servi de sépulture pour l'ensemble de la communauté locale pendant peut-être 50 à 100 ans seulement.

Un second cairn en longueur, Hazleton sud, ne se trouve qu'à 80m au sud-est de Hazleton nord. Un essai de fouilles a montré la présence d'au moins une chambre latérale et l'existence probable de carrières adjacentes.

Ce rapport accorde une attention particulière aux deux aspects qui font de Hazleton nord un site d'une importance exceptionnelle pour l'étude des cairns néolithiques à chambres en Grande-Bretagne: les détails de la construction du cairn et les restes funéraires. Le compte-rendu des fouilles s'appuie sur une série complète d'études spécialisées et se termine par une discussion des résultats des fouilles et de leur signification pour l'étude des cairns du Cotswold-Severn et du début du néolithique dans la région.

Zusammenfassung

Hazleton North ist ein frühneolithisches Hünengrab mit Grabkammern, das in die Cotswold-Severngruppe gehört und 16 Kilometer östlich von Cheltenham in der Grafschaft Gloucestershire liegt. Es wurde zwischen 1979 und 1982 vollständig ausgegraben. Die Fundstätte war seit dem neunzehnten Jahrhundert als ein jungsteinzeitliches Grabmal bekannt, jedoch hatte bisher eine archäologische Untersuchung noch nicht stattgefunden. Sie gehörte zu einer Reihe ähnlicher Fundstellen, die auf Ackerland lagen, und war für eine Ausgrabungskampagne ausgewählt worden, nachdem eine Bestandsaufnahme andauernde Beschädigung durch Zerpflügen festgestellt hatte.

Die Ausgrabungen legten ein trapezförmiges Hünenbett mit einer ungefähren West–Ostausrichtung frei. Es hatte eine Länge von 53m und war an seinem breiteren westlichen Ende 19m breit (die ürsprüngliche Länge betrug 56m mit 8m Breite am Ostende). Hazleton North ist ein Beispiel des Grabtypes mit seitlicher Grabkammer in der Cotswold-Severngruppe. Es besaß in seinem mittleren Abschnitt zwei sehr gleichartige L-förmige Grabkammern, deren Zugänge sich auf gegenüberliegenden Seiten des Hünengrabes befanden.

Nahezu das gesamte Baumaterial, das für die Errichtung des Grabhügels benötigt worden war, kam aus zwei nördlich und südlich parallellaufenden Steinbrüchen. Rothirschgeweihe, die auf den Sohlen der Steinbrüche gefunden wurden, werden als Werkzeuge für die Steinbruchsarbeit angesehen.

Die Konstruktionsweise trat in erstaunlichem Detail zu Tage. Sie ließ erkennen, daß bei dem Bau des Grabhügels mehrfach interne Futtermauern errichtet worden waren, um den strukturellen Zusammenhalt zugewährleisten. Die Areale der beiden Grabkammern waren ein Bestandteil der ursprünglichen Konzeption des Grabmals und deuten so an, daß daher das gesamte Denkmal nur eine Konstruktionsphase aufweist.

Die äußere Einfassung des Grabhügels wurde von einer feinen Trockensteinmauer gebildet, die zum Westende hin anstieg, wo sie, leicht eingezogen zwischen zwei hörnerartigen Vorsprügen, einen Vorhof bildete. Die Umfassungsmauer des Vorhofes war durchgehend und enthielt keine Steinplatten für ein Scheintor.

Die Areale beider Grabkammern enthielten umfangreiche Deponien an Skelettresten, hauptsächlich auseinandergerissen und verstreut. In der südlichen Grabkammer lagen Knochen über die gesamte Fläche verteilt. Diese stellten die sterblichen Überreste von ungefähr vierzehn Erwachsenen und sechs bis elf Jugendlichen dar, wobei beide Geschlechter vertreten waren. Auf dem Areal der nördlichen Grabkammer wurden menschliche Überreste nur in der Kammer selbst und im Eingang gefunden. Zwischen ihnen lag eine völlig leerer Gang. Die Ursache hierfür ist in dem zur Nutzungszeit eingestürzten Mauerwerk zu suchen, das weitere Grablegungen auf den Eingang beschränkte. Eine verriegelnde Steinplatte war

zwischen der Kammer und dem Gang eingefügt worden. Die nördliche Grabkammer enthielt die auseinandergerissenen Gebeine von vier Erwachsenen und vier bis sechs Jugendlichen, die jedoch teilweise beiseite geschoben worden waren. Der nördliche Eingang war ungestört und enthielt den bedeutensten Grabbefund, der je aus einem Grabmal der Cotswold-Severngruppe sichergestellt wurde. Die letzte Grablegung war die eines erwachsenen Mannes mit Grabbeigaben. Die vorangehende Körperbestattung eines weiteren Erwachsenen war teilweise beiseite geräumt worden. Verstreute Knochen, die zur Seite und gegen die Rückwand des Eingangs geräumt waren, gehörten zu einem weiteren männlichen Erwachsenen und zwei Kindern. Leichenbrand von wenigsten einem Erwachsenen und einem Jugendlichen war ebenfalls vorhanden. Die Schädel zweier Erwachsener, die zu vorangegangenen Begräbnissen gehörten, waren auf einem Vorsprung, der durch eine umgestürzte Steinplatte gebildet wurde, aufgestellt.

Die Gesamtzahl der Begräbnisse betrug 21 Erwachsene- und 12 bis 19 jugendliche Körpergräber, sowie die Brandbestattungen eines Erwachsenen und eines Jugendlichen. Der Nordeingang zeigt, daß die Begräbnisse einander folgten, und daß zu den Bestattungssitten die Niederlegung intakter Leichen innerhalb der Grabkammern gehörte. Darauf folgte dann das Wegräumen älterer Gebeinreste, um Platz für nachfolgenden Zutritt und Begräbnis zu schaffen. Zum ersten Mal ist im Zuge der Untersuchung eines Hünengrabes der Cotswold-Severngruppe eine eingehende Analyse der Streuung der menschlichen Skelettreste unternommen worden. Die gewonnene Information weist auf kein besonderes System in der Verteilung der auseinandergerissenen Gebeine hin.

Die wenigen Grabbeigaben bestanden aus einem Tongefäß, einigen Knochenperlen, Steinwerkzeugen und Feuersteinartefakten. Wahrscheinlich war all dies als persönliche Habe mit den jeweiligen Leichen in das Grab gelangt.

Unter dem Grabhügel auf der alten Oberfläche fanden sich die Spuren von jungsteinzeitlicher und mittelsteinzeitlicher Nutzung. Der jungsteinzeitliche Befund bestand aus Anzeichen für eine Siedlung. Zu diesen gehörten ein Pfostenloch mit benachbarter Herdstelle – möglicherweise Teil eines kleinen Wohnhauses – sowie der Platz eines Abfallhaufen, der Feuersteinartefakte, Topfscherben und Mahlsteinfragmente enthielt. Tierknochen, zusammen mit verkohlten Pflanzenresten, waren Zeugen für eine entwickelte neolithische Wirtschaft mit domestizierten Rindern, Schafen/Ziegen, Schweinen und Feldfrüchten, unter denen Weizen vorherrschte. Haselnüsse wurden in großen Mengen gesammelt.

Der mittelsteinzeitliche Befund lag auf einem von den jungsteinzeitlichen Funden getrennten Fundplatz und bestand nur aus Feuersteinartefakten. Diese hatten örtlichen, spätmesolithischen Charakter und deuteten auf einen kleinen Jagdplatz hin. Der Bericht über die Feuersteinartefakte enthält die genaue Auswertung von zusammenpassenden Stücken und zeigt, daß die mittelsteinzeitliche Feuersteinstreuung das Ergebnis von Verarbeitung an Ort und Stelle ist, während es sich bei der jungsteinzeitlichen Streuung um die Ablagerung von sekundärem Abfall handelt.

Die Analysen von Boden, Pollen, Weichtieren und Pflanzenresten deuten an, daß das Grab in einer Landschaft mit kleinflächigen Rodungen errichtet worden war, bei denen die landwirtschaftliche Nutzung durch eine Regeneration des Haselgebüsches vor dem Bau des Hünengrabes abgelöst worden war. Nach der Aufgabe des Grabes folgte erneut eine Kolonisation durch lichten Wald.

Die zahlreichen Radiokarbonproben, hauptsächlich von menschlichen Knochen aber auch von Geweihen und Tierknochen, zeigen, daß die neolithische Nutzung vor der Errichtung des Grabhügels, sowie die Konstruktion und die Nutzung des Grabmals grundsätzlich in den gleichen frühneolithischen Zeitabschnitt fallen. Diese Daten haben tiefgreifende Bedeutung für das Studium der Jungsteinzeit in Großbritannien, indem sie darauf hinweisen, daß das Phänomen der Errichtung und Nutzung der Cotswold-Severngräber sehr kurzlebig gewesen sein mag, wobei jedes Grab als der Begräbnisplatz für die Gesamtheit einer örtlichen Bevölkerung während eines Zeitraumes von nur etwa 50 bis 100 Jahren diente.

Ein zweites Hünengrab, Hazleton South, liegt nur 80m südöstlich von Hazleton North. Sondierungsgrabungen ergaben Anzeichen für das Vorhandensein von wenigstens einer seitlichen Grabkammer und die Existenz von seitlichen Steinbrüchen.

Dieser Bericht widmet den zwei Aspekten, die Hazleton North für die Erforschung der neolithischen Kammergräber in Großbritannien von hervorragender Bedeutung werden lassen, besondere Aufmerksamkeit: die Einzelheiten, die die Konstruktion des Grabhügels betreffen und die Überreste der Bestattungen. Die Beschreibung der Ausgrabungen wird von einer umfassenden Reihe an Spezialstudien begleitet und mit einer Diskussion der Ausgrabungsergebnisse und deren Bedeutung für die Erforschung der Cotswold-Severn-Hünengräber und des frühen Neolithikums in dieser Region abgeschlossen.

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Compiled by Lesley Adkins and Roy Adkins

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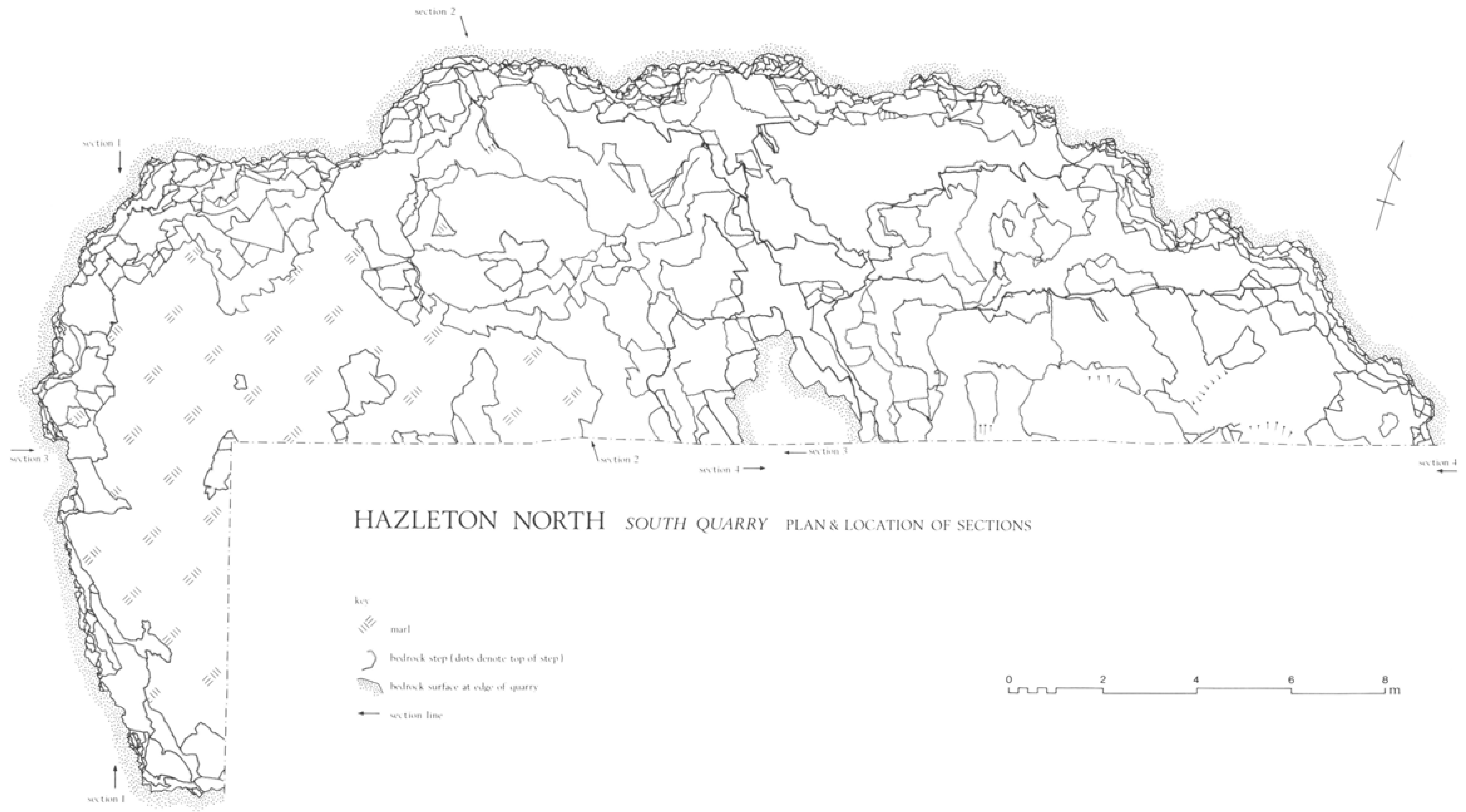

Fig 23 South quarry: plan of the excavated area and location of drawn sections

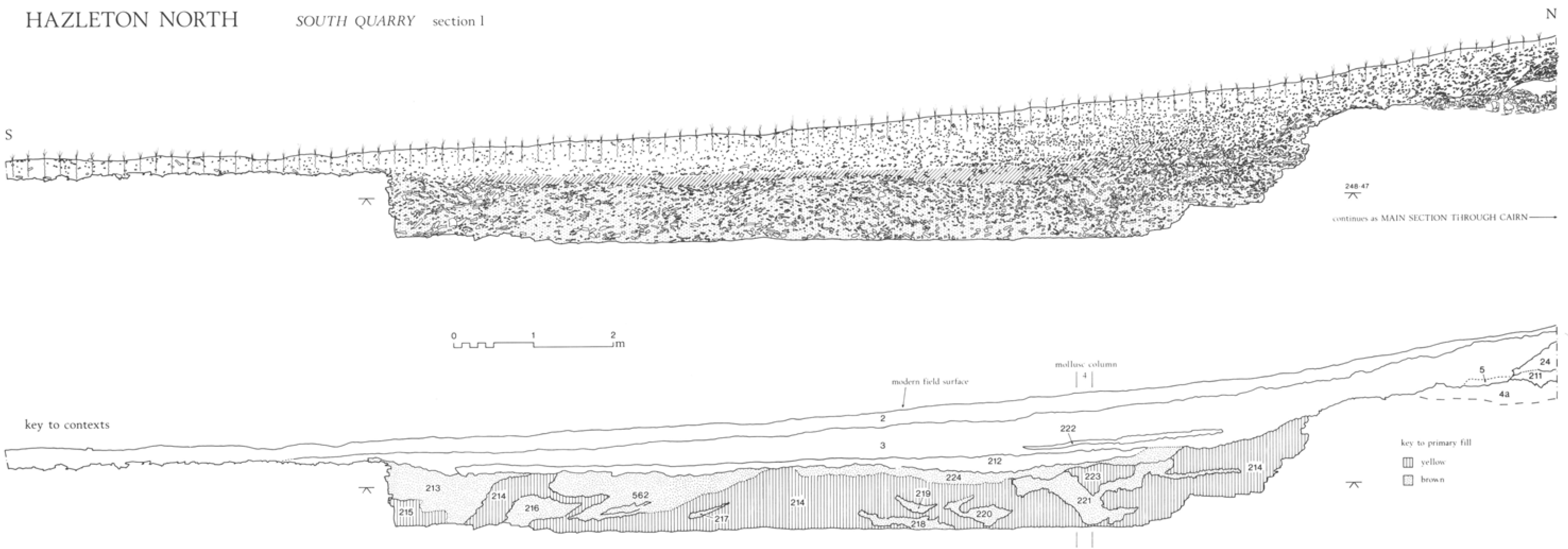

Fig 24 South quarry: section one

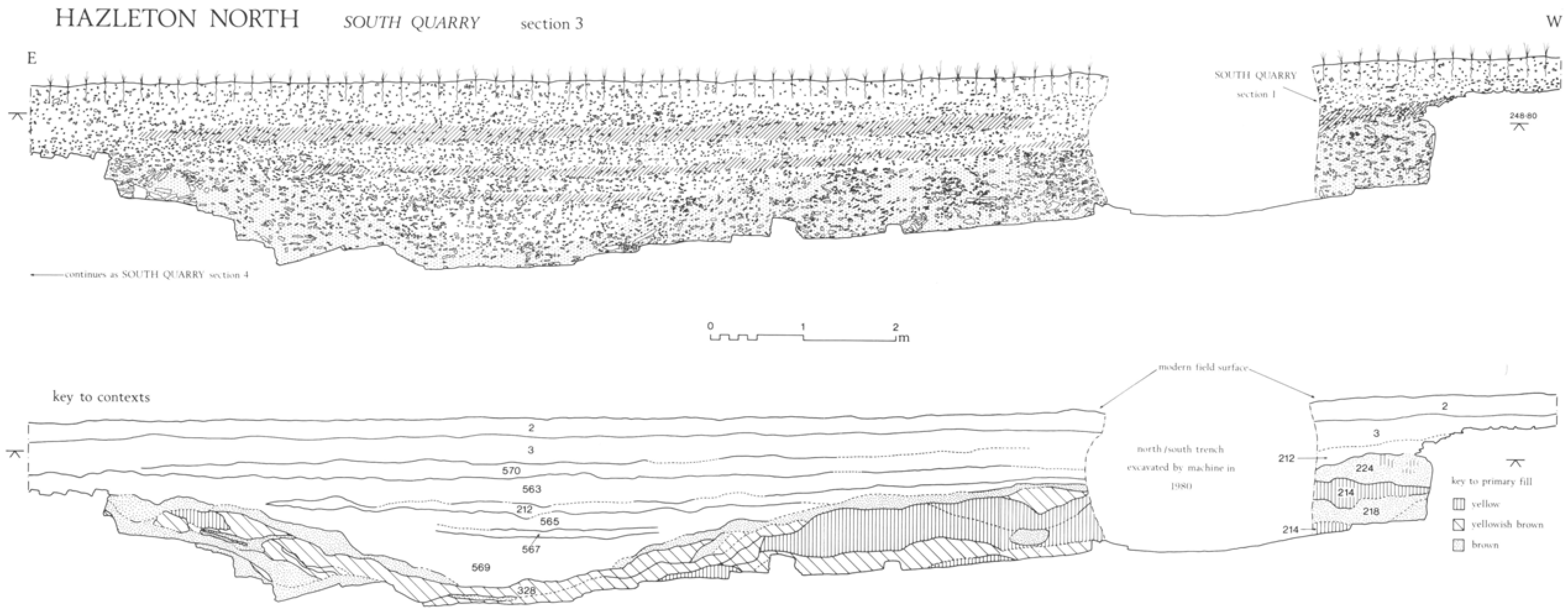

Fig 26 South quarry: section three

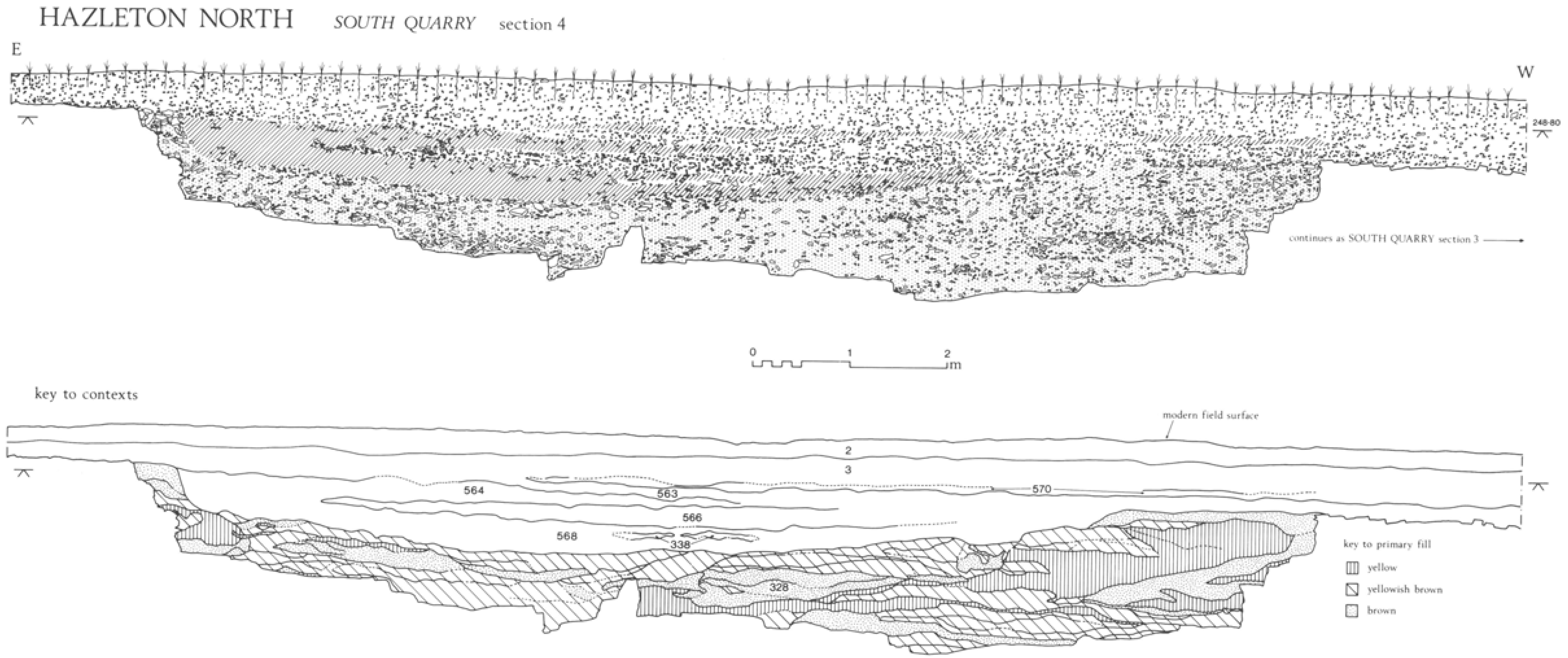

Fig 27 South quarry: section four

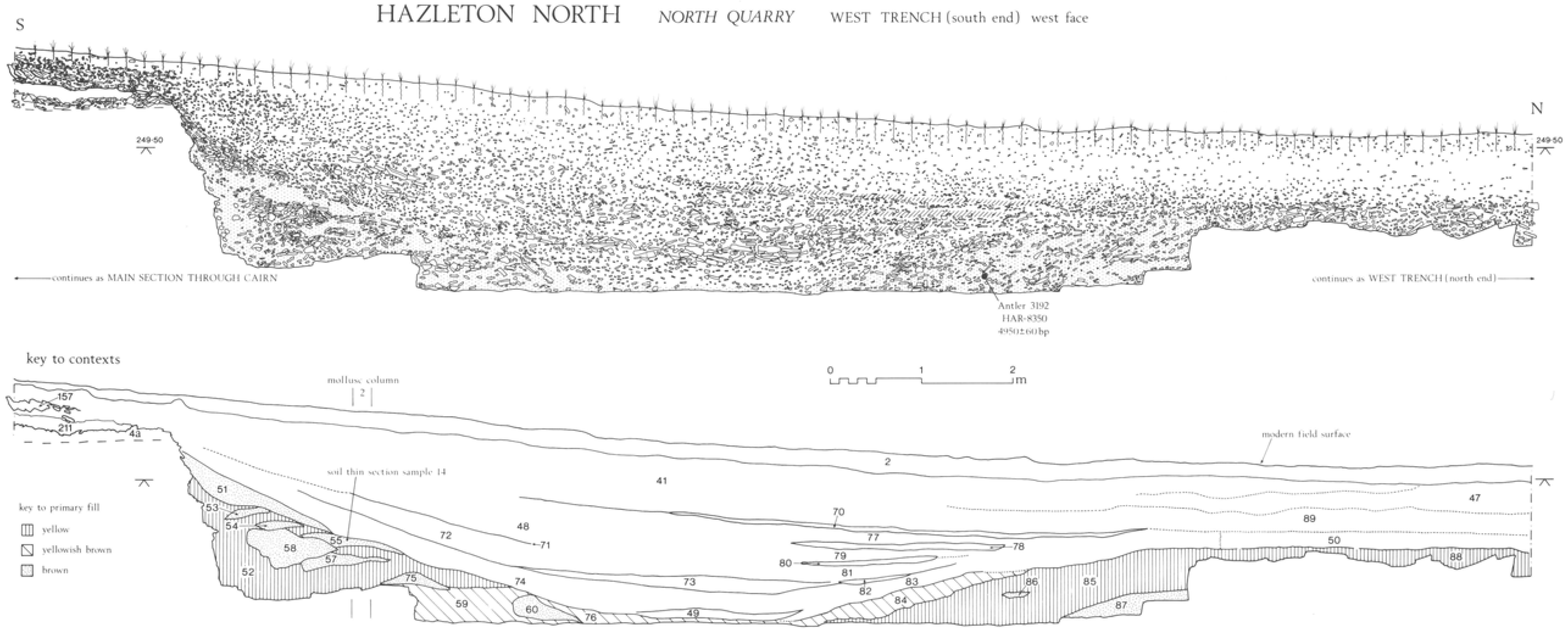

Fig 32 *North quarry section, west trench, south end*

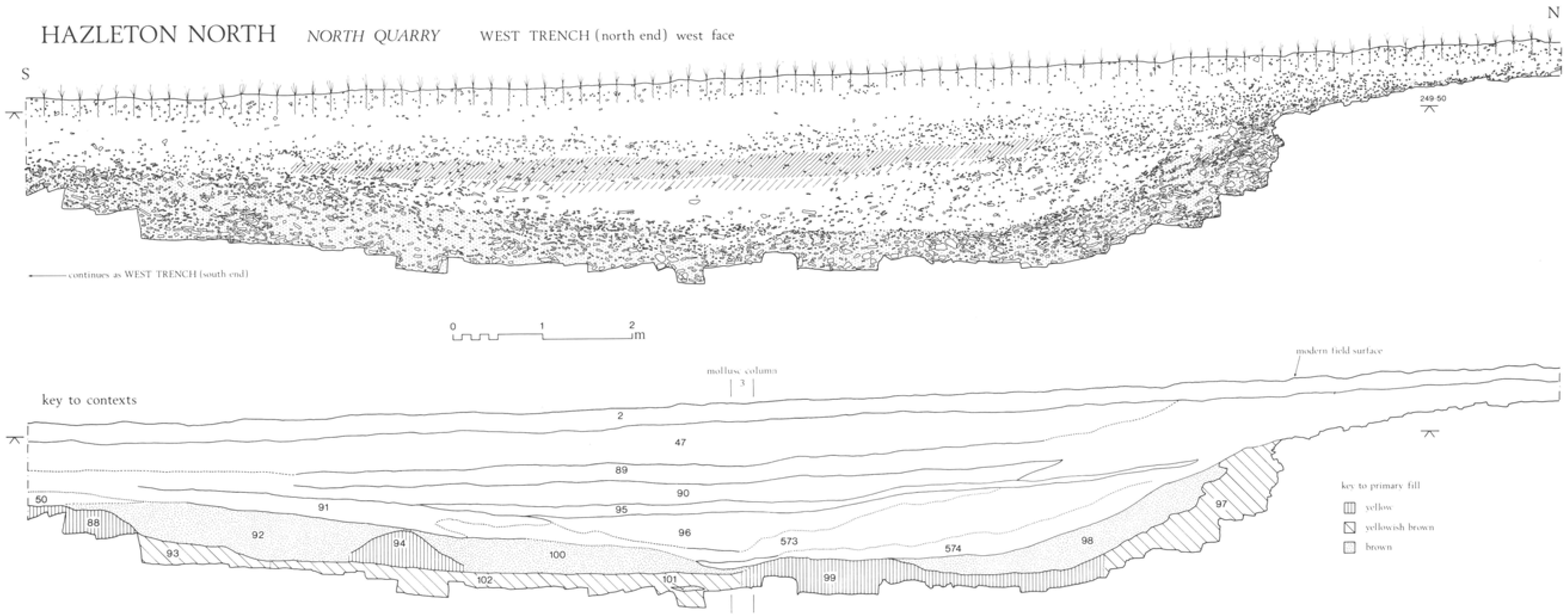

Fig 33 North quarry section, west trench, north end

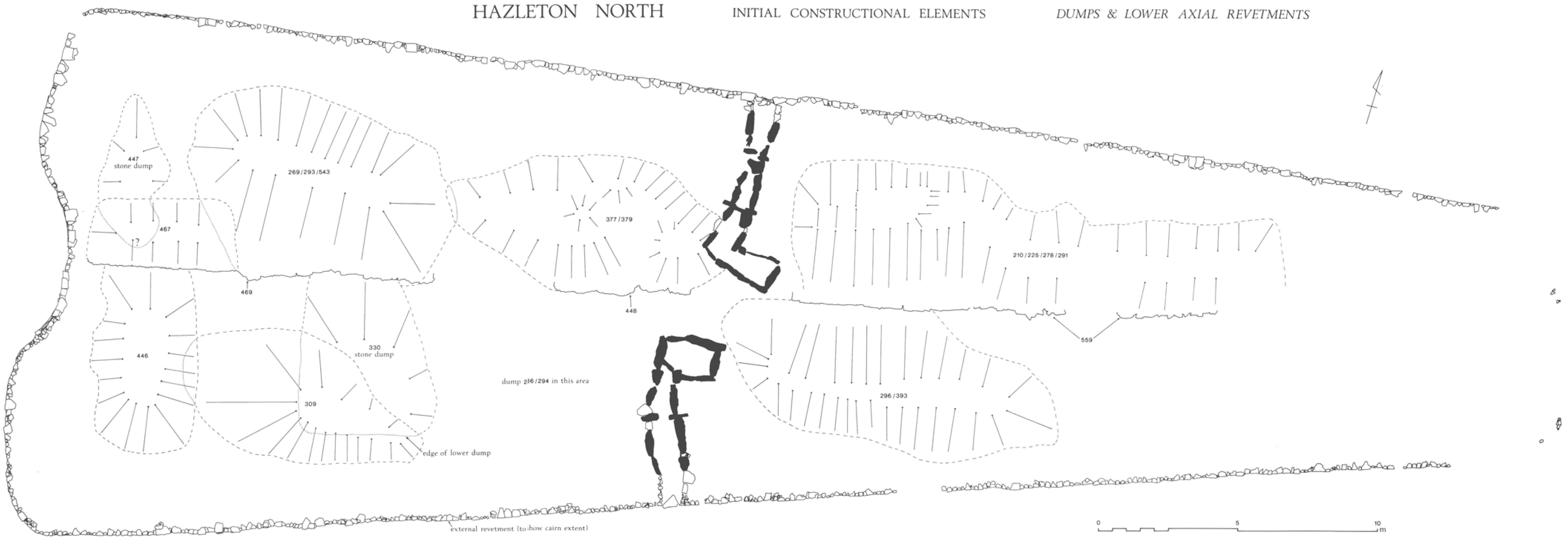

Fig 41 Plan of the initial constructional elements: dumps and lower axial revetments

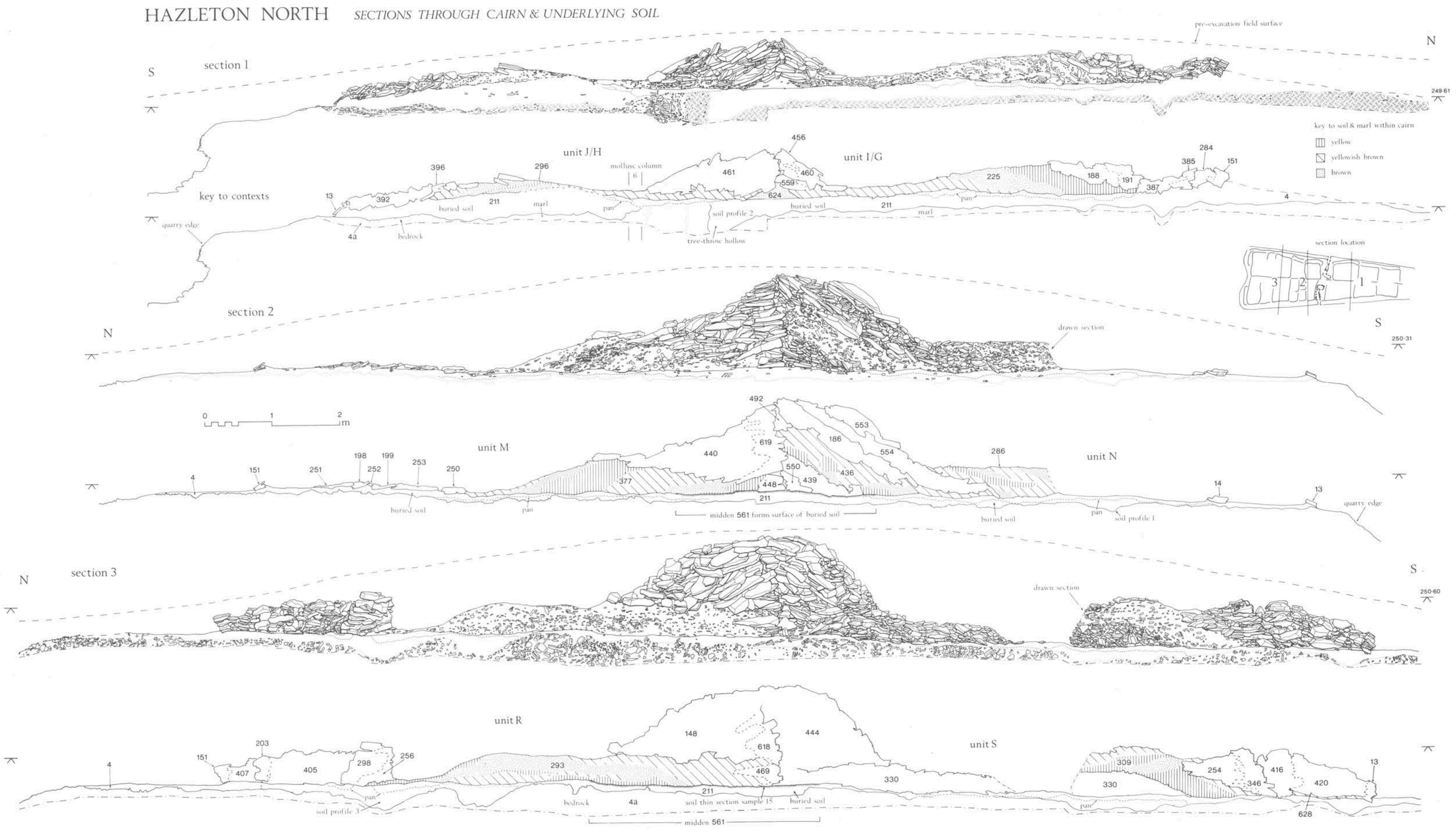

Fig 42 North–south sections through the cairn and underlying soil, recorded after the removal of various cairn deposits

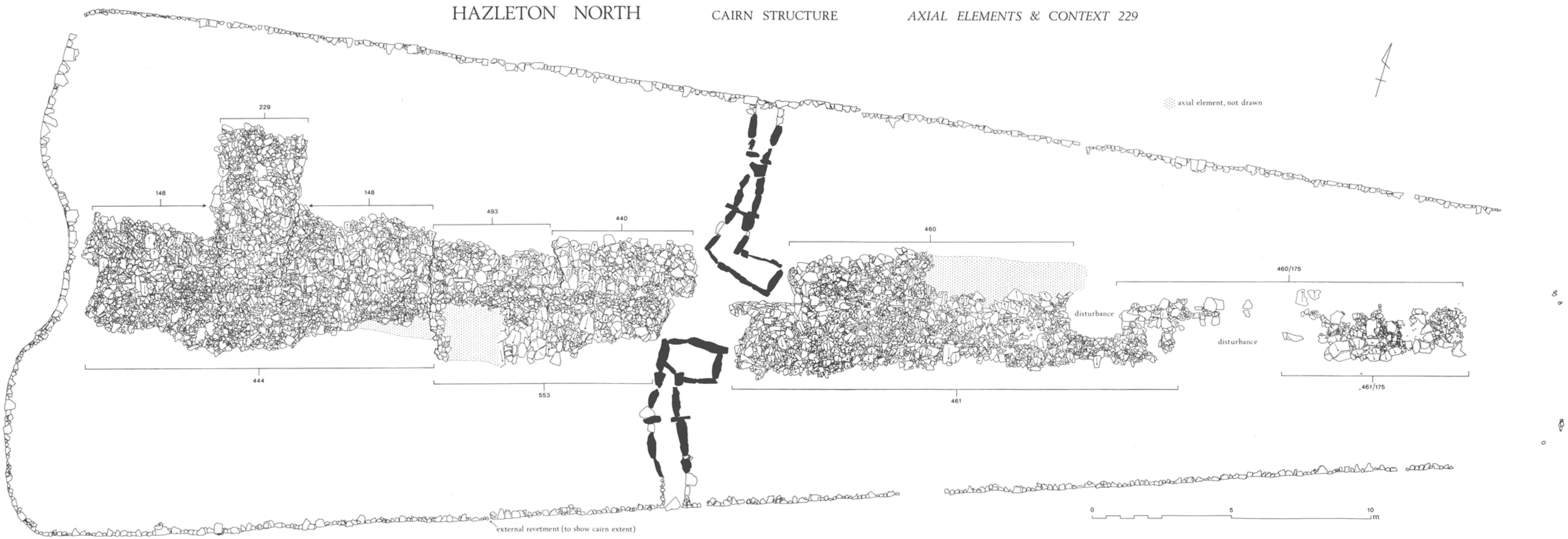

Fig 45 Plan of the cairn structure: axial elements and context 229 (unit T)

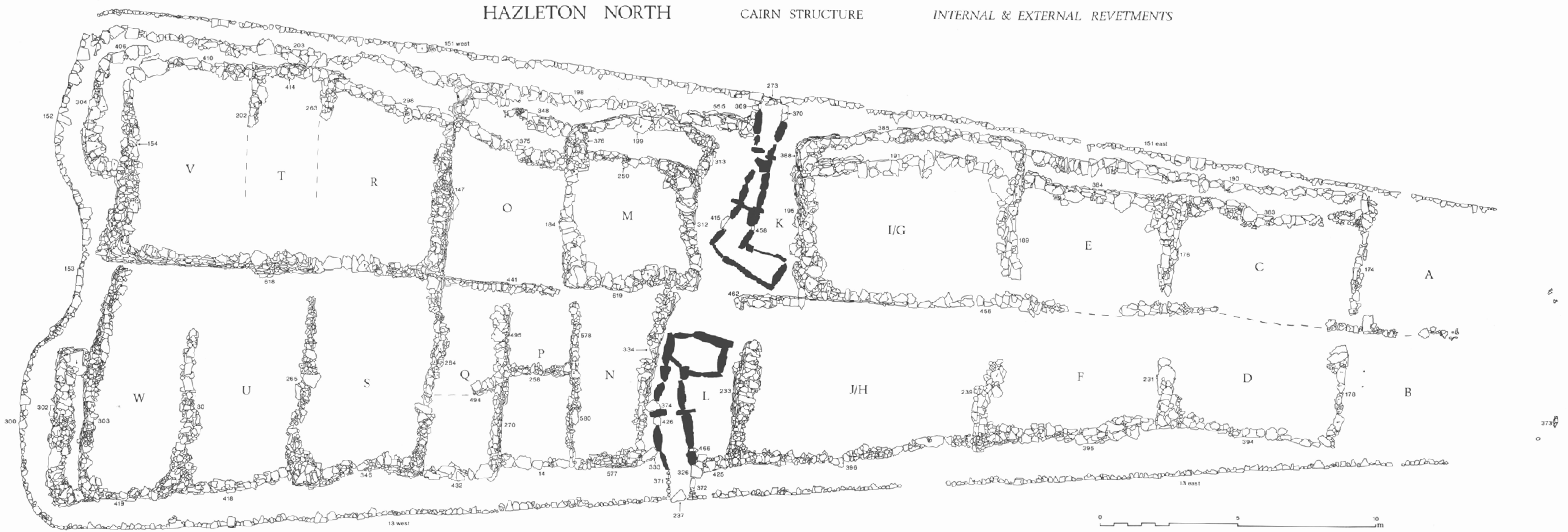

Fig 46 Plan of the cairn structure: internal and external revetments

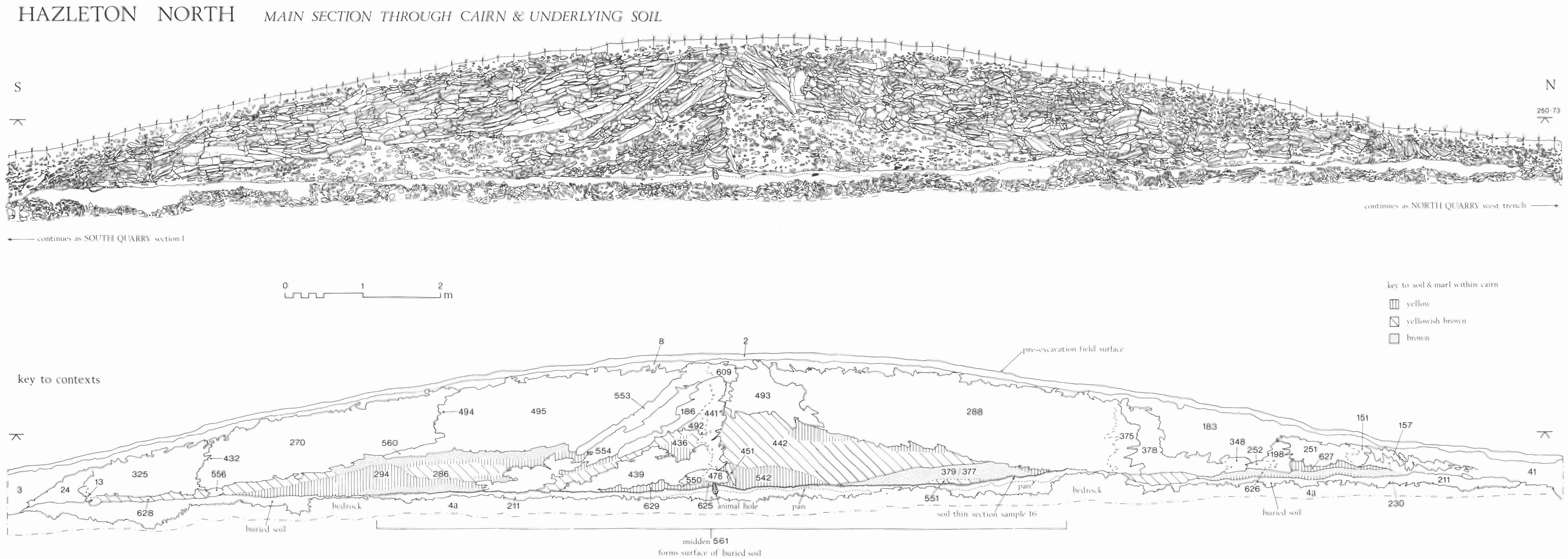

Fig 56 Main north–south section through the cairn and underlying soil

Fig 57 Plan of the uppermost surviving level of the cairn and associated stonework spread

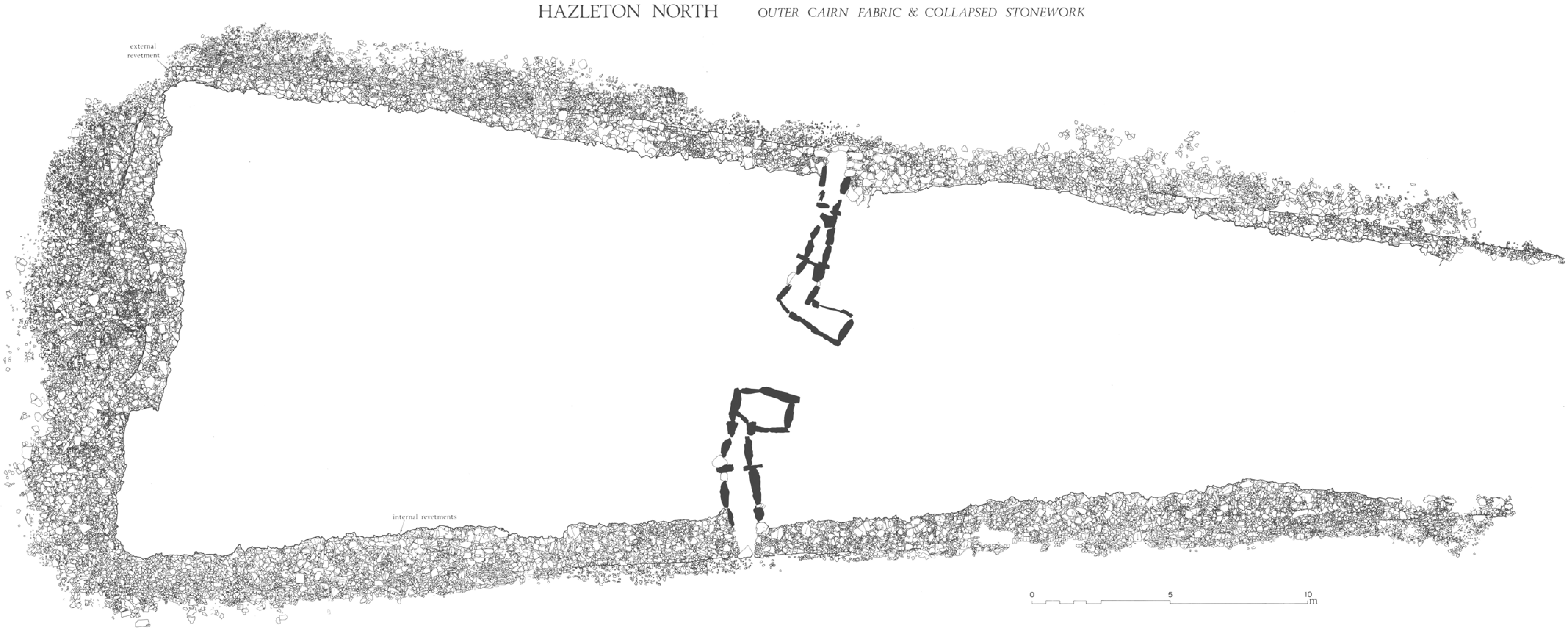

Fig 139 Plan of the outer cairn (the zone between the inner and outer revetments) and the extra-cairn material (collapsed stonework) beyond the outer revetment (the infill of units A and B at the east end of the cairn is omitted)

HAZLETON SOUTH

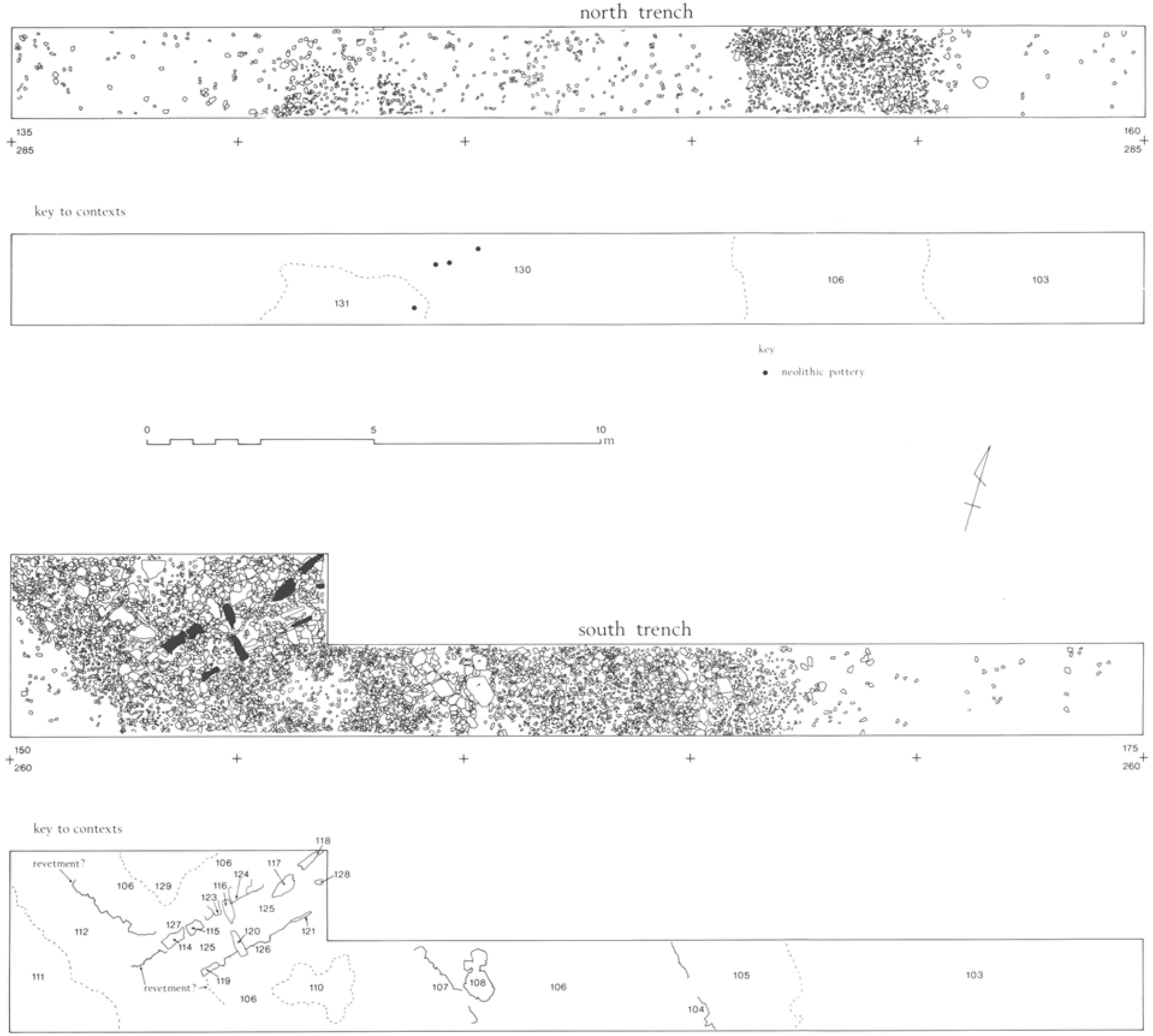

Fig 150 Hazleton South: trench plans and context keys

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Front cover
The 'flintknapper' burial in the north entrance.