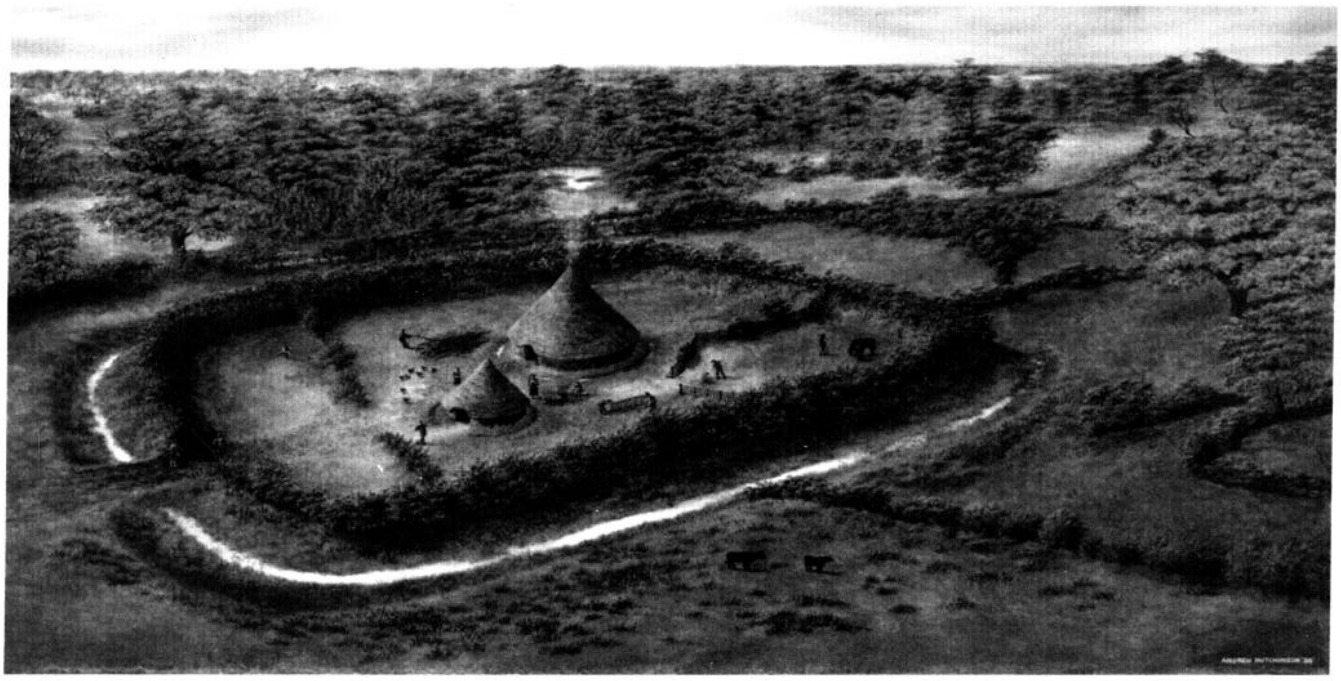
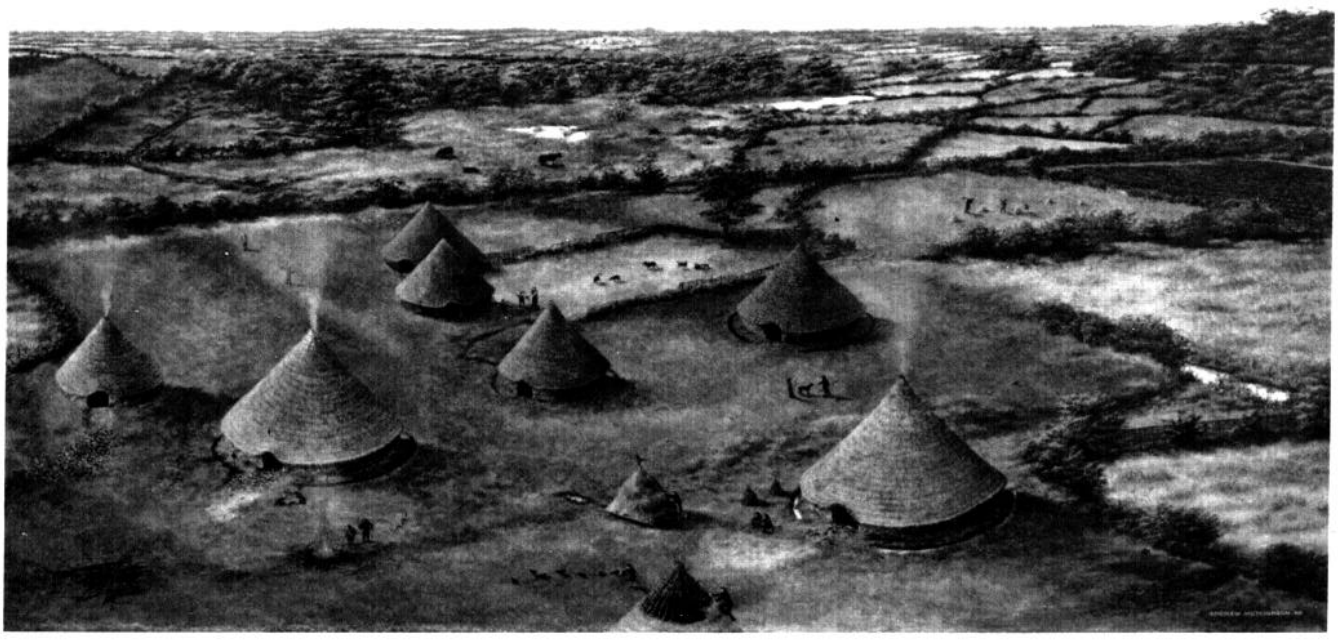
The Excavation of an Iron Age Settlement at THORPE THEWLES Cleveland, 1980–1982

D H Heslop





County of Cleveland

CBA Research Report 65

CBA Research Report 65

The Excavation of an Iron Age Settlement at Thorpe Thewles, Cleveland, 1980-1982

by
D H Heslop

with contributions by L Allason-Jones, I K Bailiff, J G Mcdonell, M Millett, J Price, D J Rackham, H P Swain, M Van der Veen

1987

Published by Cleveland County Archaeology
and the Council for British Archaeology

Published 1987 by the Council for British Archaeology
112 Kennington Road, London SE11 6RE

British Library Cataloguing in Publication Data

Heslop, D.H.
The excavation of an Iron Age settlement at Thorpe Thewles, Cleveland, 1980-l982. (CBA research report, ISSN 0589-9036; 65).
1. Iron Age-England-Thorpe Thewles (Cleveland) 2. Excavations (Archaeology) -England-Thorpe Thewles (Cleveland)
3. Thorpe Thewles (Cleveland)-Antiquities
I. Title II. Council for British Archaeology
III. Series
936.2'851 GN780.22.G7

ISBN 0-906780-65-9

The publishers acknowledge with gratitude a grant from the Historic Buildings and Monuments Commission for England towards the publication of this report.

Typeset from author's discs, printed and bound in England by Unwin Bros, Old Woking, Surrey

Contents

Illustrations

Printed element

Plates

Microfiche element

Tables

Printed element

Microfiche element

Acknowledgements

The completion of a major excavation and its subsequent publication requires the cooperation of a number of people with a wide range of skills and enthusiasms. Space alone prevents an individual acknowledgement, but I extend my warmest thanks to everybody who took part in our work at Thorpe Thewles.

The project would not have been possible without the permission and kind cooperation of the landowner, Mr G A Studholme, who tolerantly allowed us to disrupt his agricultural regime for two and a half years.

Cleveland Archaeology Section has been particularly fortunate in having the help, advice and encouragement of our local university, the University of Durham. I am particularly grateful to Colin Haselgrove for help in all aspects at all stages of the project. Martin Jones, Martin Millet, James Rackham and Marijke van der Veen all contributed to the general discussions of the problems faced. Without the combined help of the Department of Archaeology the project would have been much the poorer.

Of the excavation team, I express my warmest thanks to the site supervisors, Gordon Young and Stephen Sherlock, and all the digging team who valiantly battled through two winters on boulder clay. Of the many stalwarts I mention Georgina Brine, Theresa Carney, Simon Jeffreys, Mark Neal and Keith Smith for returning for a second season after enduring the first.

In the post-excavation room, the help of the following assistants is gratefully recorded: Deborah Edditts, Denise Jelley, Carole Horne, Iris Bohanson and Lesley Leyland. Louise Hayhow and Andrew Hutchinson did the drawings and Wendy Howells, with assistance from Gillian Cobb and Fiona MacDonell, keyed and prepared the disc for typesetting.

The Cleveland County Archaeologist, Blaise Vyner, provided help and advice throughout the project in addition to the under-acclaimed achievement of obtaining the necessary financial and administrative back-up to the project. I also thank the staff of the County Leisure Services, particularly Eric Hall, Gillian Cobb and Leslie Still. The latter also discovered the site and has kindly given permission to use his aerial photographs.

I thank all the contributors of the report and the many people who have provided advice and information towards the background study. Colin Haselgrove, Bob Bewley and Barry Cunliffe have commented on the text, which was edited by Blaise Vyner. Thanks go to the CBA Publications Committee for help with the production of the final report.

The project was undertaken under the sponsorship of Cleveland County Council, the Manpower Services Commission and the Historic Buildings and Monuments Commission. I am grateful to Bill Startin of HBMC and Ann Wheatley of MSC for their interest and assistance. Don Elgie Plant Hire undertook the earth-moving.

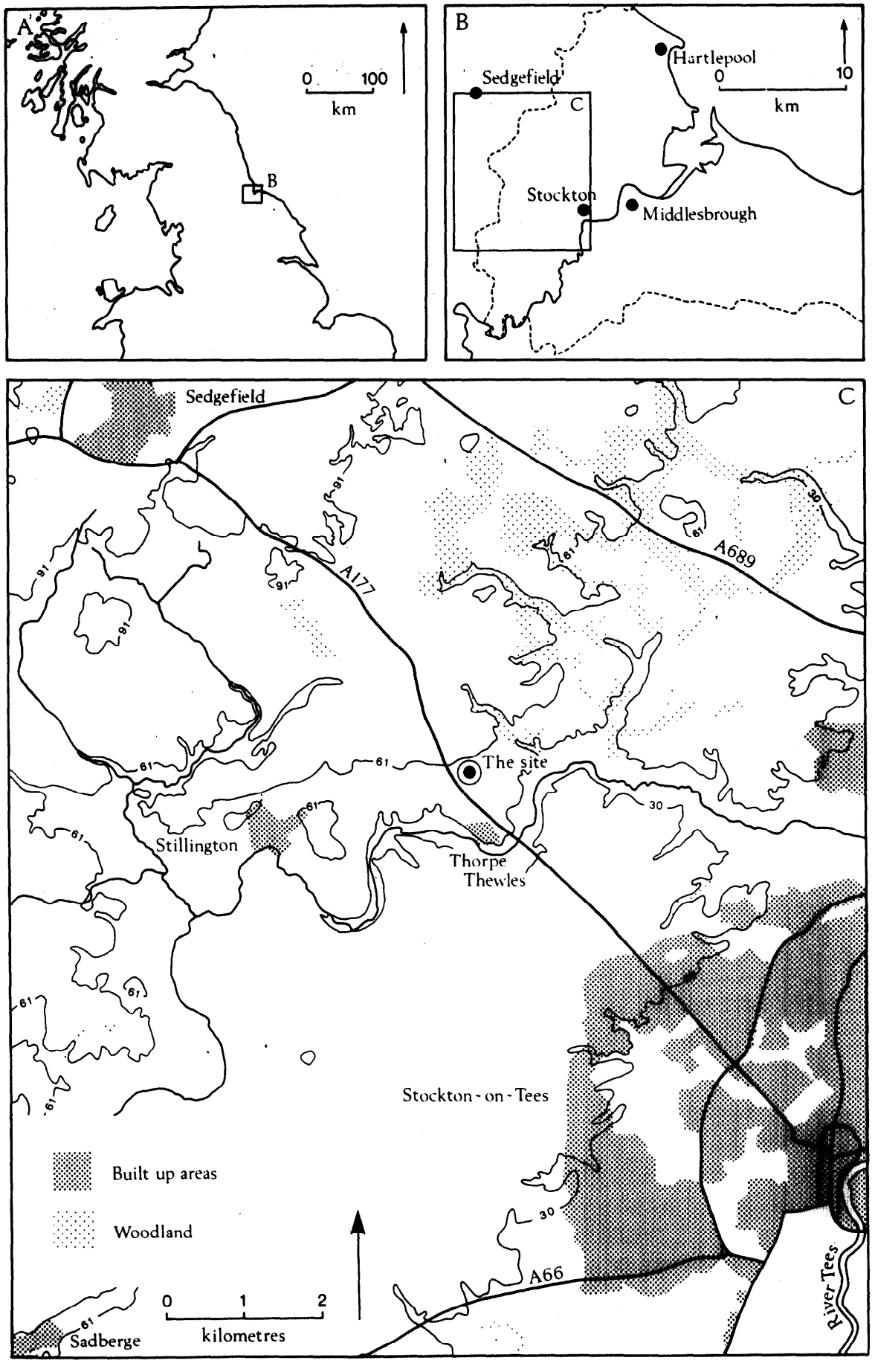


Fig 1 Location of Thorpe Thewles site

I Introduction

Summary

Excavation on the site of a cropmark enclosure revealed a complex sequence of occupation stretching from the Mid Iron Age to the 1st century AD with evidence of landscape organization before and after this period. The site produced the largest collections of Iron Age finds, animal remains and carbonized seeds recovered from northern England to date, and a wide range of structures, enclosures and boundaries were recorded. The results point to an unsuspected level of development in the fertile lowlands of the region. They suggest that this part of northern England at least was participating in social, economic and agricultural developments normally associated with southern England, including the early introduction of rotary querns and spelt and the adoption of complex, nucleated settlement types.

Background information

Geology and soils

North Cleveland lies on the eastern side of the watershed formed by the Pennines, and is bounded by the Durham plateau to the north and the Tees to the south. The site of Thorpe Thewles, 7 km (4 miles) north of the Tees and at 72 m OD can be said to overlook the Tees estuarine basin from the southern periphery of the south Durham plateau (see Fig 1). The site lies on Keuper and Bunter sandstones of varied attribution in an area where Triassic Bunter sandstones succeed Upper Permian Upper Marls and Seaham Beds before being covered by Middle Magnesian Limestone to the north; this whole range is evident within a 5 km radius of the site (Fig 2b). The Carbonates of the Magnesian Limestone occur some 300 m to the north of the centre of the excavation and abraded fragments are well represented across the site.

The effect of the bedrock geology, however, is minimized by the drift deposits known as the Teesside Tills, a subdivision of the Upper Boulder Clays (Francis 1972, 147). This material is reddish-brown and rests on laminated clay which forms ridges and hillocks over which the till is draped (Fig 2c). The varied bedrock geology is reflected by the range of mineral inclusions, with brownish sandstones predominating but with quantities of limestone from the north, dolerite from the Whin Sill, and occasional igneous erratics typical of glacially derived deposits. A change in subsoil is noted in the eastern quarter of the excavated area, roughly along the line of the eastern edge of the Main Enclosure. The subsoil here, although clay, was much sandier in texture and lighter in colour.

The boulder clay is in turn overlain by the riverine depositions of alluvium and sand and gravel. A broad band of these lighter soils runs east-west, 0.8 km (0.5 miles) to the south, flanking the gentle slopes of the Billingham Beck and attracting some small-scale quarrying around the village of Thorpe Thewles 1.3 km (0.7 miles) to the south.

Medieval and later land use

The surrounding countryside consists of undulating low hills which drain suprisingly well, considering the heavy nature of the soil, into streams occupying low valleys, usually covered in secondary woodland. The Iron Age settlement sat squarely on top of the largest hill within a radius of 3 km (1.8 miles).

This block of land east of the present A 177 and west of the Castle Eden railway line was formerly part of the open-field system of the village of Thorpe Thewles and was covered with north-south ridge and furrow on the same alignment as the road, which is reputedly of Roman origin. A small section of upstanding ridge and furrow can be seen within a small enclosure around High View, some 500 m to the east (NZ 4076 2459). The field may have been part of an Elizabethan enclosure award of around AD 1600 (VCH Durham, 3, 250).

Modern agricultural practice has removed all the hedgerows around the site to create large cultivation blocks many hundreds of acres in size, leaving the hillock considerably more exposed than in the past. The land is, however, of extremely good quality, fully justifying the local opinion that these fields are the best in former south Durham. The Agricultural Land Classification Map (Fig 2a) shows the relationship of the site to a small patch of Grade 2 land, a category that covers less than 5% of the county of Cleveland (Fig 2a). Indeed, before the stripping of the hedgerows the field which contains the site was called 'Darling', reflecting the farmer's opinion of its agricultural properties.

Aerial photography

The site was discovered from the air on 9 August 1977 by Leslie Still who, through his air surveys, has added greatly to the number of known sites of all periods in the Cleveland area. Although photographed almost every year since, the results of that flight (Plate l), have not been bettered.

The differential crop growth results from three main episodes of subsoil disturbance. The regular stripes that cover the field at 5 m intervals are land drains which were laid between the wars. The line that marks the boundary between the drains which run diagonally across the field and those which run parallel to the road represents a former substantial hedge and ditch along which telephone and power cables run. The remaining marks represent archaeological activity and differential moisture deficits within the topsoil.

Beginning with the proven archaeological features, the most striking pattern is formed by the subrectangular enclosure with its internal circular structure. This

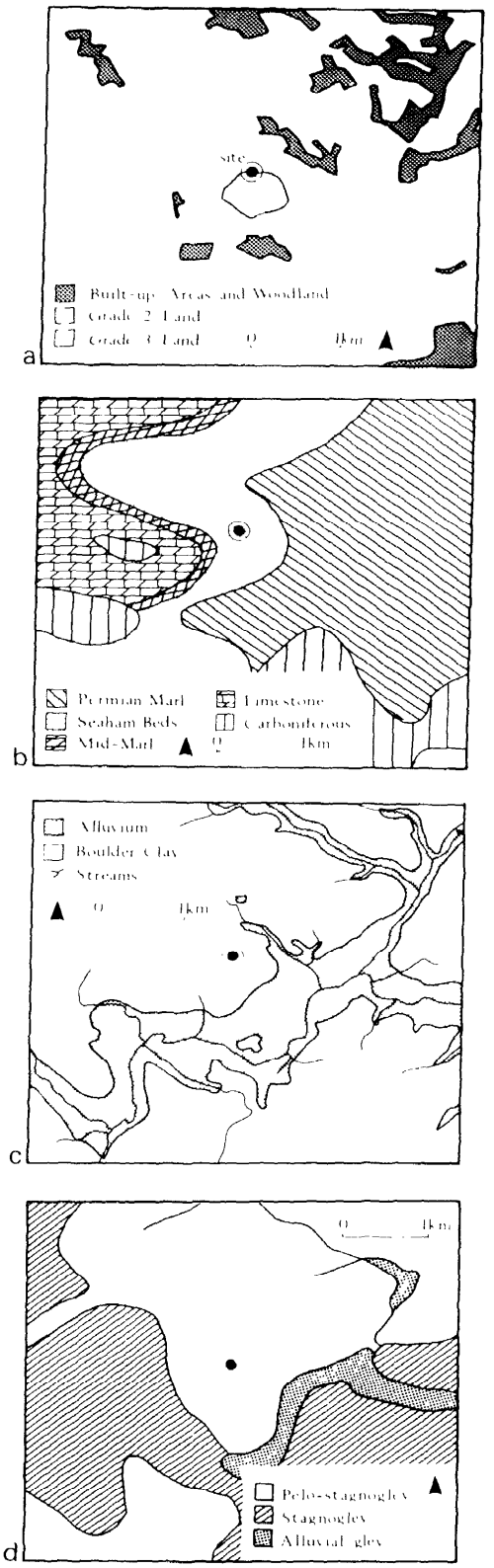


Fig 2 a Land classification; b geology; c drift deposits d soil types

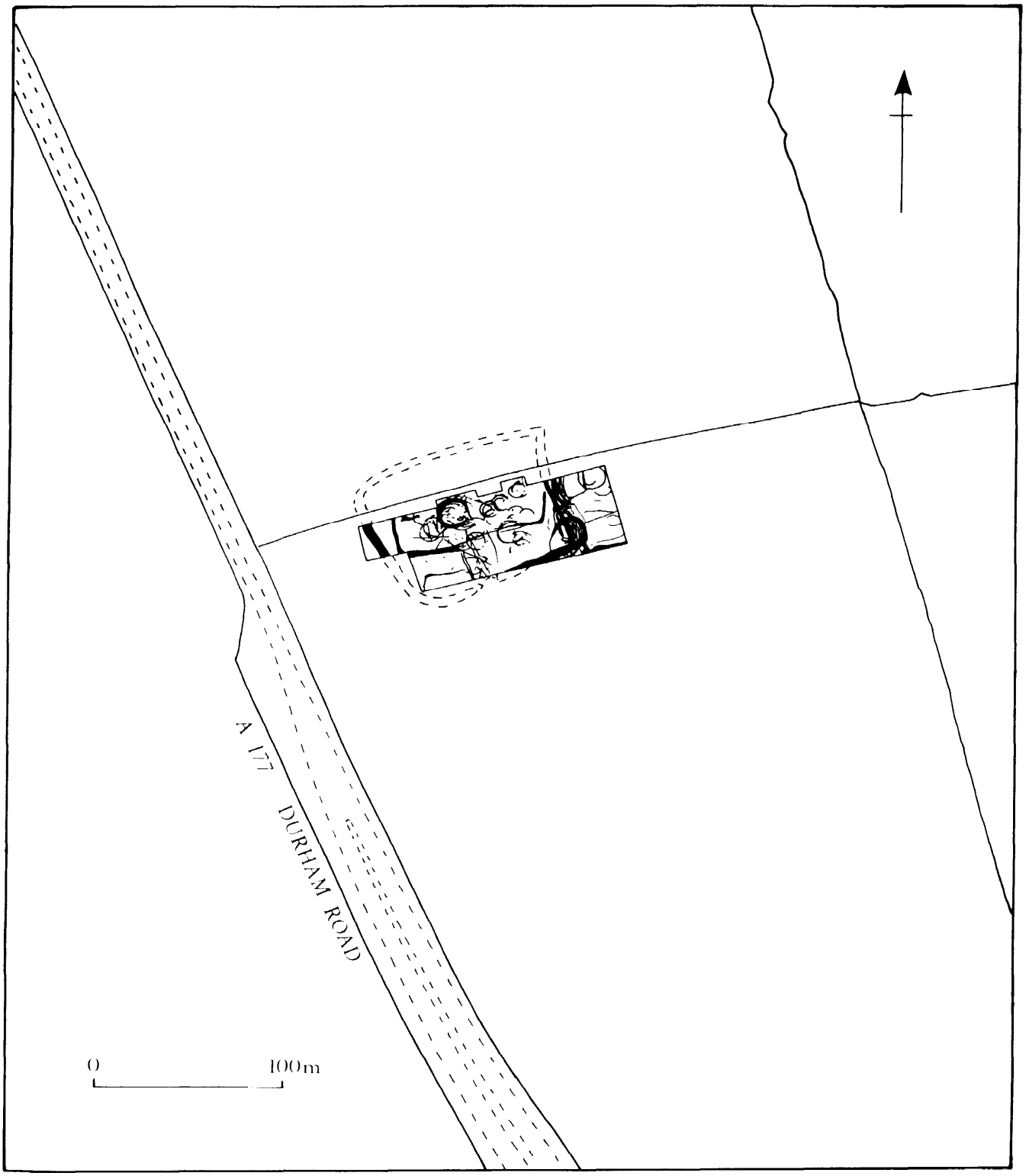


Fig 3 Cropmark and excavation

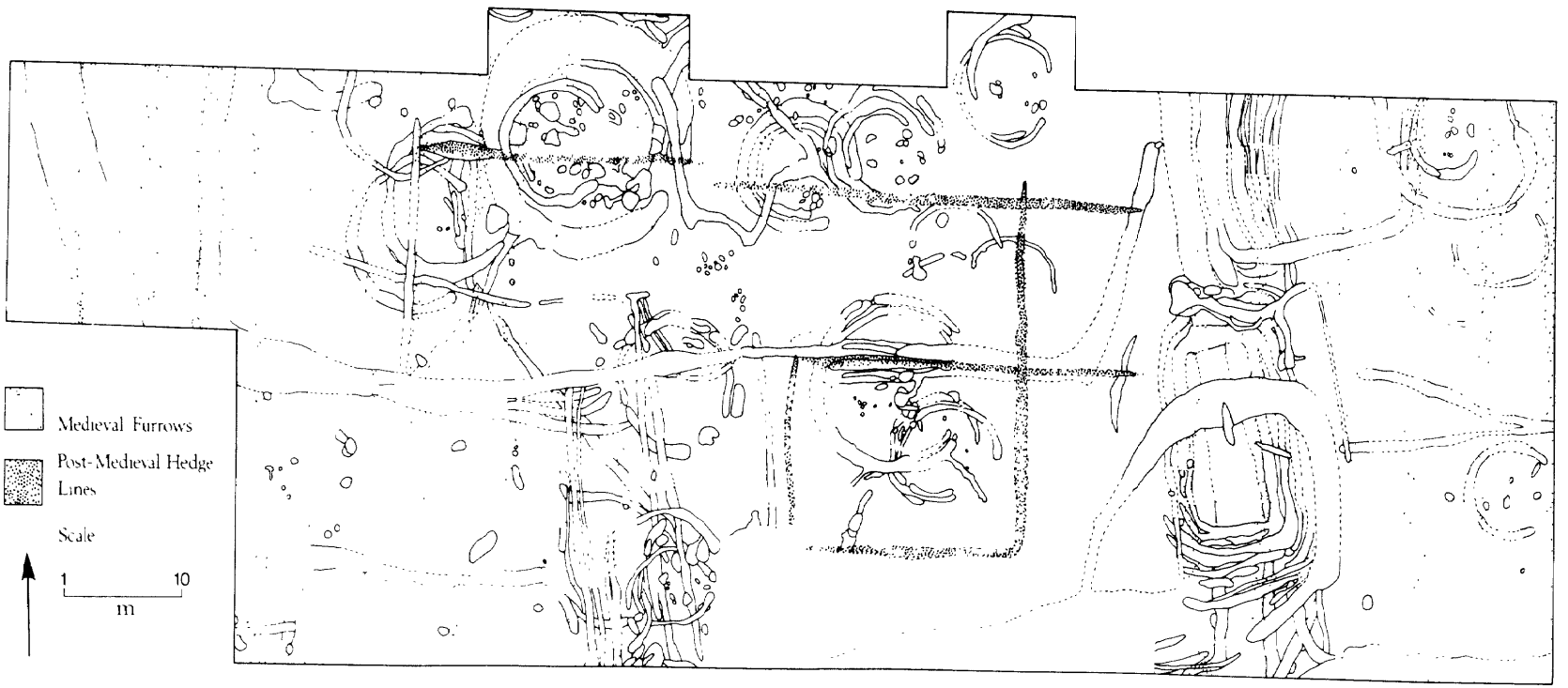


Fig 4 Medieval and later land use

example, being over 0.7 ha, rates among the largest of the enclosed settlements, a group that constitutes the most commonly recognized later prehistoric settlement form in the area. Closer examination of the photograph reveals that three sides are gently convex while the eastern side exhibits a concave curve, suggesting that the enclosure respected the alignment of an earlier linear feature, possibly a field boundary. This suggestion was backed up by two further observations. Firstly, the two western corners are unevenly rounded whereas those on the eastern side and the north-eastern corner in particular are sharply angular. Secondly, a break in the south-eastern corner of the cropmark perimeter was thought to represent an entrance causeway (this was subsequently disproved). If the eastern side followed an earlier boundary which was still in use during the life of the enclosure, then an entrance close to it would provide access from the interior to either side of the earlier boundary.

Curving away from this corner to the north-east was another linear feature thought to relate to a postulated entrance. This was tentatively interpreted as either an earlier curvilinear enclosure or a droveway to funnel livestock through the entrance. Excavation showed that this feature was not caused by subsoil disturbance. An alternative location for the entrance causeway was mid-way along the southern section where the cropmark becomes less clearly defined.

In hindsight, the most striking feature of the cropmark photographs is the absence of large numbers of the features discovered during excavation (Figs 3-4). As some of the features that fail to generate cropmarks are as deep and wide as those that do, the size of the subsoil disturbance alone cannot account for this. The crucial factor seems to be that those features that generate cropmarks all contained a high proportion of deposited occupation debris and loam, enhancing the contrast between the subsoil and the feature fills.

Pre-excavation survey

Following the discovery of the enclosure, reconnaissance fieldwalking in 1978 produced no artifacts. The site was located within the field in August 1980 with a Martin Clarke resistivity meter. A validation trench confirmed the position of the enclosure ditch within the field and suggested relatively good survival of archaeological deposits in that, although lacking horizontal stratigraphy, the rounded upper lip of the enclosure ditch was still intact. Further trenching located the eastern and southern ditch lengths and revealed that stratigraphy survived in fortuitous conditions. The presence of the telephone and power cables prevented work in the vicinity of the northern side.

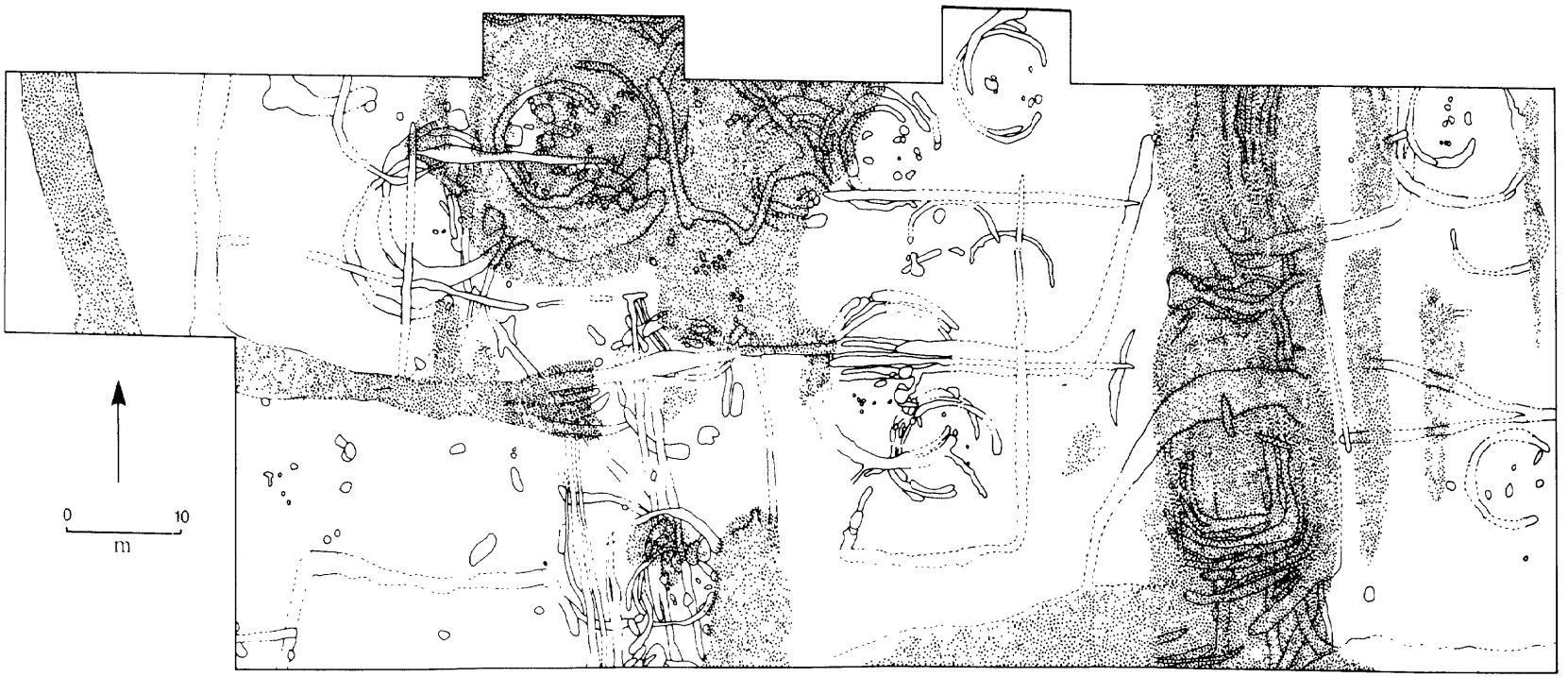


Fig 5 Extent of surviving stratigraphy

II Excavation description

Introduction

The excavation commenced in September 1980 and was completed in December 1982, a total of 114 weeks' continuous work. This was split into two 'years' that coincided with the agricultural timetable of the farmer, Mr G F Studholme, so that machine-work took place in autumn, cleaning and planning over the winter and the main excavation during spring and summer. This allowed the site to be opened for public viewing for three weeks between harvesting and back-filling.

The first year of excavation examined the western and south-eastern enclosure ditch lengths. These blocks were linked in the second year and a further block opened to the east of the cropmark. The grid-labelling system reflected this progress, areas A and B being opened in 1980, with C and D in the following year (see rear fold-out).

In total, 5,800 sq m were stripped of topsoil by JCB with dumper and Drott support. As mentioned above, prior fieldwalking had produced no finds, a situation that was not surprising given the non-durable nature of the majority of later prehistoric artifacts, particularly pottery. With this in mind and given the fact that the clay-derived soil could not be dry-sieved, it was decided not to attempt any intensive plough-soil survey.

After careful machine-stripping the site was cleaned and the troughs of the medieval ridge and furrow were defined and removed prior to planning at 1:20.

The excavation technique was influenced by three factors: the character of the deposits and subsoil in the variety of conditions experienced all year round, the presence of the modern field-drains and, most importantly, the sampling design developed for this site by C C Haselgrove, M K Jones and the author.

Being on heavy boulder-clay, the deposits oscillated between saturation and parching. During the winter months polythene sheeting was used to prevent frost-hardening and reduce waterlogging, restricting the area that could be examined at any one time. From April the combined effects of the sloping contours and wind-exposure resulted in the surface baking rock-hard, and it was not uncommon to have to pump 500 gallons of water a day onto the site to keep the deposits workable. As the nearest supply of running water was 1.2 km away, the logistics of quenching this incessant thirst were a constant problem. Consequently, features could only be seen and worked in small 'windows' and it was impossible to plan and photograph at will.

The presence of field-drains, as shown in the rear fold-out, influenced the position and scale of the excavated sections. To emphasize this factor (and explain what would otherwise appear to be eccentric procedure) it was decided against editing the field-drains out of the illustrations of the final report. (The presence of the drain also helps locate the detailed plans on the overall site plan.)

The first year's work should be regarded as an initial exploratory stage which investigated the survival and complexity of archaeological features. A rigorous sampling strategy was not implemented, although many features exposed in the first year were left for sampling in year two. Fig 105, 5:E6 (fauna1 report fiche) shows the location of the 20% (1192 of 5756 sq m) of the site that was backfilled before sampling.

The sampling design itself was concerned with the recognition and characterization of archaeological deposits, the collection of their artifactual and botanical contents and the articulation of the feature sequence into a phaseable framework.

All features and deposits recognized within the excavated area were excavated to the degree specified by the sampling design for each type of feature/deposit. The most extensive deposits were those constituting the horizontal stratigraphy (Fig 5). These required 100% excavation to expose underlying features and ensure that the total population of surviving features was included in a probabilistic sampling strategy.

Features with length <2x width (point features) were totally excavated, with the exception of suspect stake-holes. A 10% random selection was separately labelled and used as sampling points. Linear features (length >2x width) were measured and randomly selected; 10% was sectioned for sampling (Fig 104, 5:E5). Intersections between linear features were not deemed eligible for sample status, in order to guarantee that the sampled contexts were indisputably from the particular feature under investigation. A further level of problem-orientated excavation was needed to determine intersection priorities and re-cut histories, providing enough stratigraphic information to phase the site history. The final step involved further excavation to resolve problems specific to the interpretation of the feature group under investigation.

Recording and numbering

The site was divided into 8m grids numbered from the survey origin which was the north-western corner of Area B. During excavation these were subdivided into 4m quadrants labelled by compass-point, so that grid square 1 contained four quadrants, 1NE, lNW, 1SE and 1SW. This system allowed for reasonably precise spatial recording for all contexts and finds while keeping the numbers used within the planning framework in lower double figures. The extensions to include all of the Central House and Circular Structure C were labelled separately.

Layers, features and archaeological horizons were catalogued on a single numbering system for each year and context numbers were prefixed with grid letters, giving each a unique number. A total of 4,447 contexts were recorded, primarily on A4 context record sheets, with

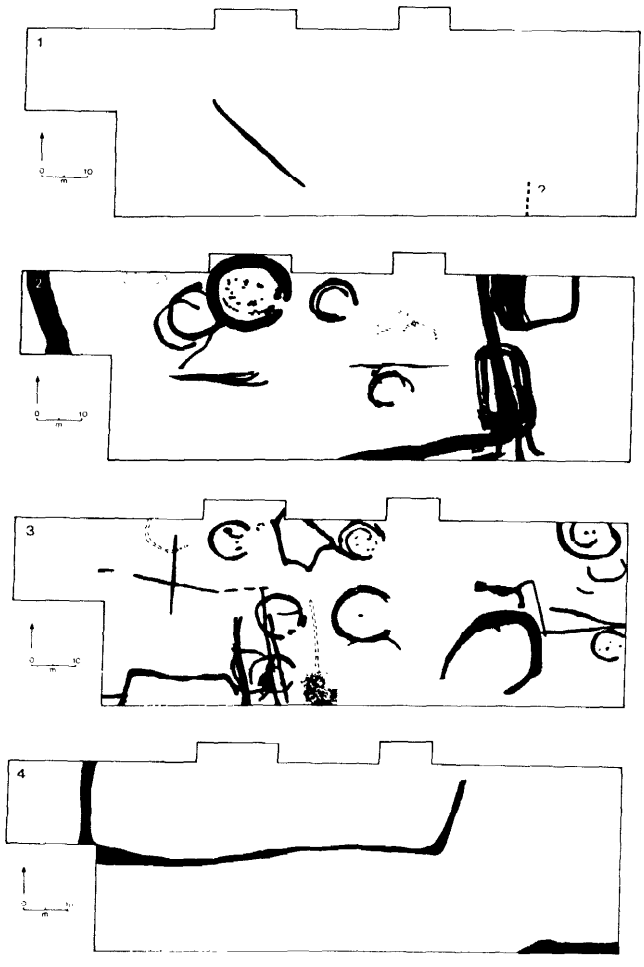


Fig 6 Plan of phases II-IV

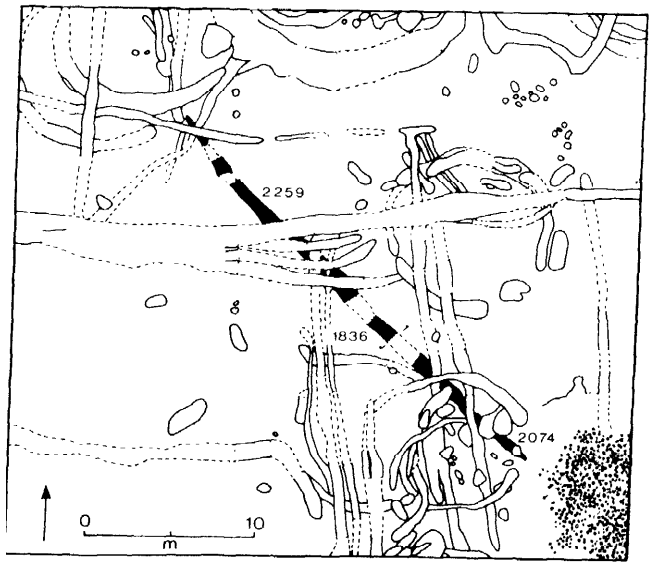


Fig 7 Phase I: Cl836

supervisors' notebooks as back-up for security and further comments.

The structure of the primary record has been maintained for this report; a decision not to renumber for publication was taken at the outset of post-excavation work, as this would increase the 'distance' between the primary record and the published report. Important layers which require reference keep their unique site number, but the majority of layers, which can be grouped to form discrete stratigraphic units (ie features or horizons), are numbered consecutively where necessary.

Bone, slag, daub and undiagnostic Iron Age pottery sherds were recorded by context and grid quadrant. Rims, bases and decorated sherds, Romano-British sherds and all other objects were recorded three-dimensionally and given small-find numbers. These have been converted to archive catalogue numbers so that they run consecutively with the excavation description, ie earliest found first.

The site phasing

Prehistoric activity on the site can be divided into three main episodes:

i The layout of landscape elements
ii A period of settlement
iii The abandonment of habitation and re-establishment of extensive landscape organization.

There is considerable evidence in the form of the re-use of earlier alignments and in the character of artifact discard that these periods were continuous and not interspersed with episodes of (archaeologically recognizable) inactivity.

This irreducible scheme, while separating pre-and post-settlement from the main phase of activity, does not allow for an analysis of change during the life-span of settlement. Consequently, a stratigraphic division of this phase was effected which encompassed the whole site (thereby including as large a sample size as possible) at the only point within the site history that this is possible (after the abandonment of the Main House and the silting up of Subrectangular Enclosure Ditches I and II). It might have made more archaeological sense to split the site history into 'enclosed' and 'unenclosed' phases, but such a division was not inherent within the material.

i Pre-settlement field boundaries
ii Settlement within and then beyond a bank and ditched enclosure
iii Open nucleated settlement and subsequent abandonment
iv Layout and use of extensive enclosures or boundaries

This scheme (Fig 6) permits comparisons to be drawn between a simple, early (?Mid-Late Iron Age) single-unit settlement and a complex, late (1st century BC/lst century AD) multiple-unit settlement, but it must be stressed that change took place within a continuum and what is being highlighted is an acceleration in the rate of this change.

Features and structures that cannot be allocated within the four phases are listed separately at the end of the excavation description and the material remains excluded from the finds analysis, but in several instances 'unphased' features have been shown on the phase plan (Fig 6) in dotted lines on a 'makes more sense' basis.

PHASE I

One linear feature could be confidently ascribed to this phase, which pre-dated the construction of the bank and ditch enclosure. This feature, C1836, could be traced for 32m and ran north-east from the gateway area to the west of the enclosure Main House (Fig 7). The ditch, which was less than 0.7m wide and 0.16m deep and of gently sloping profile, was truncated at either end, the northern being removed by later ditches and medieval ploughing, and the southern end by erosion around the enclosure entrance. The fill of this feature was exceptional in being wholly edge-derived and, even though it was open for some time, it contained no artifacts. This lack of occupation debris would accord with a a pre-settlement date. Moreover, this ditch was not in alignment with the subrectangular enclosure. As suggested above, the enclosure itself may respect an earlier field boundary which should have been evident running south from the south-eastern corner of the protective ditch.

Several features were noted which echoed the alignment of the enclosure (B1312, B 1524) and of these, B1312 was similar to C 1836 in size, profile and in having virtually no occupation debris in the fill. This feature was 0.6m in width and 0.35m deep and survived for 4.2m between later features to the north (B284) and south (D161). Although all of these linear features demonstrably post-dated the enclosure ditch, it is possible that they represent redefinitions of an earlier field boundary. The disturbance caused by the intensity of later activity in this part of the site could easily have destroyed any evidence of earlier landscapes.

PHASE II

This period saw the construction of the subrectangular Main Enclosure Ditch and Central Circular House. These were presumably contemporary, but there was no stratigraphic evidence for this. Later developments saw the abandonment of the Enclosure Ditch and its replacement by smaller Subrectangular Enclosures I and II representing an expansion of the settlement which foreshadowed more dramatic changes during Phase III. The centre of the site was probably crossed by an east-west partition of fairly short duration (Partitions, Phase II), and several ancillary structures clustered around the Main House.

It would be possible to divide the eastern group of features into phases during and after the currency of the enclosure ditch, but this distinction could not be supported across the centre of the site.

The Main Enclosure Ditch

This feature produced the subrectangular cropmark (Plate 1) surrounding 0.7 ha, a length of perhaps 360m of ditch. Of this, approximately 80m were exposed, and 14m excavated, consisting of 5m of the western length, 4m (two random sample sections) of the eastern length and the south-eastern corner. As these sections differed, they will be described separately.

The Western Section

Section 1 (Fig 8, Plate 3a) was from the western length and had a symmetrical profile, 5.5m in width and just over 1.1m deep, with even, slightly convex sides and a wide, flat bottom with round sides. The eastern or interior side displayed a shelf which would have extended the width of the ditch by a further 1.6m although it is not known how this was caused. It contained edge-derived deposits (8) which directly overlay the primary silts (9-12).

A complex sequence of deposits filled the ditch, but these can be placed in two main episodes: a period of edge-derived fills which started accumulating shortly after the digging of the ditch, and a longer period during which material rich in occupation debris was thrown into the ditch. The beginning of this episode marked the point at which the Main Enclosure Ditch was no longer deemed useful or necessary.

The lower fills were of light-brown clays washed in from either side; only the bottom layer on the western side (12) showed signs of having been deliberately back-filled. Subsequent filling was from both sides, with an initially faster rate on the western edge (11), suggesting that if the presence of a bank of upcast affected the silting pattern it would have been on that side, ie outside the enclosure.

Later, however, this pattern was reversed and deposits of edge-derived material (9, 10) were laid at an even depth on the eastern (internal) side. These fills were occasionally interspersed with deposits of darker material and one of these was sampled for carbonized grain content. The fill had been deposited from the interior, so that by the time the ditch was half-full of silty clays (7), the deepest point was above the centre of the ditch.

The upper layer of edge-derived clay was cut by a group of possible stakeholes which were restricted to the eastern, internal side. Forty-seven were excavated, the smallest being 40 mm in diameter and 30 mm in depth, the largest being 90 mm in diameter and 110 mm deep, and all had roughly conical sections. It is possible that these could have been formed naturally, as Watkins has suggested that similar features at the Iron Age site at St Germain's, Tranent, East Lothian, were caused by the tap-root of colonizing weeds (Watkins 1982). However, two observations should be made: firstly the putative tap-root holes recorded by Watkins were generally much larger than those at Thorpe Thewles, and secondly, one of the principle reasons which he used to discount the stakehole hypothesis - the lack of pattern and widespread dispersion - does not apply here, where clear lines were apparent.

At this point in time the edge-derived component of the fills was supplemented by quantities of occupation debris (6) and an uneven rate of filling was noticeable, in that a large deposit of redeposited natural clay was dumped on the eastern side in the centre of the excavated length (and therefore not seen in the section), so that subsequent deposits sloped north-south as well as east-west. It is possible that this was derived from the bank, although there is no other evidence for this.

Above this level the fills were predominantly rich, dark loams with much occupation debris. During this period the floor of the ditch was used on three separate occasions as the site of a substantial bonfire which oxidized the surrounding clay, and resulted in a sequence of fills with a very high percentage of charcoal. This activity could only have taken place in the summer as these layers would have been saturated during the winter.

The ditch was levelled to within a few centimetres of the surrounding surface (1); the top of the bank graded gently to the horizontal, showing that modern ploughing had not substantially truncated the ditch section. Although no function can be assigned to the area immediately inside the ditch, some attempt had been made to drain standing water; a small channel or gully, A70, cut the edge-derived earlier fills and the lower deposits of domestic refuse, and this was in turn covered by the latest layers. This gully was quickly filled, initially with silty clay, and then with material similar to the ditch deposits. The dating of these episodes, both relative to developments on other parts of the site and in absolute terms, could not be resolved from this section. The construction of the enclosure marked the beginning of Phase II, while the upper fill of A70 contained imported pottery dating to the late 1st century AD and presumably suggests an end-date.

The eastern sections

Three sections were investigated along this side, two as part of the random sampling strategy and a final section, placed on the south-eastern corner, to check that later activity did not conceal the enclosure entrance. The northernmost section (not illustrated), which was approximately mid-way along the eastern enclosure ditch, was noticeably asymmetrical, the outer side (eastern) being much steeper while the western side was of similar gradient to the western section.

The primary silts were clean, edge-derived clay-silts which appeared to accumulate equally from both sides until the ditch was approximately one-third full when, following the dumping of a single deposit from the western side containing more silt, a faster rate of deposition was apparent from the inner (western) side. Little occupation debris was incorporated until this time, when, as with the eastern section, the ditch, although still over 0.6m deep and 1.7m wide, was cut by the small gullies of the later Subrectangular Enclosures I and II.

Section 3

This linear sample (Plate 3b) was approximately 8m north of the south-eastern corner. The profile differed from those previously mentioned in being symmetrically V-shaped with straight, even sides sloping at approximately 45º. The silting pattern was dominated by material from the eastern, external side (7 and 5), and was of water-deposited clay containing less occupation debris than the sections to the north and south; the section also contained fewer distinct layers.

Section 3 was at the join of the southern and eastern ditch lengths. Here the ditch profile resembled the western section in having gently curved sides and a rounded, flat base 1m below the contemporary surface. The silting pattern was unlike those noted above in having darker fills at lower levels although, again, the major water-deposited clay-silt lines derived from the outer edge (8 and 6), and darker, stonier fills (7) were noted on the inner side. The main fills, 5 and 4, were rich in occupation debris, the former being cut by B1598.

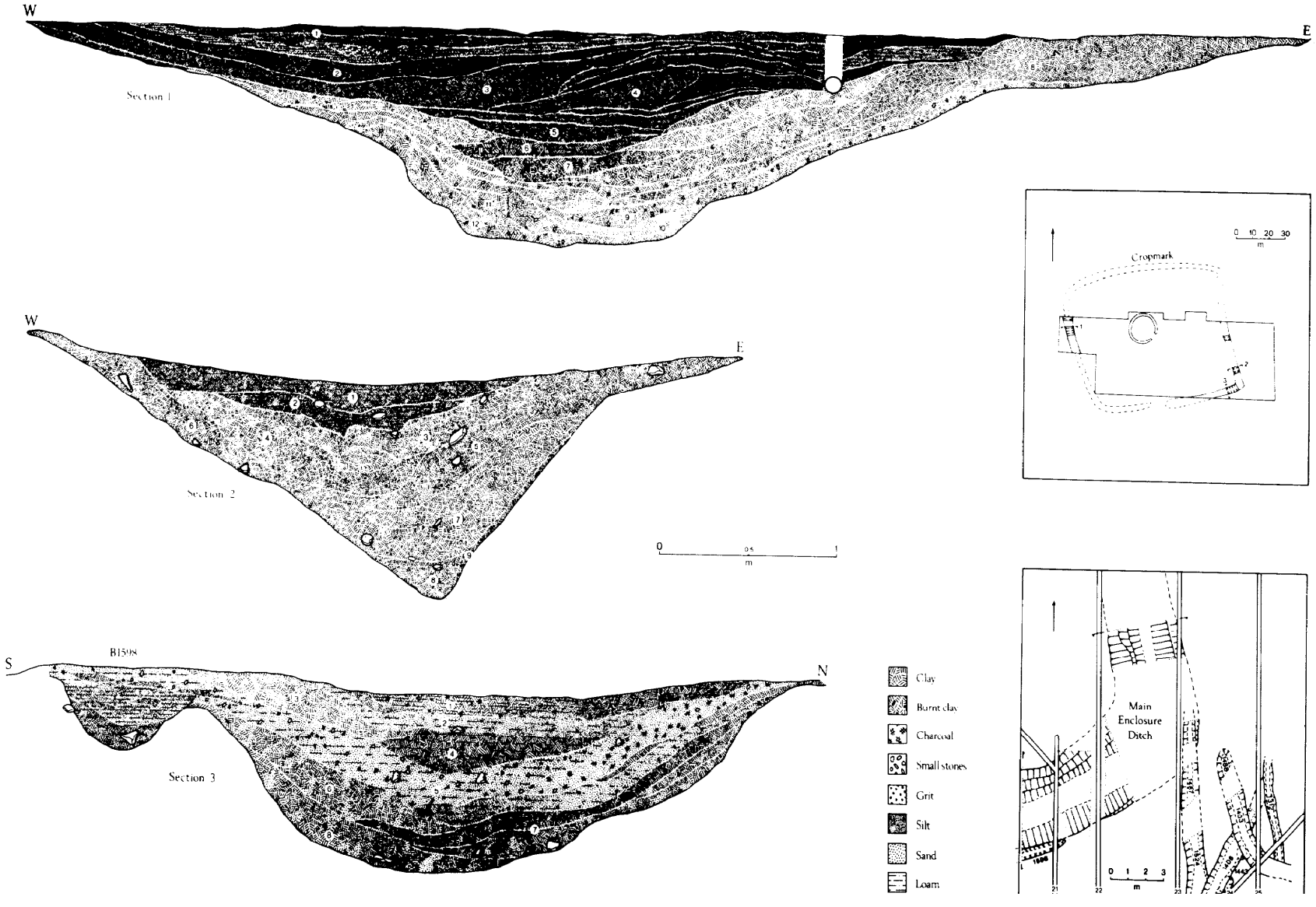


Fig 8 Main Enclosure Ditch sections

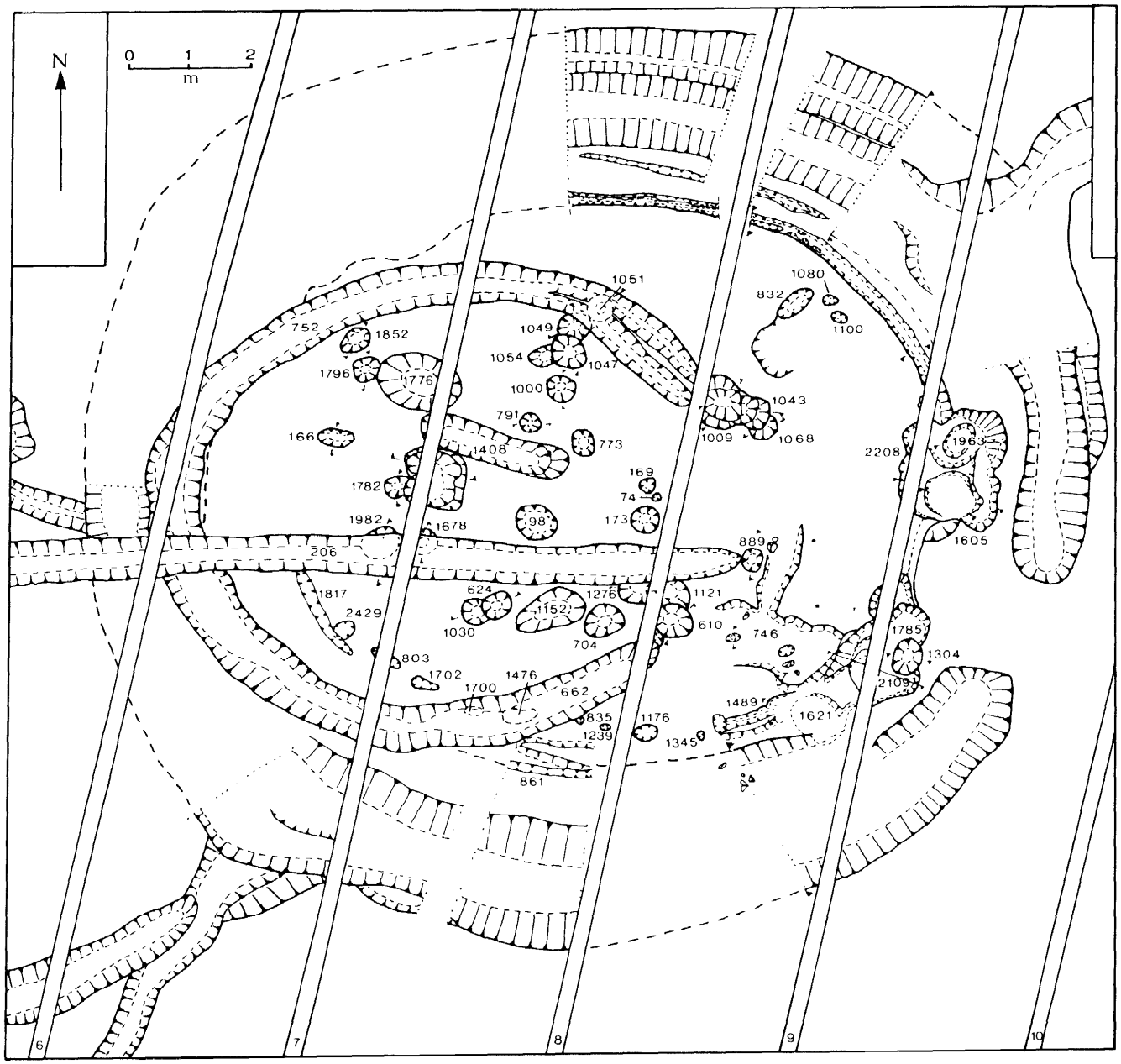


Fig 9 Central House: all features

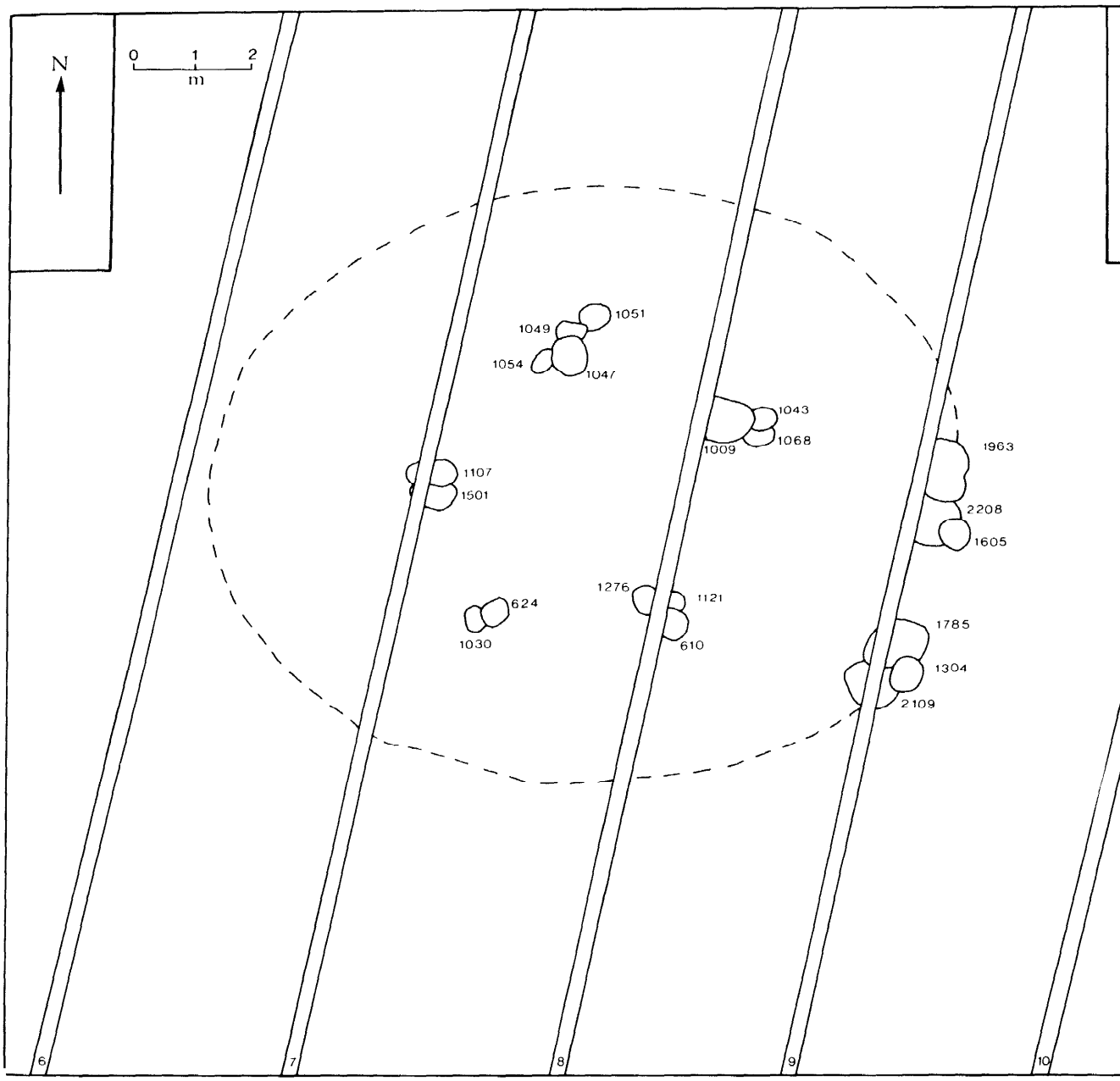


Fig 10 Central House: intercutting postholes

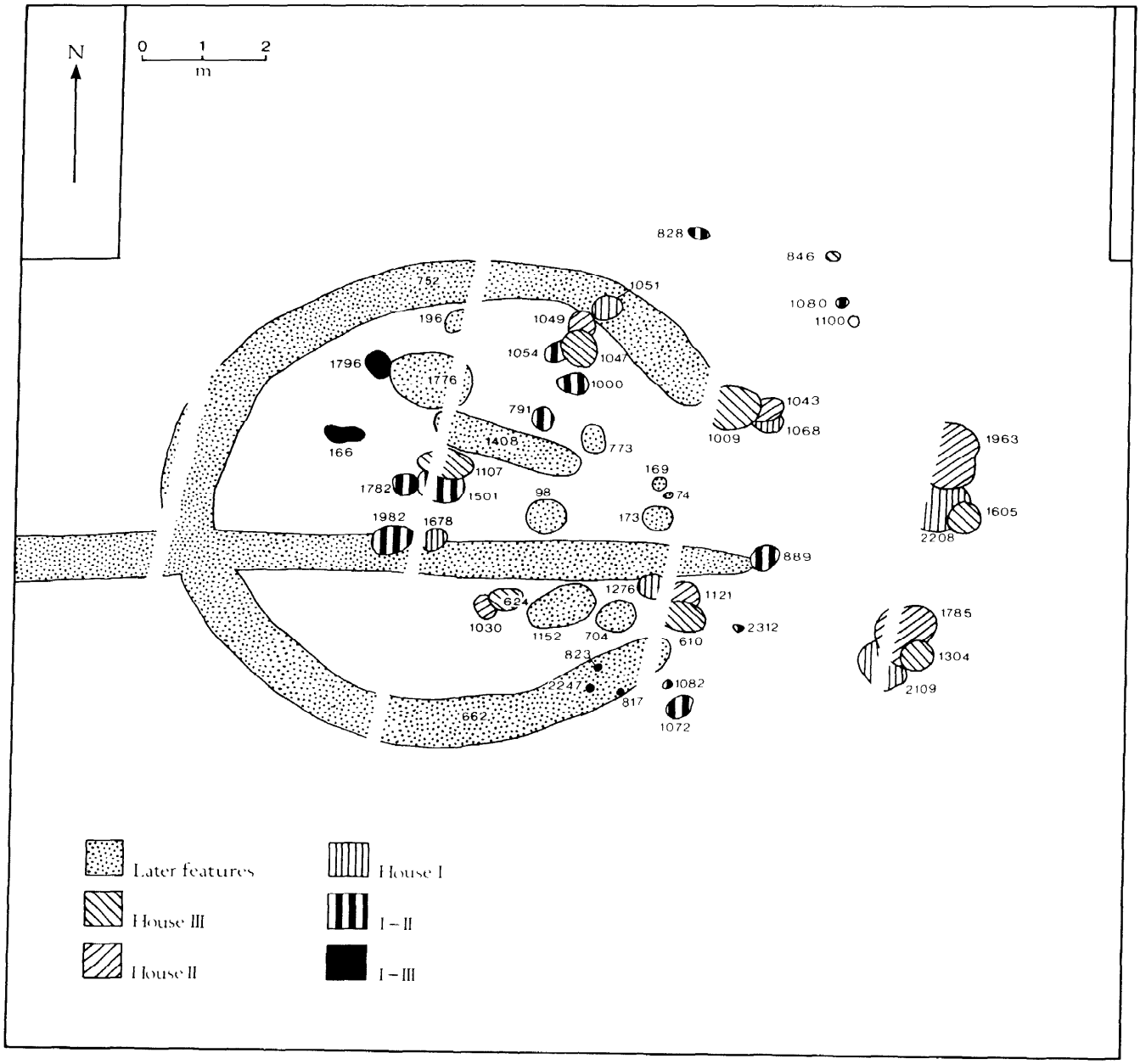


Fig 11 Central House: all relationships

The derivation of a clay deposit on the southern lip (3) is problematical; it may represent upcast from one of the other linear features in this area, (eg the Curvilinear Enclosure Ditch, B284).

The section line had to be parallel with the field-drain and was therefore not at 90º to the ditch line, but it shows the point to which the ditch had filled before the cutting of Bl598, which marked the effective abandonment of the enclosure and its replacement by smaller subrectangular enclosures.

The Central House

Introduction

The largest group of excavated contexts came from the large central building which can be seen clearly on the aerial photograph (Plate 1). The large volume of excavation data reflects both the complexity of the structure through successive rebuilds and the relatively good survival of the archaeological levels (see Fig 9).

To deal with the latter point first, horizontal stratigraphy was extant over all the surrounding drainage ditch and approximately 90% of the internal space, the loss resulting from the presence of a medieval furrow and a post-medieval field boundary (C206). Later Iron Age activity disturbed a further 10% of the floor and walling of the building (Plate 4a). The elucidation of the structural sequence was both aided and hindered by the complexity of activity - aided when later rebuilding provided stratigraphical relationships but hindered when later rebuilding destroyed important elements of the earlier buildings.

Four main episodes of activity can be deduced from the evidence: three phases of house construction and a final episode during which the area was covered by large quantities of burnt material. Unfortunately, some aspects of the building cannot be directly linked to each phase, primarily because of the nature of the floor-levels. These were not allowed to accumulate with time and were gradually eroded as the floor became worn and, probably, was swept, reducing the contemporary surface. This will be discussed below, but mention is made here to explain the order of description.

Those elements that were conducive to structural phasing (doors, roof-supports and walling) will be discussed together, chronologically; then the floors, hearths, and cobbled entrance will be described, followed by the external features (drainage ditches, run-off gullies and annexe). The final section, dealing with the abandonment of the structure, is described at the end of Phase II

The structural sequence that follows was resolved by linking groups of intercutting postholes. In addition, intercutting was noted between C624 and C1030, the former almost certainly belonging to the final phase of the building. The relationships of the doorposts are shown on Fig 10.

House I

This has been tentatively reconstructed by linking the earliest features in the stratigraphic sequence. The earliest door-posts were evidenced only by substantial extraction pits. These were badly disturbed, particularly by field drain 9 and the later doorposts (Fig 12), but sufficient remained to show that they held the most southerly of the entrance posts, and these were approximately 3.8 m apart. The profiles of these pits were generally similar, with upright, stepped sides and flat bases. The fill was of redeposited clay interspersed with patches of mixed loam and occupation debris, suggesting rapid back-fill (Fig 13).

The roof supports consisted of a ring of medium-sized timber uprights approximately half-way between the walls and the centre point (Figs 14 and 15). The eastern section was reasonably securely contexted, posts C1068, 1051 and 1276 all being the earliest posts of triple sequences. Of the remaining possible posts, Cl982 and 1796 have been tentatively linked. As seen in Fig 11, these are of I-II and I-III categories respectively, but when combined with the other House I posts provide a fairly convincing pattern that has spacings of between 3.7 and 4 m and display axial symmetry at a distance of 3.3 to 3.5 m from the southern wall. Table 1 shows the general dimensions of these features as excavated; it must be noted that House I was systematically dismantled, leaving little information about the character of the timber employed.

Table 1 Roof supports Main Structure

No.	Dimension (m)	Depth (m)*	comments
1068	0.90 x 1.00	0.46	Extraction pit
1051	0.35 x 0.32	0.40	Post probably same size
1796	0.45 x 0.41	0.30	Truncated by furrow
1678	0.38 x 0.52	0.46	post removed
1276	0.64 x 0.60	0.40	Under heath, C191

Phase II

No.	Dimension (m)	Depth (m)	Comments
1043	0.60 x 0.40	0.55	Western side lost. Extraction pit
1049	0.54 x 0.34	0.60	Southern side lost
1030	0.05 x 0.04	0.40	Post removed
1121	1.10 x 0.67	0.60	Extraction pit

Phase III

No.	Dimensions (m)	Depth (m)	Comments
1009	0.22 x 0.74	0.74	Post of similar size
1047	1.11 x 0.60	0.49	Extraction pit. Stone packing
1107	0.82 x 0.35	0.62	Western side lost. Extraction pit
624	0.40 x 0.40	0.50	Circular, post, *c* 0.5 diameter
610	0.63 x 0.63	0.35	Circular post, *c* 0.35 diameter

*Depth below contemporary surface

The walling was evident on the southern section as a line of nine separate stakes or small posts linking to a continuous slot, C1489, although the join between the eastern stake and Cl489 was destroyed by later feature

Fig 12 Central House: entrance details

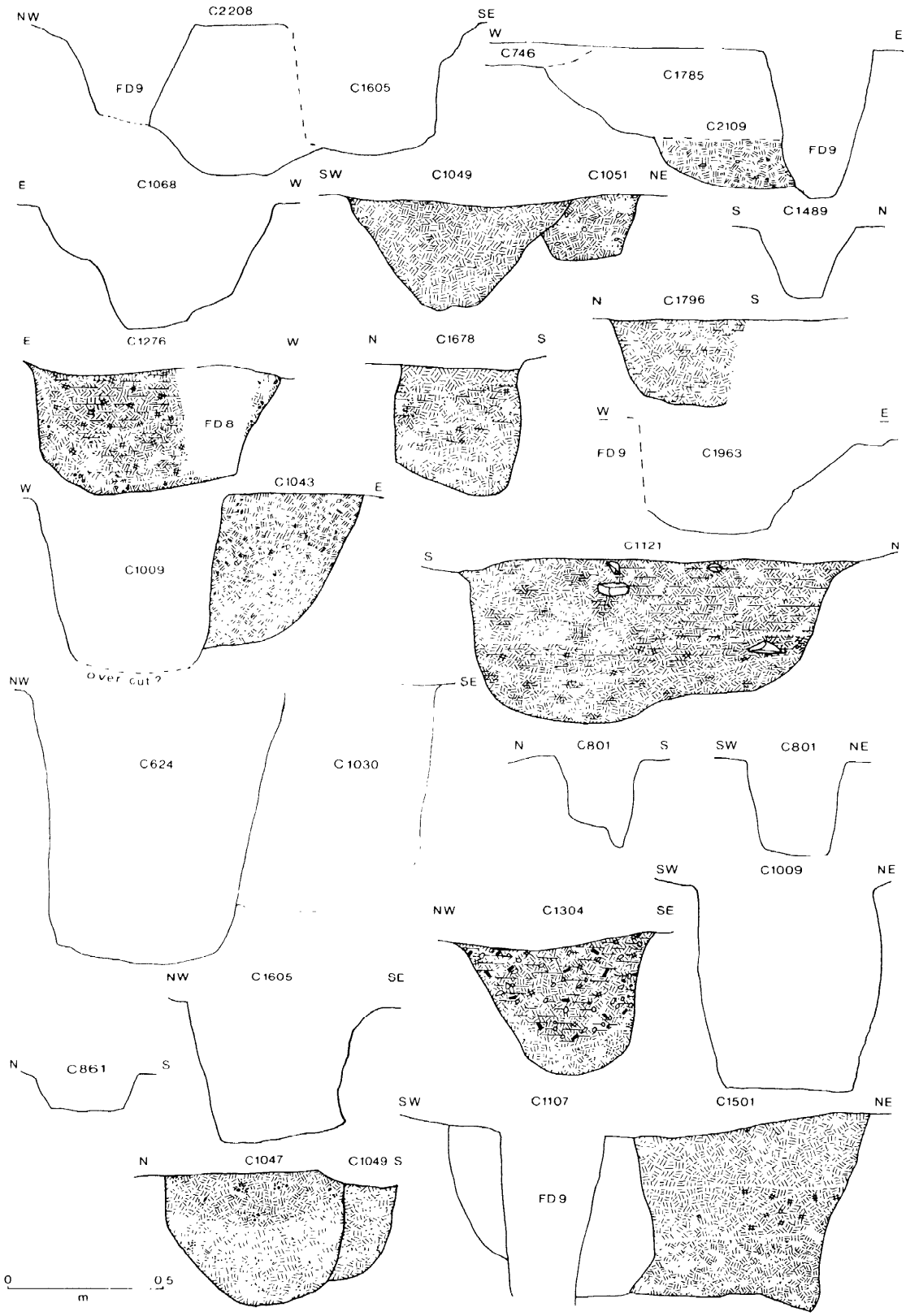


Fig 13 Central House: sections

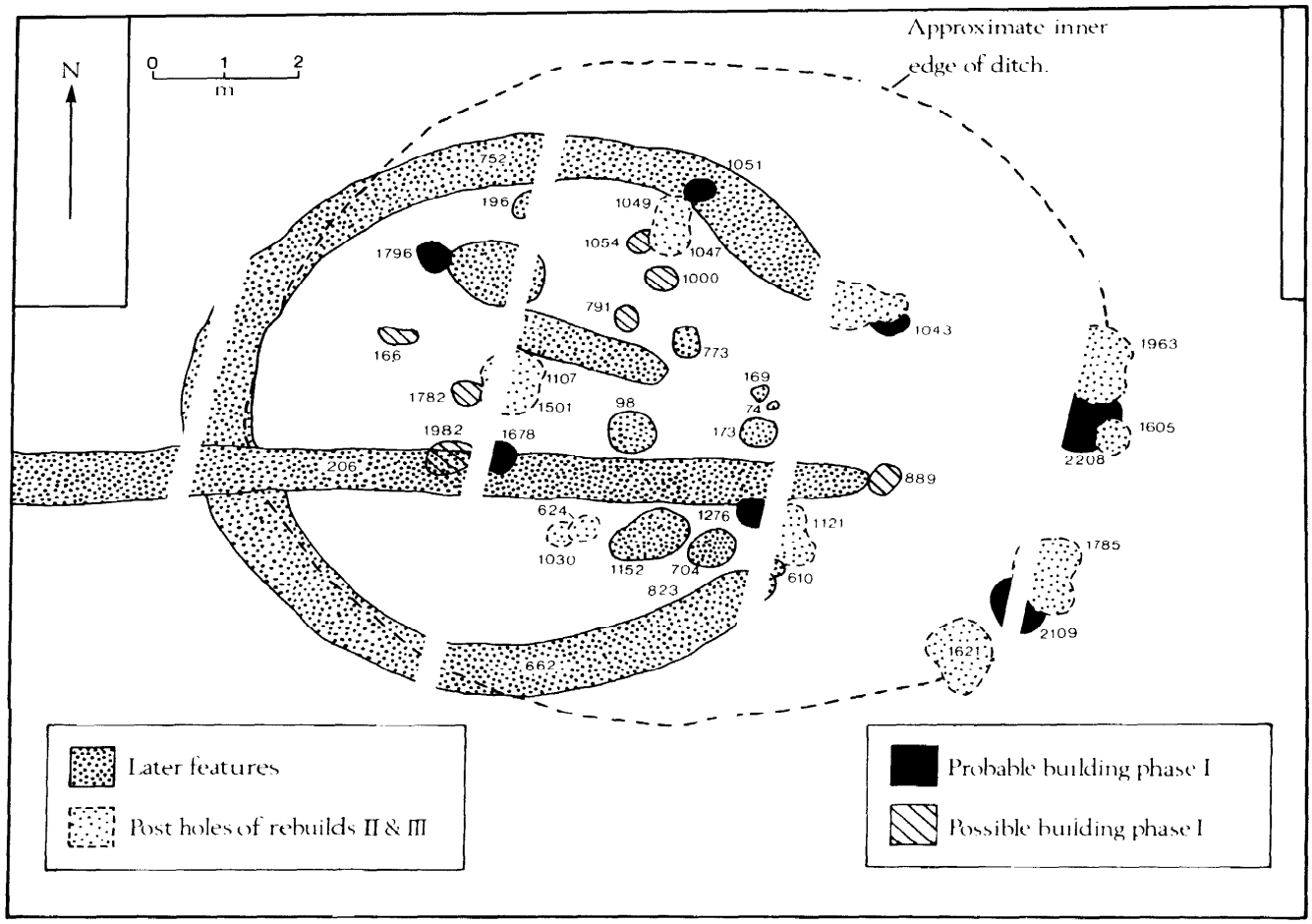


Fig 14 Central House: House I relationships

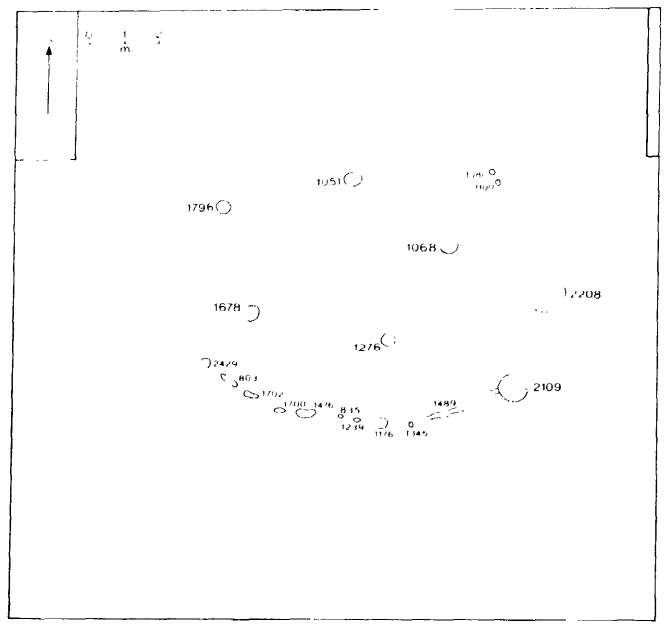


Fig 15 Central House: House I interpretations

C1449, which survived beneath floor-level accumulations built up against the walls of the later rebuilds. The western stake (C2429) was cut by House II wall-slot Cl81 7, and the line was not evidenced along the western side as a result of later disturbance. For example, the eroding effect of the House III floor can be seen in the reduced depth dimensions (Table 2) from east to west, with C206, C661 (Circular Structure I), medieval furrow 25 and possibly the later recuts of the ring-ditch combining to remove any expectation of the wall surviving further north. The expected wall-line along the northern circuit (mirror image of southern line across the axis), as shown on Fig 15, runs through two small postholes (C 1080 and Cl 100); these may have been survivals from this feature. The posts themselves were all removed during rebuilding, but from the shape of sockets and robber-holes it is possible that planks were employed (the only examples narrower than 0.2 m were both so shallow that the excavated portions were just the tips of broader members). In this context the slot Cl489 may have reflected a closer spacing near the entrance.

The shape of the structure postulated in Fig 15 is a flattened circle or oval rather than a true circle. If the wall was circular, the roof supports would have been off-centre and the wall itself destroyed by the ring-ditch of the later rebuilds.

There was no direct relationship between the wall and the southern door-post; the fill of Cl489 appeared to be cut by the door-post extraction trench. The line of Cl489 (Fig 12) entrance details) joined the inside face of the door-post rather than abutting it squarely.

in the previous paragraph that the wall and doorway group and the roof posts were contemporary. There was no stratigraphic justification for this assumption; as stated at the beginning of this section, they are linked as being the earliest features in their respective sequences.

House II

As recognized from the post sequence, House II was shifted to the north and rotated in an anti-clockwise direction (Fig 11). As far as can be discerned, the basic layout was similar to House I, with the proviso that the long central axis of the roof-supports may have been shortened, allowing for a more uniformly circular building plan (Fig 16). This was reflected in the walling, which was evidenced, albeit fragmentarily, on both the northern and southern sectors.

The entrance posts (Cl963 and 1785) were seated in massive post-holes 1 m north of the House I post-pits (C2208 and 2108 respectively). The northern post profiles had an irregular mouth, 0.95 m in diameter, and an oval, straight-sided lower section (0.63x0.5 m). The southern equivalent was less complete, the western side having been destroyed by the field-drain and the southern side by the later post, C 1304. Both contained mixed clay interspersed with pockets of occupation debris. Twenty separate contexts were recorded in Cl 763, the upper fills of which overlay the fill of wall slot C801 (see C1963, 1:A13 fiche). The relationship between Cl785 and the southern wall slot was not resolved; stratigraphy associated with the upper levels of the latest phase ring-ditch

Table 2 Stakeholes/postholes in southern wall, House I, early phase of Main Structure (west to east)

No.	Fills	Character of fill	Length	Depth	Comments
C2429	4	Backfilled clay	0·38 m	0·13 m	Cut by wall slot, C1817
C808	1	Mixed clay	0·41 m	0·20 m	Cut by field drain 7 under floor levels C757 & C782
C1702	2	Occupation debris over backfilled clay	0·33 m	0·23 m	Under gully C792, CSI
C1700	3	Mixed clay backfill	0·30 m	0·34 m	Under gully C792, CSI
C1476	4	Mixed clay with occupation debris	0·54 m	0·44 m	Over cut during excavation therefore actual shape unrecorded
C835	1	Silty clay	0·34 m	0·16 m	Post cleanly extracted and quickly backfilled under C792
C1239	1	Dark clay loam	0·20 m	0·30 m	Post cleanly extracted and quickly backfilled under C842
C1176	4	Black clay and silt	0·54 m	0·43 m	Extraction pit. Under floor level C637
C1345	3	Backfilled clay	0·16 m	0·25 m	Straight-sided socket: post removed

A further observation concerning the shape of the wall is possible from the surviving evidence. This appears to consist of a series of straight sections linked by obtuse angles rather than forming a smooth, continuous curve. This construction method could help to resolve the structural problem that resulted from the adoption of an oval rather than circular plan. This characteristic can be seen in later rebuilds of this house and in other buildings on the site,

The observation that the angles along the wall-length did not directly correspond with the position of the posts suggests that the walling may have constituted a separate structural unit, rather than being integral with the roof-trusses.

One final point concerns the underlying assumption

overlay the outer edge of the house platform, and this was not removed where field drain 7 cut the ring-ditch. Moreover, deposits here were cut by a later feature, Cl621, immediately to the west of the field-drain.

The recognized House II supports (Table 1, Figs 16 and 18) do not form a complete circle; as with House I, and for the same reasons, the western side could not be resolved into a convincing symmetrical pattern. There are two possible explanations: Cl501 may have been included in a less regular arrangement or a posthole could have been destroyed by C1408, field-drain 9 or C 1776. The posts (Table 1) were of medium size, between 0.4 and 0.6 m deep and, as far as is known, about the same or slightly less in diameter and spaced between 3.3 and 3.5 m apart. The walling (Fig 17) consisted of

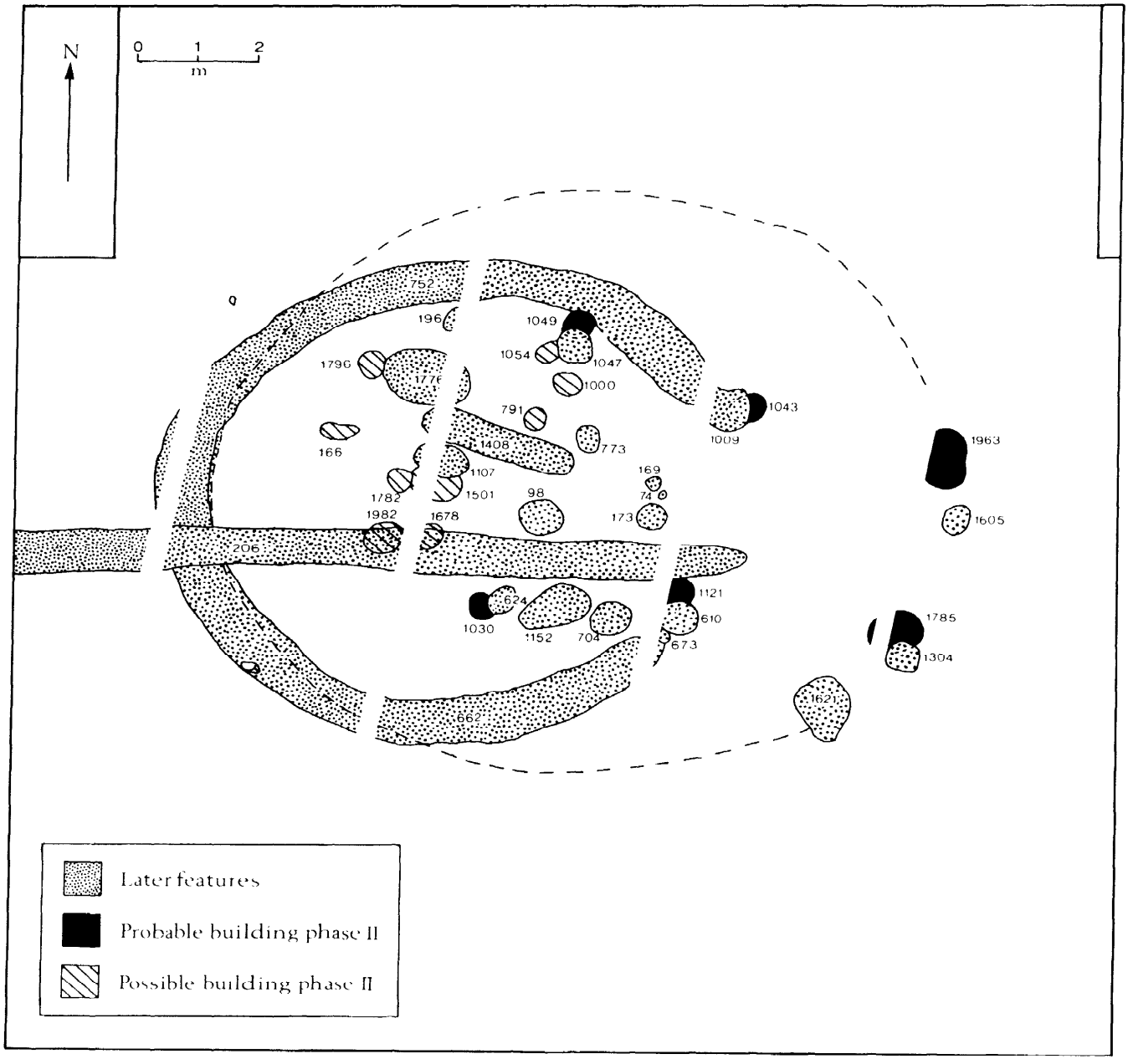


Fig 16 Central House: House II relationships

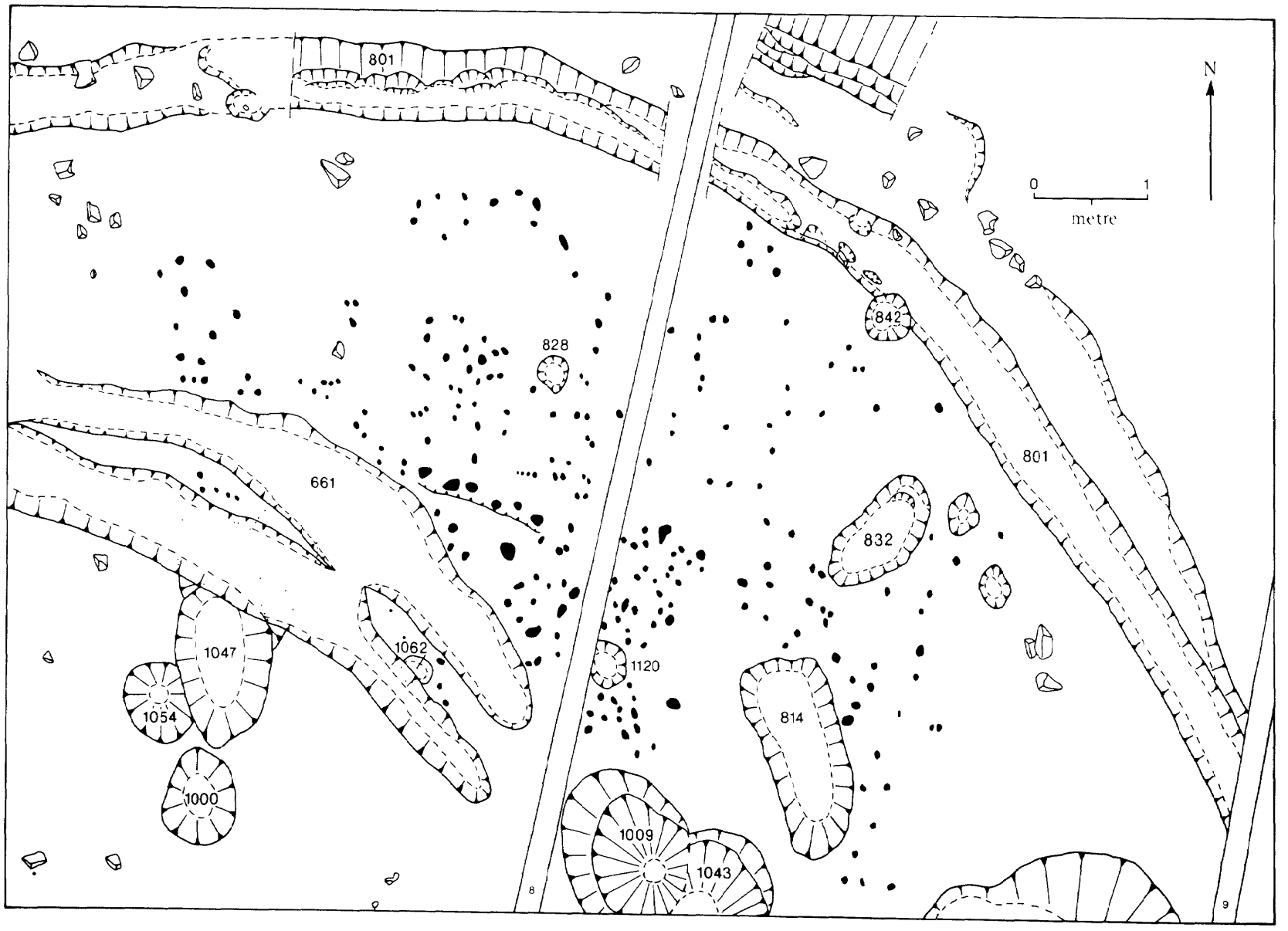


Fig 17 Central House: House II walls

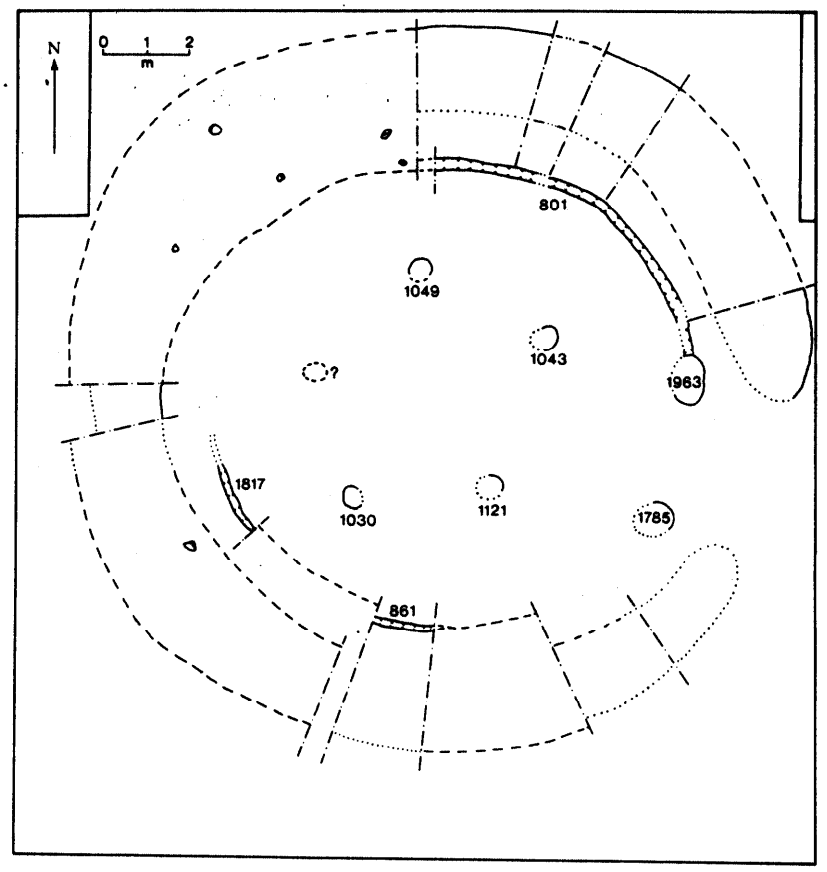


Fig 18 Central House: House II interpretation

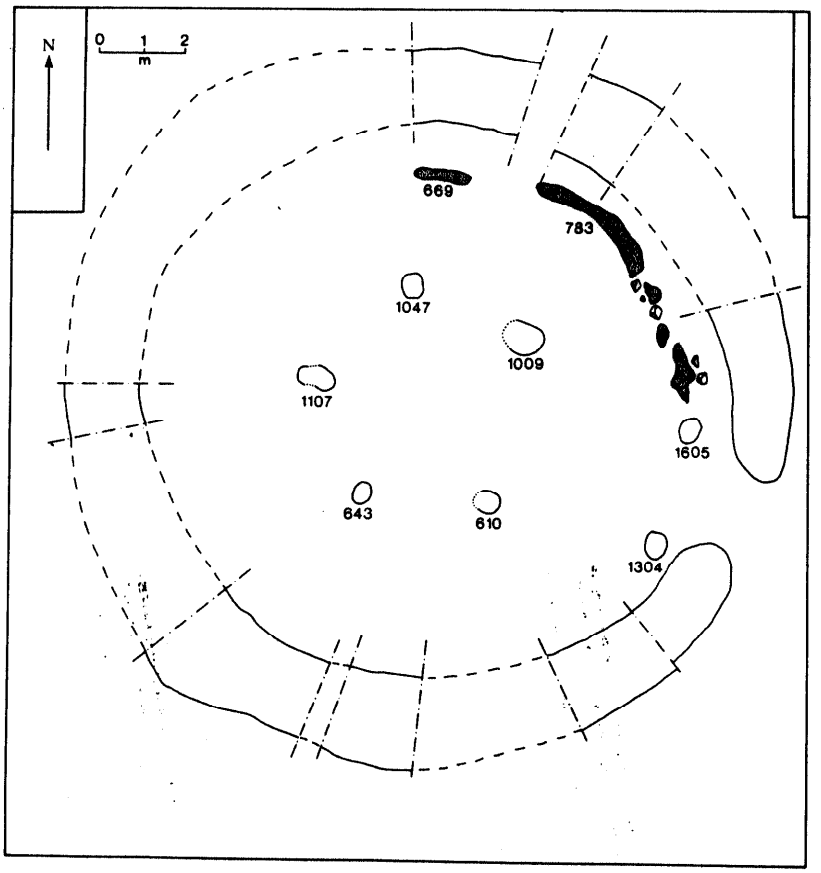


Fig 19 Central House: House III interpretation

continuous slot which was missing only along the western and south-eastern sides although the two southern stretches, C1817 and C861, were very shallow, particularly the former. Stratigraphically, the walling underlay later floor levels and, in the case of the northern section, C801, the House III wall, C783.

Timber impressions may have been present along the northern stretch of C801, Here the slot base was divided into shallow linear depressions approximately 0.15 to 0.2 m wide, less than 0.15m thick and up to 0.14m deep. Small gaps of 30 to 50 mm separated these, but only on the northern side; the southern face was almost uniformly vertical. This suggests that planks or split timbers set flush against the southern side of the trench were used to form the wall of the house. These timber impressions contained a dark, more silty fill which lacked distinct edges against the upper fills, although if the timber impressions had gone through the upper fill they would almost certainly have been observed. In fact, a stratigraphic sequence was seen within the main fill, consisting of an upper, dark clay-loam over mixed orange and yellow backfilled natural, suggesting that the feature recorded as C801 represented a robber cut to extract the timber element. Moreover, the northern edge rose briefly above the linear depressions before levelling to form a further step; this may have marked the point to which the robber trench was cut, and may even suggest that the linear impressions themselves were merely the marks of the tools used to rob the timber.

The plan of the combined wall slots, Fig 18, shows a more symmetrical building than that which it replaced. Similarities extended not only to the type of wall material (timber upright in either post or plank form) but also in design, House II also having had the walling set in short, roughly straight lengths, joined at obtuse angles and set at approximately 3m intervals. The distance from the wall to the roof-support ring was approximately 3m, and the interval between the roof supports was 4m.

House III

This was reconstructed by linking the latest features of each component sequence (door-posts, roof supports and walling) as shown on Fig 11 (above). The resultant pattern can also be regarded with a higher degree of confidence than its preceding phases, for two reasons: first and most obviously, as the last phase of rebuild it endured the least disturbance; secondly, it was possible to relate the House III features to the main floor horizons which were predominantly the product of later house habitation (see Table 3).

Table 3 Posts, pits and stakeholes, Houses I-II

Feature No.	Dimensions (m)	Depth (m)	Comments
C1782	0·70 × 0·48	0·34	Possibly cut by C1501
C1982	0·50 × 0·55	0·52	Post or pit
C1501	0·85 × 1·00	0·67	Large extraction pit? House II
C791	0·41 × 0·40	0·43	Circular posthole
C1054	0·38 × 0·39	0·36	Circular, medium-sized post
C1000	0·65 × 0·65	0·63	?Pit with round base
C1082	0·38 × 0·32	0·25	?Small post; conical section
C1072	0·34 × 0·21	0·30	Plank-post with extraction pit
C889	0·50 × 0·50	0·60	Sizable posthole
C828	0·26 × 0·27	0·18	Slight rake to west
C1080	0·18 × 0·18	0·05	Possibly related to House 1 and linked to C1100
C110	0·21 × 0·19	0·12	
C1120	0·32 × 0·32	0·20	Possibly linked to C1080 and 1100
C2312	0·25 × 0·20	0·16	Small post or stake

Posts, pits and stakeholes, Houses I-III

Feature No.	Dimensions (m)	Depth (m)	Comments
C166	0·55 × 0·83	0·66	Large extraction pit
C823	0·23 × 0·11	0·34	?Small post – cut by CSI
C817	0·23 × 0·21	0·30	?Small post – cut by CSI
C2247	0·29 × 0·30	0·31	?Small post – cut by CSI

Main House: other features

Feature No.	Dimensions (m)	Depth (m)	Comments
C2110	1·80 × 1·40	0·80	Large pit, cut by ring ditch
C1877	0·49 × 0·70	0·42	Under C207; possibly modern

The entrance posts C1605 and 1304 were placed to the south and east of the redundant earlier postholes, and their erection and dismantling created substantially less disturbance than their precursors. Both postholes were around 0.6m in diameter and 0.5m deep, with straight sides and flat bases. The timbers, of slightly smaller diameter, appear to have been lifted cleanly, with a slight widening of the northern post to suggest rocking to loosen the timber. The entrance was approximately 2.3m wide.

The roof-support ring consisted of five large postholes in roughly the same position as the House II ring. The front pair were 3.9m from the door-post and 3.5m apart; the remaining posts were equidistant, at 3m intervals. As with earlier rebuilds, the timbers themselves had been removed, either with substantial robber pits (as with C1009 and 1107), or with minimal disturbance (C610 and C624). The voids were generally filled with a mixture of dark floor-layers and stained clays. There appeared to be no deposits of heavily burnt soil such as would be expected if the postholes were levelled after the deposition of the burnt horizon. The depth of the post extraction pits varied considerably although apart from C610 (at 0.35 m) all were around or over 0.5 m, and as far as could be seen the posts were around 0.35-0.4 m in diameter. The mean distance from the posts to the northern wall was 2.6 m.

The wall was evidenced on the north-eastern section, where a 6.5 m length survived. This was of brick-red clay of a dense, possibly puddled, fine texture. The surface and both margins were slightly oxidized, probably during the conflagration which produced the Burnt Horizon which directly overlay House III. At maximum this clay was 0.71 m wide and between 30 and 50 mm thick. There was no trace of either stakes or hurdling.

There were several small and medium-sized stones on the inner and outer edges of the eastern surviving length. A second stretch of clay, C669, was recorded on the

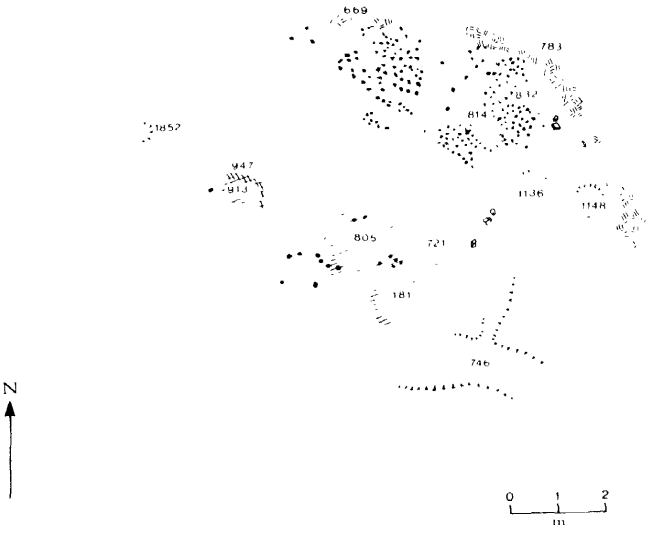


Fig *20 Central House: hearths and stakes*

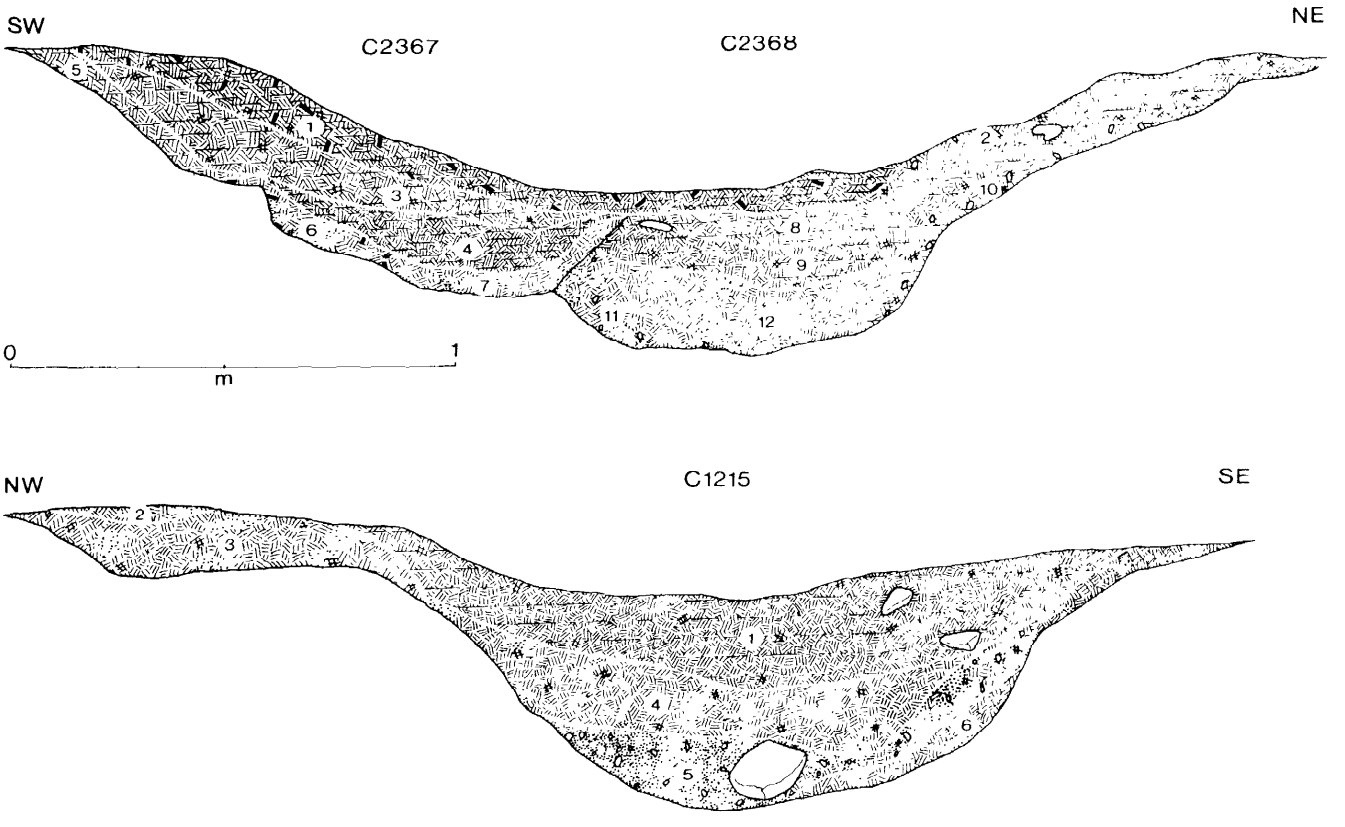


Fig 21 Central House: drainage ditch sections

northern edge of the house. This was darker in colour but was on the expected line of the wall, and it occupied the same stratigraphic position within the later house sequence. It was abutted by floor levels C526 and C482, underlay the stratigraphy over the Main House Ditch latest phase, and once removed, exposed the upper layer of the House II wall, C801. This feature is best interpreted either as a mass clay wall (cob-wall) or as a footing for such a wall. Had stakeholes cut through C783, they would have been immediately recognized; C783 was planned at two levels, upper and lower (the latter is shown on Fig 19), and no trace of a timber component was seen. It is possible that the evidence for the wall survived as a result of an oxidation of the clay during the formation of the Burnt Horizon. This quarter was subject to the most intense burning, as seen from the overlying distribution of daub, burnt soil and charcoal. This type of feature could not be expected to survive under normal conditions.

The floor

Trampled clay deposits containing varying quantities of charcoal covered approximately 325 sq m of the Main House platform (Fig 20). The thickness varied according to use and degree of survival, generally being better preserved to the south and east of the central hearths. A large number of contexts were recorded (approximately 120) but the majority consisted of small patches which varied only slightly in one particular characteristic from the surrounding horizon. Great care was necessary to spot the exact position in the stratigraphic sequence of the posts and stakes of the house interior. This was partly frustrated by the nature of the floor, which had successively eroded the surface rather than accumulated sealing layers. This was less apparent at the centre of the building, where a stratigraphy of hearth-surfaces survived, but in general the floor-levels belonged to the final phase of activity; hence other internal features could only be related to the last phase of occupation. The surface of the circular platform formed by the ditch was between 50 mm and 150 mm lower than the surrounding natural, this being particularly noticeable on the south-eastern section. In addition to the reducing effect of floor-wear and periodic sweeping, it is possible that the platform was deturfed before building commenced.

Hollows and depressions

Two areas of the floor received additional wear. These were on either side of the doorway, halfway between the door-posts and the nearest pair of roof supports (C610 and Cl009 in the final structure). The northern group was in an area of general depression in the floor which surrounded a group of four deep hollows (C814, 832, 1136 and 1148). The presence of the two half saddle querns in the back-fill of C801, immediately to the north, raises the attractive possibility that these depressions were the sockets for earth-fast saddle querns; The depressions to the south of the entrance were more substantial and formed a rough T-shape. They were filled with stained clay-loam, contained several large pieces of pottery, and were subsequently overlain by a later floor-level, C637. These may represent work-areas for activities involving pounding and sweeping and may have been located close to the door to take advantage of the light but to the side of the entrance to avoid obstructing the threshold.

Hearths

Four discrete areas of *in situ* burning were recorded in the centre of the structure. (Fig 20, nos 913, 805, 721 and 181). The latest, which probably heated the final rebuild, was Cl81 and this consisted of a circular patch of clean, probably redeposited, natural clay, approximately 1 m in diameter. This overlay an earlier floor-level and a posthole (C1276) which has been grouped with the early house roof supports. Hearth Cl81 was immediately beneath the Burnt Horizon and was cut by post-medieval hedgeline 207 and field-drain 8. Its proximity to C610 is one factor arguing against its linking with the final build; the distance from the centre of C181 to the centre of C610 was 1.25m. As with the other hearths, there was no trace of a stone surround.

The contextual significance of the remaining three areas of in *situ* burning was not so clear. C805 overlay natural but formed the upper layer when excavated. It was similar in character to C181, consisting of brick-red, oxidized, clean clay which after excavation left a slight depression, 130 mm deep, in the natural clay. Some stratigraphy was noted, the most intense burning being immediately above natural. This hearth was approximately 2m east-west by 1.65m north-south. The periphery of the lower layer was cut by several stakeholes; these were subsequently covered by later oxidation and probably represented hearth furniture. They were probably too close to the centre of burning to have formed a screen. C721 was slightly to the north-east (ie towards the door) of C805 and was smaller in extent (0.8 m north-south by 0.83 m). When found, it was separated from C805 by field-drain 8 and so no relationship was observed, but C721 was covered by a floor-layer, C706, which contained a high proportion of burnt material. This layer probably formed the eastern margin of C805, making C721 an earlier hearth.

The remaining hearth (C913) was 1.4m north-west of C805 and may have been the earliest hearth. It also overlay natural and underlay floor-levels which showed a tendency to accumulate around the hearths. C913 was surrounded by a raised lip of oxidized clay (C947), which closely resembled a similar feature around hearth B148. This was 0.88m in length and stood to a height of 80 mm, set directly on natural clay, Only the northern and eastern lengths survived as the other sides were destroyed by field-drain 6 and a Phase III pit, C1408.

The cobbled entrance

This feature prevented the threshold from becoming waterlogged during wet weather and drained directly into the surrounding drainage ditch (Fig 11 above). There was no berm between the ditch and the cobbling which had become embedded into the lip and, in some cases, had tumbled into the ditch itself.

The cobbles were a mixture of sandstones with occasional limestone and drift-derived pebbles. All had been water-rolled and were either collected from the surrounding boulder clay or, less likely, carried in from the nearest stream. Most were between 0.1 m and 0.3 m in diameter; very few exceeded 0.4 m. The stones were tightly packed, but not set, in a dark-grey clay matrix. Individual stones displayed a flat surface uppermost, but generally no great care had been taken in this aspect of construction. There was no observable difference in wear between the exposed surfaces of the stones and the

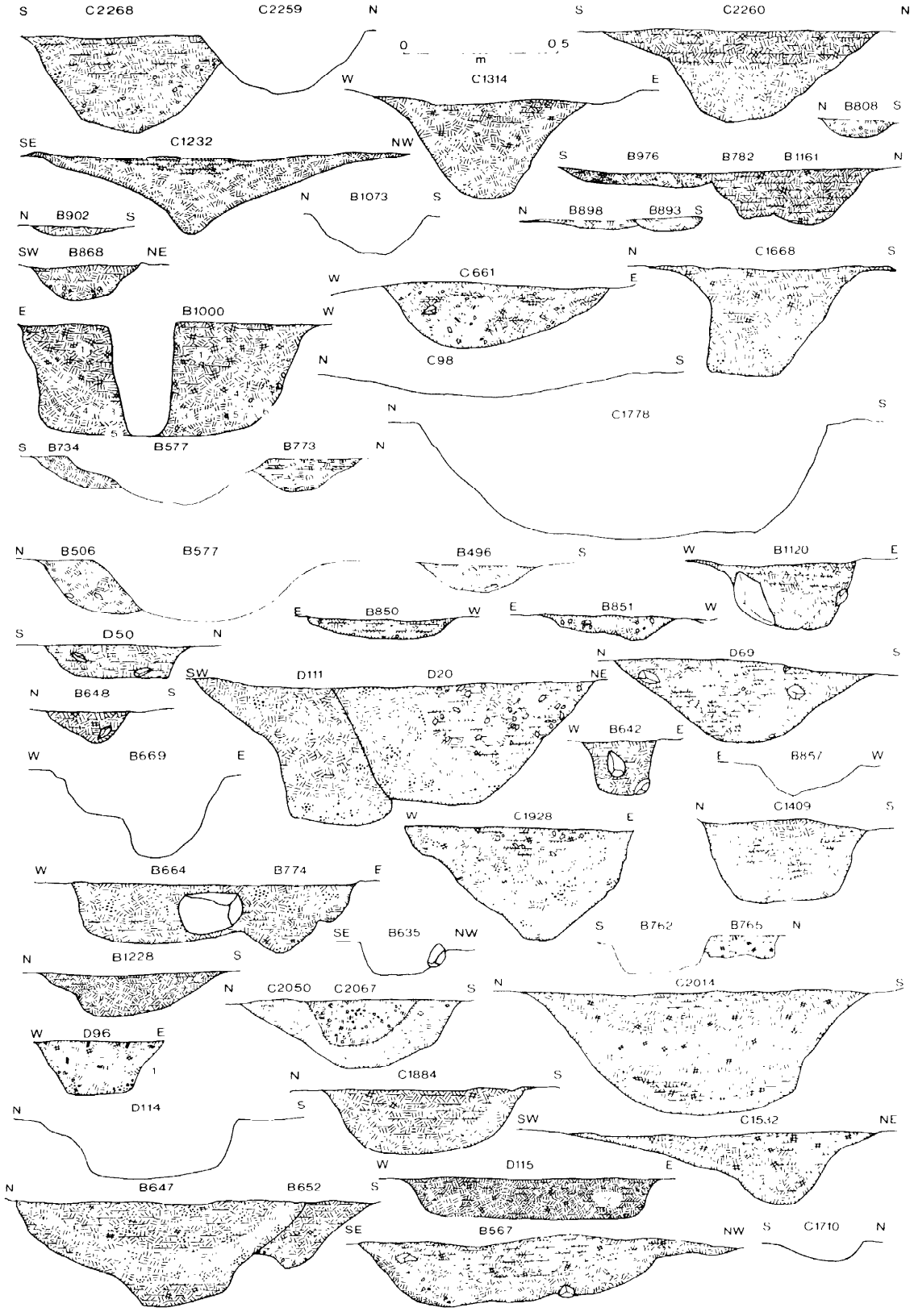


Fig 22 Sections of Circular Structure ring-ditches and postholes. Circular Structure L; C2268; 2259 and 2260: Circular Structure E; B808, 1073, 976, 782, 1161: Circular Structure J; Cl232 and 1314: Circular Structure G; B902: Circular Structure F; B868 and 1000: Circular Structure H; 898 and 893; Circular Structure I; C661, 98,1668 and 1778: Circular Structure B; 734, 577, 773, 506, 496, 1120, 850 and 851: Circular Structure N; D50, 111, 20 and 69: Circular Structure D; B669, 648, 857, 664 and 774: Drainage Complex Q C1928 and 1409: Circular Structure D; B1228, 635, 762 and 765: Circular Structure M; C2050, 2067 and 2014: Circular Structure O; D96, 114 and 115: Circular Structure K; C1884, 1532 and 1710: Circular Structure C; B647, 652 and 567

underside as revealed during excavations. The surface was, however, very uneven, there being 0.21 m between the highest and lowest points.

Depressions

Areas of additional wear across the surface of the floor are described in this category. Two of the deeper features, Cl852 and 814, may have been shallow pits or settings for internal furniture or implements (Fig 20).

External Ditches

The building was surrounded by a substantial drainage ditch which had been recut at least once, although not necessarily during the recognized rebuilds of the house. The southern terminal displayed only one phase, this probably being the latest which removed the previous example.

Six sections were excavated, totalling 43% of the total circumference, including the two terminals and sections along the northern and southern arcs. One further section was reduced to the level of the lower fills of the latest phase on the western side in order to check the relationship with Circular Structure L. The entire ditch was reduced to the point where the upper layers were confined between the ditch lips (ie masking stratigraphy was removed), although this did not necessarily constitute a meaningful archaeological horizon. Further, the southern section was excavated up to and including the spread of burnt material across the platform and ditch.

The sections were dominated by a broad, flat-bottomed ditch, C2368, over 2.6 m wide and 0.95 m below contemporary ground-level. This was cut by a smaller, narrower ditch, C2367, which in turn cut an earlier phase, C2367, which was only extant in the northern section (Fig 21). The argument for linking the latest two ditches with House II and III rests on the relationship between the northern door-posts and the ditch terminals; the earlier ditch, labelled C2304, terminated directly in front of the phase II post, Cl 963, while the later ditch continued 1.8 m further south, echoing the southern shift of the door post. The backfill of B1963 was overlain by the upper layers of B2303. The southern terminal displayed only one phase. This was mid-way in size between the second and third ditches in the northern sections.

External stratigraphy

Amidst the horizontal strata of mixed 'occupation spreads' extant in the area of the Main House, two groups of deposits can be pointed to as representing possible upcast from the Main House ring-ditches, being of a clay-silt base rather than of loam. As such, they have survived the homogenizing effect of the soil-mixing agents which created the undifferentiated character of much of the stratigraphy between the Main House and Circular Structure D.

The northern group was situated to the outside of the northern ring-ditch terminals, extending approximately 3 m to the east. The southernmost layers (C749,478) were mixed with the northernmost cobbles of the entrance threshold, and were overlain by layers rich in charcoal and oxidized clay (Burnt Horizon, layer C79). These layers, in total 0.1 m thick, were of mixed orange, yellow and light-brown clays, interspersed with patches of dark soil and charcoal. They were thickest to the north, extending beyond the northern limit of excavation where five superimposed episodes were recorded, but similar deposits were not found to the north of the northern ring-ditch section (ie to the west of field-drain 9). Redeposited clays were also recorded to the south of the Main House, where a single, mixed clay-silt survived between C2106 and the southern edge of the ring-ditch.

Circular Structure L

This structure was evidenced by a ring-ditch of two main phases, the earlier of which was recut once (Fig 22). A group of nine small internal posts may have been associated (Fig 23).

The earlier ring-ditch was approximately 10 m east-west and 12.2 m north-south, this flattening occurring at the entrance, which faced due east and was at least 8 m wide. The northern terminal (C2268) was cut by the latest recut of the Main Structure Ditch (Cl21 5) which had destroyed the relationship between L and the earlier Main Structure Ditch, Cl216 However, the southern equivalent (C2181) clearly cut a drainage run-off channel, C2210 (itself cut by Cl215), which almost certainly belonged to the Main Structure. The earlier phase of L was, therefore, probably contemporary with the first or second Main Structure and may have functioned as an annexe to the main house (see C2259). The later phase (C2260, 2118) was erected 3 m to the south-west. This structure had an angled northern section and an entrance gap over 7 m wide.

A group of seven small postholes (Table 4) were positioned in a rough T-shape, with the head in line with the entrance terminals of the later phase (C2260 and C2118). These (C2197, 2203, 2216, 2166, 2108, north-south and C2 156, 2143, east-west) could have been contemporary, as they cut a series of rather amorphous gullies which ran north-south within the circle of the earlier Circular Structure L and these were also cut by C2260. The north-south gullies were recorded together as C2212. They may represent scrapes for clay and be associated with the construction of the earlier phase of Circular Structure L, A further north-south feature, C2104, ran parallel with these gullies but was of a more regular linear nature. This was later than C22 12 but was cut by the later phase of the structure. The southern terminal was round and cut by C2106, an east-west partition; the northern end was cut by C206, a modern feature. These shallow gullies were on the western edge of the surviving horizontal stratigraphy; they would not have survived across much of the excavated area.

Table 4 Features inside Circular Structure L

Feature No.	Dimensions (m)	Depth (m)	Comments
2197	0·25 × 0·25	0·10	Circular plan – small post?
2203	0·25 × 0·30	0·15	Oval plan – small post?
2216	0·10 × 0·10	0·18	Large stake hammered into subsoil
2134	0·20 × 0·24	0·10	Forms rough line with C2197, C2216
2156	0·17 × 0·22	0·10	Small, subcircular posthole
2143	0·28 × 0·28	0·24	Small post
2108	1·00 × 1·00	0·30	Circular pit
2212	1·07 × 0·42	0·10	Shallow linear feature
2217	0·23 × 0·41	0·20	Small ?posthole

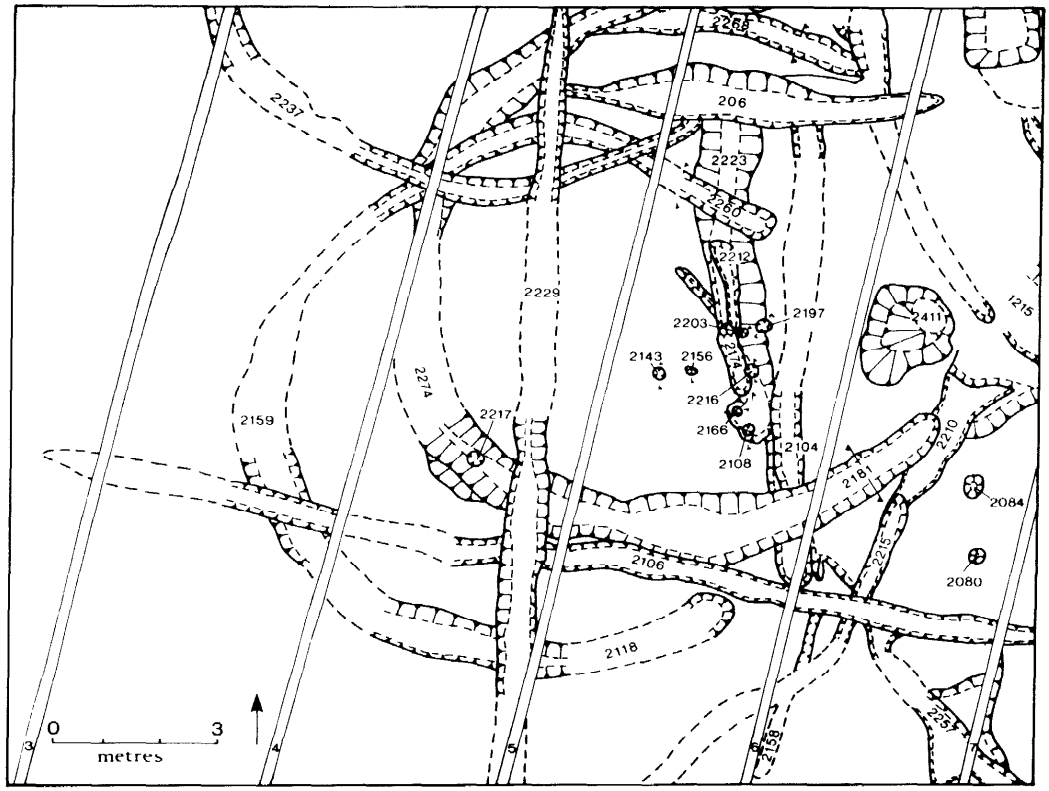


Fig 23 Circular Structure L

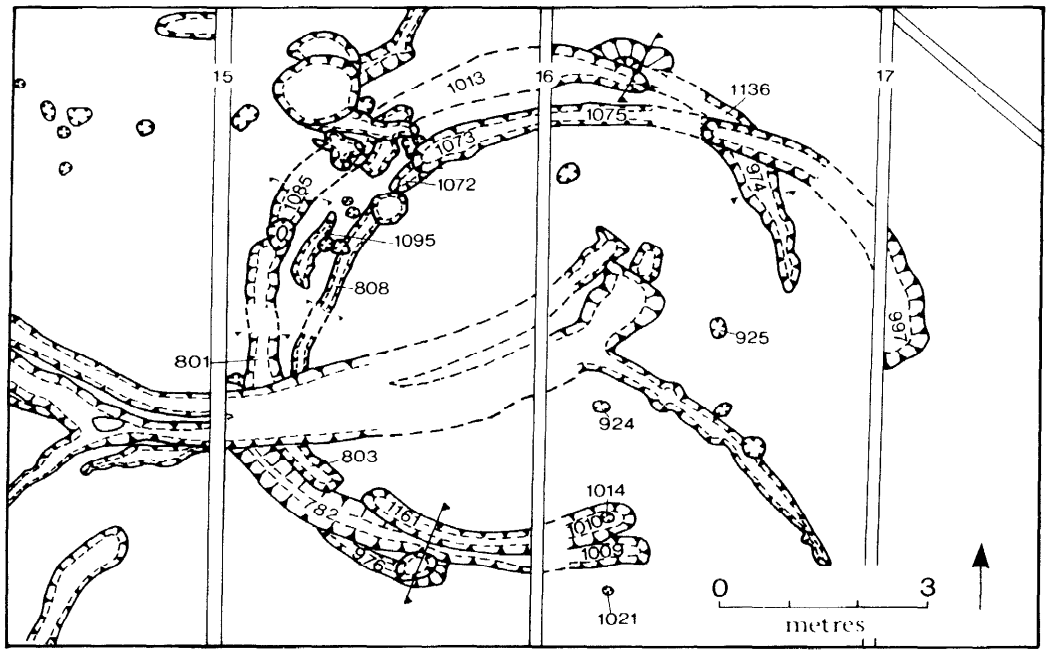


Fig 24 Circular Structure E

Other circular structures

Circular Structure E

Underlying a later building (Circular Structure B) and a group of pits and scoops (B958 etc) was an irregular group of subannular ditches which drained an asymmetrical platform of approximately 40 m square. An entrance of 4.5 m faced south-east (Fig 24).

The earliest ditches were linked either to B1095 or B808. If B808 was the earliest, the northern terminal was subsequently destroyed by B997, whereas B1095 could have linked with B974. Later activity had removed the relevant relationships. The latest phase (either the third or fourth recut) was deeper and less continuous and consisted of B997, the expanded northern terminal, B1013, B801 and B1010, the southern terminal. The phasing is shown on Fig 67; l:E3 fiche.

Of internal features, postholes B924, 995 and 925, recorded with Circular Structure B, may have belonged to this structure. A small group of stakeholes clustered around the southern section of the ring-ditch, both inside and out, in the manner seen at Circular Structure J. A smaller group was found in the north-west interior, south of B1073.

The interpretation of the smaller circular structures presents difficulties, especially the irregular and apparently short-lived examples like E. There was no evidence for roofing and the internal stakes may have been associated with later activity. Chronologically, Circular Structure E was the earliest feature group in the south-east part of the enclosure and so was constructed in relatively open space. This may have had a bearing on its function.

Circular Structure J

This structure (Fig 25, Plate 5a) was situated 5.5 m east of the Main House, roughly level with the northern ring-ditch terminal in an area on the edge of the surviving stratigraphy. Although horizontal stratigraphy was noted across the building, no definite floor-levels could be identified; the horizontal sequence consisted of homogeneous upper layer (layers C32, 39) which spread across the area from the Main House to the inner edge of Circular Structure D. This was a uniform, dark, grey-brown clay-loam, with charcoal, burnt clay and occupation debris in patches across the horizon. Soil differences had been removed by the action of soil-mixing agents, and little could be distinguished until the lighter, 'B-horizon' was exposed, through which the subsoil features were cut. These mixed masking layers may have been produced by the puddling effect of animal trample after the abandonment of features in this area; there was no noticeable difference on either side of drainage ditch Cl339, for example, so this process must post-date this Phase III feature. Although mixed, these layers did not contain post-Iron Age occupation debris, suggesting that pottery and metalwork were not being discarded across this area after the third quarter of the 1st century AD.

The recorded components of Circular Structure J consisted of a pair of concentric, penannular ring-ditches which may have been contemporary, a small group of shallow internal pits and a cluster of possible stakeholes. For convenience a small number of external and post-ring-ditch features will be described at the end of this section.

Circular Structure G

This shallow, partly circular ditch (Fig 26) was the earliest of three similar ditches which have been assigned to Phase II rather than Phase III for circumstantial reasons. This is based partly on their proximity to two definite Phase III feature groups - Circular Structure B and Circular Structure D - and their location on the line of the Phase III trackway. On the other hand, as Phase II structures they would have been located roughly mid-way between structures J and E, at 5 to 6 m intervals (the approximate distance between the Main Structure and Circular Structures J; M and B; M and K; B and drainage complex Q).

This part of the site contained no surviving statigraphy and plough-erosion became progressively more severe down-slope, ie to the east and south. This was caused by modern ploughing, as no furrows penetrated to the level of the subsoil. It is difficult to assess the loss of archaeological features in absolute terms, the only indicators being the presence of stakeholes across the western part of the three feature groups. A further 0.2 m of erosion would have removed all trace of these structures and left only the bottom of pit Bl000. A southern length of Circular Structure G was recorded on pre-excavation plans but was so shallow that it was removed when the area was trowelled to define features during excavation. This is shown on Fig 68, l:F2 fiche.

Circular Structure F

This ring-ditch was located to the north and west of Circular Structure G, and it enclosed an area of approximately the same size (Fig 26). Again, the uphill side was deeper and more regular (ditch B868) and the western side (B899) may originally have extended around the southern arc.

A large circular pit surrounding a cluster of stakeholes and one or two small posts occupied the northern section of the internal platform. Shallow features further south may have been lost by deeper plough penetration in that direction. The pit and stakes may not have been contemporary, but they are unlikely to be later than the ring-ditch as the stakes respect the inner edge of B868 with none cutting the fill.

Circular Structure H

A very fragmentary length of ditch, possibly a ring-ditch, in an area of more severe erosion (100 to 200 mm lost), this cut Circular Structure F and must, therefore, post-date Circular Structure G (Fig 26). Although this may never have been part of a structure, the feature group name used in the archive has been retained for convenience.

Enclosure Partitions, Phase II

The enclosure interior in Phase II showed some evidence of internal specialization. The circular structures were restricted to the north of a series of east-west ditches, with the exception of Circular Structure E, which was situated towards the south-eastern corner of the interior, 10 m north of the southern length and 16 m west of the eastern ditch. If the bank was internal, Circular

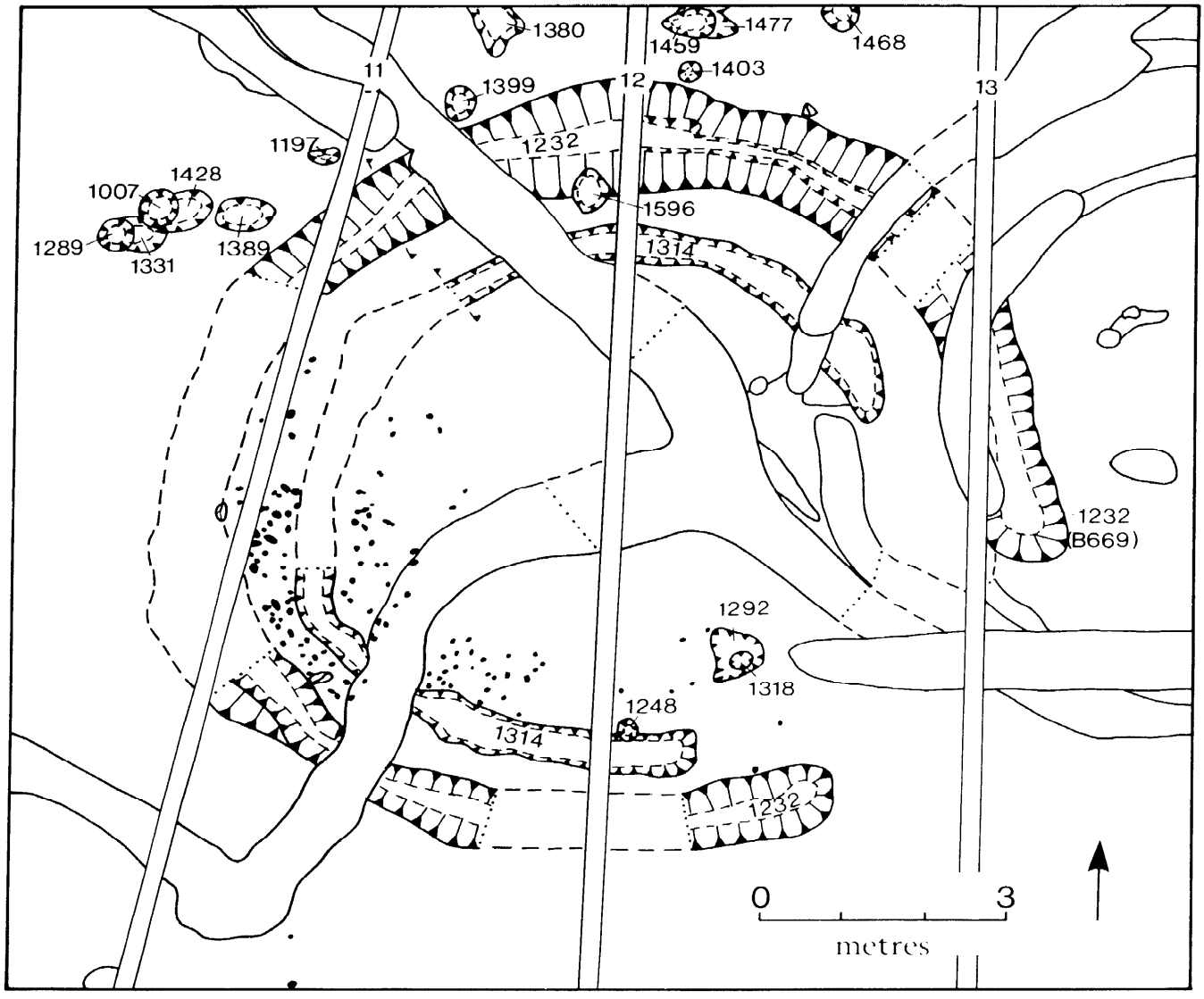


Fig 25 Circular Structure J

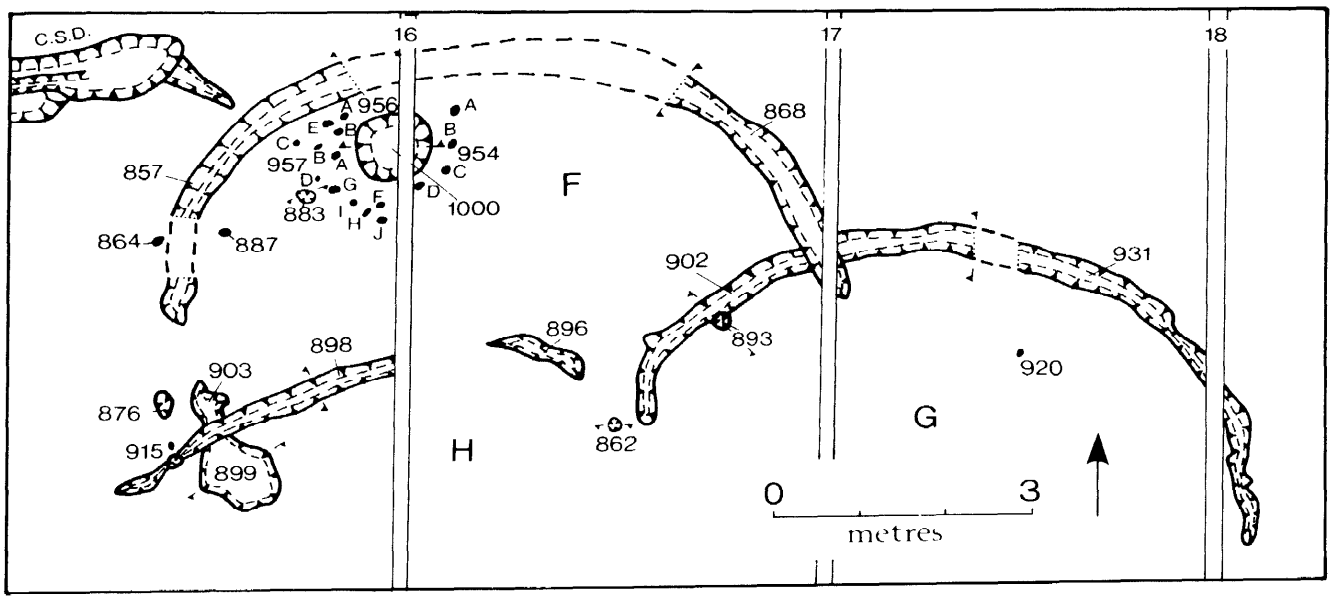


Fig *26 Circular Structures G, F and H*

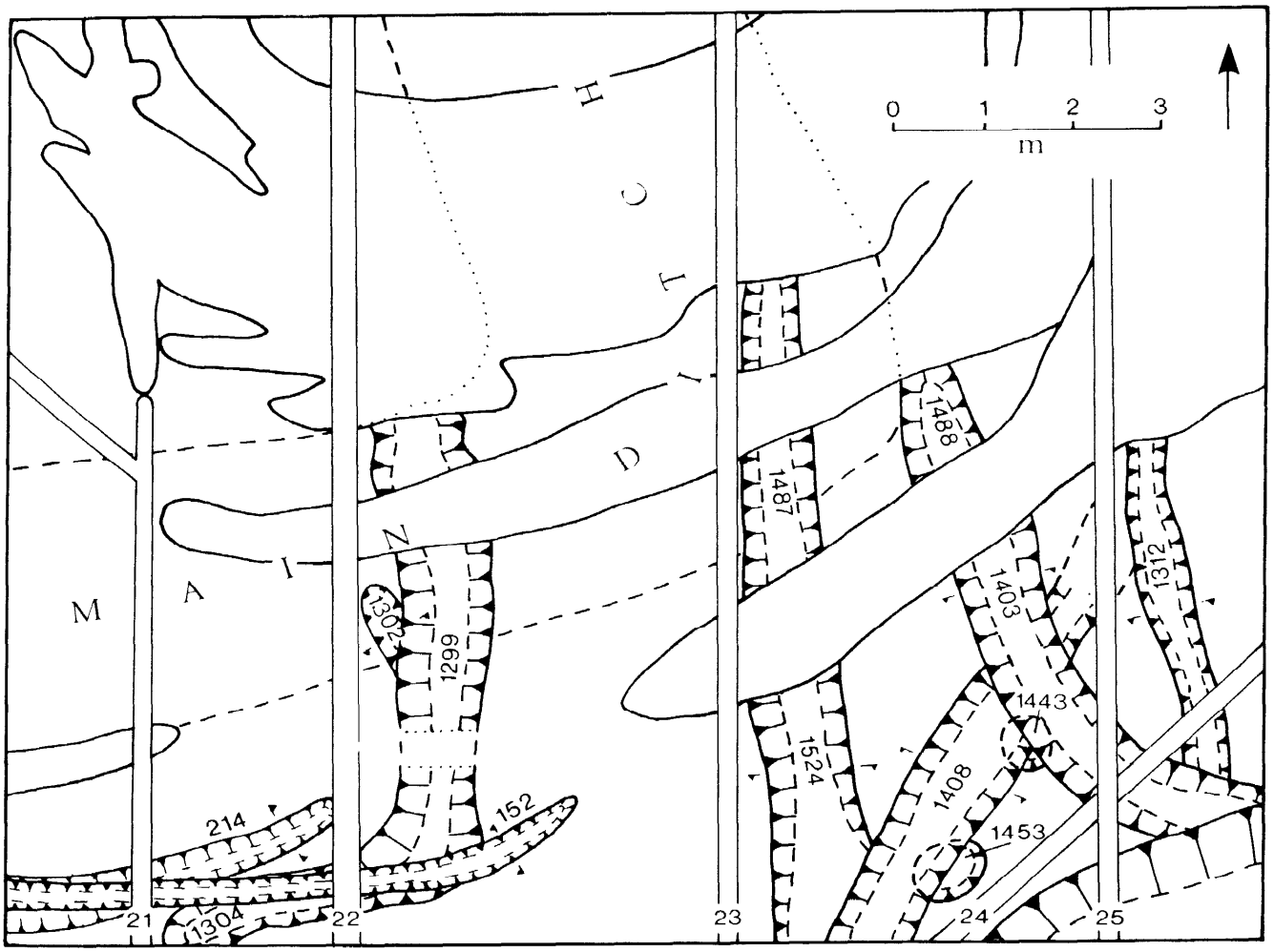


Fig 27 Features outside the Main Enclosure Ditch

Structures E and G would have taken up most of this part of the settlement between the Main Enclosure Ditch and the internal circular structures. There was a noticeable absence of features earlier than late Phase III.

The centre of the excavated area was traversed east-west by two groups of ditches which occupy the same position in the site chronology.

The east-west partitions consisted of two groups of recuts to the south of and cut by the Late Rectangular Enclosure Ditch II, and were initially thought to be earlier versions of that Phase IV group of ditches. However, they were considerably smaller and, both in the eastern and western stretches, their relationships with other features contradicted that assumption. On the eastern side the area crossed by the ditches was used to build Circular Structure B before the establishment of Late Rectangular Enclosure Ditch II. On the western side these were cut by north-south Phase III ditches (Cl88 and 1820) and Circular Structure M before Late Rectangular Enclosure Ditch II appeared across this part of the site.

Furthermore, there was a gap between the eastern and western ditches of some 16 m, presumably to allow direct access from the enclosure entrance to the main house, and this was not respected by the Late Rectangular Enclosure Ditch II. If these ditches were later than Phase II, then they would have existed after the abandonment of the Phase II buildings but before any Phase III structures (Circular Structures M, B, drainage complex Q, Circular Structure K), creating a hiatus between the main occupation phases II and III. If this was so, then these ditches would have contained negligible amounts of occupation debris, but this was not the case.

The presence of the Phase IV enclosure ditches (C507, B519 etc) destroyed the western end of the western group (C1900, 1931 and 2500). The eastern group, (B322 and B339) either terminated before Late Rectangular Enclosure Ditch II turned north, or turned north, terminating before the excavated section of Late Rectangular Enclosure Ditch II, or had been completely destroyed by it. The recut history was straightforward.

The earliest ditch on the western side was C2500 and the two later recuts moved south and extended further east. The eastern sequence was simpler, with only two ditches recovered, although later activity to the north may have removed other recuts. The southern ditch, B339, was the earlier. The western terminals of this pair were not excavated, as they ran under the baulk which held the TL probes.

A north-south ditch, C389, may also have been an enclosure partition. It ran from a rounded terminal 17 m south of Circular Structure J to 10.8 m west of the western terminal of B399. It was earlier than the Cobbled Entrance but displayed no other evidence of dating.

Features south of B222

This group comprises two circular pits and a group of irregular slots and depressions (see Fig 31 below). The two pits, B958 and 961, were unlike any other features on the site, in that they contained a blue-grey gley of consistent, very fine texture. The latest, B958, was approximately 1.15 m in diameter, almost perfectly circular, with vertical sides and flat base, 0.1 m below the subsoil surface. This replaced a similar feature, B961, slightly to the north which contained a mixture of backfilled natural and grey gley.

A linear feature, B1077, ran northwards from B961 to meet B222. It may have debauched into B222 but it was not possible to resolve this from the fills.

To the south of B958, and earlier in date, was a series of irregular scoops and gullies filled with very mixed clay of varying colour with little occupation debris. These cut the ring-ditch of Circular Structure E (B1085).

B958 may have been used as a slurry pit for processing and storing fine clay such as would be used in potting. The fill (layer B939) was similar to the grey clay exposed at the edges of feature C2184, being much finer and more consistent than the surrounding dull, brown-red, boulder clay.

Pathways across the Main Enclosure, Phase II

Only one clear pathway was recognized as belonging to Phase II. This ran from the Main House Entrance to a point mid-way along the southern Main Enclosure Ditch, where a gateway is presumed to have existed. This showed on exposure as a darker band containing stone. Excavation removed a series of layers over and around the stones, leaving a depression or hollow way some 0.2 m deep. The stones were not set in any discernible pattern and only occupied perhaps 5% or 10% of the surface area, but in places they appeared to be grouped and included several large, flat stones including the lower stone of a beehive quern, working face uppermost. Several stones were embedded in the natural clay, and evidence of more was found in the form of stone-holes (a group of Unassociated Point Features probably belong to this category, C2451, 2456, 2462, 2476, 2478). The pathway may have been substantially or partly paved, but if so this was considerably disturbed and robbed during Phase III.

There was little evidence of this path across the central portion of the excavation, apart from the gap between the eastern and western Partition groups, but as the path reached the southern Main Enclosure Ditch further hollowing was recorded. This had reduced the contemporary ground surface and allowed more horizontal stratigraphy to survive. It was impossible to date this erosion precisely; it predated the construction of the cobbled surface, which dipped noticeably in the centre and from north to south.

Features outside the Main Enclosure Ditch, Phase II

This group (Fig 27) forms a stratigraphic unit between the disuse of the Main Enclosure Ditch and the appearance of the two subrectangular enclosure ditches cutting its eastern side. However, they differed in form, alignment and fill sequence, so the later ditches must not be taken as redefinitions of a static landscape.

The earliest, B1524, ran due south from the B1448/ B1339 sequence (Subrectangular Enclosure I) to the southern limit of excavation, cutting the upper ditch-fills of the Main Enclosure Ditch. The next ditch, B1408, was on a slightly different alignment, although subsequent ditches reverted to the north-south line. Of these, B1312 was an insubstantial, short-lived gully, cut by B1403, which may have linked with B1229, 5 m to the west.

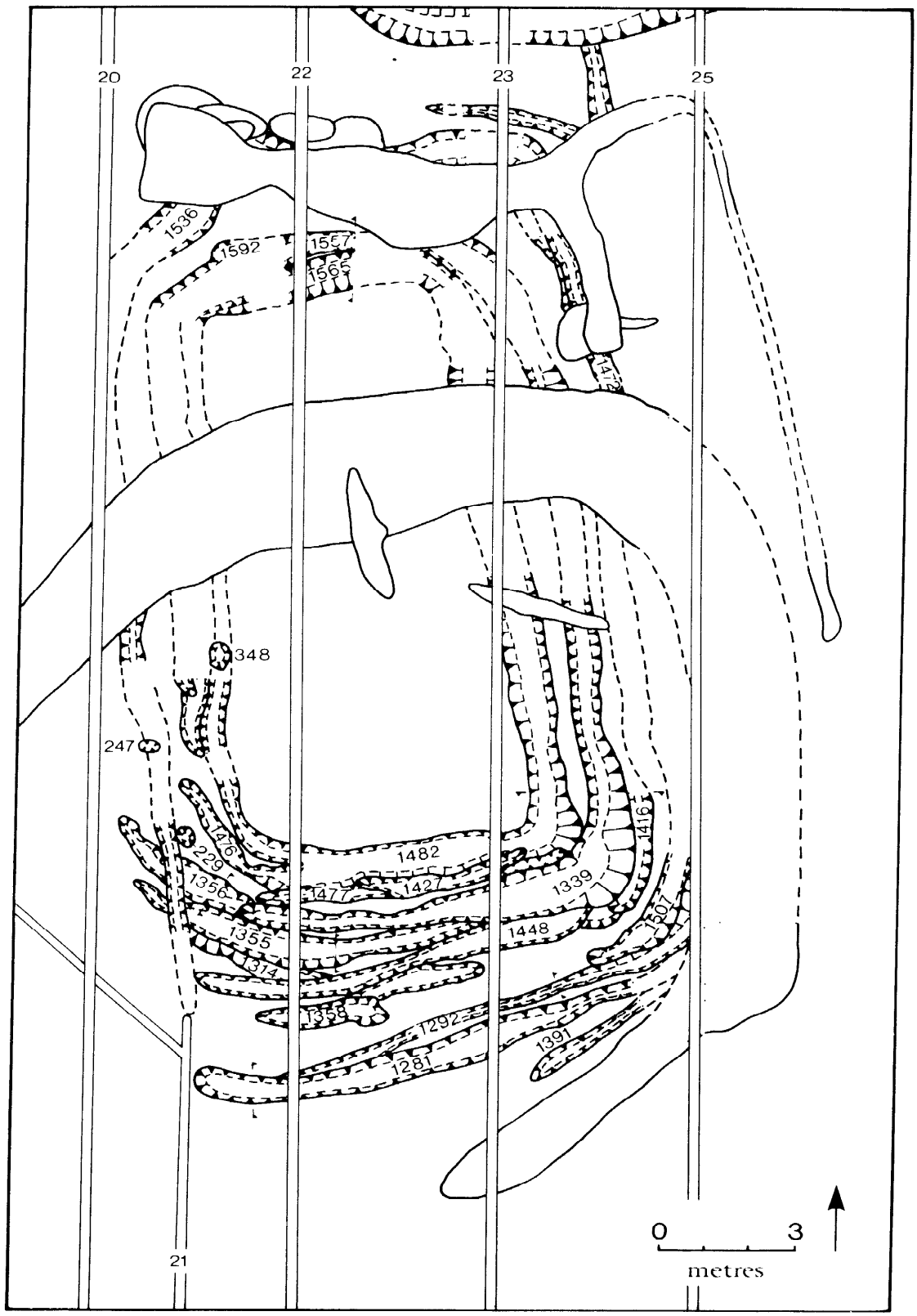


Fig 28 Subrectangular Enclosure I

This pair ran north-south before turning west (B1229) and east (B1403), just before the southern baulk.

As mentioned in the Phase I section, an early boundary was expected in this part of the site to account for the aberration in the alignment of the eastern side of the Main Enclosure. It is quite possible that an early boundary, if cut into the subsoil at all, would have been completely destroyed by the intensity of activity in this area.

Two undated point features, B1443 and 1453, were located 3.5 and 4.3 m respectively from the enclosure corner. These were circular pits of unknown purpose and predated all other features in the area, with the possible exception of B1524 and the Enclosure Ditch itself.

Features outside the Enclosure: Phase II-III

This small group (C152, 214 and hearth 148) comprises the latest features that cut the stratigraphy over the Main Enclosure Ditch. They cut B243 which overlay B1449, 1299 and the upper layer of the Main Enclosure Ditch, (layer B1308). The ditches are shown on Fig 27 and the hearth in fiche (1:G7).

The upper stratigraphy overlying the Main Enclosure Ditch (B209) was equivalent to B1128 (upper layer of stratigraphy over the southern length of the Main Enclosure Ditch which contained a southern butt beaker R-B11), and did not extend southwards to show a relationship with these features, as the general level of the ground surface rose to the south of the enclosure ditch. This could, therefore, date either to the later Phase II occupation (ie contemporary with the later phases of Subrectangular Enclosure I) or Phase III. It has been included here for convenience.

Subrectangular Enclosure I

At a point when 0.4-0.5 m of silt had accumulated in the Main Enclosure Ditch, the eastern length (layer B1321) was cut by a subrectangular enclosure (Fig 28) of unknown function.

The earliest phase of Subrectangular Enclosure I, B1482, apparently enclosed an area 14.5 m long and 5.6 m wide, without a break to provide a dry entrance. The northern and southern sections dipped into the partly filled Main Enclosure Ditch to a depth that would certainly have been waterlogged during the winter months. Subsequent recuts (B1476, B1477 etc) extended further south but did not continue along the western side, and several later recuts, eg B1427 and B1314, only replaced the southern section of the enclosure. As the Main Enclosure Ditch was still in the process of silting up, later phases of Subrectangular Enclosure I crossed the ditch at progressively higher levels.

The excavation of the enclosure was effectively divided into two parts, separated by B284. The northern section consisted of B1565, B1472, B1557 and B1536 in chronological order, and although described separately they can be linked generally with ditches B1482, B1339, B1416 and B1474.

The latest group of recuts of the Subrectangular Enclosure Ditch was the most southerly and hence enclosed the largest area. The upcast was probably thrown to the immediate north, covering the preceeding recuts, which were at a lower level, The general build-up over the Main Enclosure Ditch reached the level of the surrounding surface before the cutting of the latest sequence so that, unlike earlier phases of the Subrectangular Enclosure I, this group did not dip into the depression over the Main Enclosure Ditch.

Considerably more occupation debris was noted in the fills that sealed off these ditches, including deliberate dumps of burnt material, suggesting that refuse was again being discarded in the vicinity after an almost total lull in refuse deposition. The filling of B1281 is taken as the final episode of Phase II in this corner of the site; features cutting the layer that sealed B1281 are the first of Phase III.

Subrectangular Enclosure II

This feature group (Fig 29) can be linked to Subrectangular Enclosure I in general form and stratigraphic context. It was situated to the north-west of Subrectangular Enclosure I and with the western edge parallel with the Main Enclosure Ditch which lay to the west, by then in the final stages of silting. Both features were overlain by similar occupation material. The filling of the last recut of this group is taken as the point at which Phase II ended and Phase III commenced, so the overlying stratigraphy is in the next phase, although the process of stratigraphic accumulation filling and overlying the ditches was continuous.

The form of the enclosure presented problems of interpretation. The southern and western sides showed only one phase which linked to the last ditch on the western side; this, in contrast, had at least eight different redefinitions. Earlier recuts on the south and west may have existed and been removed by the latest cut (D139), but it is more likely that the western side filled more quickly, both as a result of being closer to the source of domestic refuse and, in its later phases, as a result of cutting the softer fills of earlier recuts rather than the less rapidly eroded natural clay.

The western sequence can be split into an earlier, narrow, irregular and silt-filled sequence (B57, 162, 1537, 161 and 64), and a later, more substantial group (B35, 51 40, and 39) with rounded profiles and fills which contained more occupation debris. The later group represented an enlargement of the enclosure; the last phase, B39, was 5 m to the west of B57.

The Main House - abandonment

The recognition of stratigraphy associated with the initial disuse of the Main House was crucial to the phasing of the house and post-house sequence. The general pattern of deposition was slowly resolved as it became apparent that much of the southern section and the area around the entrance causeway were overlain by a continuous spread of burnt soil mixed with fragments of charcoal and burnt clay which, although inconsistent and occasionally disturbed, could be used as a stratigraphic horizon across the house and surrounding ring-ditch. (The ditch was full to the point shown in the sections, Fig 21 above). As this was exposed, obviously intrusive features were removed, followed by the remaining post-Burnt Horizon stratigraphy. Differential survival meant that at this stage the western part had been eroded to natural, the central part to floor and hearth level and the remainder was

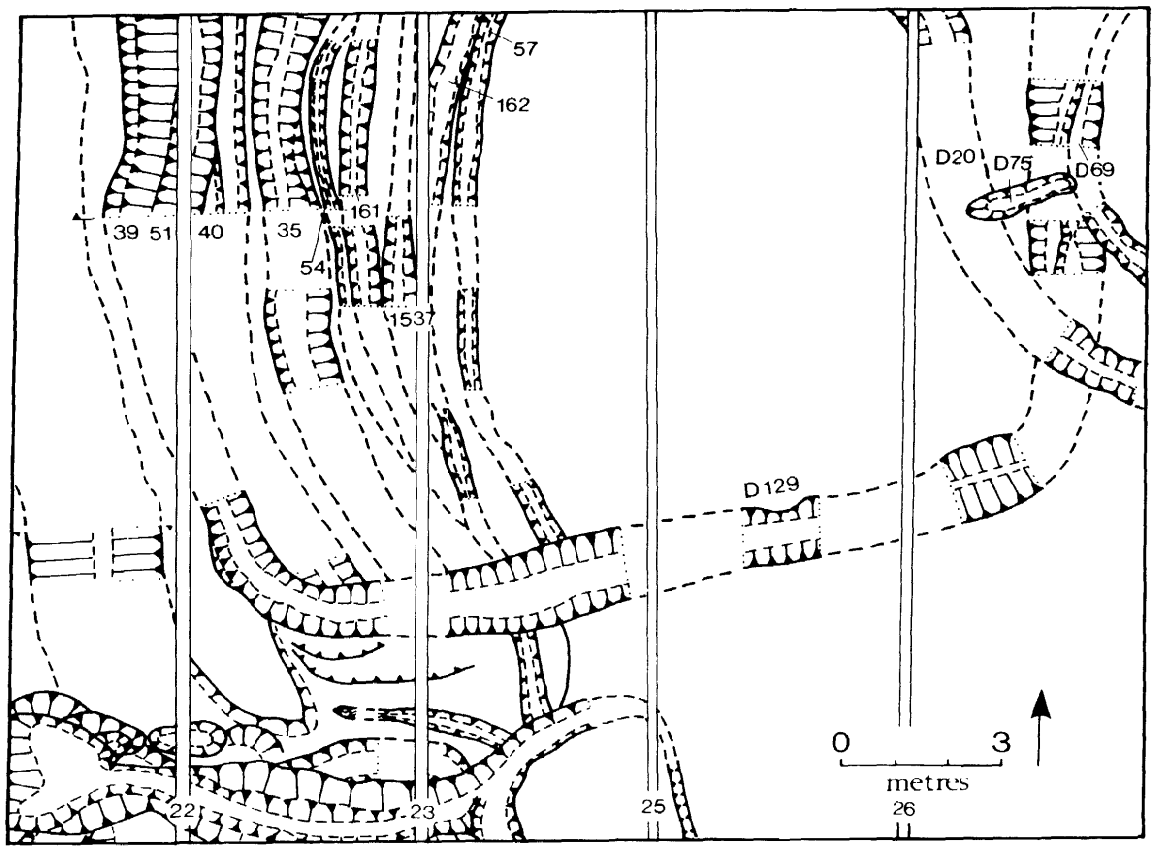


Fig 29 Subrectangular Enclosure II

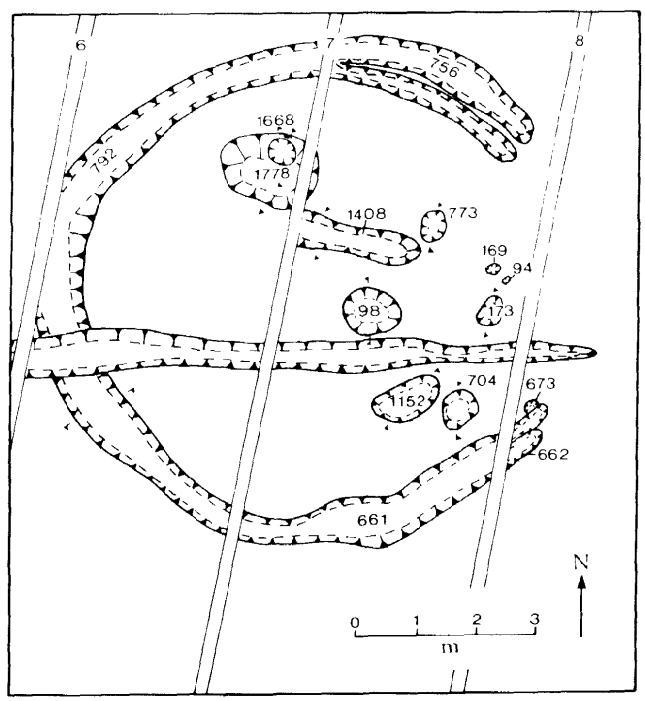


Fig 30 Circular Structure I

masked by the burnt material which was partly disturbed. Any gaps in coverage had to be examined to establish the presence of further intrusive features, although this was difficult given the complex character of the stratigraphic sequence. The platform was photographed at this level (Plate 4a).

The removal of the Burnt Horizon left the problem of establishing the character of the underlying stratigraphy, which consisted of extremely mixed patches of material varying from trampled charcoal through oxidized clay to redeposited natural. The sections provided by later features showed that across most of the interior the depth of remaining stratigraphy was generally less than 50 mm. Several contexts below the Burnt Horizon did not appear to relate to the floor levels.

Several layers immediately beneath the Burnt Horizon were of redeposited natural, mixed with a little darker, floor-derived soil which could not have formed as part of the trampling associated with the use of the floor. These have been tentatively assigned to the extraction of the posts of the final phase Main House, providing circumstantial evidence that the Main House was systematically dismantled rather than destroyed in an accidental or malicious conflagration.

Several other contexts occupied this stratigraphic horizon; these were of darker clays and soil, and may have represented disturbed floor material. The House III postholes were not covered by the Burnt Horizon, but their fills contained varying quantities of burnt clay and charcoal, although it was impossible to say if this material was derived from disturbed floor-levels. Two points should be considered: firstly, given the continuous character of the Burnt Horizon, it is impossible that it could have been laid down unless the platform was substantially cleared; secondly, the Burnt Horizon contained no large pieces of charcoal or any fragments which showed signs of planking or joinery, even though large pieces of fired clay from the mass wall did survive.

Given this evidence, it can be concluded that the house was systematically dismantled to salvage larger timbers after which the unusable elements (thatch, old spars and any accumulated occupation refuse) were burnt to clear the site for the rebuilding (Circular Structure I and Associated features), which happened shortly afterwards.

PHASE III

Major changes were associated with this phase which saw an expansion in the size of the settlement, an acceleration in the rate of land-use change and a greater interest in the layout of intra-site partitions. As with Phase II, the greatest activity was focused towards the centre of the site, but the unenclosed plan allowed for a more even spread of circular structures across the hilltop.

These developments were reflected in a change in the character of artifact discard, which consisted of small quantities of fine metalwork and carved jewellery collecting in redundant Phase III ditches, and greater evidence for specialisms associated with the smaller buildings and enclosures.

The excavation description commences with discussion of features between Phases II and III and the stratigraphy associated with the abandonment of the Main House and subsequent drainage and re-use of the house platform.

Drainage ditch complex Q

A series of interconnecting curvilinear ditches enclosed an area to the east of the Main House during Phase III. These features cut the cobbled entrance to the Main House, its northern ring-ditch terminals and the subsequent Burnt Horizon. The irregular plan of the group, the changes in profile at the corners and the variations in depth suggest that the individual stretches were cut at different times. However, despite extensive excavation, this could not be fully resolved, probably because the earlier ditches were still open and flowing when the later extensions were added. Certainly an uneven rate of filling was evident; this explains the larger number of recorded contexts (a total of 136) from these features.

The purpose of the complex seems to have been twofold. Firstly, the western section drained the area of the filled northern ring-ditch surrounding the Main House platform (which was re-used for Circular Structure I) and secondly, it prevented the area to the north of Circular Structures M and B from becoming waterlogged. There is also some evidence that this area was used as a trackway during Phase III.

The archive description gives separate numbers to each length, and these are described in a clockwise sequence. A number of point features of uncertain attribution were found in this area (see Table 5); the only observed relationships (Cl 596 cut Cl 312 and Cl438 cut C1386) suggest that if they were all contemporary, they predated Q and post-dated Circular Structure J. For convenience these are described in two sections, those inside Q and those outside.

Table 5 Pits and postholes

outside Ditch Complex Q

Feature No.	Dimensions (m)	Depth (m)	Comments
C1380	0·79 × 0·49	0·16	Possible terminal of ring-ditch
C1477	0·47 × 0·33	0·33	Irregular plan
C1459	0·39 × 0·39	0·17	Circular, probable posthole
C1468	0·30 × 0·30	0·35	Post, 0·14 m diam. clay packing
C1403	0·30 × 0·23	0·12	Probable extracted post
C1399	0·33 × 0·24	0·12	Possibly linked with C1403
C651	0·40 × 0·47	0·20	?Posthole or stone-hole

Inside Ditch Complex Q

Feature No.	Dimensions (m)	Depth (m)	Comments
C1197	0·28 × 0·31	0·10	Semicircular plan, ?posthole
C1007	0·38 × 0·38	0·35	Circular post-socket. No pipe
C1289	0·32 × 0·32	0·19	Round profile, clay fill
C1331	0·42 × 0·36	0·45	?Posthole, originally circular
C1428	0·56 × 0·56	0·37	Substantial post or pit
C1389	0·52 × 0·72	0·24	Uneven plan and profile
C863	0·32 × 0·34	0·18	Circular ?post or small pit
C862	0·42 × 0·40	0·13	Asymmetrical profile

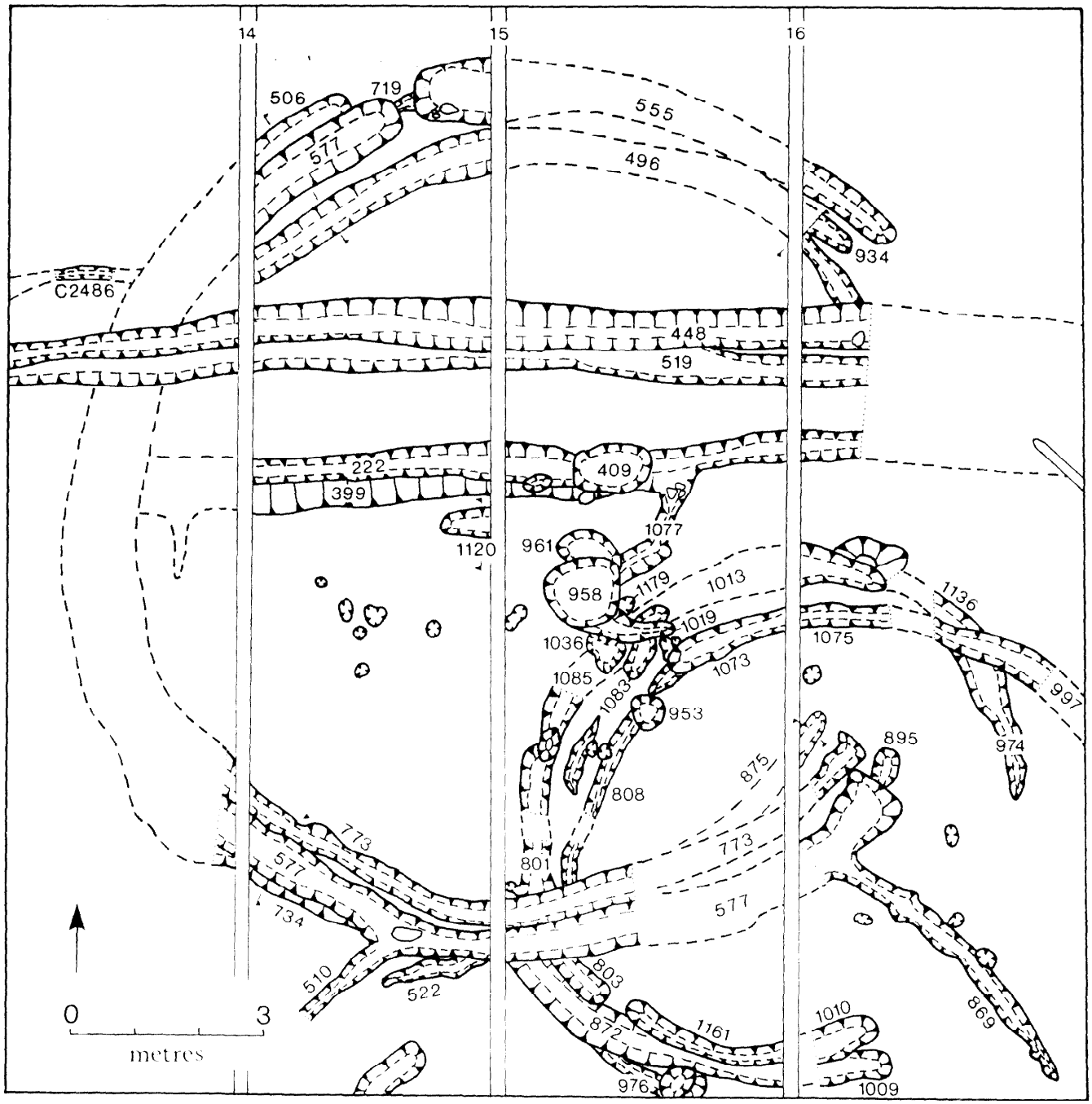


Fig 31 Circular Structure B

Circular Structure I

After the demolition of the Main Structure, the platform was re-used as the site of a small, almost circular ring-ditch 9.6 m north-south by 8.5 m east-west, with an entrance causeway 4.5 m wide. This appears (Fig 30) to have been recut once, but this could not be seen in the fill which was extremely mixed, partly as a result of the variety of deposits which formed the sides of the ditch and partly as a result of the well drained nature of its location.

Numerous features may have been associated with this ring-ditch, including central hearth C98, of laid clay set in a circular depression 90 mm deep (see Table 6). There were several substantial pits, (C1778, 1408, 1152) and several possible postholes. There was no evidence of either door-posts or roof-supports.

Table 6 Features possibly associated with Circular Structure I

Feature No.	Dimensions (m)	Depth (m)	Comments
C98	1·05 × 0·05	0·09	Circular hearth – surface lost
C1668	0·53 × 0·50	0·40	Cut C1778
C1778	1·20 × 1·05	0·42	Large flat-bottomed pit
C1408	0·53 × 2·43		Linear pit or scoop
C169	0·24 × 0·20	0·35	Small post
C94	0·03 × 0·28	0·24	
C173	0·38 × 0·35	0·22	Small post
C1152	0·96 × 1·12	0·30	Small pit or scoop
C773	0·70 × 0·50	0·28	Possible post or pit
C704	0·65 × 0·55	0·29	Shallow irregular feature
C673			Cut by ring-ditch C661

Linear features cutting Main Structure Burnt Horizon

Several other features occupied the area over or to the north of the Main Structure platform after Phase II. Of these, a group intercutting features (C512, 447 and 436) to the north-east of the house are almost certainly of Phase III date; one other may be (C481), and a pair of irregular, small, linear disturbances (C337 and 335/6), almost certainly are animal burrows (see fiche Fig 69, 2:C4).

Circular Structure B

This building (Fig 31, Plate 5b) represented the largest circular structure of the Phase III settlement, the earliest ring-ditch being approximately 11.5 m in internal diameter, the latest being larger by a metre.

The surviving evidence consisted purely of subsoil features, as stratigraphy only survived on the western margin of the interior in the form of the base of contemporary soil containing no finds and being cut by all other features. There are two indicators that little had been lost by modern ploughing. Firstly, traces of small stone cobbling survived in the area of the entrance threshold where it had subsided into earlier features associated with Circular Structure E, secondly, daub mass-walling was found *in situ* on the surface of the later ring-ditch features (eg B577) and this may have represented the wall footing of the final phase building.

Of the subsoil features the ring-ditch replacement sequence was fairly straightforward. Four phases were recorded, the earlier being shallow and substantially destroyed, the later deeper and in two sections. The postholes make no discernible pattern, which is puzzling as other indicators suggest that little had been lost in later ploughing. A strip of the interior, 3 m wide, was destroyed by the Late Rectangular Enclosure Ditch II and a modern field boundary, (the latter not shown on Fig 31). One possible explanation could be that later floor-wear and sweeping destroyed some, but not all, of the earlier roof supports and that later rebuilding used different methods of construction. The situation is confused by the possibility of the presence of features pre- or post-dating this circular structure, particularly activity associated with pits B958 and B961.

The earliest drainage ditch was only apparent at the terminals (B934, 875) of the remaining lengths. The northern section was removed by later cuts, while on the southern arc only 30 mm of the terminal itself survived for 1.19 m, the rest presumably being removed by erosion from later phases. The following phase occupied the inner circuit of ring-ditch recuts. Later recuts (B577) enlarged the interior by approximately 1 m. Successive recuts enlarged the entrance from 7.2 m to 8.2 m.

The interior features (Table 7) can be placed in three categories: a single central post, a group of small posts in the southern section and three shallow, circular features in the northern part.

Table 7 Circular Structure B

Northern

Feature No.	Dimensions (m)	Depth (m)	Comments
B850	0·59 × 0·52	0·07	Shallow pit
B851	0·45 × 0·37	0·08	Shallow pit
B863	0·70 × 0·70	0·10	Circular pit

Southern

B1219	0·16 × 0·10	0·09	Small post or stake
B993	0·21 × 0·21	0·18	D-shaped post
B1053	0·23 × 0·28	0·14	Post-stone packing
B966	0·19 × 0·15	0·23	Large stakehole
B1107	0·20 × 0·20	0·08	Possibly posthole
B1108	0·21 × 0·25	0·06	Irregular plan
B1165	0·12 × 0·10	0·10	Post-stone packing
B1137	0·23 × 0·18	0·34	Small posthole
B1147	0·25 × 0·22	0·06	Irregular feature
B1070	0·33 × 0·28	0·08	Pit or posthole
B1058	0·21 × 0·22	0·12	Small post-burnt fill
B1101	0·26 × 0·21	0·06	Shallow feature
B1204	0·15 × 0·16	0·10	Stakehole
B953	0·52 × 0·58	0·27	Large post or pit
B1055	0·15 × 0·16	0·08	Possibly small posthole
B1040	0·18 × 0·17	0·12	Possibly posthole
B1042	0·17 × 0·18	0·11	Possibly small posthole
B1180	0·46 × 0·49	0·43	Large post
B1028	0·25 × 0·20	0·31	Post with stone packing
B1097	0·22 × 0·14	0·15	Post or stakehole

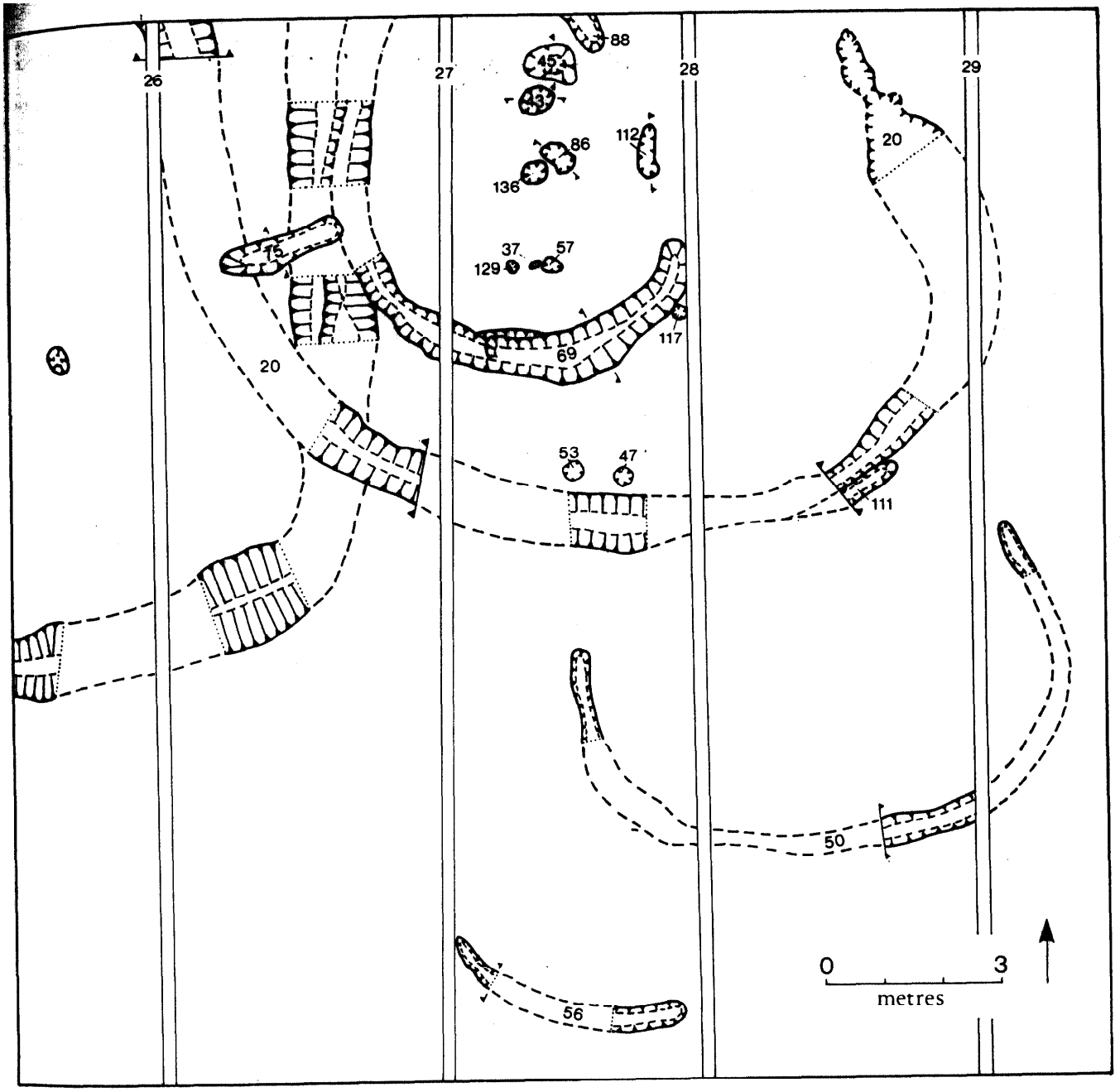


Fig 32 Circular Structure N

External features

B839	0·18 × 0·18	0·06	Shallow robbed posthole
B925	0·25 × 0·25	0·15	Post with stone packing
B924	0·38 × 0·23	0·20	Oval posthole – stone packing
B978	0·28 × 0·26	0·16	Posthole – 0·2 m diam. pipe
B1032	0·30 × 0·26	0·15	Circular post

B1142 was a stone-packed post stance at least 0.5 m in length. The post had been removed by loosening but not removing the sandstone packing (largest block (0.2 lx 0.11 m)), and the resultant void was quickly filled with dark grey loam. The size and the presence of packing (rare on the site) indicate that B1142 held a substantial post while its position in the centre of the ring-ditches suggests a structural function.

The remaining posts were much smaller and formed a group to the south of the main east-west axis of the house. A line of 11 posts may have formed a length of fencing or an internal partition. Others may have pre- or post-dated the circular structure.

Circular Structure N

This structure occupied the north-eastern corner of the excavated area, outside the Main Enclosure Ditch. Assuming the main ring-ditch was originally circular, approximately 60% of the 11 m diameter was within the area excavated (Fig 32).

Circular Structure N was in an area cut by medieval furrows. Horizontal stratigraphy survived (albeit only the base of the contemporary soil horizon) immediately to the west, although it was not found across the interior of the ring-ditch except in a depression or broad feature immediately against the northern baulk (D45).

The pre-excavation plan (Fig 72, 2:D10 fiche) shows how the recorded archaeological features had been 'edited' by post-depositional activity, particularly the two medieval furrows.

The structure itself consisted of an outer substantial ring-ditch, D20, which was a recut and extension of an earlier ditch. This was roughly circular, with an entrance terminal of very irregular shape on the eastern side. This surrounded a much smaller subcircular ditch, D69, which may have been contemporary, although this cannot be proved; both D20 and 69 were cut by D75 and cut D129 (Subrectangular Enclosure II). D69 cut a small posthole which, if associated with D20, would show it to be later.

The internal area, in contrast with the spaces outside D20, contained numerous small postholes, although no definite structural design could be elucidated (see Table f-9.

Table 8 Circular Structure N

Pits and stakeholes

No.	Dimensions (m)	Depth (m)	Comments
D43	0·45 × 0·52	0·22	Much stone in fill
D86	0·41 × 0·77	0·20	Irregular shape, post removed
D136	0·30 × 0·45	0·10	
D129	0·20 × 0·22	0·20	Post-socket
D37	0·39 × 0·39	0·14	Irregular shape – ?post removed
D57	0·40 × 0·56	0·12	Very shallow – ?post removed
D117	0·20 × 0·22	0·36	Cut by D69
D53	0·48 × 0·38	0·16	On N- edge of D20
D47	0·41 × 0·32	0·15	0·50 m east of D53

Pits and gullies

No.	Dimensions (m)	Depth (m)	Comments
D88	1·30 × 0·70	0·08	Terminal of shallow round-profiled gulley
D45	2·90 × 0·75	0·13	Shallow hollow filled with occupation debris
D122	1·00 × 0·35	0·19	Irregular linear feature; fill as D45
B1028	0·25 × 0·20	0·31	Post with stone packing
B1097	0·22 × 0·14	0·15	Post or stakehole

External features

B839	0·18 × 0·18	0·06	Shallow robbed posthole
B925	0·25 × 0·25	0·15	Post with stone packing
B924	0·38 × 0·23	0·20	Oval posthole – stone packing
B978	0·28 × 0·26	0·16	Posthole – 0·2 m diam. pipe
B1032	0·30 × 0·26	0·15	Circular post

Externally, two lengths of ditch to the south of the structure may have been associated. D50 was semicircular in plan with terminals which pointed north-west, each 2 m south of D20. This may have functioned as an annexe to Circular Structure N. A slightly curving ditch (D56) of shallow profile, ran for 4 m on a north-west south-east alignment, 6 m south of Circular Structure N.

Circular Structure D

This building (Fig 33) was assigned to the third phase because it cut Circular Structure J, a second phase feature. It almost certainly linked with C1339, which post-dated the Main Structure. The exact relationship with Cl339 was not categorically established; as seen on Fig 33, both Cl902 (which linked to B1339) and C1928, the south-western sector of Circular Structure D, converged with the southern terminals B764 and B834 at the point where they were cut by a modern east-west hedge-line. Certainly Circular Structure D and B1339 cut J and the rather awkward shape of the drainage complex Q would be partly explained if it was designed to link with Circular Structure D.

The ring-ditch of D was either an eccentric (southern sides closer than northern) double ditch, part recut once, or it was of a single phase, refurbished three or possibly four times. The former hypothesis would see Circular Structure D as a direct replacement of J, which was probably a double ring-ditch, although in that example

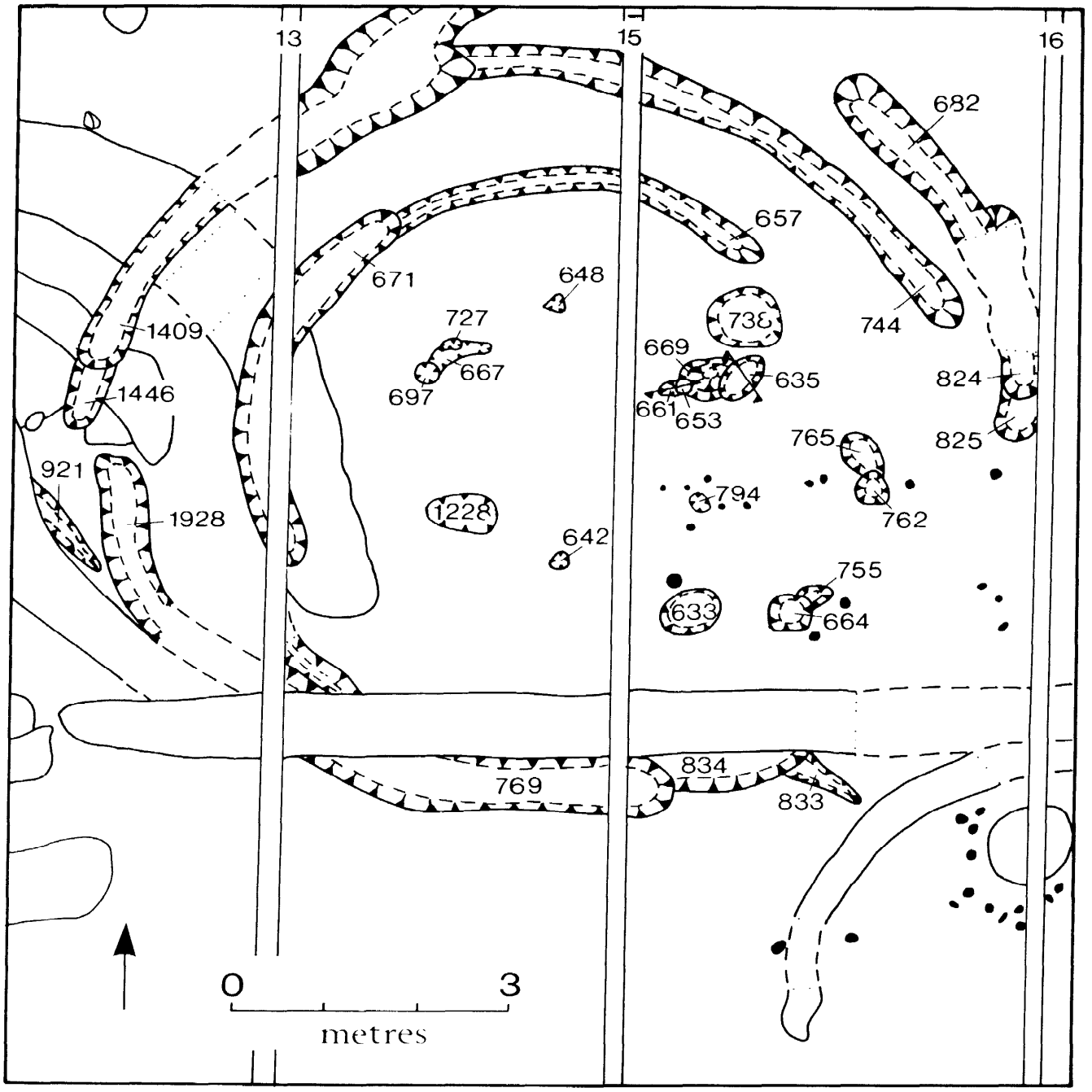


Fig 33 Circular Structure D

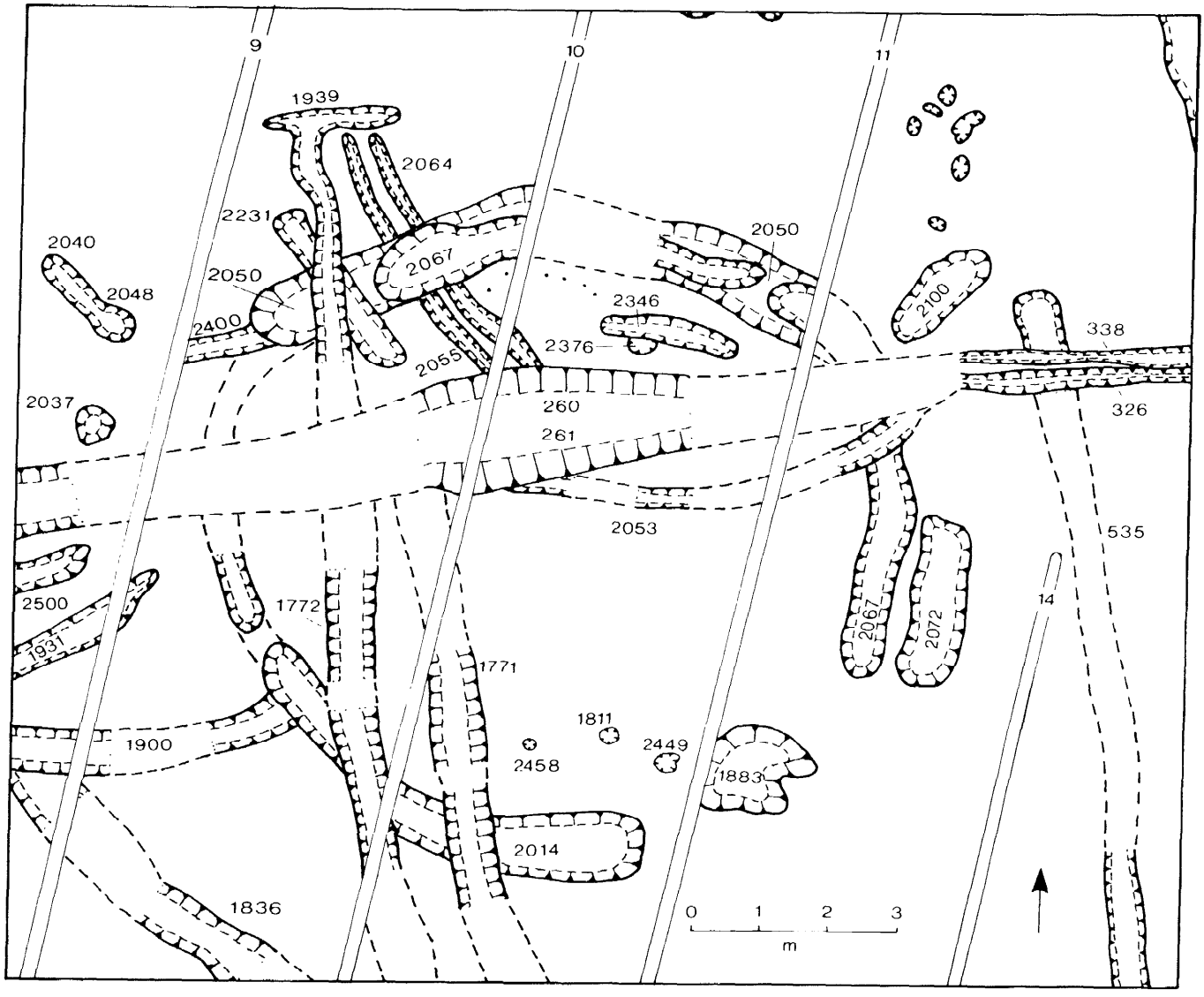


Fig 34 Circular Structure M

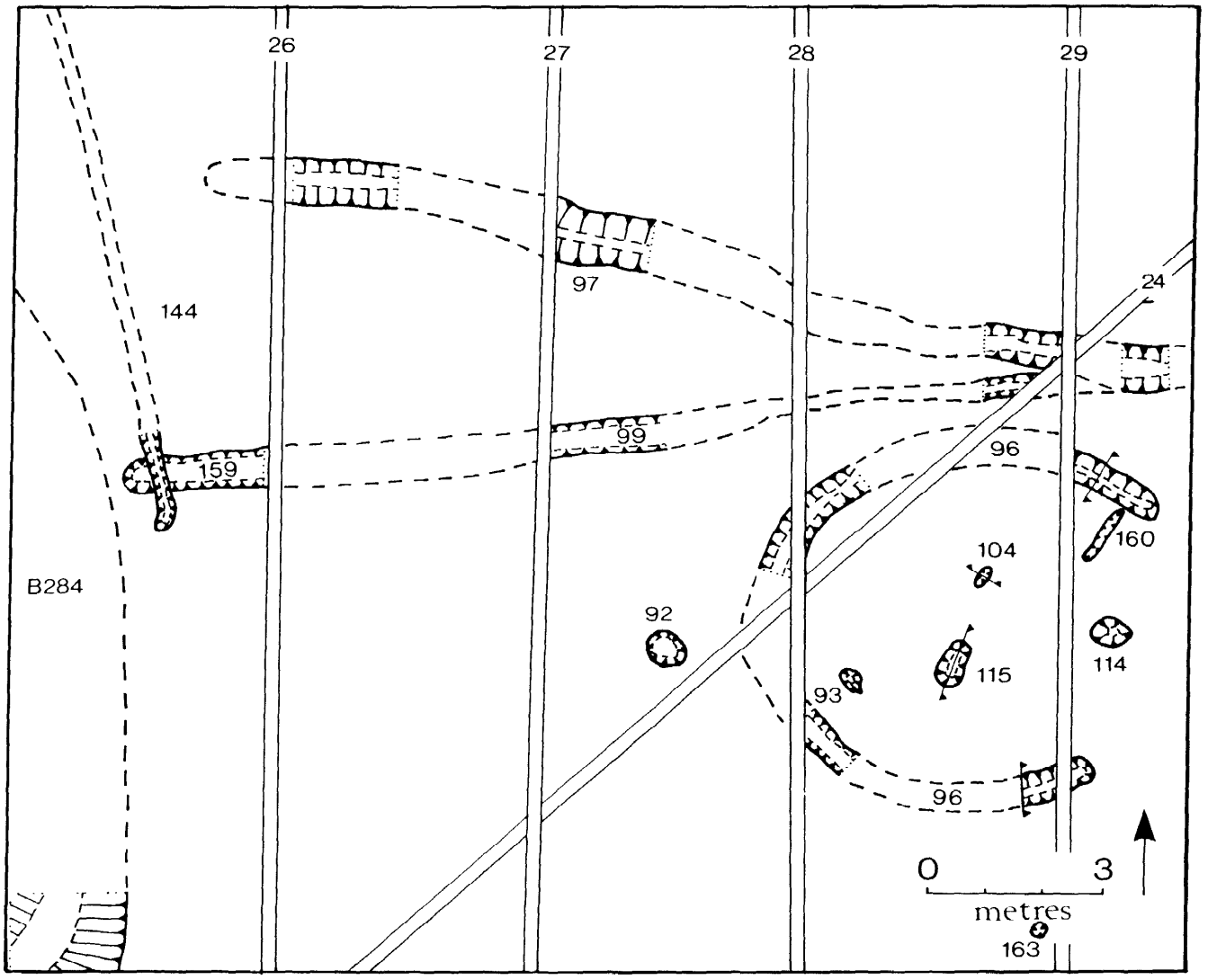


Fig 35 Circular Structure O

the circuits were concentrically placed with the entrance terminals symmetrical. A further complication is added by an outlying length, recut once, B825/824, which may have linked with the latest phase of the outer circuit, in which case only the northern part of that ring-ditch was recut.

The structure showed every indication of having been roofed, unlike Circular Structure J, but no definite structural formula could be elucidated (Table 9). Two types of upright timber were present, medium to small postholes and stakeholes (roughly defined as surface area <150 mm and depth<150mm). A rough 'ring' of posts occupied the centre of the floor, four of which displayed recuts, (B755, 765, 669, 727). Other shallow or earth-fast posts may have been lost, and one or two of the smaller negative features described as stakes may have had some structural function. These formed a rough line east-west in the centre of the inner ring-ditch. Two shallow features of approximately the same shape and profile, B633 and 738, were probably pits or quarry scoops. They contained mixed occupation material, unlike the generally quickly back-filled post holes. There was no trace of cobbling around the threshold.

Table 9 Circular Structure D: internal features

No.	Diam - dim	Depth	Relationship	Comments
B775	0·48 × 0·34	0·14	Cut by B664	Irregular shape; extraction pit
B765	0·52 × 0·39	0·16	Cut by B762	Extraction pit
B669	0·46 × 0·47	0·34	Cut by B635	Extraction pit
B727	0·27 × 0·21	0·20	Underlies B667	Post-pipe – 0·19 m diam
B664	0·40 × 0·46	0·11	Cuts B755	Post – against East edge
B762	0·46 × 0·39	0·20	Cuts B765	?Extraction pit
B635	0·49 × 0·45	0·08	Cuts B669	
B697	0·20 × 0·20	0·19	Replaced 727	Stone-packed, post removed
B648	0·19 × 0·29	0·10		Post removed; possibly stoned-packed
B1228	0·25 × 0·51	0·14		
B642	0·24 × 0·26	0·20		Packing evident, post removed
B784	0·17 × 0·18	0·17		
B794	0·21 × 0·19	0·16		Post-socket
B663	0·15 × 0·15	0·10	Cut by 653	
B653	0·21 × 0·13	0·12	Cuts 661 & 669	Possibly pre-B635
B633	0·71 × 0·54	0·13		Probably not a posthole
B738	0·75 × 0·76	0·27		Probably not a posthole

The only find of note was a beehive quern, Q12, in the southern early phase terminal, B834, which was deposited before the accumulation of the primary silt.

Circular Structure M

This structure (Fig 34, Plate 6) consisted of a circular ring-ditch of three phases: a large shallow feature (C1883), several small internal posts and stakes, and a short length of concentric internal ditch, (C2346). A group of small linear ditches which predated the later ring-ditches have been included here for convenience.

Circular Structure 0

This small, almost perfectly circular ring-ditch (Fig 35) had an internal diameter of 6.2 m and an entrance gap 4.9 m wide which faced east south-east. The ditch was a simple continuous feature with symmetrically rounded terminals. The entrance gap had a subcircular feature (D114) placed centrally between the terminals, and the internal platform contained a couple of shallow pits or stone-holes, D104 and D115, the latter resembling B567 in Circular Structure C (see Table 10).

Table 10 Features associated with Circular Structure O

In tern al features

Feature No.	Dimensions (m)	Depth (m)	Comments
D160	0·96 × 0·15	0·10	Small linear slot
D114	0·47 × 0·80	0·19	Posthole/pit
D115	0·97 × 0·55	0·11	Posthole/pit or stone-hole
D104	0·51 × 0·20	0·05	Posthole/pit
D93	0·45 × 0·37	0·11	Posthole/pit
External features			
D92	0·75 × 0·79	0·19	Circular pit
D163	0·32 × 0·32	0·14	Posthole or small pit

There was no direct evidence for the phasing of this structure; in line with the general site interpretation it can be suggested that, being outside the enclosure, it was later than the earlier part of Phase II. The observation that the linear ditch D99 kinked as it approached the site of Circular Structure O may indicate that they were at one stage contemporary.

Two other features are included in this section; both are circular pits or postholes, D92 to the west and D163 to the east.

Linear Ditches in Area D

Two linear features traversed Area D on the eastern side of the settlement, D97 and D99. These have been placed in Phase III as they are outside the Main Enclosure; D99 appears to stop abruptly short of B284 (Curvilinear Enclosure Ditch) as though this was already in existence, although this may be purely coincidental. D99 was cut by D144, part of the sequence of features cutting the

Main Enclosure Ditch and Subrectangular Enclosure II and associated with the first discard of imported pottery. D99 was subsequently cut by D97 which swung to the north as it passed Circular Structure O or its site.

East-west partition Cl939

This feature consisted of several discontinuous lengths of shallow gully in an area where stratigraphy survived to the level of the contemporary B horizon. It was later than the group of Phase II features to the north (Circular Structure L, ring-ditch run-off gully C2155) and possibly connected with the north-south Phase III partition, C1772. The western edge was possibly linked to A170, a north-south ditch which linked with the Phase IV enclosure II. This relationship was not excavated, but pre-excavation plans show that Cl939 did not cut the upper layer of A 170.

Southern enclosure ditch

This enclosure stood on the southern edge of the excavation in an area of otherwise little activity (Fig 36). The phasing is established by its priority over Cl710, a Phase III ring-ditch. Had this evidence not been available, it would have been linked indirectly to the Main Enclosure Ditch and the Phase II partitions, as it displays the same gently convex alignment along its northern length. The surviving ditch, C2438, may have replaced an earlier phase or, more likely, it demonstrates the re-use of earlier boundaries during later occupation, suggesting a continuity of settlement.

The enclosure was substantially ditched, with an east-facing entrance causeway. The north-eastern corner was covered with coarse metalling when the ditch was no longer required (see Fig 74, 2:Gl0 fiche).

Southern baulk features

This group comprises a series of ditch terminals (Fig 37) beneath the western periphery of surviving stratigraphy associated with the cobbled pathway to the south-east of Circular Structure K. These extended only 2 m into the excavated area and can only be taken as an indication of the complexity of features to the south of the area examined in 1981-2. As they cut B1772 they must have dated to the later third or fourth phase; a lack of Romanized pottery within the fills provides negative evidence against a Phase IV context. In general characteristics these resemble the smaller enclosures which post-dated the Main Enclosure Ditch.

The main sequence was a succession of ditch terminals aligned north-east south-west, all containing very similar silty clay fills. These cut a short east-west feature, Cl729, which cut C1772.

Partition ditches, Phase III

A group of north-south ditches of round shallow, profile occupied the southern part of the site during Phase III, running from the presumed entrance to the interior. Their general similarity suggests they were related, but the two principal groups (C1771-1772 and 1820, 1887) were not contemporary. However, the latter may have directly replaced the former, involving a movement of approximately 8 m to the west. This may have been to accommodate the construction of Circular Structure K. The flattening of the curve along the western side of ring-ditch C1532, on a path almost parallel with C1820, adds weight to the suggestion that Circular Structure K and one of the C1887-1820 pair were contemporary, bearing in mind that Circular Structure K post-dated Cl 771-2. (except the earliest Circular Structure K ditches, Cl710-l884 for which no relationship was available). The presence of a physical barrier immediately west of Circular Structure K would explain the absence of burnt material in that part of the site.

An east-west partition may have belonged to the same landscape organization. Cl939 cut all Phase II features in this area and was cut by C2229, an unphased feature which probably belonged to the later part of Phase III or early Phase IV. This was cut by but did not extend beyond Late Rectangular Enclosure II, although this need not imply that they were related as the northern end appears to stop for no obvious reason 19.6 m north of Late Rectangular Enclosure Ditch II.

Circular Structure K

To the north-west of the cobbled entrance was a group of features relating to industrial activity. These have been grouped together as Circular Structure K, which seems to have been placed away from the main focus of activity in an area previously crossed by enclosure partitions (Fig 37, Table 11).

Table 11 Circular Structure K: internal features

Feature No.	Dimensions (m)	Depth (m)	Comments
C1629	1·20 × 1·20	0·07	Hearth
C1663	0·50 × 0·30	0·40	Posthole
C1744	0·36 × 0·16	0·28	Posthole
C1587	0·33 × 0·33	0·28	Posthole
C1623	0·50 × 0·35	0·06	Shallow pit
C1696	0·23 × 0·30	0·16	Possible posthole
C1796	0·85 × 0·75	0·13	V-shaped feature
C1550	0·39 × 0·50	0·15	Pit
C1606	1·22 × 0·97	0·22	Large, shallow pit
C1662	0·91 × 0·65	0·12	Depression or pit
C1631	0·64 × 0·48	0·18	Shallow posthole or pit

Although surrounded by a reasonably complete ring-ditch at one time (Cl532 and C1705), the later recuts were only evident on the northern and western sides. The first phase (Fig 75, 3:A4 fiche) may not have been associated with the later activity, although the character of the ditches and their fills was similar and this phase followed a trend noted with later recuts, namely a gradual shift to the south-east. In strictly stratigraphical terms, however, there was no evidence that Cl589 and 1710 were related. Although earlier, it is not known by how much; they may belong with Phase II rather than Phase III (although in this case it would be difficult to explain their function as they would have been a long way from any other contemporary activity).

Two triangular pits, C2057 and C2184, were located in this area. They cut into a band of blue-grey gley which

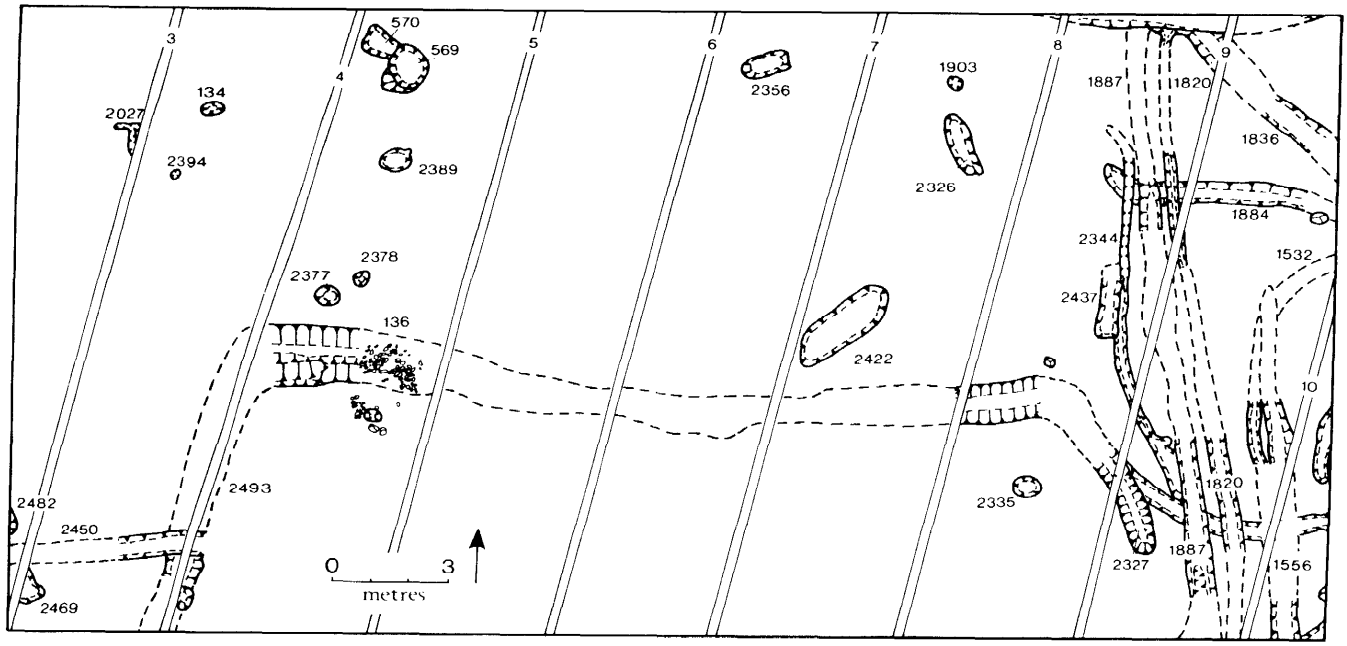


Fig 36 Southern Enclosure Ditch

Fig 37 Circular Structure K

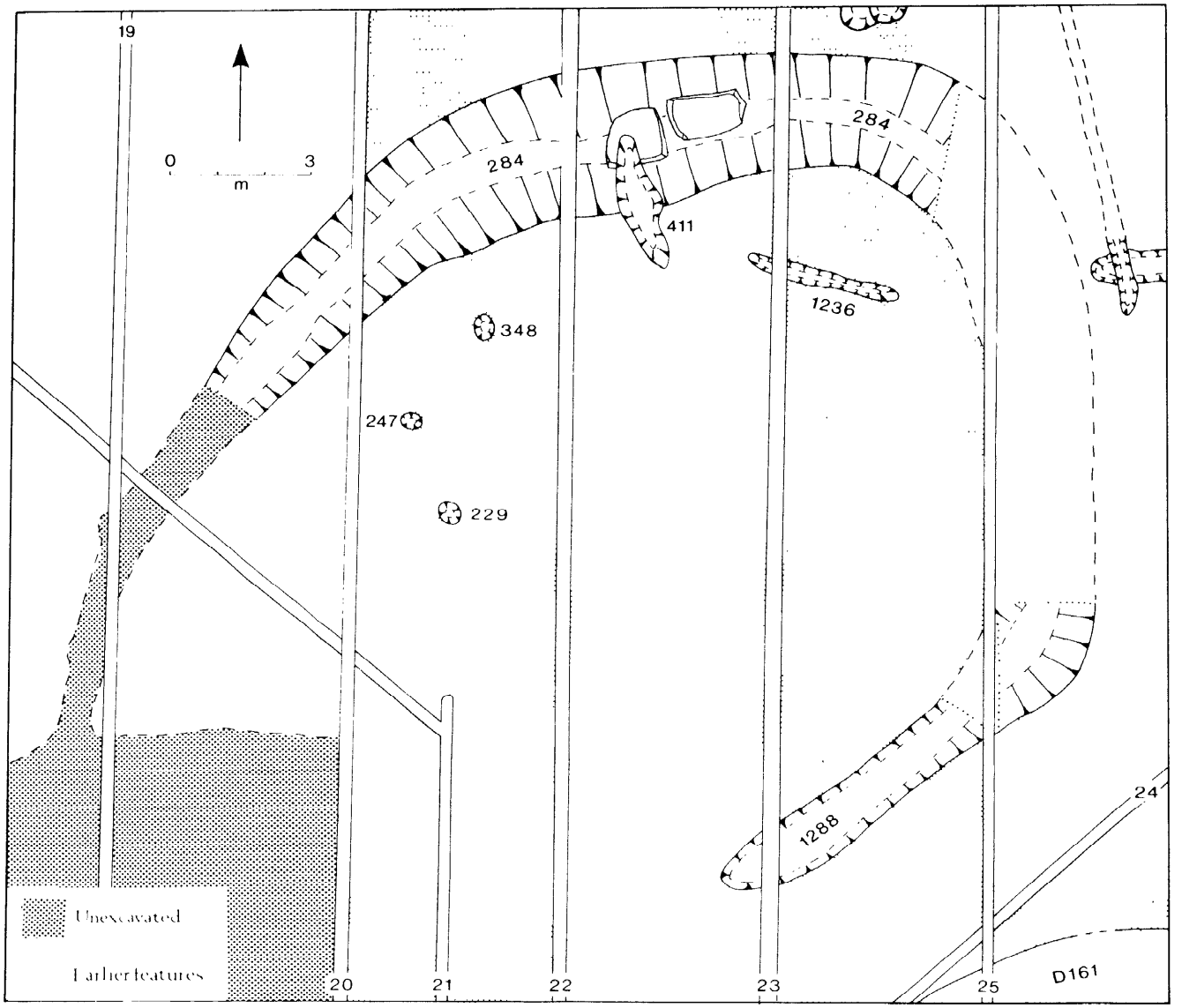


Fig 38 Curvilinear Enclosure Ditch

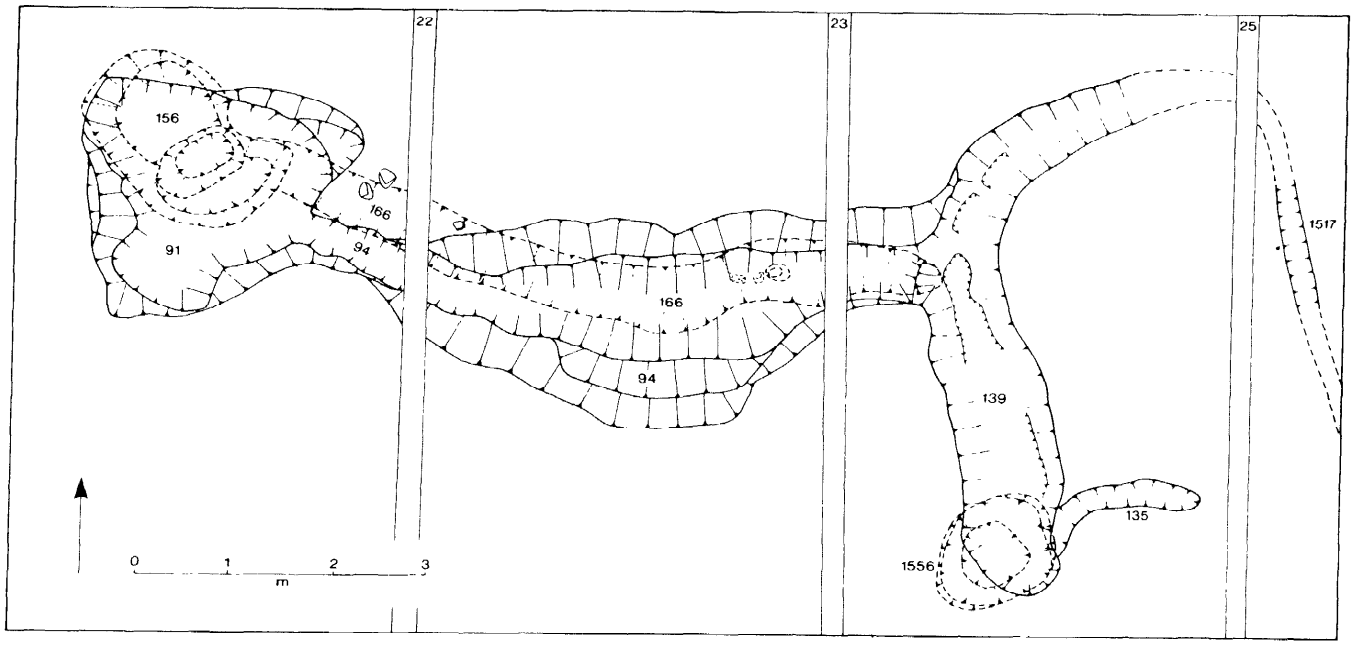


Fig 39 Pit and Ditch Complex A

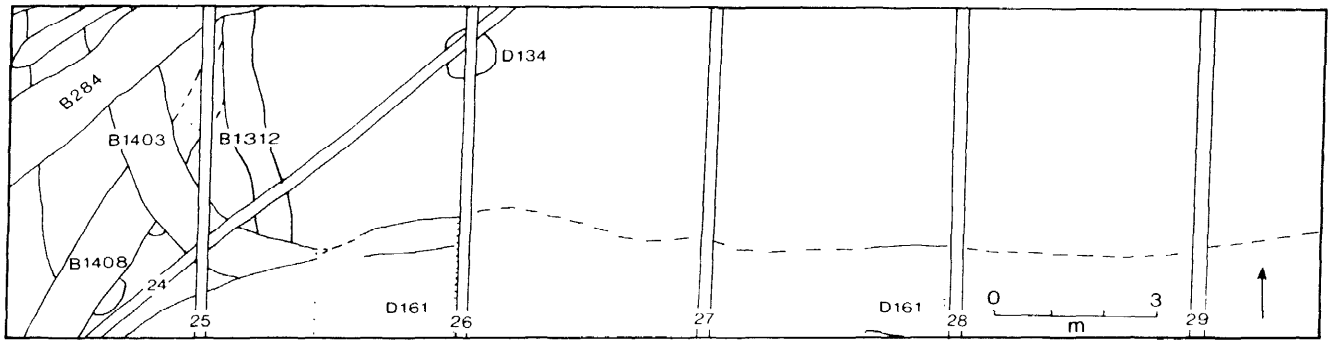


Fig 40 Laze Rectangular Enclosure Ditch I

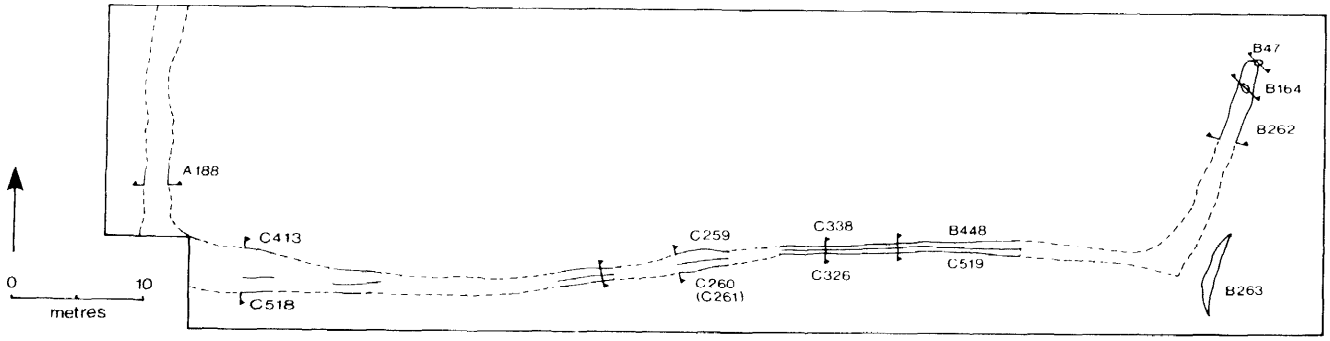


Fig 41 Late Rectangular Enclosure Ditch II

occurs here naturally within the boulder clay. It was very similar to that found in the postulated clay-curing pits (B961 and 958) south of B222. It seems likely that the gley was exposed during the excavation of B1532 and then extracted for pottery making or other uses. The gley seen here was found to contain small ferruginous nodules, and it is possible that extraction ceased when the density of these corrupted the purity of the gley.

Curvilinear Enclosure Ditch

This feature group (Fig 38) dominated the south-western part of the excavated area during Phase III. It consisted of a curvilinear ditch that cut the Main Enclosure Ditch and succeeding subrectangular enclosures. Although of massive proportions on the northern and western sides, the south-eastern side terminated 2.8 m from the southern baulk, while the north-western stretch tapered from over 3.5 m to less than 0.8 m in width, with a proportional reduction in depth. The south-western corner was not investigated; it may have returned in an easterly direction to oppose the south-eastern terminal, but this was not resolved as this section underlay masking stratigraphy associated with the final phase of occupation. This ditch contained relatively clean, water-deposited clay-silts with no perceptible direction of silting, and it had an S-shaped profile. Of some 54 m exposed (ie where both sides were identified) approximately 28 m were excavated.

Little of contemporary date could be identified within this asymmetrical and inconsistent circuit; three small posts may have been contemporary, but the complexity of underlying features would have resulted in impeded drainage across much of the interior. It is possible that this enclosure represented a continuation of the use of Subrectangular Enclosure I.

Stone causeway

During the active life of enclosure B284 the surrounding ditch would have greatly impeded movement across this part of the site. This led to the construction of a stone causeway across the deepest section of B284 at the only point where the natural sides had not been cut into by earlier ditches (MED, B1482, B1466, B1775, B1476). The causeway itself was constructed of three main elements. The foundation consisted of two very substantial, fine-grained, sandstone boulders shown on Fig 38, both over 0.75 m long, set side by side in the centre of the ditch. These were surrounded and then covered by large stones, on average 0.25-0.3 m in size, which formed the bulk of a stone platform 2.4 m in width. These stones (Fig 77, 3:B3) had been collected from the underlying boulder clay or from a nearby stream and are therefore of irregular shape, but careful construction helped compensate for this.

The final stage was the levelling of the upper surface with noticeably smaller stones, especially against the northern bank, and most of the slippage on either side derived from these stones. The fact that the loosened stones were scattered throughout the surrounding ditch deposits suggested that they were dislodged during the period of use of the causeway rather than at a single point in time. This had occurred after the Curvilinear Enclosure Ditch had accumulated primary fills but before its abandonment.

Two querns, a saddle (Q15) and a beehive (Q16), were incorporated into the upper section of the causeway, and the causeway was covered by the upper layers of ditch B284.

Pit and Ditch Complex A

These features (Fig 39) were situated at the northern end of Subrectangular Enclosure I, and the central ditch lengths echoed the shape of the latest northern ditch of that sequence, B1536.

The earliest features were isolated pits, B339 and B1556, the former of oval plan, the latter subsquare. A later pit, B156 (2.15x1.50 m) cut the western side of the Main Enclosure Ditch and, with shallow, stepped sides, may have been a clay quarry. An east-west ditch, B166, debauched into this pit, but this may have been a later addition which used the partly filled pit as a drainage sump. This was linked to a curvilinear ditch, B139, which enclosed a semicircular platform of unknown use. This cut B1556 but may have been associated with an earlier phase of B139, which was completely removed during recutting.

The pit and linear ditch were recut at least once (B91 and 94 respectively) and a series of layers on the edges to the north and south were related to the upcast and subsequent erosion of this activity. The overall effect was to reduce the surface in this area and allow for the accumulation of horizontal stratigraphy derived from upslope.

Stratigraphy associated with Phase III occupation

It was fortuitous that the character of the Phase III settlement provided contexts which acted as suitable receptacles of occupation debris below the level of plough damage in addition to the expected horizontal mantle of contemporary topsoil.

The stratigraphy which covered the central section of Area C (over eastern parts of the Main Structure and Circular Structures J and D) was up to 100 mm thick and masked all archaeological activity as a result of the effect of soil-mixing agents both during and after occupation on the hilltop. The cause of this mixing, which penetrated through the horizon to the top of the subsoil, is uncertain, although the activity of earthworms and grass and weed root action typical of topsoil horizons provides the most obvious explanation. The lower sections of deeper deposits escaped this homogenizing effect, eg layers beneath the Burnt Horizon and over the enclosure ditches in Area B.

Alternatively, this horizon might have been caused by a change in the use of this area during Phase IV, which saw the Late Rectangular Enclosure Ditch II used as a livestock pound. This would result in puddling of the topsoil which would have destroyed horizontal variations in soil character. The undifferentiated masking stratigraphy was planned before excavation and spatially sampled for carbonized plant material.

The upper levels of the Main Enclosure Ditch at all points sampled were the product of accumulation long after the enclosure ceased to provide an effective boundary circuit, and the upper layers contained fragments of imported pottery. The depth of these deposits varied according to the degree of earlier filling; this was

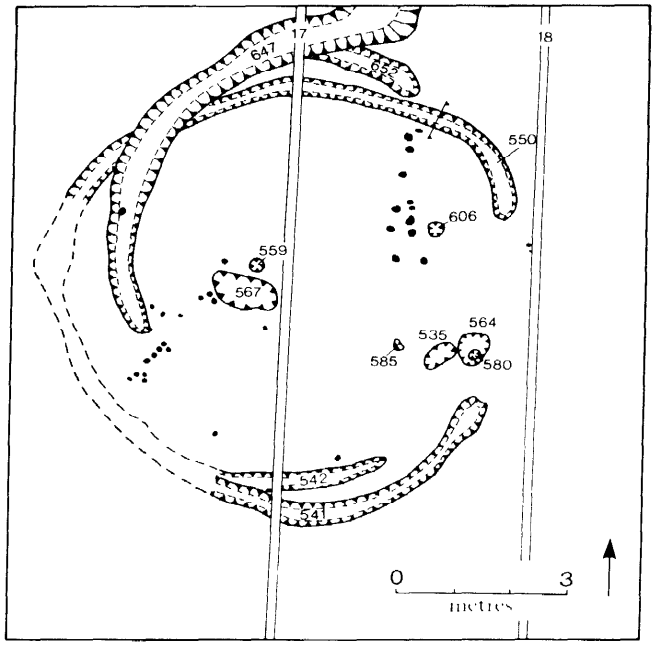


Fig 42 Circular Structure C

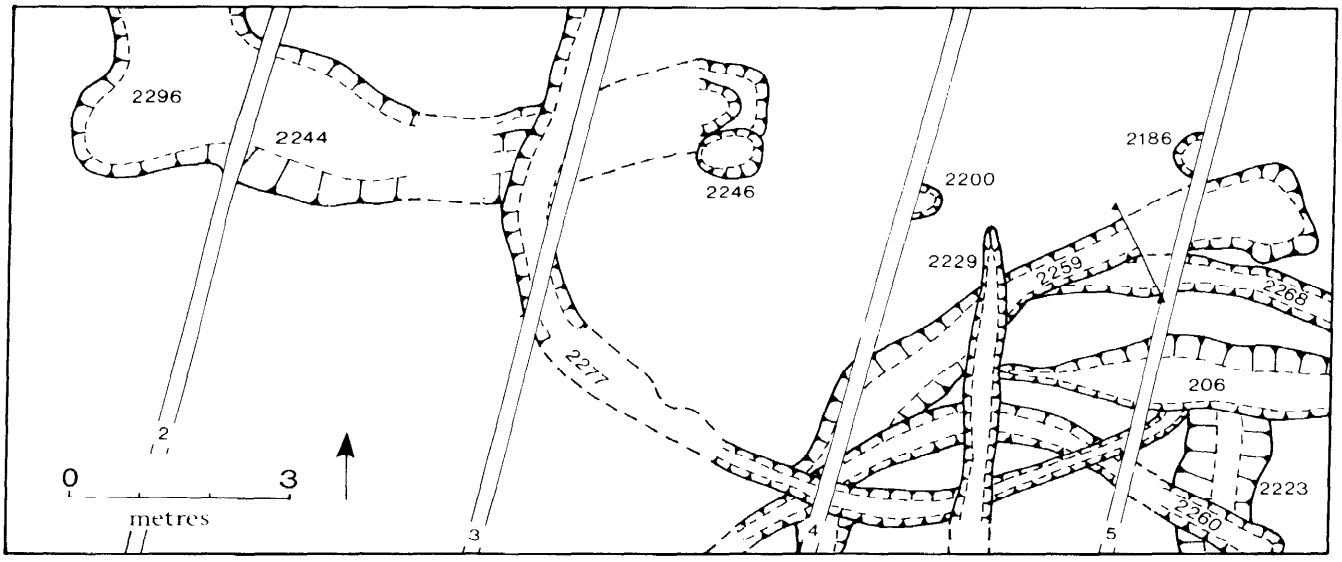


Fig 43 Circular Structures R and S

greater along the southern half of the eastern length (as would perhaps be expected, since this was the downhill section), and the character of stratigraphy was effected by the nature of refuse discard. The northern sections of the eastern side and the western section were very rich in pottery, small finds and animal bone (but not querns) as these areas appear to have been accepted as places to throw domestic detritus, whereas contemporary contexts like the Curvilinear Enclosure Ditch upper layers were kept clean of rubbish.

One area of discard formed a depression over the eastern Enclosure Ditch against the northern baulk; this was recorded as a feature, B 11.

PHASE IV

Two feature groups constituted the fourth and final phase of archaeological activity. These were substantial ditches which divided the site into large, enclosed, rectangular blocks. Stratigraphically these cut every other feature on the site except demonstrably medieval and modern features, and they did not receive occupation debris after the middle of the 2nd century.

The Late Rectangular Enclosure Ditch I

This was located on the extreme south-east of the site (Fig 40) and ran parallel with the south baulk of Area D. In total 22 m were exposed, of which just over 7 m were excavated. The Late Rectangular Enclosure Ditch I was in use in the mid 2nd century AD, and as a land boundary may have respected partitioning in use during Phase II. A relationship with the earlier features was established in that B1403, which was cut by Subrectangular Enclosure I, ran south for 7 m before turning to run west and form the earliest boundary in this part of the site. This reflected the continuity of landscape suggested in the layout of the eastern side of the enclosure and demonstrated in the re-use of the Phase II east-west ditches (Cl900 etc) by the other Phase IV feature group, the Late Rectangular Enclosure Ditch II.

By Phase IV, however, when D 161 was cut, the western edge was remodelled to swing south, leaving the excavated area 4 m south-west of the southern terminal of Phase III Curvilinear Enclosure Ditch, which may have originally been associated, although this enclosure was certainly filled in at a considerably earlier date (late 1st century AD).

The ditch itself was broad and round-profiled, and contained well defined stratigraphy. Only the lower levels contained mid 2nd century pottery.

The Late Rectangular Enclosure Ditch II

This feature group dominated the site during the latest period of archaeological activity (Fig 41). The phasing argument is quite simple: these features cut, successively, Circular Structure B, Circular Structure N, and the Phase III partitions, and in turn were cut only by demonstrably medieval and modern features. The intersections with all the Phase I, II and III features were not fully examined as this would have meant the excavation of almost the whole length of the ditch. However, the similarity between these ditch-fills themselves did not enable the edges of recuts within the ditches to be confidently defined without excavation, and so no attempt has been made to show these on the plans. Moreover, the western stretches were covered by horizontal stratigraphy, which had subsided into the softer ditch deposits, obscuring recut lines at ground level.

The ditch had two or possibly three distinct phases, the latest of which was the largest, and this had removed much of the preceding evidence. A possible early phase, C261, was recorded in one of the excavated sections, in the centre of the site, although this may have been no more than an uneven silt-line in the filling sequence of C260.

The next phase was evident across the western part of the southern side, but was not apparent in either the western or eastern sides. The final phase formed a substantial enclosure with an entrance causeway facing east. The square-ended terminal was 4 m south of the northern baulk; there was no trace of the northern terminal, gateway structure or any metalled approach which would have survived if it once existed. The enclosure turned an obtuse corner, 19 m south of the entrance, and ran for 78 m before turning northward to leave the excavated area. Both the south-eastern and south-western corners have rounded upper sides; the south-eastern has an angular outer side; the south-western outer side was outside the trench but was probably also angular. The enclosure itself was over 80 m long and at least 25 m wide.

The excavated lengths totalled 38% of the total final phase exposed (52 of 122 m), but most of this was along the complex southern side, where 42 m was excavated of 78 m exposed (54%).

Two characteristics were noted across the distances examined: firstly there was great variation in the size and shape of the ditches, and secondly there was a very uneven rate of occupation and metallurgical debris discard. These factors complicated interpretation and dating, hence although the western length (A188) contained no late finds it has been tentatively linked with the latest phase because of similarity of profile to the latest phase ditch along the western part of the southern ditch (C413), which did contain Romano-British pottery. The dating of the earlier phases is particularly problematical. Too little survived of the possible earliest phases, but the next phase clearly cut the Phase III features it intersected. It did not, however, contain imported pottery, although the latest Phase III features elsewhere on the site did.

UNPHASED

Circular Structure C

This was situated to the north-east of Circular Structure D, 9.8 m from the eastern side of the enclosure ditch (Fig 42). Two main phases were recorded. The earlier was surrounded by a shallow and continuous penannular drainage ditch (B541) approximately 8 m in diameter. The southern, down-slope length was recut and deepened to reduce the entrance gap from 5.1 m to 3.5 m. Three

possible postholes may relate to the ring-ditch entrance, B535 and B564 corresponding to the two successive southern terminals, with B606 relating to the northern terminal.

No evidence for a roof was recovered, although a wall may be inferred from the presence of two alignments of stakeholes that partitioned the interior. These features (B721 and B712) make more sense if viewed as abutting a wall, the construction of which did not involve subsoil disturbance, like the cob wall of Circular Structure B. The only internal feature of note was a subrectangular pit towards the centre of the earlier phase. This contained a sequence of edge-derived fills and soil with a little occupation debris. The latter contained no finds, and could not be stratigraphically related to the surrounding ditch.

Subsequently the ring-ditch was recut on a different alignment, but only along the north-western, uphill, arc - a further indication that the primary function of the ring-ditch was for drainage. This structure was probably enclosed and unroofed and may represent an insubstantial pen or drained workspace.

Circular Structure R

This structure (Fig 43) intruded into the excavated area on the western edge of the known settlement. Only the southern side was recovered, and as this was of unusual character a large percentage was excavated (approximately 65%). The original plan was probably horseshoe-shaped with wide terminals flanking an east-facing entrance. The surrounding ditch, C2244, was much deeper than usual.

The south-western corner was enlarged and widened, C2296, although this may have been after the construction of the ring-ditch, A possible terminal drainage sump, C2296, predated C2244. The ditch-fills were predominantly water-deposited clay-silts containing much less occupation debris and with virtually no domestic refuse, although the ring-ditch fill contained three crucible fragments.

The unusual shape, fill and peripheral position of this structure hint that it performed some specialized function. It was probably short-lived, but its exact position within the site history could not be defined. It was cut by Circular Structure S, which also cut Circular Structure L, and so the most likely association would be with the later stages of the Main House.

Circular Structure T

This was defined by the southern stretch of drainage ditch C2224, and was of curvilinear form with simple round terminal. This was perhaps an insubstantial circular structure with a south-eastern facing entrance gap and with a diameter of 10 m, if symmetrical. Some 3.9 m were traced in the north-western corner of the Main House Extension.

Index of Micro-fiche Report

B1302 1:G3 B1299 l:G3
B1449 l:G4 **Features outside the Enclosure, Phase II-III**
B214 l:G5
Bl52 l:G5
B148 l:G6
Subrectangular Enclosure I
B1482 1:G8
Bl565 l:G8
B1477 l:G9
B1427 l:G9
B1496 1:G10
B1356 1:G10
B1314 1:G10
B1355 1:G10
B1416 1:Gll
B1448 1:Gll
B1339 l:G12
Bl557 l:G12
B1358 l:G13
Bl507 l:G13
B1292 l:G14
B1281 l:G14
B1391 2:Al
Bl536 2:A1
B1472 2:A2
B1318 2:A2
Bl537 2:A3
B54 2:A3
B161 2:A3
B57 2:A4
B162 2:A4
B35 2:A5
B51 2:A5
B40 2:A5
B39 2:A6
Features cutting and overlying Subrectangular Enclosures I-II B1258 2:A8
B1236 2:A8
Phase III Drainage Ditch Complex Q
Cl438 2:A10
Cl437 2:All
Cl339 2:All
Cl495 2:A13
Cl 186 2:A13
C1150 2:A13
C729 2:A14
Internal features
Cl197 2:B2
Cl007 2:B2
Cl289 2:B2
Cl331 2:B3
Cl428 2:B3
Cl389 2:B3
C863 2:B5
C862 2:B5
External features
Cl380 2:B6
Cl477 2:B6
Cl459 2:B6
Cl468 2:B7
Cl403 2:B7
Cl399 2:B7
Cl596 2:B8
C651 2:B9
Circular Structure I
C661 2:B10
C98 2:Bll
Pits and Postholes Cl668 2:B12
Cl778 2:B12
Cl408 2:B13
Cl69 2:B13
C94 2:B14
Cl73 2:B14
Cl 152 2:B14
C773 2:Cl
C704 2:C2
C673 2:C2
Linear features cutting Main Structure Burnt Horizon
C512 2:C3
C481 2:C3
C447 2:C5
C436 2:C6
Circular Structure B
B934 2:C7
B875 2:C7
B506 2:C8
B895 2:C8
B719 2:C9
B889 2:C9
B733 2:C10
B555 2:C10
B577 2:C10
B869 2:C14
B522 2:C14
B510 2:C14
B1120 2:D2
Internal features B850 2:D2
B851 2:D2
B863 2:D4
B839 2:D5
B925 2:D5
B924 2:D6
B978 2:D6
B1032 2:D6
Circular Structure N Ring-ditches D20 2:D8
D111 2:D9
D69 2:D9
D50 2:D9
Internal features D88 2:Dll
D45 2:Dll
D112 2:Dll
D43 2:D12
D86 2:D12
D136 2:D13
D129 2:D13
D37 2:D13
D57 2:D13
Dl17 2:D14
D53 2:D14
D47 2:D14
Other Features D56 2:El
D75 2:El
Circular Structure D
B657 2:E2
B671 2:E3
B834 2:E3
B833 2:E3
B769 2:E4
Cl928 2:E4

III The finds

Introduction

The finds have been catalogued by subject. In those sections that comprise more than one material a prefix is added, eg Metalwork (M) so that gold, silver, bronze etc can be tabled together. Only one catalogue is used for each subject in order to help link the volume-printed descriptions with the fiche report. Within each type, the catalogue numbers are *in the order of the excavation description,* ie roughly chronological, although discussion within each group is treated thematically.

The Iron Age pottery

by H P Swain

Introduction

The Thorpe Thewles assemblage is the largest well stratified group of Late Iron Age pottery from the north-east. A total of 1522 Iron Age or native pottery sherds were excavated from 453 stratified contexts. Data on the diagnostic sherds, ie rims, bases and decorated pieces, were sorted on a microcomputer. Sixteen variables were recorded for each, dealing with form, fabric and contextual details, which in the case of diagnostic sherds included exact location. The diagnostic sherds represent 19% (289) of the assemblage; of these 178 could be assigned profiles, These form the basis of the following discussion. The mass of body sherds provided information only about fabric, inclusion type and sherd width. The diagnostic sample was compared with a randomly selected 289 sherds from the 1233 undiagnostic residue under these three headings to see how representative the former is of the whole. These results (Table 12, 4:A2 fiche) suggest that the sample can be considered as typifying the assemblage as a whole.

With the exception of two imported Iron Age vessels (12, 198) the material can be identified as the product of one technological tradition which produced little gross variation. The study attempts to examine the pattern of recurring variables to see how, and in what social context, the vessels were made and used. Attempts at a typological approach to the assemblage have proved largely unsuccessful, although representative samples of the principal forms are illustrated and described in chronological order (Figs 44-7).

Catalogued variables

All sherds, or groups of sherds when obviously from the same vessel have been catalogued separately by a series of variables (Table 13, 4:A3). The aim has been to characterize each sherd in a series of formalized descriptions dealing with form, fabric and contextual details so that a close study of individual pots or large groups of sherds could be carried out without returning to the pottery itself. This system of cataloguing was essential to allow easy computerization of the pottery, and has allowed a complete catalogue of diagnostic sherds to be presented in fiche (Appendix 2 4:B9).

Form

Vessel profiles were recorded by use of a key sheet of rim, body and base types. This tripartite division was adopted in order to allow for the difficulties in reconstructing complete profiles from small undiagnostic body or rim sherds and to help recognize any functional properties that may have been inherent in one specific aspect of form but not in the shape as a whole. Nineteen distinct rim types, ten bodies and five bases were catalogued; when simplified and joined, seven general profile types were recognized. The key sheets for rim, body and base coding is presented in fiche (Fig 79, 4:A4).

Body profiles
Four main body shapes were recognized: bowls or cauldron-shaped vessels, bucket-shaped pots, barrel-shaped vessels and vessels with an S-shaped profile.

Rims
It is a reflection of the diversity of forms within the assemblage that nineteen distinct rim types were recognized, These have been tentatively divided into three general groups in which some functional differentiation might be inherent, namely simple, everted and lid-seat rims.

Bases

Five base types were catalogued, varying in the angle and size of foot. (Base type l-5). In the examples where complete profiles existed bases proved to be of a simple nature with no noticeable foot and flat-bottomed, eg 41 and 119.

Vessel size
Vessel diameter was measured from the highest point on the rim. An exact measurement often proved difficult or impossible and a more general tripartite division into small (< 110 mm), medium and large (> 200 mm) diameters was used. Sherd thickness was recorded as one of eight ranges of measurements each rising by 3 mm from 1 mm to 24 mm.

Form
The principal rim, body and base types have been

Fig 44 Iron Age pottery 1 (1:4)

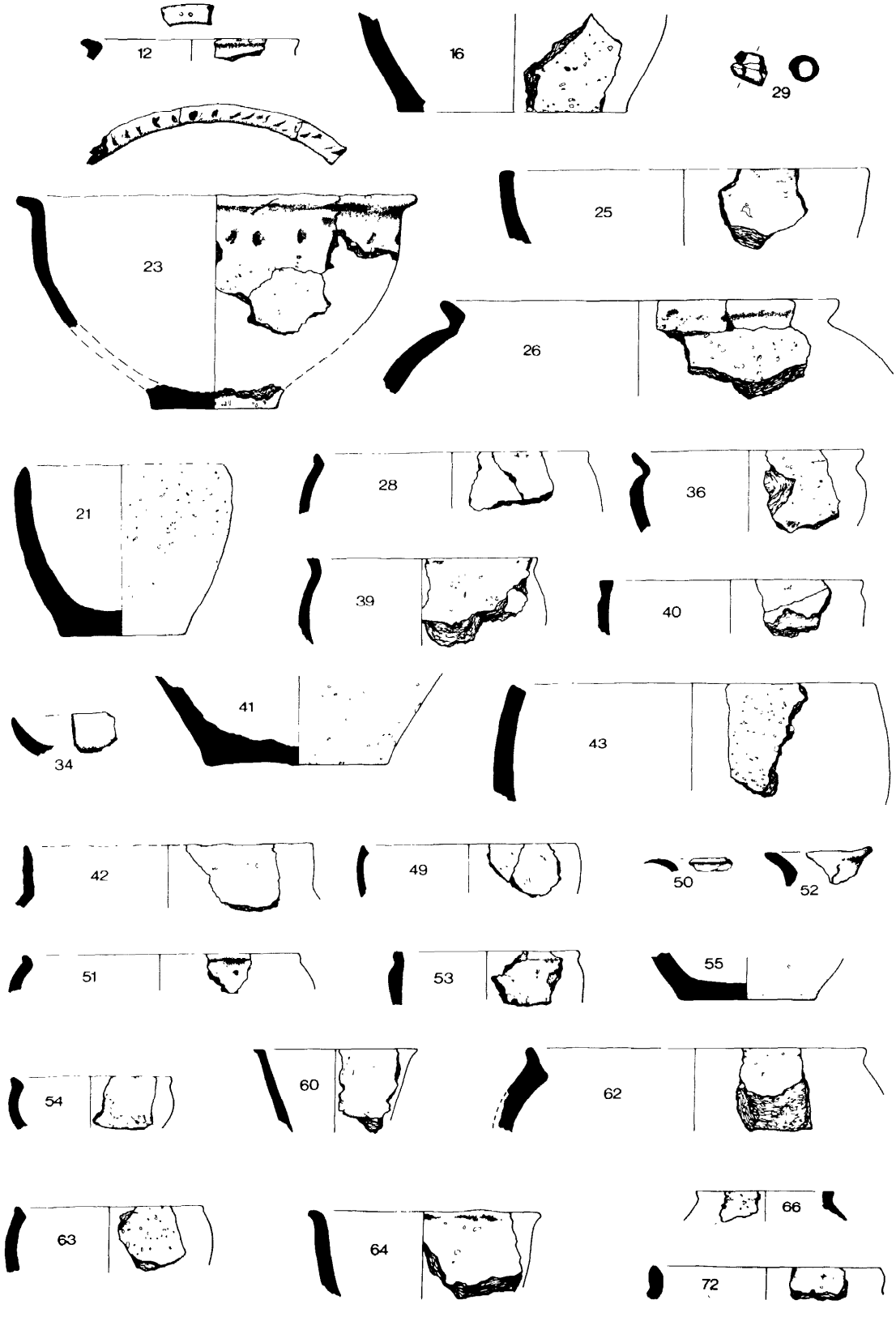


Fig 45 Iron Age pottery 2 (1:4)

Fig 46 Iron Age pottery 3 (1:4)

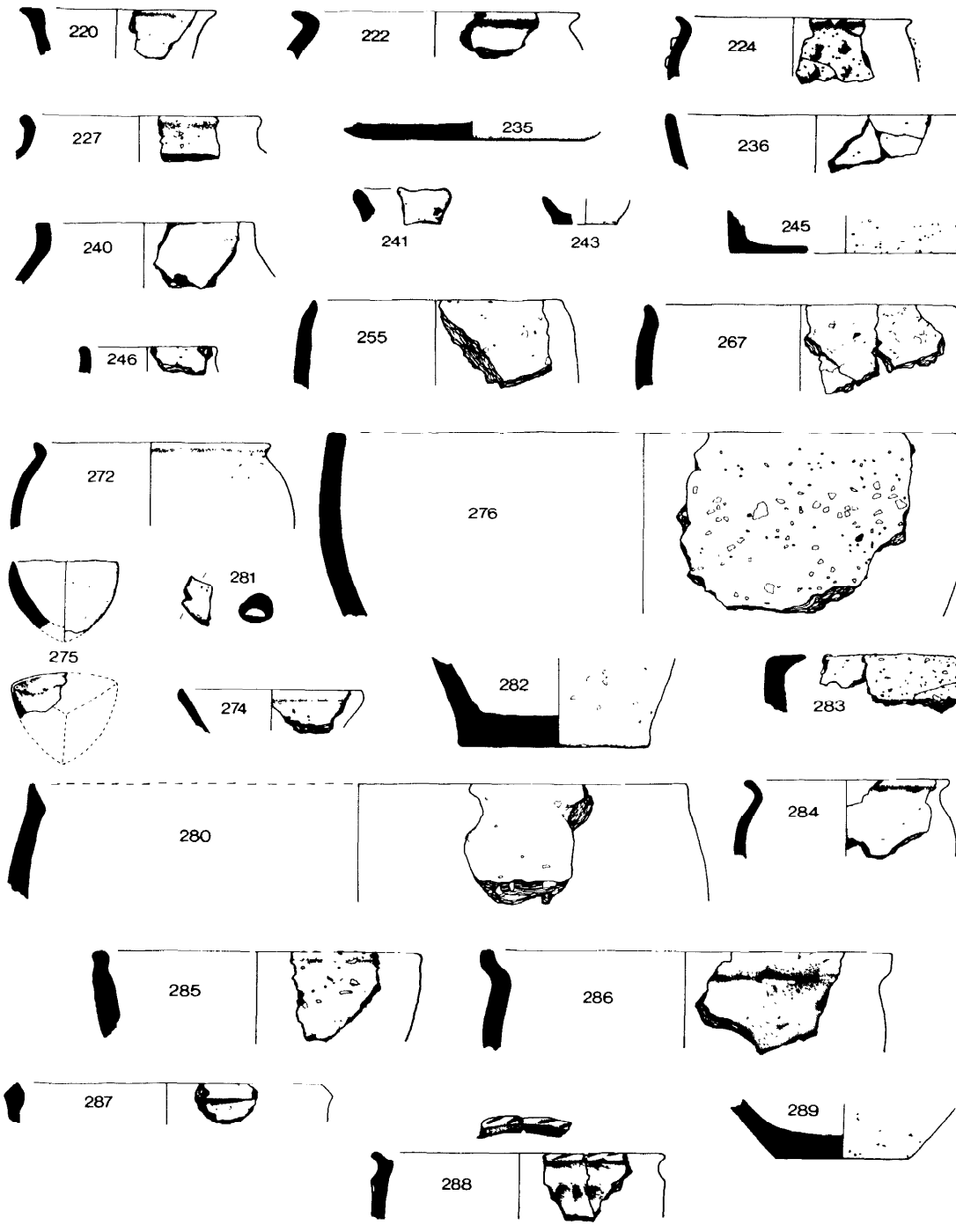


Fig 47 Iron Age pottery 4 (1:4)

described separately above. So diverse and numerous was the variety of complete forms that it became obvious that some degree of simplification would have to be introduced. For this purpose the subdivisions of bodies and rims were clustered leaving three general rim types - simple, everted and lid-seat - and four body types - bowls, buckets, barrels and S-shaped or shouldered. Figure 80 shows the frequency of sherds when divided into the twelve possible combinations of these simplified form classifications with bipartite sherd-width also added. This diagram can be used to identify seven common profile types.

Bowls (body 1) are put into a single group, there being too few to warrant further subdivision. The examples with simple tapering rims are discussed above and the only example with an everted rim is 23.

Bucket-shaped pots (body 2) fall into two groups, by far the larger being those with simple rims (either large, 276, or small, 126). A smaller group of buckets had everted rims, eg 220. No vessel with a bucket-shaped body had a lid-seat rim.

Pots with barrel-shaped bodies (body 3) form by far the largest group in the assemblage and are subdivided into three groups by rim type. Those vessels with simple rims form the largest group within the assemblage, eg 82, 101, 114, 138 and 255, most of a medium or large size. Barrel-shaped vessels with everted rims are also relatively numerous with some large examples, eg 28 and 74 but smaller vessels are more common, eg 28, 51, 222 and 272.

Lid-seat rims appear exclusively with barrel-shaped bodies. Again the types can be divided between small (49) and larger (62).

S-shaped or shouldered vessels (body 4) have again been put into a single group, the body profile by its nature making differences between simple and everted rims minimal. Most examples are medium or small-sized (36, 42, 227).

To summarize, large to medium-sized barrels are common, as are buckets with simple, tapering rims eg 21, 82, 114, 198 and 276. There exist a smaller number of large, barrel-shaped vessels with everted rims, eg 26 and 74.

The majority of medium-sized vessels are barrels or shouldered pots with various everted rims, eg 36, 51, 84, 103, 156 and 227. There also exists a group of medium to small buckets with simple or everted rims, eg 64, 126, 129, and 140. There is a group of primarily small, simple, rimmed barrels eg 112, 116 and 218, and a small group of medium or large-sized vessels with lid-seat rims, eg 144 and 194.

Tables 14 and 15, (4:A9) illustrate in detail the occurrence of specific form types by phase, and illustrate not only the wide variety of forms but also how few examples there are of each type. Any attempt at a traditional typological approach to form is made largely invalid for these reasons. The general point that can be made is that forms which appear in Phase II are also present in Phase III although often in different proportions, and the only marked difference lies in Phase IV.

Other vessel types

Crucibles

Illustrations 90 and 275

Eleven pieces of crucible from at least six vessels were recovered from stratified contexts in two specific areas (see discussion). Vessel 275 was large enough to show that the form was the common, rounded, triangular shape (Cunliffe 1974, 295). All have uniformly grey-coloured surfaces and cores in fabric two. The inclusions in four examples have been burnt out at high temperatures, which has also affected the surface of the fired clay giving it a brittle, glazed texture and leaving shallow cracks. Non-ferruginous metalworking residues survive on at least two fragments.

Other industrial vessels 29, 34, 50, 52, 134, 207, 241, 281

A distinct group of vessels share similar properties and have proved difficult to either reconstruct or interpret, although a connection with metalworking processes seems not unlikely. All examples are in fabrics one to three, the majority in fabric two. The fired clay is of an exceptionally fine, smooth, 'soapy' nature, forming clean, rounded fractures, and containing no large inclusions. When present, inclusions were of dolerite or, rarely, quartz, crushed to smaller than 1 mm diameter. All shared a distinct combination of core and surface colouration in that not only are all surfaces fully oxidized but the shades of colour are particularly light and in many cases unique to this group, suggesting particularly high firing conditions. Detailed descriptions, based on a division into five groups, are included in the microfiche archive.

Thumb pots

Two complete 'thumb pots' were found, one from the Main Structure the second from the Main Enclosure Ditch in area B. They are both approximately 33 mm in diameter by 20 mm high, ie about the right size to have been fashioned from a small piece of clay using the fingers and thumb of one hand. As the vessels were complete, inclusion type and fabric were difficult to gauge; neither was in a fine or coarse fabric. One possible function of these vessels is as test vessels for pottery firing. Thumb pots could be made with each batch of pottery, placed in the bonfire and pulled out at intervals to check when the main vessels had become ceramic. Such an explanation would explain the low-baked appearance of the thumb pots although this does underestimate the ability of the potter to judge when his vessels are fired. Finally it is possible that the vessels were used as containers for cosmetics or dyes. The black colouring on the inside of one example may hint at this, There is, of course, every possibility that thumb pots fulfilled no practical function and were no more than childrens toys,

The use of decoration

Illustrations 12, 23, 53, 102, 119, 135, 169, 182, 224, 288

Sherds from 15 decorated vessels were excavated from stratified contexts. The position of decoration within the assemblage as a whole was therefore minor and as there was a considerable variety of decorative motifs it would be unwise to overestimate the social and cultural importance of such a small and disparate group.

One of the most interesting examples (12) comes from the Main Enclosure Ditch. Two sherds bore clear traces of stamped circles (approximately 4 mm diameter) on

the top of and along the outer edge of the rim. The vessel rim type falls within the Thorpe Thewles form range although the pot fabric is unique in the assemblage, being particularly sandy, and it seems reasonable to interprete this pot as an import (see below).

Eleven vessels have finger-impressed decoration. The most notable are 23, for which a complete profile could be reconstructed, 182 (with a peculiar inturned rim) and 102. These pieces can all be placed within the general tradition of such decoration within the northern Iron Age (Challis & Harding 1975) and might be seen as representing the last vestige of this tradition before its abandonment. Possibly of similar origin is 135, which has punctured decoration around its shoulder, most probably produced using a bone; there are also narrow slashes along the top of the rim.

At the furthest extreme from vessels which may represent a hangover from an earlier tradition is 224. Here the nodule decoration almost certainly represents an attempt to copy a rusticated beaker, one facet of Roman influence on the later part of the site's history. Coming beween these first two types are examples 53 and 169. The latter displays similar, if less pronounced, rusticated decoration though on a more simple vessel form. No 53 shows this type with regular fingertip impressions taking the place of nodules. A similar decoration is found on 119, which has a regularly spaced double line of fingertip impressions around its foot.

Apart from this small group, several sherds had incised grooves cut into them. However, none were on large or diagnostic sherds, and it is therefore impossible to know whether they were intended as decoration or were produced by accident. No 288, although unstratified, is discussed in the catalogue.

Other variables

Colour

Munsel colour charts were used to record fabric colour for the exterior, interior and core of each sherd. Only a very small percentage of vessels were of a single colour; on mixed surfaces the prevalent colour has been recorded. The majority of sherds had uniformly unoxidized cores with surfaces both oxidized and unoxidized.

Inclusions

Inclusions were catalogued by type, size and distribution. Initial identification was carried out with a hand-held microscope and this was backed up with a selective programme of thin sectioning. The two principal inclusion types were quartz and dolerite or the similar diorite. A few examples had voids where inclusions had been chemically removed, and one pot had lumps of sandstone mixed with dolerite inclusions.

Inclusion types in the 289 diagnostic sherds broke down as follows:

162 contained dolerite 56.2%
85 contained quartz 29.8%
35 contained dolerite/quartz 12.45%
4 contained voids 1.42%

The nearest geological source for dolerite and quartz is the Cleveland Dyke, which outcrops five miles to the south, and both rock types occur commonly in the boulder clay. It was found by experiment that these were the only two mineral types found on site which were suitable for crushing into pottery temper.

Fabric

In this analysis the term 'fabric' has been restricted to relate to the clay matrix or 'biscuit' of the vessels, and as such bears no relationship to inclusion type. Initially, the assemblage was divided into eight fabric types ranging in relative coarseness from fabric one 'most fine' to fabric eight 'most coarse'. To facilitate easy reference eight sherds were used as fabric reference pieces. Analysis showed that these eight types divided into four ranges as follows:

Fabrics one and two (18 catalogue examples: 6.8%) are limited to use in crucibles, spouted vessels and a few small bowls.

Fabrics three to five (102 catalogue examples: 39%) are fine fabrics which appear in the majority of vessel types and with the full range of inclusion types and vessel colours.

Fabrics six and seven (112 catalogued examples: 42%) are coarse fabrics which appear in the majority of vessel types.

Fabric eight (29 catalogued examples: 11.1 %) was found to occur with the largest vessels usually with massive dolerite inclusions.

Surface finish

Two sherds, nos 274 and 188, have received some form of polishing or wiping to leave a relatively smooth surface. One vessel (198) was burnished. Some pots, eg 21, have clearly had their insides scrubbed out with an abrasive. This process had eroded the clay leaving scratch-marks and inclusions protruding through the surface. This process also appeared on the outer surfaces of some vessels, eg again 21, but to a far lesser degree. Surface finish was catalogued on a relative scale of smoothness, through fine, smooth, uneven, coarse.

Surface condition

The most important factor in assigning function to particular pots was the adhesion of carbonized residues to many vessels. The long-held and doubtless valid interpretation of such residues is that they result from semi-liquid foodstuffs boiling over the edge of cooking pots and becoming carbonized when coming into contact with open flames; there was a predominance of residues on the outer shoulder of vessels. The concretions were ignored unless they apppeared purely on the exterior surface. Of the catalogued sherds, 26.4% had residues on their outer surfaces.

Discussion

Production and technology

The excavator has already suggested that clay quarrying and preparation was taking place on the site (see above). Domestic production of pottery is further argued for by the local availability of inclusion types and limited range of fabrics.

An argument for on-or-near-site pottery production can also be made from the diversity of forms and firing, suggesting no specialization of production. The vast majority of vessels show clear evidence for a rapid firing in open bonfires, producing a variety of surface colours.

This highlights the few examples where some attempt seems to have been made to provide a uniform surface, as in the case of the industrial vessels, where uniformity of colour is almost certainly due to a more controlled firing.

Two vessels stand out as being atypical. No 12 has a simple rim but is distinguished by impressed circle decoration and an exceptionally evenly fired fabric. As such it may represent an import. Stamped decoration is known in the area from the late Iron Age site at Roxby, North Yorkshire, although the sherds there, with wheel-type stamps, are thought to be of Saxon date (Inman *et al* 1985, 196). Parisian ware, thought to be of 1st or 2nd century AD date, has small, circular-stamped decoration, but in almost all examples this was restricted to a cordon on or above the vessel waist, and can be discounted as a possible parallel (Corder 1958, 48; Stead 1980, 43).

The second vessel that appears intrusive within the assemblage is no 198. The rim, a rounded lid-seat, is not unique (cf 62) but the sharp angle of the shoulder is not a feature of this tradition, nor is the burnished surface and uniformly black colouration which may be the result of full reduction.

Function

The whole area of vessel function encompasses great problems in both theoretical and practical terms. Apart from the straightforward examples such as crucibles, there is a vast range of potential uses of pottery vessels, most of which will leave no recognizable trace. Factors such as the symbolic significance of decoration, socially set proscriptions and taboos and the need to express and reinforce kinship and caste politics through material culture all combine to frustrate analysis (Hodder 1982).

An attempt to tackle these problems is detailed in Appendix III, which matches a series of testable parameters against the data given in Appendix II. The general terms (cooking pot, storage jars etc) used in the catalogue are taken from this.

The presence or absence of carbonized concretions can be assumed to give reasonably clear evidence of function (cooking) and this can be checked against other variables, for example the extent to which clay preparation and inclusions were specially chosen to perform specific functions. Peacock (1984) has suggested the unsuitability of quartz or similar inclusions in cooking pots due to their poor properties of thermal absorption. Figure 82, (4:A11) expresses the numbers of sherds with external residues with dolerite inclusions relative to those with quartz or voids. The chart clearly shows not only the preference for dolerite inclusions but also their far more frequent use in vessels with external residues. Figure 81, (4:A10) shows the tendency for dolerite inclusions to be larger than quartz inclusions. Quartz as a rock is far easier to crush into small pieces. It is therefore possible that instead of an understanding of the thermal properties of inclusions these differences illustrate a preference for the more easily crushed quartz in more carefully constructed or smaller drinking and storage vessels, with dolerite appearing more commonly in the larger coarse cooking pots. Figure 82, (4:A11 presented in fiche) further illustrates these observations in relation to surface finish.

Similar variations and trends can be recognized in the use of different fabrics, suggesting some form of functional differentiation. Figure 81 (4:A10) shows a more frequent use of finer fabrics in smaller vessels and those with small and quartz inclusions. Figure 83, (4:B2) shows a greater frequency of oxidized surfaces in finer fabrics and a less frequent use for cooking, ie fewer residues. This suggests not only a preference for finer fabrics in vessels not associated with residues but also a difference in the firing of coarse and fine fabrics.

The exact methods of clay preparation need not be of prime concern beyond observing that there seems to be a preconceived idea of pottery function which is often reflected in production and raw material selection. Figure 83; (4:B2) takes this process a stage further by illustrating the seven form types with the addition of those other parameters which might reflect pottery function, ie vessel size, external residues, inclusion and fabric type. While restating the production preferences already noted, eg the presence of residues on larger, coarse fabric pots, this shows that such combinations are not closely confined to particular forms, suggesting that functional parameters, whether formal or concerned with fabric, play a more important role in pottery production than the adherence to particular shapes. Figure 84; (4:B3) further illustrates these observations by showing that fabric divisions are similar amongst bucket and barrel-shaped pots and that no body type is exclusive to any one group of fabrics. Although external residues are proportionately more prevalent in association with certain body and rim types, as with fabrics, they are not confined exclusively to any single pottery form (Fig 84; 4:B3).

The wide diversity of trends observed in form and the failure of vessel form to correlate fully with the functional indices for which we can test may be explained by two closely linked concepts. Firstly, we must recognize that the potter would be aware of a large number of slightly different ways of making pots, and the selection of one against another may have been influenced as much by personal choice and specific availabilities as by particular formulae.

Secondly, it is also necessary to see vessel function dynamically, that is although a vessel may be designed and produced to fuilfil one function there will be others that it can and will be used for, as is the case with modern pottery. There will be exceptions to this rule (many storage vessels are too large or have rim types too complex to permit their ready conversion to consumption vessels) but the majority of pots will be open to multiple functions. This situation is made more complex by the wide variety of minor variations within any one major function type. For example, some cooking vessels if used only for boiling liquids might never receive concretions on their outer surfaces, whereas some storage vessels might have their intended contents cooked in them first, eg preserves, and therefore might be found with concretions. This effect will also bias the sample quantitively. Storage is a static function carried out in areas out of harm's way and, all other things being equal, will give the storage vessels a relatively long life. However, re-use for cooking immediately multiplies the possibilities for fracture. Broken cooking pots may not have been immediately replaced by new cooking pots as a result of seasonal or 'special time' proscription on ceramic production, or, more simply, because there was a surplus of unused storage or consumption vessels which could be used in the interim.

Regional significance

The pottery of the Late Bronze Age and Iron Age in the Tees Valley displays a bewildering variety of fabrics and forms. However, excavations from the 1960s have provided sufficient material to place the Thorpe Thewles assemblage in a regional tradition as significant as southern equivalents (Cunliffe's style-zones), if of a different character. In contrast to southern assemblages, pottery from this area does not display the recurrence of decorative motifs on distinctive, short-lived forms. Northern pottery must be seen within a tradition that allows for the long currency of simple forms and rim types. Within this general background we see the adoption, use and discard of slight variations and amendments in pattern at a local level, but as yet it is impossible to subdivide the region into ceramically distinctive units.

Earlier 1st millennium assemblages are known from Eston Nab and Heathery Burn (Challis & Harding 1975, 38). Both these assemblages contain slack-profiled, simple rimmed vessels but each contains more sharply angled vessels, usually around the shoulder, which are explained as imitations of bronze bucket shapes and often described as 'situlate' (Challis & Harding 1975). These forms are unknown from later sites such as Catcote, Thorpe Thewles and Ingleby Barwick, all in Cleveland (Long forthcoming, Heslop 1984) and may have been discarded around 500 BC. A further trait, the use of plastic ornament, is common on earlier sites but also occurs in 1st century contexts at Thorpe Thewles and possibly Catcote (ibid).

The fabrics from Eston and Heathery Burn are generally less tightly bonded, and show less attention to surface finish. Sherds are therefore softer, with less regular fractures and are rarely large enough to be assigned to profiles. To aid the firing of these crude constructions very large inclusions of igneous rock, sandstone and quartz are used for the first time, starting a practice that only dies out in the Saxon period (cf vessels from Norton on Tees, Cleveland, Sherlock pers comm). Softer, 'corky' fabrics are not present at Thorpe Thewles, where greater attention to clay preparation is clearly seen. The resultant fabric and characteristic firing pattern can be directly matched at all other Tees Valley Iron Age sites and, indeed, into the Romano-British period, showing that a common technology was being shared. Local availability determined the selection of inclusion types, so that dolerite is common at Thorpe Thewles whereas calcite occurs south of the Jurassic sandstone (eg Rillington, North Yorkshire, Turnbull 1982, 5).

Finer fabrics are more common on later Iron Age sites, often on simply everted or bead-rimmed beakers, as at Percy Rigg, North Yorkshire and Ingleby Barwick, Cleveland (Close 1972, 28; Heslop 1980, 4) and similar fabrics are employed for industrial purposes. The imitations of Romano-British forms (eg Fig 47, 224) are in finer fabrics, and a link with the introduction of vessels for drinking is possible.

Most sites in the Tees Valley share a range of basic forms, but different proportions of specific types can be discerned, although most sites produce assemblages of small size, questioning the value of such distinctions. More upright rims are seen on the periphery of the North York Moors (Great Ayton Moor, Tinkler & Spratt 1978; Pale End, Hayes 1966; and Percy Rigg, Close 1972). Thorpe Thewles has a range of globular bowls or jars not seen elsewhere (nos 89, 93, 138). In general the same patterns occur across the region, suggesting that the settlements were linked by social contacts and were unwilling to develop marked individual ceramic personalities.

Finally, how are the spatial and chronological boundaries of this tradition defined? Geographically the assemblages south of the North York Moors are different in having a greater predominance of massive, upright and complex rimmed vessels (eg Rillington and to a lesser extent, Levisham Moor, Turnbull 1983, 5; Hayes, 1983, 32).

A few miles to the north of Thorpe Thewles it appears that later Iron Age sites are aceramic (Coxhoe, Strawberry Hill and Thornborough Scar, Haselgrove & Allon 1982; Clack, pers comm). Why perishable materials replace ceramics is at present a mystery, but this pattern does appear to be a real one and the solution must lie in the nature of the subsistence economy, of which virtually nothing is known as yet.

Chronologically, significant changes can be charted between Phases III and IV at Thorpe Thewles, where the introduction of Romanized pottery alters the functional basis of the tradition, although fabric and firing similarities suggest that the same technology was being employed.

The interplay between the 'native' and Roman traditions took several forms. Firstly, many new forms in wheel-thrown fabrics were introduced across the region and some were copied in native fabrics. There would have been periodic re-emergences of native production during gaps in the supply of Romanized products, but there were probably certain functions not covered by Romano-British potters, and some communities may have persisted outside the Roman economy (cf Roxby, North Yorkshire, Inman *et al,* a site which runs through the Romano-British period without receiving any wheel-thrown pottery). Conversely, certain functions could not be fulfilled by native production, particularly mortaria, which are uncommonly prevalent (up to 25% of total Romano-British pottery) at Thorpe Thewles Phase IV, Catcote (Long forthcoming) and Larchfield Farm, Cleveland, (Vyner pers comm). Post-conquest sites do not display the range of cooking and storage vessels that dominate the earlier assemblages, as these were directly replaced by the ubiquitous grey wares. However, we can only speculate about these changes from very limited data. It is a matter of some urgency that a sizable native Romano-British site is examined to continue the sequence that stops in the mid 2nd century at Thorpe Thewles.

Illustrated examples

Illustrations are presented chronologically in order of the excavation description, numbers referring to the catalogue of diagnostic pottery sherds presented in fiche.

The Catalogue

Phase I

No pottery was recovered from the Phase I ditch.

Phase II

Large, coarse, barrel-shaped pots with simple rounded or flattened rims such as 21 and 43 are common throughout Phase II and III. Medium-sized, more rounded vessels, for example 28 and 51 also appear in Phase III, but the near vertical everted and rounded rim seems restricted to Phase II, rims becoming wider and more pronounced in Phase III. 62 with its lid-seat rim is more indicative of Phase III cooking pots and indeed sherds from this vessel were also found in C486; 60 is also the only example of a type more common in Phase III.

A complete range of the fine fabric sherd types appears.

Main Enclosure Ditch

12 B IS85

Small, everted-rimmed, probably barrel-shaped pot. Fabric three with crushed quartz inclusions, smoothed surfaces. Exterior and interior both brown. Core very dark-grey with light-brown layer showing below exterior surface. Small, circular, impressed decoration on top of and along edge of rim for which no obvious parallels can be suggested.

Main House

16 C 1377

Base, fabric eight with dolerite and quartz inclusions. External surfaces pale-brown, core very dark-grey.

21 C 812

Barrel with simple rim. Reconstruction from approximately half of vessel. Fabric eight with dolerite inclusions. Interior completely pink through oxidation of iron in the dolerite. Core grey, exterior mainly grey with some areas of red/yellow and some sooty smudging. Interior has been scrubbed out.

23 C 982

Reconstruction of cauldron-type vessel of which approximately one third survives. Fabric five with dolerite inclusions. Exterior predominantly very dark-grey with some lighter areas and extensive concretions and smudging. Interior partly dark-grey and partly red/yellow. Core very dark-grey. Finger-tip decoration along top of rim and around shoulder.

25 C 943

Bucket-shaped cooking vessel with simple, slightly inturned rim. Fabric four with dolerite and quartz inclusions. Core black, interior dark-brown, exterior red/yellow with extensive sooty smudging and concretions.

26 C 1202

Large barrel-shaped pot with everted rim, probably used as a storage vessel. Fabric seven, with dolerite and quartz inclusions. External surfaces pale-brown with some red/yellow and black patches. Core dark-grey. Horizontal linear markings on interior caused by smoothing of wet clay.

28 C 750

Barrel with steep everted rim. Fabric five with crushed quartz inclusions, interior pale-brown, core dark-grey, exterior black through contact with burning.

29 C 757

Curving spout, very thin-walled. One end has smoothed, upturned lip suggesting a join. Fabric two, with a very few crushed quartz inclusions. All surfaces pink, light-grey and red/yellow.

Main Structure Ditch

34 C 2368

Rim sherd suggesting a small, bowl-shaped vessel. Fabric three with a few crushed quartz inclusions. Exterior red/yellow and grey, core grey, interior red/yellow.

36 C 1471

Medium-sized, barrel-shaped pot with steep, flaring rim. Fabric seven with dolerite and quartz inclusions. External surfaces red/yellow. Core very dark-grey. Concretions and blackening on exterior surface, plus a large firing flaw, in exterior surface.

39 C 876

Shouldered, S-shaped vessel, probably used for storage. Fabric seven with dolerite inclusions. Interior red/brown, core very dark-grey. Exterior predominantly white with patches of black and red/yellow.

40 C 912

Cooking vessel with flattened simple rim and external shoulder bevel. Fabric seven with dolerite inclusions. Exterior surface red/yellow with extensive sooty smudging. Interior red/yellow with evidence of scrubbing out, core black. Slight finger impressions along top of rim, probably constructional.

41 C 2471

Base. Fabric eight with large dolerite inclusions, Exterior surfaces red/yellow, interior black. Extremely coarse and uneven interior. Grain impressions on bottom and exterior sides.

42 C 2236

Barrel with vertical neck is unique though similar to 240. Fabric seven with dolerite inclusions. All surfaces very dark-grey to black, with external sooting and some concretions. Internal surface has been scrubbed clean.

43 C 2260

Large, barrel-shaped pot with the flattened simple rim. Fabric eight with dolerite inclusions. All surfaces very dark-grey/brown.

Enclosure Partitions, Phase II

49 C 2468

Barrel-shaped storage pot with lid-seat rim. Fabric six with dolerite inclusions, surfaces very dark-grey/brown, core dark-grey.

50 C 2468

Break fractures suggest the everted rim to a small vessel, but wear could have eroded the original form. Fabric two with no inclusions. Top surface red/yellow, over a white layer which is visible in section. Lower surface black.

51 C 1912
Barrel-shaped cooking pot with everted, rounded rim. Fabric four with uneven large dolerite inclusions, Exterior surface is black with thick concretions, but a pink, oxidized, buried surface shows in section. Interior is pale-brown and core is grey.

52 C 1900
Funnel-shaped sherd with rounded outer rim and break fractures on all other edges. Fabric two with a few finely crushed dolerite inclusions. External surfaces pink and red/yellow, Core light-grey.

53 C 1900
Vertical-sided pot with slight shoulder and simple, flattened rim. Fabric is closest to six, but is of a flaky nature and not notably close to any Thorpe Thewles fabric but with quartz inclusions. Exterior and core are dark-grey/brown, interior is dark-brown. Decoration is by finger-tip impressions in two rows around the shoulder, the inverse of that found on 169 and 224.

Features outside Enclosure

54 B 1403
Small, barrel-shaped pot with everted rim. Fabric five with dolerite and quartz inclusions. All surfaces black with concretions on exterior shoulder.

55 B 1299
Base. Fabric six with dolerite inclusions. All surfaces black. Concretions and sooting on inside. Finger impressions visible on interior surfaces, grain impressions on base exterior.

Subrectangular Enclosure I

60 B 1346
Bucket-shaped pot with everted, flat-topped rim. Fabric six with dolerite inclusions. All surfaces very dark-grey. Extensive sooty smudging on exterior.

Subrectangular Enclosure II

62 D 16
Also in C 486. Barrel-shaped cooking pot fabric eight with dolerite inclusions. Exterior dark-grey/brown with some sooting. Core grey, interior grey with pink smudging from oxidized iron in inclusions. Interior shows evidence of scrubbing out.

Depressions over Subrectangular Enclosure I

63 B 275
Barrel with possible everted lid-seat rim. Fabric four with dolerite inclusions. Exterior surfaces red/yellow, core grey.

64 B 242
Bucket-shaped pot with everted rim. Fabric six with dolerite inclusions, very dark-grey exterior, black core, brown internal surface. Traces of concretions on exterior.

Abandonment of Main Structure

66 C 252
Similar form to 240 but smaller, possibly a storage vessel. Fabric six with dolerite inclusions. Surfaces pink, core dark-grey.

69 C 408
Barrel-shaped cooking vessel, vertical, simple rim with slight inner lip. Fabric eight with large dolerite inclusions, interior pale-brown core very dark-grey. The profile is unique for the site.

72 C 558
Shouldered storage vessel with vertical tapering rim. Fabric six with dolerite and quartz inclusions, black exterior and core, light-yellow/brown interior.

74 C 73
Large, barrel-shaped storage vessel with everted rim. Fabric six with quartz and dolerite inclusions. Surfaces are pale-brown with darker patches, core is dark-grey. Part of interior surface has broken away, probably during firing.

78 C 766
Body sherd of shouldered storage vessel. Fabric seven with dolerite inclusions. Red/yellow exterior with patches of black brought about by contact with other objects during firing core, very dark-grey, interior brown.

82 C 250
Barrel-shaped vessel with simple, rounded rim. Fabric eight, large dolerite inclusions. Reconstructed from approximately one-half of vessel. Exterior surface yellow/brownish/red with concretions on shoulder and rim. Interior dark-grey, core very dark-grey. Extensive grain impressions on base exterior.

83 C 250
Simple, steep-sided vessel. Fabric four with dolerite inclusions, surfaces dark-grey.

84 C 310
Barrel-shaped pot with steep everted rim. Fabric four with crushed quartz inclusions. External surfaces very pale-brown, core dark-grey.

85 C 310
Shouldered vessel with steep flattened rim. Fabric seven with quartz and dolerite inclusions. Exterior very dark-brown, core very dark-grey, core red/yellow.

89 C347
Barrel-shaped cooking pot with flattened, inturned rim. Fabric seven with dolerite inclusions. Dark grey-brown surfaces with patches of brown. Extensive concretions on exterior.

90 C 497
Crucible rim fragment. Fabric two with quartz inclusions as well as numerous spherical voids between 2 mm and 1 mm in diameter. Oxidized grey surfaces and core. Surface shows evidence for contact with extreme heat cracking, blistering and glazing the clay. No metal residues.

Phase III

The vessels constitute five principal form groups, but there is a large degree of variation throughout.

Small bowl or bucket-shaped pots with simple or everted rims, eg 129 and 126, were most probably drinking cups. Vessel 60 from Phase II would fit into this group. There are several large, barrel-shaped pots with flattened, simple rims probably designed for cooking, eg 133 and 93, similar to 43 in Phase II, Other larger, barrel-shaped vessels have either simple, tapering rims, eg 114, or more complicated lid-seat rims, eg 144 and 194. There is a large group of medium or small-sized, barrel-shaped vessels with a wide variety of everted rims, eg 162 and 177; most were probably used for storage.

Finally there is a group of medium and small vessels with steeper sides and tapering, simple rims, used either for storage or as drinking cups. Both thumb pots also appear in Phase III.

Re-use of Main Structure Platform

93 C 1438
Large, barrel-shaped cooking pot. Fabric eight with dolerite inclusions. External surface very dark-grey/brown, core black, interior pink. Thick, black concretions with surface sooting on outside shoulder, rust-coloured concretions, possibly ferruginous, in patches on the interior and on break surfaces.

100 C 1495
Shouldered vessel with steep, flattened rim, fabric six with dolerite inclusion. Exterior black with sooting and concretions. Core very dark-grey showing a buried red/yellow exterior. Interior red/yellow.

Circular Structure I

101 C 792
Rim fragment from simple, rimmed, barrel-shaped pot. Fabric three with dolerite inclusions. Red/yellow surfaces, dark-grey core.

102 C 297
Barrel with sharply everted rim, Fabric five with quartz inclusions. Exterior and core very dark-grey, interior dark-grey/brown. There are concretions on underside of rim and some sooting on surface. Decoration is with finger-tips along edge and on top of rim.

103 C 314
Shouldered vessel with simple, rounded rim. Fabric eight with dolerite inclusions. Exterior is pink, core and interior are grey. There is evidence for cleaning on both surfaces. Slight finger-tip impression on interior of rim would appear to be constructional rather than decorative. This is probably a storage vessel.

104 C 922
Thumb pot. Fabric probably six with dolerite inclusions. Exterior surfaces brown. Discussed separately above.

Circular Structure B

106 B 496
Barrel with steep everted rim, fabric seven with quartz inclusions. Coarse surface, all surfaces black.

112 B 683
Steep-sided, barrel-shaped pot with slightly everted, simple, rounded rim, fabric three with small voids, possibly from limestone inclusions. Exterior surfaces are smooth with a reddish, strong brown colour. Core is red/yellow.

113 B 457
Slack-shouldered, S-profiled cooking vessel. Fabric seven with dolerite inclusions. Concretions on external shoulder. Red/yellow external surfaces, grey core.

114 B 722
Exact reconstruction using approximately half of vessel. Simple-rimmed cooking pot, fabric six with dolerite inclusions. Interior and core grey. Exterior predominantly dark-grey through smoke smudging, with evidence of buried red/yellow surface.

Circular Structure N and Annexe

116 D 45
Small, steep-sided pot with simple flattened rim, fabric six with large quartz and dolerite inclusions. Black exterior and core, brown interior. Surface too coarse for a consumption vessel.

119 C 1928
Base, fabric five heavily gritted with crushed quartz. Exterior and half core black, interior and interior core red/yellow. Heavy sooting but no concretions on exterior. Almost vertical sides and clean join with base make this vessel particularly unusual. The base is decorated with two parallel lines of finger indentations. A specific storage function seems likely. The gritty, sandy surface is uncommon but possibly caused by abrasive cleaning.

Circular Structure D

120 B 744
Barrel with thick everted rim, fabric six with dolerite inclusions. Exterior red/yellow, interior grey, core dark-grey.

Circular Structure M

126 C 2067
Small, bowl-shaped pot, fabric five with quartz inclusions. External surfaces red/yellow, core black.

Stratigraphy in D

129 D 23
Bucket-shaped pot with tapering, simple rim. Fabric four with dolerite inclusions. Exterior and interior surfaces red/yellow with sooty smudging on exterior core grey.

Partitions, Phase III

133 C 2229
Barrel-shaped cooking vessel with lid-seat rim. Fabric seven with dolerite inclusions. Red/yellow interior with very dark-grey core and exterior with concretions on exterior of rim. Sherd shows clear evidence for pot construction with overlapping coils.

134 C 2428
Shape suggests heavy wear. It is taken that this sherd represents the section through the base of a vessel, but

if so it suggests a linear as opposed to curvilinear shape with near vertical sides, and therefore does not relate to any of the normal pot forms associated with the site. Fabric two with dolerite inclusions. All surfaces grey.

135 C 2450
Barrel-shaped pot with flattened rim, fabric seven with dolerite inclusions. External surface very dark-grey/ brown, with impressed rectangles on shoulder, and narrow slashes on rim. Two pairs of closely placed, subrectangular impressions on interior surface, possibly grain impressions.

Cobbled entrance and stratigraphy

137 C 372
Bucket-shaped vessel with impressed groove in top of rim and slight internal bevel. Fabric four with dolerite inclusions. Core is dark-grey, interior black and exterior dark-brown with sooting. Concretions are present on inner rim lip. A cooking function, possibly with a lid, seems likely.

138 C 367
Simple, barrel type pot. Fabric seven with dolerite inclusions. Tar-like concretions are extensive on the exterior, with smaller amounts on the interior but none on break surfaces. Exterior very dark-grey/brown, core black, interior red/yellow.

140 C 400
Vessel with everted, flattened rim, fabric four with dolerite inclusions, smooth surfaced. External surfaces black core very dark-grey.

144 C 486
Cooking pot of barrel-shape, with lid-seat rim. Fabric five with crushed quartz inclusions. Exterior and internal surface pale-brown, core dark-grey. Extensive concretions and smudging on external surface.

149 C 546
Barrel-shaped cooking pot with everted rim. Fabric six with quartz inclusions as well as voids, possibly from calcite. Very dark-grey exterior with concretions, interior red/yellow, core grey.

150 C 551
Extremely thick-rimmed cooking pot, steep-sided. Fabric seven with dolerite inclusions. External surfaces and core black, internal surface very dark-grey, with red/yellow below surface showing in section. Concretions on exterior.

156 C 1783
Gently curving, bucket-shaped storage pot, with everted, tapering rim. Fabric six with quartz inclusions. Core very dark-grey. Majority of surfaces red/yellow with some sooty smudging. Other sherds from the same vessel have more extensive smudging on external surface and small amounts of concretions.

Curvilinear Enclosure Ditch

162 B 1243
Barrel-shaped vessel with narrow shoulder and everted rim. Fabric five with crushed quartz inclusions. All surfaces black.

163 B 1243
Base, thin-walled with steeply angled sides, fabric six with quartz inclusions, smooth surface. All surfaces black, a rim sherd probably from the same vessel suggests a barrel-shaped form.

167 B 284
Exact form unclear. Fabric eight with large dolerite inclusions. Exterior and core grey, interior pink.

169 B 187
Possible consumption vessel with steep sides and simple rim, fabric four with crushed quartz inclusions. Interior and core very dark-grey, exterior red/yellow with very dark-grey patches. Decorated with oval nodules. See also 224.

170 B 155
S-shaped, slack-shouldered drinking cup. Fabric four with crushed dolerite inclusions and smooth surface. Pot excavated and reconstructed complete from single masking layer. External surface dark-grey, internal surface red/yellow, core very dark.

171 B 139
Thumb pot. Quartz inclusions with red/yellow colouring on the exterior and completely black on the interior suggesting that it was used to hold a burning substance. (See also 104, and discussion above.)

172 B 80
Small-shouldered vessel. Fabric four with crushed dolerite inclusions, External surfaces very dark-grey/brown, core very dark grey.

177 B 85
Thin-walled, barrel-shaped pot with everted rim, probably used for storage. Fabric five with extremely small (under 1 mm diameter) quartz inclusions. Exterior surfaces red/yellow with layer of sooting, core very dark brown. Part of the exterior surface has peeled away from the pot body, probably during firing.

Undifferentiated Stratigraphy

178 C 31
Bowl-shaped cooking pot with simple rim. Fabric four with dolerite inclusions. Dark-grey external surface, red/yellow interior, grey core with layer of red/yellow below external surface, Concretions on external surface,

182 C 32
Barrel-shaped cooking vessel with inverted rim. Fabric seven with dolerite inclusions. Pale-brown external and internal surface, dark-grey/brown core. Extensive soot smudging and some concretions on external surface. Top of rim decorated with finger impressions, inner lip of rim broken off.

184 C 32
Base. Fabric four with dolerite inclusions, External surfaces red/yellow, core dark-grey. A large section has broken away from the base, probably during tiring.

Features cutting Subrectangular Enclosure II

187 A 12
Probably a bucket-shaped pot with everted rim. Fabric

three with large rounded and angular voids up to 5 mm diameter. Exterior and core black, interior dark-brown.

195 A 5
Barrel-shaped cooking pot with simple flattened rim. Fabric eight with dolerite inclusions, exterior black with evidence of fire blackening and concretions. Interior red/yellow and has been scrubbed leaving inclusions proud of the surface, core grey.

196 B 11
Slack-shouldered barrel with simple flattened rim, probably a storage pot. Fabric five with quartz inclusions. Dark-brown/grey exterior, red/yellow interior, very dark-grey core.

197 B 44
Large cooking pot with lid-seat rim. Fabric five with dolerite inclusions. All surfaces very dark-grey. Concretions and sooting on external surface.

198 B 11
Shouldered pot with lid-seat rim. Fabric six with some dolerite but mainly quartz inclusions. External surfaces red/yellow with patches of brown and black, core black. This vessel has been particularly finely finished, the profile is constant throughout and all surfaces have been smoothed and polished. Within the assemblage this preparation is quite unique and suggests a 'foreign' origin.

207 B 41
One of two near-identical funnel-shaped sherds apparently from the same vessel but not joining. Fabric three with red/yellow exterior colouration, grey core and black interior.

209 B 124
Steep-sided, barrel-shaped vessel with flattened, slightly everted rim. Fabric seven with dolerite inclusions. Dark-grey/brown exterior, very dark-grey core. Interior patches of dark-grey/brown and red/yellow, the interior has been scrubbed out; small area of concretions on exterior.

215 A 16
Extremely large S-shaped storage pot. Fabric four with quartz inclusions. Exterior surface predominantly red/yellow with patches of black and pale-brown. Core grey, upper interior is pale-brown; the lower is grey.

Pit and Ditch Complex A

218 B 98
Steep-sided vessel with slightly everted rim. Fabric three with crushed dolerite and quartz inclusions. Smooth surfaces, exterior black, interior pink, core grey. Possible consumption vessel.

220 B 98
Small, bucket-shaped pot with flattened everted rim. Fabric four with dolerite inclusions. External surfaces red/yellow, core very dark-grey, finger nail impressions along rim which are probably constructional.

222 B 98
Barrel with everted rim. Fabric four with dolerite inclusions. Exterior and core very dark-grey, interior pink.

Phase IV

Mainly small drinking or storage vessels in fine fabric, generally slack-shouldered or S-shaped, eg 240 and 246. Some profiles are unique, eg 227 with a vertical shoulder. Only one example is decorated (224) and this is probably an imitation of a Romano-British rusticated beaker. Vessels 236 and 255 stand out as falling more easily into the Phase III group.

Late Rectangular Enclosure Ditch I

224 D 161
Barrel-shaped pot with everted rim. Fabric five with quartz inclusions. The exterior surfaces are a constant strong red/yellow, the core is black. Uniformity of the colouration suggests careful (as opposed to controlled) firing conditions (see Decoration above).

Late Rectangular Enclosure Ditch II

227 B 519
Vessel with vertical neck and everted rim. Fabric four with crushed dolerite inclusions, slight sooting on external shoulder. Exterior red/yellow, core black, interior light-brown/grey.

235 B 164
Base, fabric four with crushed dolerite and quartz inclusions. All surfaces very dark-grey, very even, smooth surfaces, slight smudging on interior.

236 B 164
Bowl-shaped vessel. Fabric five with quartz inclusions, very smooth surfaced. All surfaces dark-grey/brown.

240 C 157
Shouldered cooking pot with simple flattened rim. Fabric four with dolerite inclusions. Exterior very dark-grey with concretions, core grey with layer of red/yellow below exterior surface. Interior red/yellow and scrubbed clean, but with some concretions. Smooth surface.

241 C 157
Funnel-shaped sherd of group 2. Red/yellow external surfaces, dark-grey interior. Fabric two with very few finely crushed quartz and dolerite inclusions (less than 1 mm diameter).

243 C 326
Base. Fabric four, principally with quartz inclusions. All surfaces dark-grey, core dark-grey with layer of red/yellow below both surfaces.

245 C 413
Base. Fabric five with large number of finely crushed quartz inclusions. All surfaces grey/brown.

246 C 413
Small, steep-sided vessel with slightly out-turned, rounded rim, possibly drinking cup. Fabric five with crushed quartz inclusions. Exterior red/yellow, interior and core black. Concretions and sooting on interior surface.

255 C 413
Simple, barrel-shaped vessel, possibly a drinking cup. Fabric five with dolerite inclusions. All surfaces grey with white patches. Evidence for scrubbing out on exterior and interior surfaces.

Unassociated point features

267 C 2469
Cooking pot, rounded simple rim, barrel-shaped body. Fabric seven with dolerite inclusions, Thick concretions present on external surface but some also on inside. Black exterior and core, very dark-grey/brown interior.

272 C 569
Rounded barrel with everted rim. Fabric five with quartz inclusions. Exterior surfaces primarily red/yellow with patches of black, core very dark-grey.

Circular Structure C

274 B 541
Bowl-shaped pot. Fabric six with dolerite inclusions. All surfaces black. Concretions on external and internal surfaces, both of which have been wiped to give smooth appearance, except for where inclusions break the surface.

Circular Structure R

275C 2296
Large crucible fragment. Fabric two with crushed dolerite and quartz inclusions. Oxidized grey and brown surfaces and grey core. No direct evidence for contact with metals or extreme temperatures.

276 C 2296
Large, bucket-shaped vessel with simple flattened rim, no evidence for a cooking function. Fabric eight with large dolerite inclusions and coarse surface. Finger impressions around rim are likely to be constructional rather than intended decoration. Interior and lower part of exterior surface brown, core and upper half of exterior black with possible sooting. Several grain and grass impressions in surface.

Circular Structure S

280 C 2277
Large, barrel-shaped cooking pot with lid-seat rim. Fabric eight with dolerite inclusions. Exterior black with concretions and sooty smudging. Interior red/yellow, core dark grey.

281 C 2277
Curving spout, wider end has inturned lip most probably to facilitate joining with vessel or other spout section. Fabric two with a few crushed dolerite inclusions. External surfaces pink, core grey.

Circular Structure T

282 C 2224
Base. Fabric six with dolerite and sandstone inclusions. Exterior surface red/yellow, interior and core grey. Sooty smudging and grain impressions on base. The sides show clear indication of pot construction with overlapping 'slabs' or 'coils' along the joins of which it had fractured.

Unstratified

283 Field-drain 15
Rim sherd from topsoil but clearly of Iron Age type. Form is not obvious, but suggests an upright vessel with steeply inturned rim. Fabric six with inclusions are of large irregular pieces of quartz between 1 and 5 mm diameter. Exterior and interior surfaces are pale-brown, with dark patches of sooting on the outside. Body shape and rim type are unique, suggesting that the vessel may have been constructed for one particular function,

284 B 71 Hedge-line
Barrel with everted rim. Fabric five with quartz inclusions. External and surface and are very dark-grey, interior brown concretions on external face.

285 2 Topsoil
Bucket-shaped pot with rounded expanded rim. Fabric seven with dolerite inclusions. All external surfaces grey, core very dark-grey.

286 2 Topsoil
Barrel-shaped pot with an everted lid-seat rim. Fabric seven with dolerite inclusions. External surfaces grey, core very dark-grey.

287 2 Topsoil
Vertical sided body with expanded lid-seat rim. Fabric five with dolerite inclusions. Core dark-grey, other surfaces red/yellow with patches of brown.

288 2 Topsoil
Found in topsoil but nevertheless of particular interest. The fabric is distinct from any Thorpe Thewles type, colouration is black all over. Finely crushed crystalline/ sandy inclusions. Close formal parallels can be drawn with pottery from Castle Hill, Scarborough, dated to the 7th century, although fabrics are quite different. (Challis & Harding 1975).

289 2 Topsoil
Base, fabric seven with large dolerite inclusions. Interior and core dark-grey, exterior red/yellow.

The thermoluminescent dating of the Iron Age pottery *by I K Bailiff*

TL dating of pottery from Thorpe Thewles has been incorporated in a programme of research that is concerned with dating reduced coarse wares from north British sites of the Iron Age and early medieval periods. The site was particularly suitable for our programme, since it had already yielded a sequence of suitable pottery from well stratified and substantially uniform burial environments by the time the TL project had com-

menced. Also, excavation was due to proceed for further seasons, permitting additional sampling and long-term, on-site measurements.

The samples

Eighteen sherds taken from Phases II-IV of the site were submitted for dating (see Table 18 4:Dl). The fabric classifications are by Hedley Swain. Most of the fabrics were amorphous, coarse, unoxidized wares containing dolorite inclusions and one (TTTLlB) was selected as an example of well characterized black-burnished ware.

The measurements

The details of the laboratory experimental work, using the quartz inclusion and pre-dose techniques, are to be published elsewhere. However, the on-site measurements that were carried out should be mentioned here. Seven dosemeter probes were buried in baulks and sections that were considered to be representative of the burial environments of the samples for a period of one year. This procedure allows us to directly measure the radiation dose for particular burial environments and to determine the extent of variations in environmental dose-rate over the site. For dating programmes where overall accuracy of better than ± 10% of the TL age is being sought this is an important component of the experimental work (Aitken 1977).

The results

TL dates for twelve sherds are given in Table 19 (4:D2); the remaining six sherds were rejected since they yielded quartz samples of either low quantity or poor TL characteristics. The TL dates are given in years AD/BC and, being absolute dates, they require no secondary calibration. Two associated error terms are given in years at the 68% level of confidence, following an assessment of errors similar to that described by Aitken (1976). The first is a measure of precision and is to be used when comparing TL dates from this site. The second is the overall error and takes into account all known errors; it is to be used when comparing the TL dates with calibrated carbon 14 dates or calendar-based dates. The TL dates are compared with archaeological dating evidence in the discussion.

Phase II

The TL dates for Phase II form a group centering about 500 BC; if the sources of error between the samples can be considered to be random, a mean date (Aitken & Alldred 1972) of 485 BC (± 45; ± 190) may be derived. The first error term is the precision and the second the overall error associated with the weighted mean age, as discussed by Aitken & Alldred. This mean date for Phase II raises the interesting question of whether the occupation of the site was longer than had been previously thought (a proposed *terminus ante quem* of 300 BC), although this cannot be clearly demonstrated at the 95% level of confidence using the overall error.

Phase III

If the same assumptions concerning the random error are made for the Phase III TL dates, a mean date of 135 BC (± 110; ± 190) is obtained. The mean dates of Phases II and III can be shown to be from two groups by the use of the t test (0.01 level of significance).

Phase IV

The TL date of 110 AD (± 145; ± 175) for a sample of black-burnished ware (TT18) was in good agreement with the accepted date for this diagnostic fabric and further supports the consistency of the TL dating framework.

Of the remaining TL dates for Phase IV (TT 3, 16 and 17):

a) the date for TT3 (40 AD ± 220; ± 270) is consistent with its context, although the precision of AD evaluation was not particularly high, and

b) the dates for TT 16 and 17 are significantly earlier than their assigned phase, but their fabric is similar to the earlier phase II type and the excavator agrees that since they were recovered from an area of intense activity on the site, it is quite plausible that they were residual.

An examination of the distribution of TL dates with fabric type shows a grouping of early TL dates with fabric types 6-8, which confirms that none of the coarser fabrics are of late date. However, the early dates obtained for pottery from late phases of the site present a difficulty in deriving mean dates for phases on the basis of association of phase with TL sample where a small number of dates have been obtained. This raises the question of whether TL dates should be assessed by context/phase or by fabric classification where there is the possibility of residuality. Some care has to be exercised if macroscopic classification of fabric type is to be used, since it is inherently subjective. One way in which we can make a direct and unambigious comparison is by the testing of diagnostic fabrics (as we have done with the black-burnished ware) that have been assigned to a date range on historic evidence. However, for prehistoric sites, where no other complementary absolute dating may be available, the problem remains. Clearly, this is an interesting problem that we shall have to consider in more detail.

Acknowledgements

The research project was supported by the SERC and the University of Durham. The author acknowledges the cooperation and help of Mr D Heslop (Thorpe Thewles) who supplied the TL samples, and of Mr I A Watson (TL) and Ms J A Findlay (sample preparation) who assisted in laboratory measurements and are supported by grants from the Nuffield Foundation and the Manpower Services Commission respectively. Mr C C Haselgrove brought the site to the attention of the author.

The Romano-British pottery

by Martin Millet

Introduction

The material examined was divided into fabrics, using a hand lens, on the basis of the criteria suggested by Peacock (1977). The details of the occurrence of these fabrics are given in the catalogue (Tables 20-8; 4:El-E9) and are summarized in Table 12. In both these tables the material is divided according to the excavator's phases. The illustrated material is also grouped by fabric and phase, with the context of the sherds given in the catalogue. Insufficient material is present to allow detailed chronological conclusions to be drawn, although the general evidence for the different phases presents a consistent pattern. Individual fabric descriptions are followed by an assessment of the dating. A final section discusses the material in its regional context and presents the broad chronological conclusions.

Table 12 Summary of Roman Pottery

Phase	III		IV		IV		UNP		MOD	
			LRED I		LRED II[1]					
Fabric	wt (g)	%[2]	Wt	%	Wt	%	Wt	%	Wt	%
1a	11	3			67	7			26	
1b	5	2			84	9				
2	51	9			235	25				
3	5	10								
4					12	1				
5	28	6			2	1				
6	3	2			11	1				
7	11	3								
8					5	1				
9	3	1								
10					7	1				
11					2	1				
12	16	4			31	3			34	
13	77	21			210	31				
14	7	2								
A	87	23	179	100	39	4				
B	38	10								
C									9	
D					103	11				
E	61	16								
F					37	4	10			
G	18	5								
Totals	421	36[3]	179	82	925	54	71		69	

[1]Late Rectangular Enclosure Ditch I and II
[2]Percentage of Roman pottery present to nearest integer
[3]Percentage of Roman pottery within whole phase

Fabrics

1A South Gaulish samian ware. The material present is all Neronian or later.

1B Central Gaulish samian ware. Chronologically unspecific.

2 Wheel-made, reduced fabric, mostly grey. Common inclusions visible are quartz sand, subangular to angular; black inclusions, probably ferric; rounded brown inclusions, perhaps grog, Maximum size 0.5 mm. Some fine white mica. Well fired, origin uncertain. Illustrated sherds Fig 48, nos 31, 32, 33, 34 and 47. Dating presents difficulties as although there are a number of identifiable forms, only numbers 32 and 47 are paralleled in the region. Gillam (1968, form 112) gives a date in the early 2nd century for no 32. He also suggests a date of the later 1st century for no 47 (1968, form 337). This general time span is confirmed by the associations at Thorpe Thewles, and does not conflict with the general impression given by the other forms in this fabric.

3 Oxidized fabric with reduced core, tempered with slightly micaceous quartz sand, mostly very fine. Sparse larger angular to subangular particles, mostly of clear quartz. A few larger black inclusions, probably ferric. Soft but well fired. Origin uncertain. Same fabric as that used for the unusual Iron Age vessels. The dating is suggested by the single diagnostic sherd of rusticated beaker (7) which is unlikely to be later than the early 2nd century (Gillam 1968, form 98; Hanson *et al* 1979, fig 15, nos 11 and 15) and has good parallels in the Flavian period.

4 Reduced throughout, hand-made, wheel-turned.

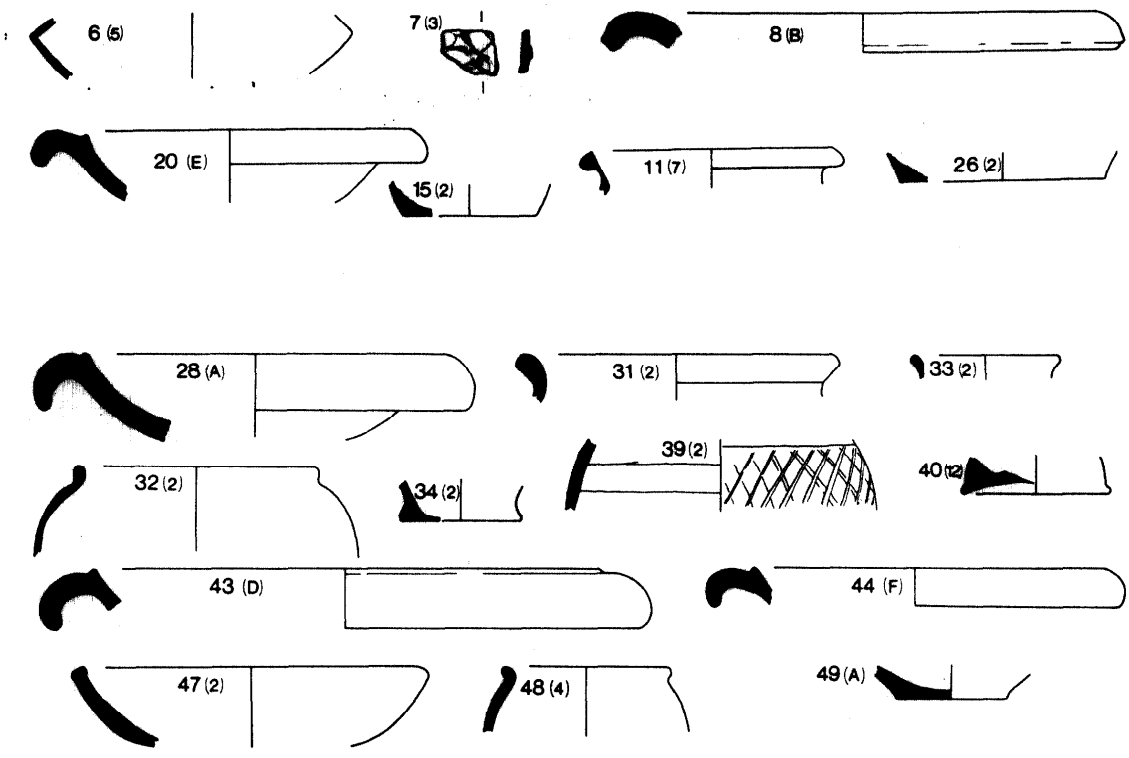


Fig 48 Romano-British pottery (1:4)

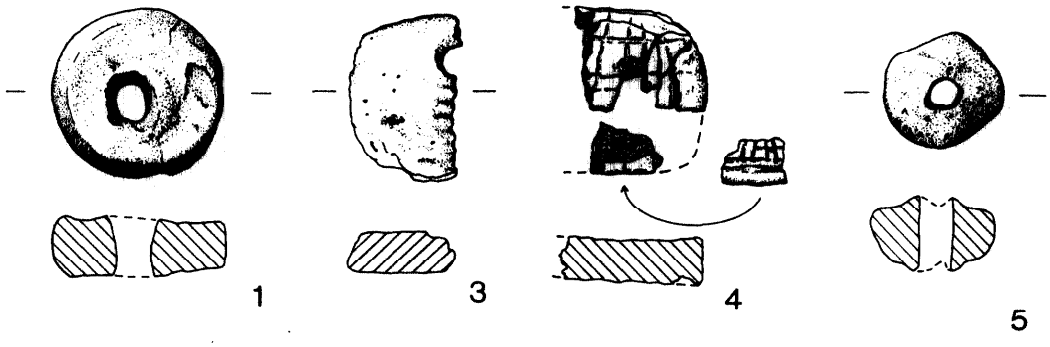


Fig 49 Objects of fired clay (1:2)

Tempered with abundant clear-to-translucent quartz. Black-burnished ware of Dorset origin (Williams 1977), Illustrated sherd Fig 48, 48. Parallels include Gillam (1968, type 123; Farrar 1973, fig 1 no 1). Dating is usually considered to be Hadrianic or later in the north, although production in Dorset begins in the Iron Age. There seems no reason to exclude an earlier 2nd century date as sites on the Stanegate seem to have received it in the Trajanic period (Simpson 1975, 325).

5 Orange, oxidized fabric, very fine matrix, soapy surface. Abundant fine mica, sparse fine subangular quartz (clear, translucent and rose) with some black, ferric (?) inclusions. Illustrated sherd Fig 48, 6. The fabric is not of diagnostic origin, although the form is closely paralleled by a pre-Flavian type commonly found on southern sites (eg Cunliffe 1971, 2, 191, fig 89, no 69; Marsh & Tyers 1978, 568, type IIIG; Hawkes & Hull 1947, pl LVIII, type 120). This makes a pre-Flavian date almost certain.

6 Bright-orange, oxidized, soft fabric with abundant subangular quartz (clear-to-translucent) and large (1-3 mm) ferric (?) inclusions. No dating evidence.

7 Oxidized, very pale-cream fabric with burnished surfaces. Very fine, rounded quartz inclusions. Illustrated form Fig 48, 25. The form is that of a butt beaker, and the fabric suggests a southern British or continental origin. The parallels (eg Hawkes & Hull 1947, types 112-5) all suggest a pre-Flavian date.

8 Reduced and overfired sherd, perhaps a waster, tempered with abundant, rounded-to-subangular, clear quartz. No dating evidence.

9 Reduced, blue-grey fabric, hard-fired with rough surface. Abundant, clear-translucent, subangular quartz. No dating evidence.

10 Reduced, pale-grey fabric, micaceous surfaces tempered with abundant, angular-subangular, clear-to-translucent quartz and sparse ferric (?) inclusions. No dating evidence.

11 Yellowish buff, oxidized fabric, tempered with abundant, subangular, translucent quartz and ferric (?) inclusions. No dating evidence.

12 Pale, orangey/buff, oxidized fabric with visible gold mica. Tempering consists of abundant, ill-sorted, clear and multicoloured, angular-subangular quartz plus a few feldspar and grog fragments. Variable coarseness, with coarsest resembling South Spanish amphora fabrics (Fabric 13). Mortaria fabrics B, E, and F belong to this general group. Illustrated sherd Fig 48,40. There are no clearly datable forms present although the illustrated base (no 40) resembles a Dressel 28 amphora of the 1st century AD, and a residual sherd from a modern context may derive from the rim of a Hofheim type flagon. The mortaria in a related fabric are all 2nd century.

13 South Spanish Dressel 20 amphora (identification kindly confirmed by Dr S J Keay). Although produced in quantity in the 1st and 2nd centuries AD, these are most characteristic of the 2nd century in Britain.

14 *Terra Nigra:* white paste with very fine, subangular, translucent, quartz temper. Grey-to-black slip, with fine mica visible. Imported. *Terra Nigra* is characteristic of the pre-Flavian period, although some forms continue into the early Flavian period. The form of this vessel is uncertain, although a date after cAD 80 seems unlikely (Rigby 1973).

The Mortaria

by K F Hartley

Fabric A: 29 joins 30 and 28 is part of the same pot but does not join. Diameter *c* 230 mm. Soft, fine-textured, cream fabric with thin grey core and a few red-brown and quartz inclusions; the trituration consists of much small quartz and a little red-brown material. Burnt before fracture. This mortarium is likely to be from the same workshop as those found in a store at Castleford (publication forthcoming), in a deposit dated AD 140-50; these were almost certainly made in south Yorkshire and perhaps at Castleford itself. A date in the first half of the 2nd century would best fit this example (Fig 48, 28). Three further sherds, 16, 17, and 18 conjoin.

Fabric B: 8, a flange fragment with distal bead, in pink-brown fabric with pale-grey core; a good amount of ill-sorted quartz, red-brown and occasional black inclusions; appears to be self-coloured; surface abrasive. Probably made in the north-east of England *c* AD 135-75 (Fig 48, 8). This fabric appears related to fabric 12 above.

Fabric C: 70, body sherd in very hard, orange-brown fabric with thick, dark-grey core and quartz inclusions; self-coloured; trituration consists of ill-sorted quartz fragments. Origin unknown, but probably either Little Chester or a workshop in the north of England. A similar example is known from Wharram Percy. Probably 2nd century.

Fabric D: 43, Diameter *c* 35 cm. A mortarium in fine-textured, orange-brown fabric with some quartz and occasional traces of cream slip. Origin uncertain but undoubtedly in the north, York would be a possibility (Fig 48, 43).

Fabric E: 21, (flange fragment) joining 20. Diameter *c* 220 mm. Sandy, orange-brown fabric with mostly ill-sorted quartz and occasional black and red-brown inclusions; no trituration survives; slightly abrasive. Made in north of England, probably in the period AD 130-70 (Fig 48, 20). This fabric appears related to fabric 12 above.

Fabric F: 44, diameter *c* 210 mm. Fine textured, orange-brown with grey core and moderate amount of quartz, red-brown, grey and white inclusions; no trituration surviving. This is a somewhat different fabric from E but again will be the product of a workshop in the north of England. AD 100/120-160 (Fig 48, 44). This fabric appears related to fabric 12 above. 71, an incomplete rim section is in a fairly similar fabric. Made in the north of England in the 2nd century.

Fabric G: 10, body sherd in soft, fine-textured, orange-brown fabric with few red-brown and some tiny quartz inclusions; one red-brown trituration grit survives; cream slip. Made in the north of England, possibly at York and more likely to be 2nd century than any other date.

Discussion

Regional con text

Aside from the obviously imported and non-local fabrics, the majority of the assemblage seems to have a local origin. Few of the fabrics identified here have, however, been identified from the recent excavations at Stanwick

and there are similarly few resemblances to the Binchester assemblage (J Evans pers comm). In the absence of detailed knowledge of other assemblages from the area little progress can be made, except to observe that the recurrence of coarse ware vessels tempered with ferric inclusions (both here and at Stanwick) perhaps indicates pottery production to the south of the Tees, around the Cleveland Hills. It remains possible, however, that these inclusions derive from iron working as, for instance, at Stanwick itself where recent excavations have revealed what may be industrial hearths (Turnbull, pers comm). The general lack of similarities with Stanwick may suggest that the sites were involved in separate networks of exchange, or were differentially involved in the same network, as both sites were certainly occupied contemporaneously (Haselgrove & Turnbull 1984). We may note that the rich assemblage of samian and other imports at Stanwick in comparison with Thorpe Thewles perhaps supports the latter hypothesis with Stanwick being a high-status centre. This would be supported by a comparison of the two samian assemblages, with Thorpe Thewles being 'normal' in its proportion of decorated material, whilst Stanwick has exceptional quantities of it at the same period.

Chronology

The pottery shows an overall range from the mid 1st century AD (c AD 60) to the middle of the 2nd century. Some of the material cannot be later than AD 70, although with the exception of a couple of sherds of *mortaria* nothing need be later than *c* 130. The most likely pattern of supply seems to be one with a small quantity of material arriving intermittently over a long period.

The comparatively small range of material and limited absolute quantities from each phase makes the dating difficult. The following list of dates is therefore only tentative, and may require modification when further sites in the region are known.

Phase III: Pre-Flavian to early Flavian

Phase IV: (Late Rectangular Enclosure Ditch I) Latest material includes mid 2nd century *mortaria* although the range runs from the early Flavian.

Phase IV: (Late Rectangular Enclosure Ditch II) Generally suggests an early 2nd century date.

Phase IV: (Unassociated Feature C529) The only material is from the first half of the 2nd century.

It may be noted (Table 12) that the quantity of Iron Age material in Phase III is considerably more than in the later phase; this *may* support the limited evidence of the datable sherds in suggesting a gap in pottery supply between Phases III and IV. It is essential to distinguish here between pottery supply and site occupation since they are not the same thing. The amount of material concerned is also very small in absolute terms, although representing a substantial assemblage in regional terms.

Against this possibility of discontinuity should be weighed the similarity in fabric between Phase III and the later phases, and the general absence of material typical of the 2nd century from the later phases (compare Gillam 1968, *passim).* The only notable dissimilarity is in the quantity of Fabric 12 which is accounted for by the small number of large and heavy sherds of this fabric from Phase IV.

Objects of fired clay

by H P Swain

Introduction

This small group (Fig 49) includes two spindle whorls, two tablets (both of particular interest), an unidentified clay object and a small terracotta figurine found in the topsoil and in all likelihood post-medieval in date, which is described in fiche.

Cl C32 Unassociated Masking Layer - Main House
Spindle whorl. Diameter approximately 47 mm, hole diameter 10 mm, 12 mm thick. Oxidized red/yellow surface, with many grain impressions. No inclusions.

C2 B44 Main Enclosure Ditch
Fired-clay object resembling the rim of a pot, but it displays no perceptible curve. The surface is dark-red, the core grey and with angular inclusion voids. The object is extremely light and bears no resemblance to any of the Iron Age pottery fabrics.

C3 B386 Curvilinear Enclosure Ditch
Tablet constructed of two thin, semicircular pieces of clay pressed face to face, the join showing along the straight edge. The clay is of Iron Age pottery fabric two, with inclusions of crushed quartz. One face (Fig 49, 3) has been decorated with a series of grooves, the other appears to have been broken off from a larger piece. It could therefore be argued that this was once a complicated pendant with a circular hole for suspension and possibly a symmetrical pattern of central grooves.

C4 B519 Late Rectangular Enclosure Ditch II
Rectangular tablet. Although nearly complete when found, this object proved to be, with the exception of the outermost surface, non-ceramic, making it extremely difficult to reconstruct. Roughly 47 mm by 45 mm wide and 13 mm thick, the tablet has straight, flat sides and rounded corners. All surfaces including edges are decorated with uneven criss-cross incisions. Exterior surfaces are evenly oxidized red/yellow, interior colour is unoxidized dark-grey. Inclusions are principally of finely crushed quartz. The fabric is not obviously similar to the pottery vessels, being flakey and uneven. The most obvious function would be as a gaming piece.

C5 A2 Topsoil
Spindle whorl of uneven shape. Diameter roughly 34 mm, hole diameter 10 mm, maximum thickness 20 mm. Oxidized red/yellow surface, no inclusions.

Metalwork

by Lindsey Allason -Jones

Gold

MI C206 Features cutting Burnt Horizon (P7)
Gold earring consisting of two open circles in each of which is an open motif made from continually coiled, circular-sectioned wire welded to a central dome-headed pin to form a six-looped, three-dimensional 'daisy' pattern. The loops project well out from the plan of the piece. The outer edges of the loops are welded to the rectangular-sectioned outer circle which in turn is welded to the second circle. A curved strip welded to both circles is broken at the ends and is probably the remains of a third ring, but no evidence survives to suggest that this ring had a looped centre.

This is an attractive piece of jewellery which has a definite Celtic 'feel' to it although no obvious parallels spring to mind either from Britain or the Continent. Looped gold wire is known on a finger ring from Munsingen dated to the 1st century BC (Jacobsthal 1969, pi 52, no 77) and also on a later earring from Tortosa in Spain (Marshall 1969, no 2343), but is not commonly used in this manner. It is possible that the motif is a three-dimensional development of the wheel pattern, popular from the 1st century BC to the 2nd century AD (Dechelette 1914, 1298). On purely stylistic grounds the earring could be ascribed to Continental rather than British manufacture in the 1st century BC. Total width 26.5 mm; Diam of rings 14 mm; Est total thickness 6 mm.

Silver

M2 C2 Topsoil
Penannular silver ring of circular section with tapering terminals (Fig 50). The decoration of incised transverse grooves all round the interior of the ring suggests that it is an earring rather than a finger ring, although this would still be an unusual way of decorating an otherwise common earring form.

X-ray fluorescence suggests that the silver was probably debased with 10-20% brass. Int diam 18.5 mm; T 1.5 mm.

Bronze

M3 C299 Main Structure, Floor Levels
Undecorated, distorted, penannular bronze earring of oval section tapering to both ends. This is a common type in all cultures and as such is undateable. W 2 mm; T 1.5 mm.

M4 C274 Burnt Horizon
Bronze spiral ring of three coils of rectangular-sectioned wire. Both ends taper to a point. The diameter is very small and it may have been a child's finger ring. Int diam 12 mm; T. of wire 1.5 mm.

MS C274 Burnt Horizon
Long, straight, tapering shank of a bronze bow-brooch. The convex face has two deeply incised median lines. The brooch has been broken above the waist but seems to curve sharply from the three waist ribs. This suggests that it is a brooch of Riha's Type 2.6, dated to the first half of the 1st century AD (1979, Taf 8, no 215-19; 215 is decorated by a single median line). See also Almgren 1923, No 19; Ritterling 1912, Type la; and Ettlinger 1973, Type 18.

The turnover has broken off the solid catchplate but a fragment of pin survives corroded to the side. The edge of the catchplate runs up under the waist, and has a tiny hole pierced through it. Riha recognized a single hole in the catchplate as a separate type (1979, Abb 2, k) as opposed to two holes which Olivier saw as being for the purposes of repair (in Potter 1979, 209). L 57 mm; max W 6 mm.

M6 C1220 Drainage-Ditch Q
Bronze strip-brooch made in one piece. The bow is rectangular in section and uncurved, emerging from the spring at a right angle. The tapering face is decorated with a median groove and two incised marginal lines. The catchplate is solid and is missing the turnover, but traces of a pattern picked out in pounced dots survive on one face. The loosely coiled spring is circular in section and forms one coil on either side of the bow. The chord is external.

This unusual brooch can be compared with the group of Nauheim derivatives from Fishbourne (Hull in Cunliffe 1971, 100, figs 36, 37) in the angular, straight bow and the solid catchplate. Several of the Fishbourne brooches are also decorated with incised lines and grooves along the bow. Of the 21 found on that site 19 were 'securely dated to AD 43-75'.

The external chord was not present on any of the Fishbourne brooches, but two examples are known from Glastonbury (Bulleid & Gray, 1911, I, pl XL, E185, E 142). The punched-dot motif is also unusual on Nauheim derivative catchplates although occasionally seen on trumpet brooches of a similar date (cf Ushaw Moor, Durham: *Durham Archaeol J* forthcoming; and Chester: *Antiq J* 1963, 43, 289. In this latter context the motif is apparently a north British device copying the openwork scroll design of the early trumpet brooches (cf Carmarthen, Risingham: *Antiq J* 1975, 55, 41 ff; and Llanferres: *Antiq J* 1963, 43, 290).

Nauheim derivative brooches are common on sites in the south of Britain but comparatively rare in the north, a fact which has been taken to suggest that the form did not survive long into the 2nd century AD (Bushe-Fox 1928, 40). L 62 mm; max W 5 mm.

M7 Cl355 Cl409 Circular Structure D
Bronze spiral ring of two coils of circular-sectioned wire. Both ends are rounded rather than tapered.

Spirals were used as finger rings from the Bronze Age to the Anglo-Saxon period. However, Richter has also suggested that 'spirals of this type were apparently worn in the hair and also in the ears, as is shown by their appearance in the ears of the heads on 'Canopic' urns' (1915, 342, no 1150). Int diam 16 mm; T of wire 1.5 mm.

M10 B98 Stratigraphy, Phase III
Tiny piece of bronze wire. L 12 mm; T 0.25 mm.

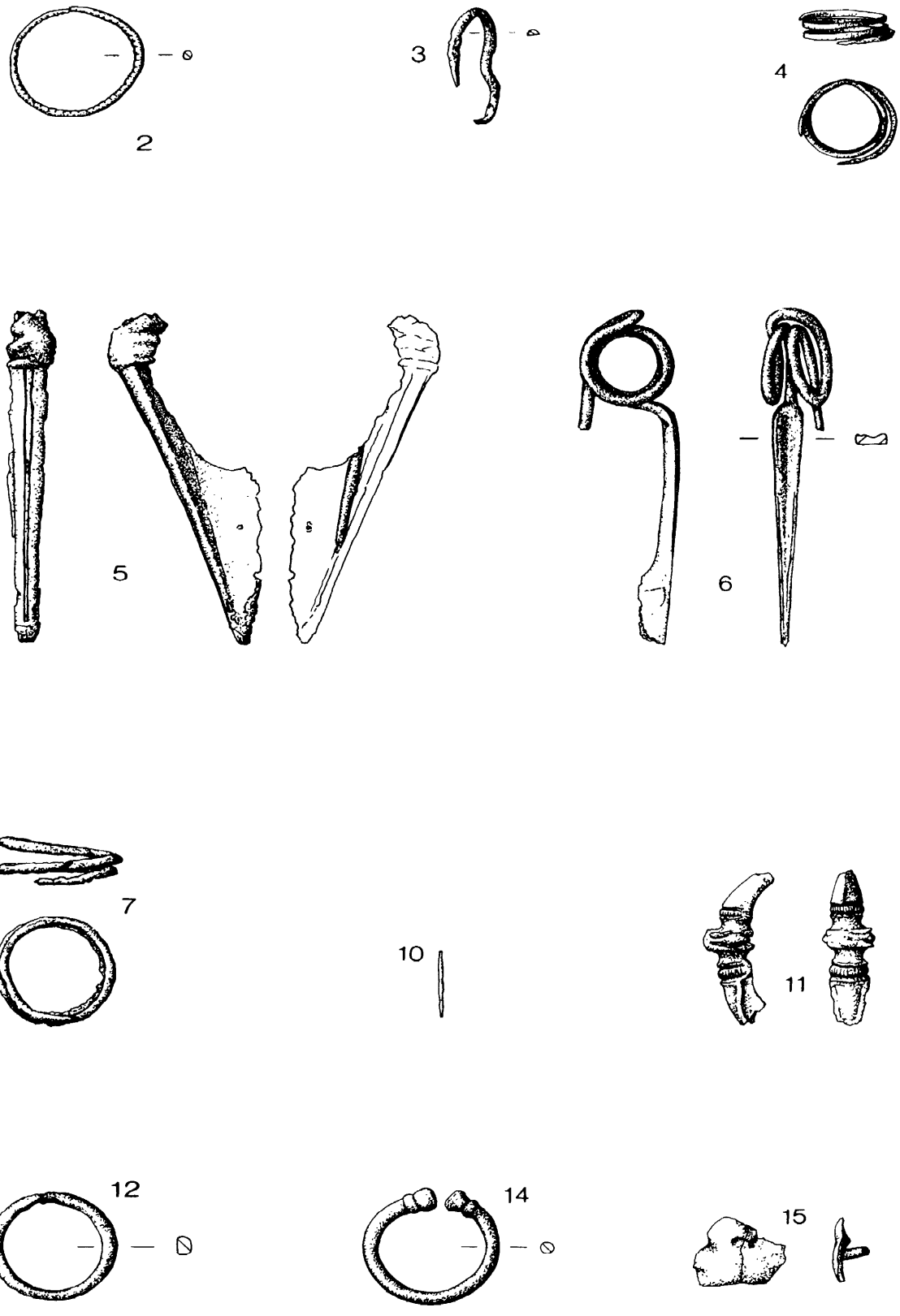


Fig 50 Metalwork 1 (1:1)

Table 13 Metalwork catalogue

Cat. No.	Metal	Grid	Context	Feature	Feature group	SF No.	Phase	Description	Illustration	Comments
M1	Au	C	205	—	FC BH	—	III	Earring	Plate 7	Possible continental 1st century BC
M2	Ag	C	2	—	TOPSOIL	302	MOD	Earring	Fig 50	
M3	Ae	C	299	—	MSFL	60	II	Earring	Fig 50	
M4	Ae	C	274	—	BH	57	II	Spiral ring	Fig 50	
M5	Ae	C	274	—	BH	55	II	Brooch	Fig 50	Early 1st century AD
M6	Ae	C	1220	1337	Q	207	III	Brooch	Fig 50	Probable 43–75 AD
M7	Ae	C	1355	1409	CSD	215	III	Spiral ring	Fig 50	
M8	Ae	B	160	284	CED	69	III	Pin/strip		Fragment
M9	Ae	B	274	284	CED	91	III	Fragment sheet		
M10	Ae	B	98	—	STRAT III	52	III	Pin/wire	Fig 50	Fragment
M11	Ae	B	54	263	LRED II		IV	Brooch	Fig 50	Trumpet type late 1st–mid 2nd century AD
M12	Ae	C	407	413	LRED II		IV	Ring	Fig 50	Probably suspended
M13	Ae	C	407	413	LRED II	—	IV	Fragment		Very small
M14	Ae	C	2	—	TOPSOIL	—	MOD	Penannular brooch	Fig 50	1st century AD
M15	Ae	C	2	—	TOPSOIL	3	MOD	Small stud	Fig 50	Possibly ear-stud
M16	Fe	C	310	—	LOMSD	66	III	Small rod	Fig 51	
M17	Fe	B	743	744	D	140	II	Fragment ring		
M18	Fe	C	367	—	SCS	77	III	Bar		Fragment
M19	Fe	B	80	91	A	39	III			Fragment
M20	Fe	B	85		STRAT III	45/6	III	Curved bar	Fig 51	Joining pieces
M21	Fe	C	407	413	LRED II	115	IV	Fragment ring	Fig 51	
M22	Pb	A	37	—	MED	18	II	Fragment sheet		Very small

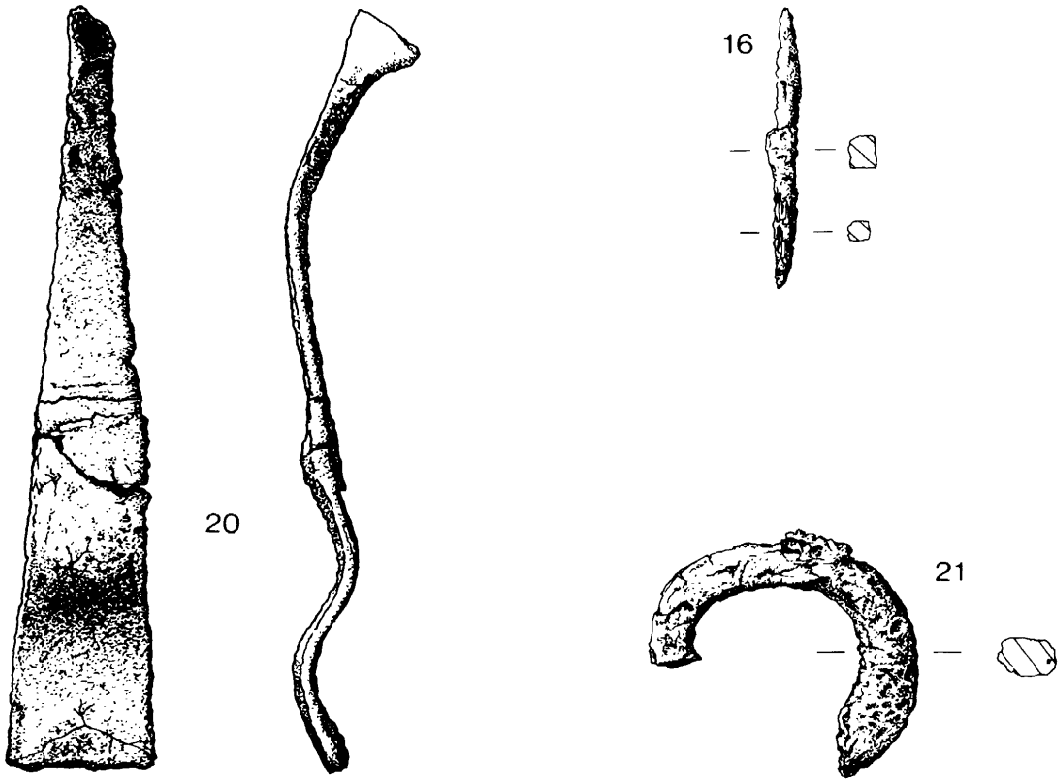


Fig 51 Metalwork 2 (1:1)

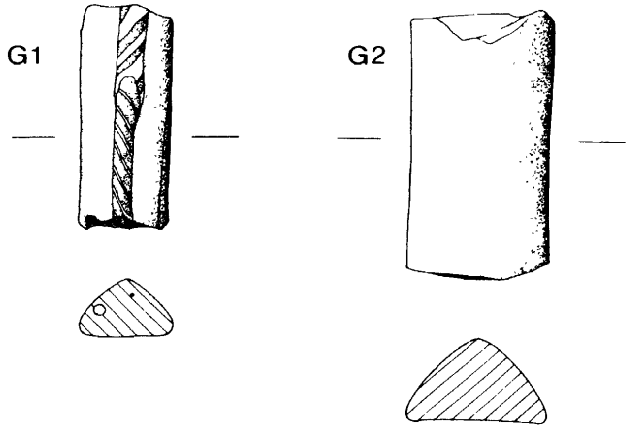


Fig 53 Objects of glass (1:1)

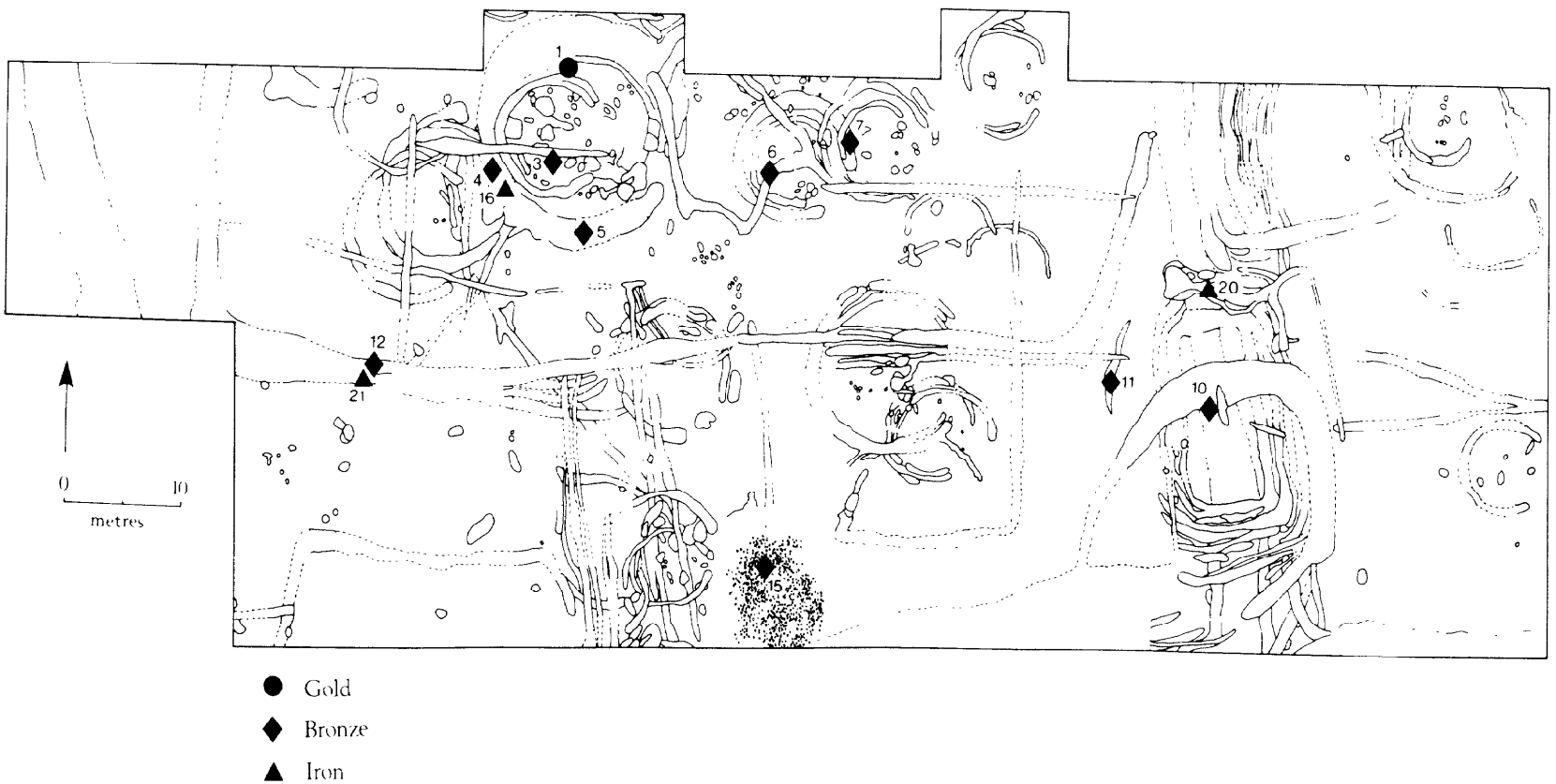


Fig 52 Distribution of metalwork

MI1 B54 B236 Late Rectangular Enclosure Ditch II
Waist from a trumpet brooch. The upper bow was of diamond section. A band of milling between two grooves separates the upper bow from the waist which has a degenerate acanthus moulding surviving at the back as two ribs. Below the waist is another band of milling between two incised lines; as with the upper band this milling does not continue- around the back of the bow. The fragment of lower bow which survives suggests that there was a shallow central rib. Although fragments of enamel were found amongst the acanthus moulding it is probable that they were from the head or lower bow. (cf Watercrook: Olivier in Potter 1979, fig 84, no 12; late lst-mid 2nd century AD; and Newstead: Curle 1911, pl LXXXVI, nos 15-16)

This is a common form, particularly in the military areas of Britain, and was already being produced in the north before the end of the 1st century AD L 27 mm; Max W 9 mm.

M12 C407 C413 Late Rectangular Enclosure Ditch II
Annular bronze ring of oval section with a well worn groove across the inner face suggesting that the ring was hung in use.
D 20 mm; W 2.5 mm; T 3 mm.

M14 C2 Topsoil
Penannular bronze brooch with knobbed terminals set on disc necks. The circular-sectioned shank expands to the terminals. The pin is missing, but there is an area of wear 13 mm from one neck and parallels from Newstead have fragments of hinge survivng in the same place (Curle 1911, pl LXXXVIII, nos 3, 17). The bronze is very light in weight and traces of white metal plating survive around the terminals.

This type of penannular brooch has been classified by Elizabeth Fowler as Type A3 and dated to the 1st century AD (1960, 149-77).

MI5 C2 Topsoil
Tiny bronze stud. Although fragmentary, the head appears to be four-petalled and its size suggests that it may have been an ear-stud (cf York: Wenham 1968, fig 36, no. 30). L of shank, 2 mm.

Iron

M16 C310 Layers over Main Structure Ditch
Iron rod of rectangular section tapering to both ends and stepped in the centre (Fig 51). L 42.5 mm; Max W 5 mm; Max T 4 mm.

M20 B85 Stratigraphy, Phase III
Iron bar in two pieces tapering to an expanded end and curved to a shallow S-shape. Broken at both ends.

Two similar objects in bronze from Cyprus with a ring projecting from the splayed end and then expanded end developed into a loop are identified as hasps by Richter (1915, 360, nos 1234, 1235).

L 110 mm; T 2 mm; Max W 19 mm.

M21 C407 C413 Late Rectangular Enclosure Ditches II
Incomplete, corroded iron ring of oval section. An apparent expansion from one edge is the result of corrosion and is not an original feature. D 40 mm.

Metal finds in the fiche archive *by H P Swain*

The fiche archive contains a catalogue and brief description of other metal finds which through fragmentation or corrosion were functionally unidentifiable. These were three pieces of iron from Phases III and IV, one piece of lead from fill of main ditch and three fragments of bronze from Phase III (metal catalogue nos M15 to M22, 4:G1). The distribution of volume-printed metal objects is shown on Fig 52.

Objects of glass *by Jennifer Price*

Three fragments of glass were found during the excavations, one from a vessel and the other two from bangles (Fig 53).

G1 A12 Main Enclosure Ditch
Fragment, bangle with D-shaped cross-section and unmarvered horizontal cord at centre. Very pale-greenish ground, blue and opaque white twisted cord. Ground dull and extremely bubbly, with some large elongated bubbles extending across the surviving piece. Two pieces of cord were used for central trail; one with loosely twisted rods of blue and white of approximately same thickness is overlaid by one with tightly twisted rods where blue is thicker than white. Height 10 mm; internal diameter 48 mm; maximum thickness 28 mm; length of fragment 28 mm.

G2 C333 C338 Late Rectangular Enclosure Ditch II
Fragment, bangle with triangular cross-section. Opaque white. Dull and bubbly. Height 15mm; internal diameter 60 mm; maximum thickness 10 mm; length of fragment 32 mm.

Several hundred glass bangle fragments have been recorded in Britain, and particularly in northern Britain, on Roman sites in contexts which are usually datable to the later 1st or early 2nd century AD and on native sites which are often difficult to date closely. These have been examined on a number of occasions. Kilbride-Jones (1937-1938) defined three types and produced a basic classification for these bangles, and Stevenson (1954-1956; 1976) has provided a great deal of further information and extended the distributions of some of the types.

The two fragments from Thorpe Thewles come from a Type 2 bangle (no G1) and a Type 3A bangle (no G2).

No G1 is from a bangle with a single horizontal twisted cord. The surviving fragment indicates that the original cord was not sufficient to surround the bangle as it has been patched with a second cord which partly overlies it. Type 2 bangles have D-shaped sections and one or more horizontal twisted cords, sometimes with spiral 'eyes' and occasionally with opaque white lines near the edges. The most usual colour combination is bluish-green, though other ground and cord colours are also known.

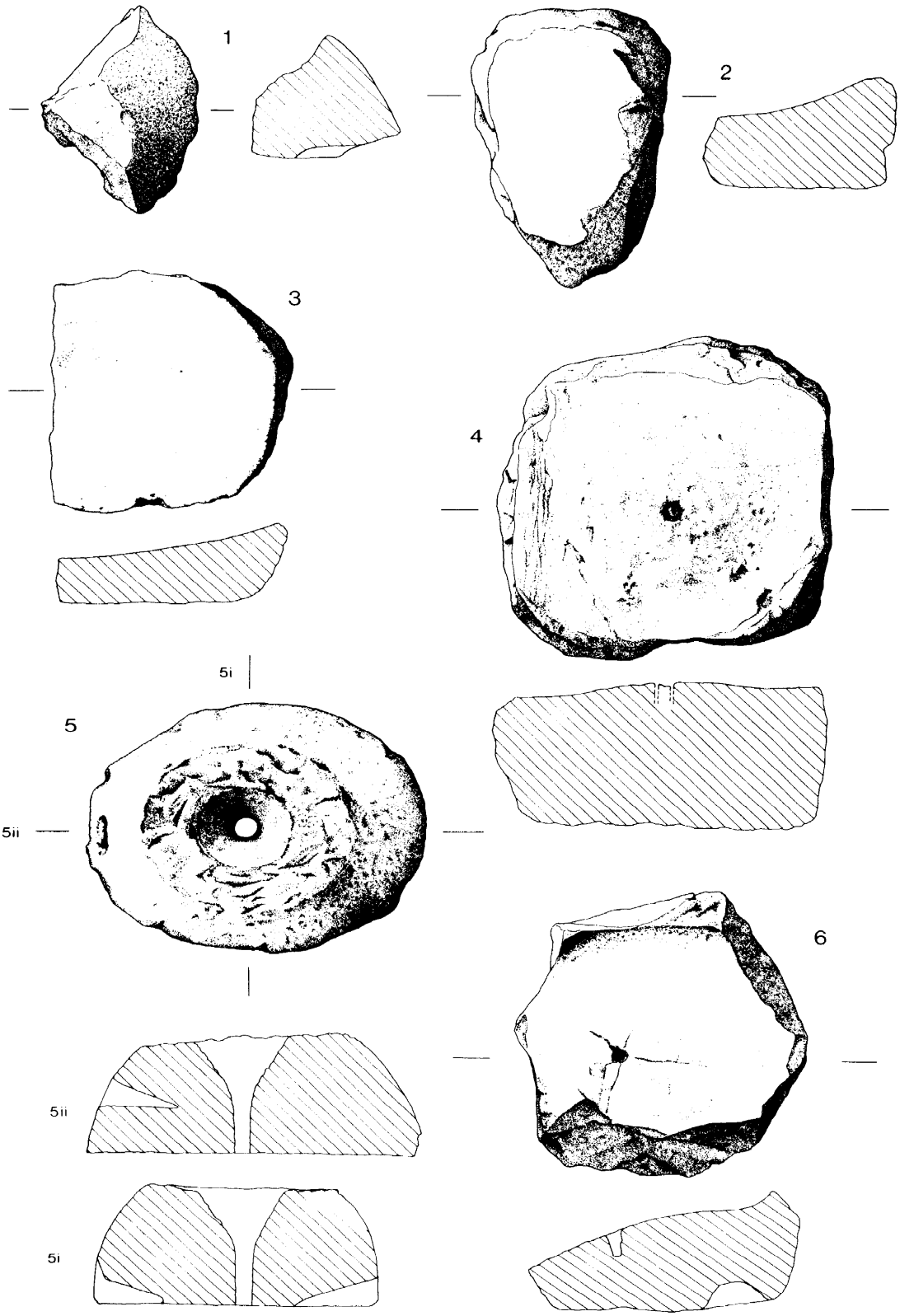


Fig 54 Querns (1:6)

It has usually been accepted that these and other glass bangles were produced at one or more sites in northern Britain, probably in the late 1st and early 2nd century AD, but recent finds of fragments in Neronian and very early Flavian contexts at Fishbourne (Harden & Price 1971, 366-7), Valkenburg (van Lith 1977; 1978-9, 119-21), Cirencester (Charlesworth, 1982, 106) and Usk (unpublished) indicate that Type 2 bangles were in use and presumably produced in southern Britain before they were made in the north. Furthermore, a number of other pieces come from settlements with evidence for early military occupation, such as Canterbury, Chichester, Sea Mills, Verulamium, Colchester and Baldock. As none have been found on Romano-British native sites in southern Britain, it is possible to suggest that the initial production may have been connected in some way with the Roman military presence in the region. This suggestion has recently been developed in greater detail in connection with a bangle fragment from Wharram Grange Roman villa (Price forthcoming).

In northern Britain, very few pieces have come from closely dated contexts; the finding of two fragments in the Agricolan supply base at Red House, Corbridge (Charlesworth 1979, fig 20, 15-16), and another from within the clay rampart of the Flavian fort at Elslack, near Skipton (May 1910, pl XII, fig 1) demonstrates that they were in use in the last quarter of the 1st century AD, but there is no clear evidence for their presence before the establishment of the Roman military presence in the region, In this connection it is noteworthy that the Thorpe Thewles piece was found in a sealed context at the top of the Main Enclosure Ditch, and may come from an immediately pre-Roman horizon, which makes it unique.

The bangles are distributed widely in northern England and lowland Scotland, occurring at many military and native sites. The centre, or centres, of manufacture have not been identified, but it seems very possible that their production in northern Britain is also connected with the Roman army in some way.

No G2 is from a heavy, opaque white bangle with a triangular cross-section (Type 3A). About 200 fragments of these have been recorded in northern Britain, some of which have come from Roman forts and their *vici,* though most are known from native sites. There is a very marked concentration of finds in south-east Scotland and Northumberland, and it has been suggested that Traprain Law, where 88 pieces have been noted, may have been a centre of production, However, recent work in south-west Scotland and north-west England has produced evidence that the distribution of these bangles is far more widespread than was previously believed (Jobey 1972-4, 137). There are also many fragments from sites in Yorkshire and Lancashire, but the type is not found further south except for one piece from London (Stevenson 1954-6, 220).

There is very little evidence for the close dating of this bangle type, though it is generally accepted that they were made and used during the late 1st and early 2nd century AD. A fragment from Tullie House, Carlisle, was probably deposited around AD 90, and another from Chesterholm came from a stratified context dated to around AD 115-25 (Stevenson 1976, 53-4).

The Thorpe Thewles piece was found in the Late Rectangular Enclosure Ditch with pottery dating from the early 2nd century.

G3 B332 B419 Late Rectangular Enclosure Ditch II
(not illustrated), Small fragment, handle and shoulder of bottle. Bluish-green. Part of broad angular handle with multiple reeding applied to curved shoulder. Dimensions 12x12 mm; thickness (shoulder) 4 mm.

This minute piece of glass has certainly come from a 1st or 2nd century bottle which probably had either a cylindrical or square body. Such glass bottles were produced in very large quantities for the transport and storage of liquid or semi-liquid substances, though large specimens were sometimes re-used for a variety of other purposes, often ending up as cinerary urns. Both cylindrical and square bottles are extremely common in later 1st century contexts on sites in Roman Britain, and the square form also dominates 2nd century assemblages, though the cylindrical bottle disappeared soon after AD 100. Angular handles with multiple reeding occur on both forms as well as on bottles with hexagonal and rectangular bodies. Intact or largely complete examples are known from many sites in northern Britain, as at York (Harden 1962, pl 66, HG 53 and pl 67, H 34 c-cylindrical and hexagonal), Carrawbrough (Charlesworth 1959, pl III, 2-square), and elsewhere.

Querns

by D H Heslop

Introduction

Excavation produced a total of 19 querns, two of which were unstratified (Figs 54-6). The provenanced examples were from Phases II and III, reinforcing the suggestion that these represent the periods during which the hilltop saw habitation (Fig 57). The assemblage can be divided lithologically into fine and coarse-grained sandstone types, and on morphological grounds into saddle and beehive varieties. There were no flat rotary querns of Romano-British type.

The catalogue (Table 30, 4:G12), in accordance with the other finds reports, follows roughly the chronological sequence of the feature descriptions.

Lithology

The querns have been examined by Prof J E Hemingway who kindly provided notes on lithology. All the querns are of carboniferous sandstones and none need originate from outside the county of Durham. They split into coarse sandstones (Group I) and medium-fine sandstones (Group II).

Group I

These are of a coarse-grained sandstone of Millstone Grit type, yellow buff in colour with occasional reddish tinges. Some examples have deeply corroded felspars providing

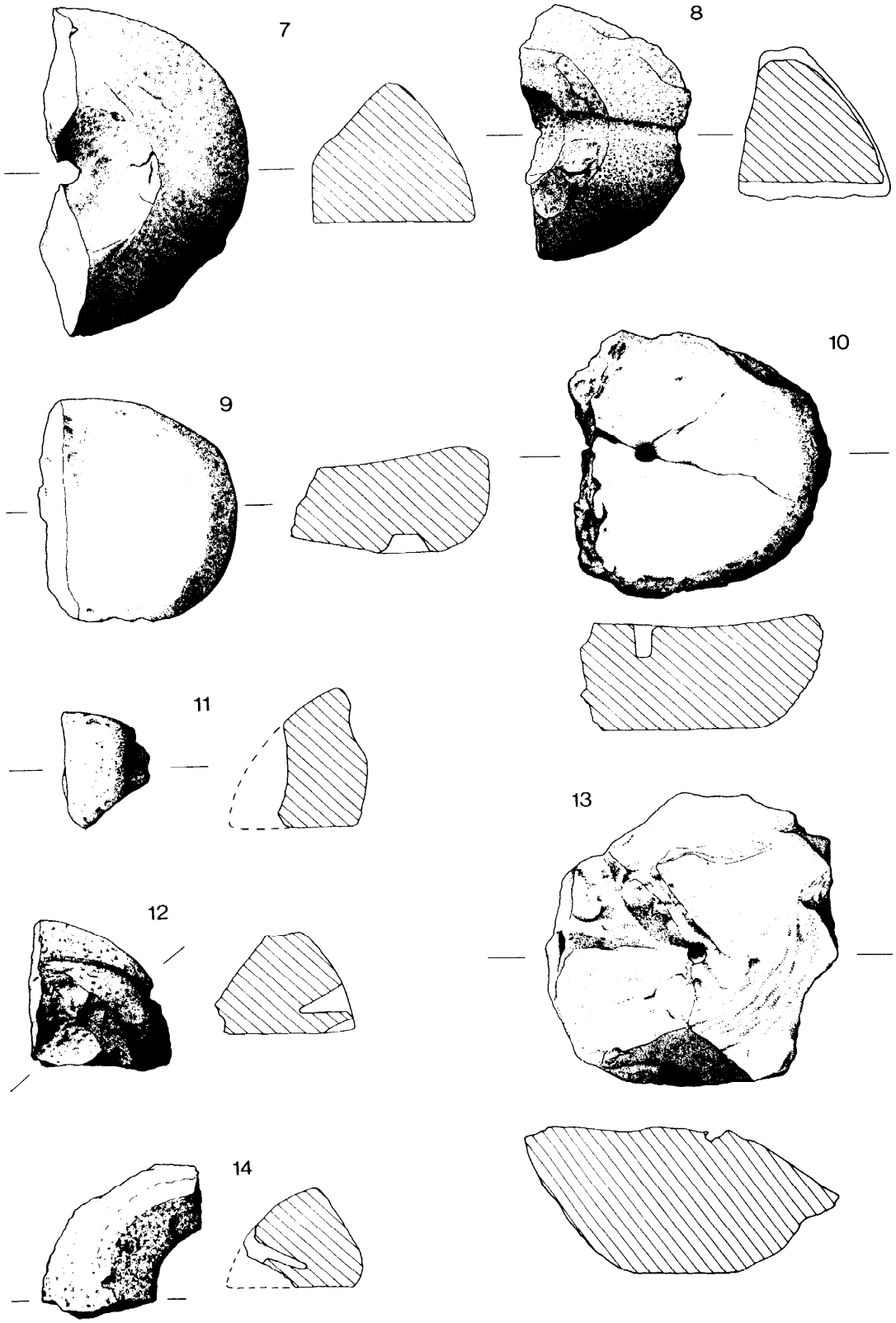


Fig 55 Querns 2 (I:&)

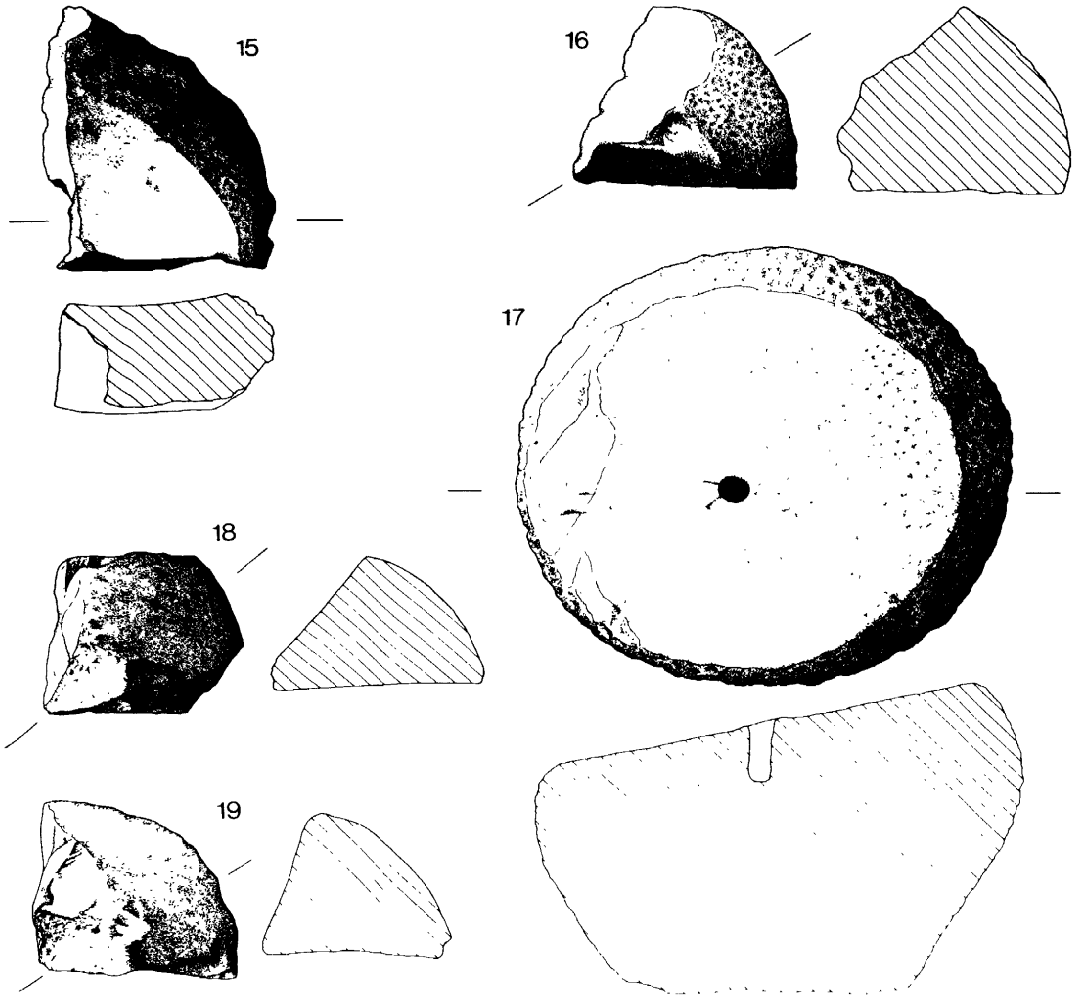


Fig 56 Querns 3 (1:6)

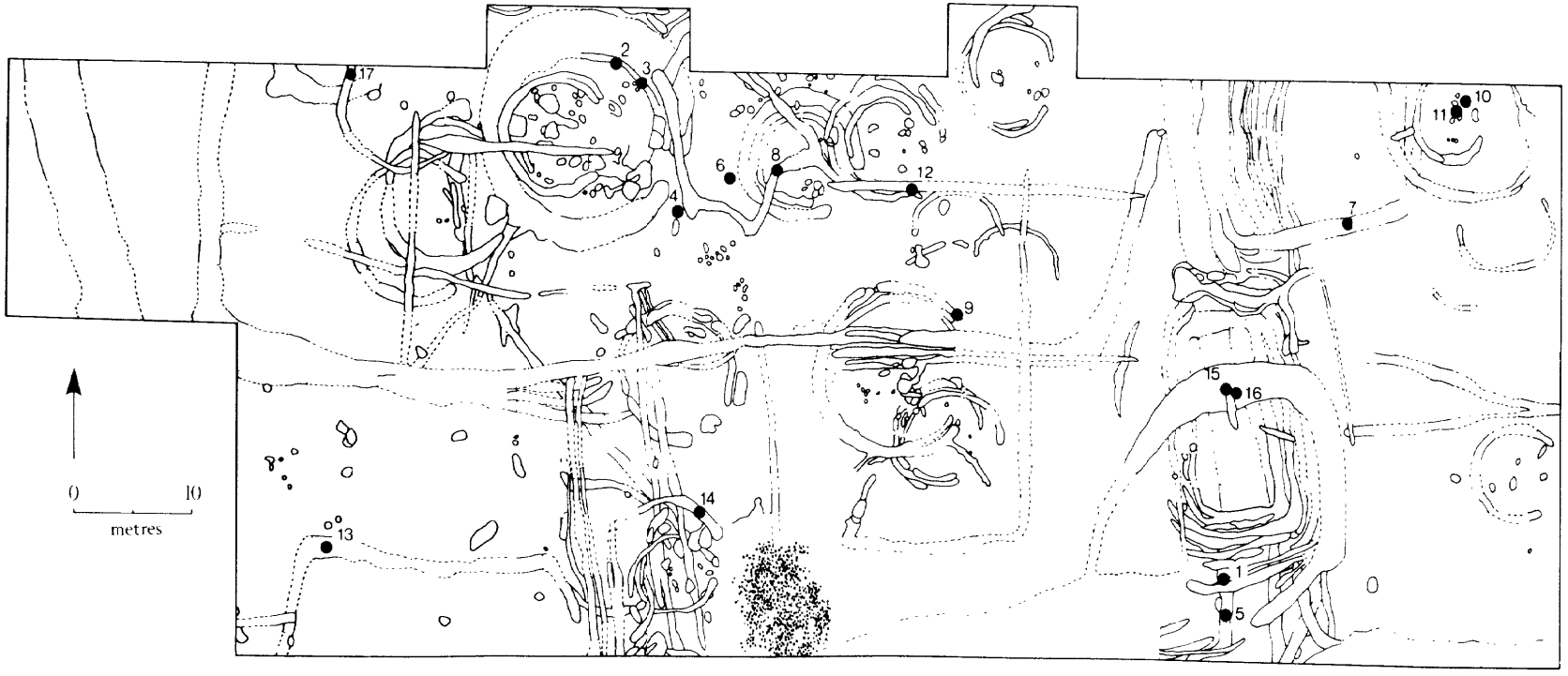


Fig 57 Distribution of querns

a good rough texture highly suitable for milling. Although the geological type is insufficiently diagnostic to suggest the location of the exploited outcrop, the general homogeneity of the group suggests that they are from one general locality, possibly in Weardale. Two examples, both beehive upper stones (1 and 8), ar sufficiently similar to suggest they are from the same source, which produced feebly bedded, heavily weathered, feldspathic sandstone. These are listed as forming subgroup Ia.

All the saddle querns are of Group I type, but beehive querns were also made from Millstone Grit. The quality of sculpture is generally higher than on group II querns.

Group II

The remaining querns are of a fine-medium, pale-gre sandstone of uniform texture and generally from large or massive beds that show a tendency towards denseness. Micaceous examples occur, but all are almost certainly from the Coal Measure series, and they could have come from any of the river sections west of Durham. As with Group I, there are no unique characteristics that enable attribution to a single petrological source. Of the ten group IIs, five are identical under macro-observation and almost certainly come from a single quarry/factory (7, 12, 14,16,18), and a sixth (4) is very similar. These have been termed sub group 2a. The Coal Measure querns are of inferior quality, and little recommends them as milling stones except ease of working. Further data is provided in fiche (Fig 94, 4:G10 (distribution by lithology) and Figs 96 and 97, 4:G10 and 11 (lithology, morphology and phase histograms)).

Morphology

Saddle querns

Four of the stones were lower stones of saddle querns. These were spread equally between Phases II and III, but both Phase II examples (2 and 3) were from one feature, the wall slot for the Main House II. As all of the querns were found in secondary contexts; the latte depositions could be residual.

Three examples are broadly similar in shape, having a concave working surface and pecked working around the upper lip, this being particularly apparent on 15. The fourth (3) looks significantly different, having a much flatter profile in both the longitudinal and transverse plane. This is emphasized by the lack of an upper lip, which produces an acute angle between the grinding face and the side. These differences may result from usage; unlike the other saddle querns, 3 had been very heavily worn.

The saddle querns appear to have originated as boulders of approximately the desired proportions, as the only other clear signs of working apart from the upper lip are on the bottom facet, presumably to flatten the profile to make the quern more stable. Alternatively, the rock may have been crudely worked to 'rough-out' stage and pecked to produced the final product, on either the production or consumption site.

Both of the saddle querns found in Phase III contexts bore 'cup-marks' or sockets on their under-surface. Quern 9 has a symmetrical hole almost 30 mm deep and 60 mm in diameter situated on the edge of the surviving end, at the thickest point of the section. The profile across this hole is straight-sided and flat-bottomed. Significantly, the base of the hole has a crushed surface unlike the peck-worked surfaces that produced the quern-shape or e the fracture where the quern had broken. It appears that the quern was broken, inverted and had a depression worked into the top, and this was used as a small mortar, or as a pivot-stone. Quern 15 also bears a socket on the under side, but this example is much wider and larger, being 70 mm deep and at least 85 mm wide.

Beehive querns

Fifteen beehive querns were recovered, ten topstones (two unstratified), the remainder lower stones, but no two examples could be matched, either as fragments of y the same stone or as upper and lower stones of a pair. The usual shape of the upper stones is hemispherical with an even curve and a deep, straight-sided conical hopper. There is a clear difference in shape between the two lithological groups; the Millstone Grit type have a height to base ratio of 0.40 or greater (max 0.54) while the poorer Coal Measure types have a h:b of 0.42 or less (min 0.34). The tendency for the Group 1 querns to have higher h:b ratios is accentuated by their having narrower hoppers capable of holding less grain than a Group 2 quern of the same diameter, but being heavier. See Fig 95m 4:G11 (Distribution) and Figs 99 and 100, 5:A3 and 4 (h:b ratios for Thorpe Thewles and North Yorkshire)

The handles

Seven of the upper beehive querns had sockets to accommodate handles (Table 31,4:G13). None of these pierced the wall of the quern to join with the central feed-pipe, ie they are not of the Hunsbury type, although the majority of handle-sockets penetrated at least half way through the wall. This meant that when broken the fracture was usually through the handle, athough in two instances this was not so. If the majority of querns had two handles then each surviving quarter-fragment would tend to have (one half of) a socket and half-fragments would tend to have two. In fact the seven quarters and r two halves have five between them. When split into lithological groups the Group 1 stones, comprising two quarters and one half, have only one incomplete socket, whereas the Group 2 stones (five quarters and one half) have four sockets. These calculations omit the single complete upper stone, a Group 2 example; this has two redundant sockets replaced by a single socket midway between the earlier pair.

There appear to be differences in the shape of the sockets; the majority (seven of nine) are slot-shaped (ie height to width ratio>0.5). Of these, three had traces of iron-handles; it appears that the slot-shape were so worn by iron handles whereas the circular sockets either had wooden handles or were little used or were better filled. This latter suggestion is backed up by quern 12 which had a circular socket that was actually in the process of being widened internally. It is possible that the querns were originally made with circular holes but subsequ received iron handles.

Lower stones

Five substantially complete lower stones were recovered;

these show greater variation in form, although this may have been emphasized by varying degrees of wear.

The single Group 1 example (6) was heavily worn and re-used but the shape of the rough-out could be established. This was disk-shaped, and some care had been taken to create even, sloping sides and a fairly flat base, again an example of the finer working on the Millstone Grit types. The four Group 2 bases show markedly different profiles. The largest (17), weighing 28 kg is circular in plan with curved upper sides, straight, sloping lower sides and a flat, circular, crudely finished base. The spindle socket, now empty, is not aligned at right angles to the grinding surface, and has been unevenly worn producing a socket 20 mmx26 mm, Quern 4 was cut from a roughly square block, having uneven sides and a flat base *c* 0.27 m square. This example still retains the iron spindle which occupies a socket 15 mm in diameter. Quern 10 as found was disk-shaped with a flat base, but the original shape may have been altered by subsequent re-use, which involved the base being used as a sharpening surface, which left a highly polished, longtitudinal wear pattern which was produced before the main breakage. The fourth Group 2 base (13) was roughly hemispherical with a small flattened base, 100 mm in diameter. Unlike the basal facets on the other lower stones, there is a difference between the working of this bottom side, which has been smoothed, and the rest of the stone-work, which is pecked, as though the flattening of the base was done later.

Despite the difference in form, all of the base-stones share one functional property, namely that the basal facet is not parallel with the upper working-face, resulting in an inclination of the grinding surface.

Other objects of stone

by H P Swain & D H Heslop

S2 C2172 Circular Structure K (Fig 58)
Possible large rubbing stone of coarse carboniferous sandstone, (Millstone Grit type), with leached felspars. Similar to quern no 8. The form has resulted from the bedding cleavage of a riverine boulder, but the flat surface appears man-made with an uneven area of polishing. Maximum length and breadth of flat surface :272 mm by 180 mm. Maximum height 120 mm.

S5 C1761 Circular Structure K (Fig 60)
Mould for bronze working, broken along two planes, parallel to and across actual mould. Sandstone from local Coal Measures, possibly showing traces of fossil plants. The stone is fine-grained and therefore easy to work, but also brittle. Stone 100 mm by 130 mm by 60 mm deep. Mould 60 mm by 15 mm, and 9 mm at its deepest.

See also metallurgical section.

S6 B44 B11 Stratigraphy, Phase III (Fig 58)
Spindle whorl with one edge broken. Black shale of poor quality, 9 mm thick, 32 mm maximum diameter, diameter of hole 6 mm.

S3 C1966 C1939 Partition III (Fig 58)
Spindle whorl of flaggy micaceous sandstone of a highly fissile nature, one piece having broken off. This probably originated locally from coal measures. Maximum diameter 33 mm, 10 mm, thick. Diameter of hole 10 mm.

Other objects of stone in the fiche archive

The fiche archive contains a catalogue and brief discussion of other stone objects which do not demand more detailed description. These comprise four single-handed rubbing stones and one whetstone.

Jet

J1 B2 Topsoil
Fragment of a jet ring of rounded rectangular section. This is too bulky to be a finger ring and too small to be a bracelet. It may have been worn as a pendant (cf South Shields: Allason-Jones & Miket 1984, 7.171) or as a hair ring (cf Silchester: Lawson 1976, fig 7, no 59). A similar ring of Iron Age date from Glastonbury (Bulleid & Gray 1911, 261, fig 55) has been described as 'a harness loop', but it is to be doubted whether jet would be strong enough for this purpose.

Int diam 25 mm; Width 8 mm; Thickness 10 mm.

Amber

A1 Cl218 Cl902 Drainage Complex Q
Amber bead with central circular hole and elliptical section. Surface somewhat discoloured and grazed but otherwise sound. Diameter 12 mm, diameter of central hole 5 mm, height 3 mm.

Objects of worked bone and antler

by H P Swain

Introduction

Fifteen examples of bone and antler which showed evidence for working, other than butchery, were excavated. Complete pieces and those for which a function seemed clear have been illustrated (Fig 59). Other examples are described in the archive report. The skeletal identifications were kindly provided by D J Rackham. The group includes four pieces of antler, particularly interesting in that skeletal remains of deer are otherwise absent from the faunal assemblage.

B1 A85 Main Enclosure Ditch
Strip of split antler whose sides taper to a rounded end. The convex face is decorated with roughly scored horizontal and oblique lines. A circular hole (diam 5.5 mm) is pierced in the centre at the apex of a triangle of scored lines and the antler has split from this hole to the

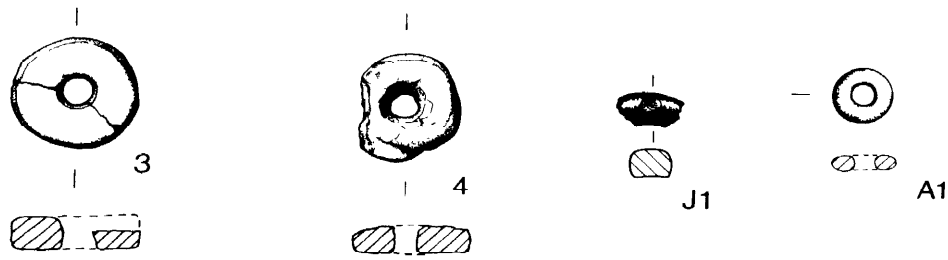


Fig 58 Objects of stone (1:2)

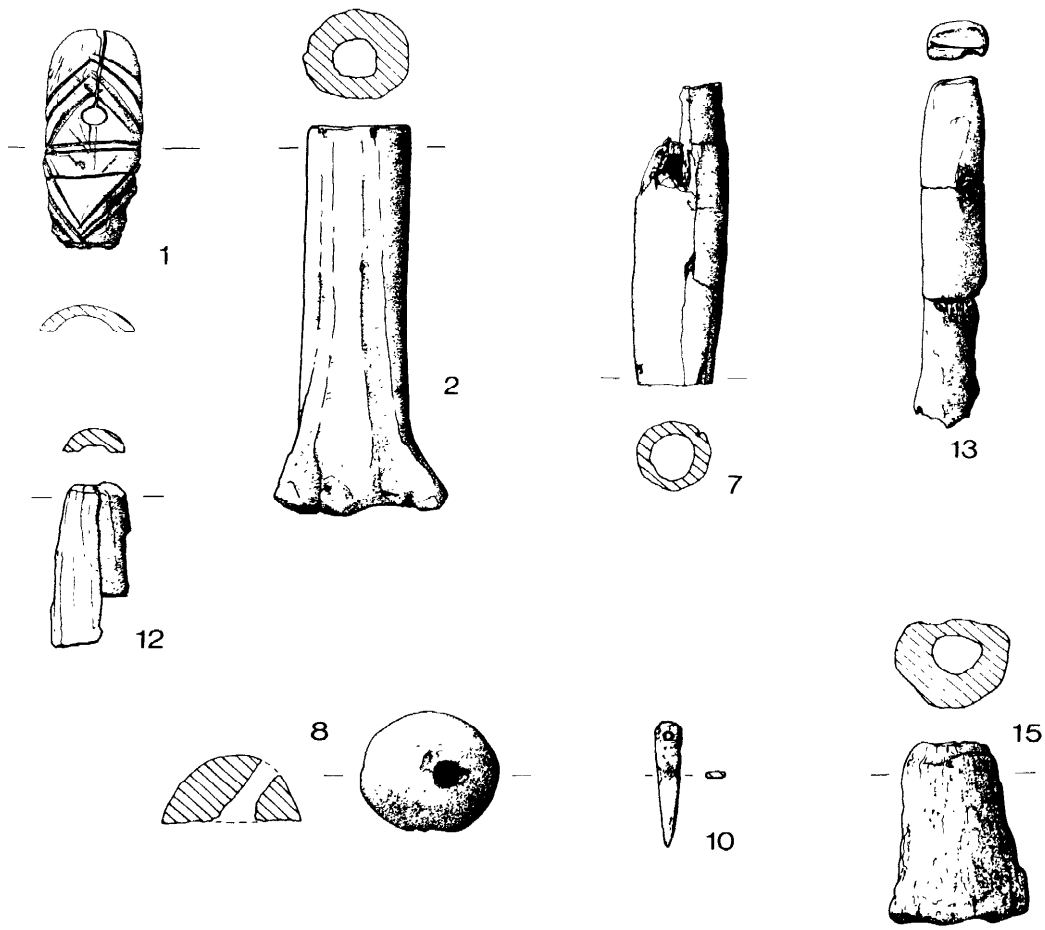


Fig 59 Objects of bone and antler (1:2)

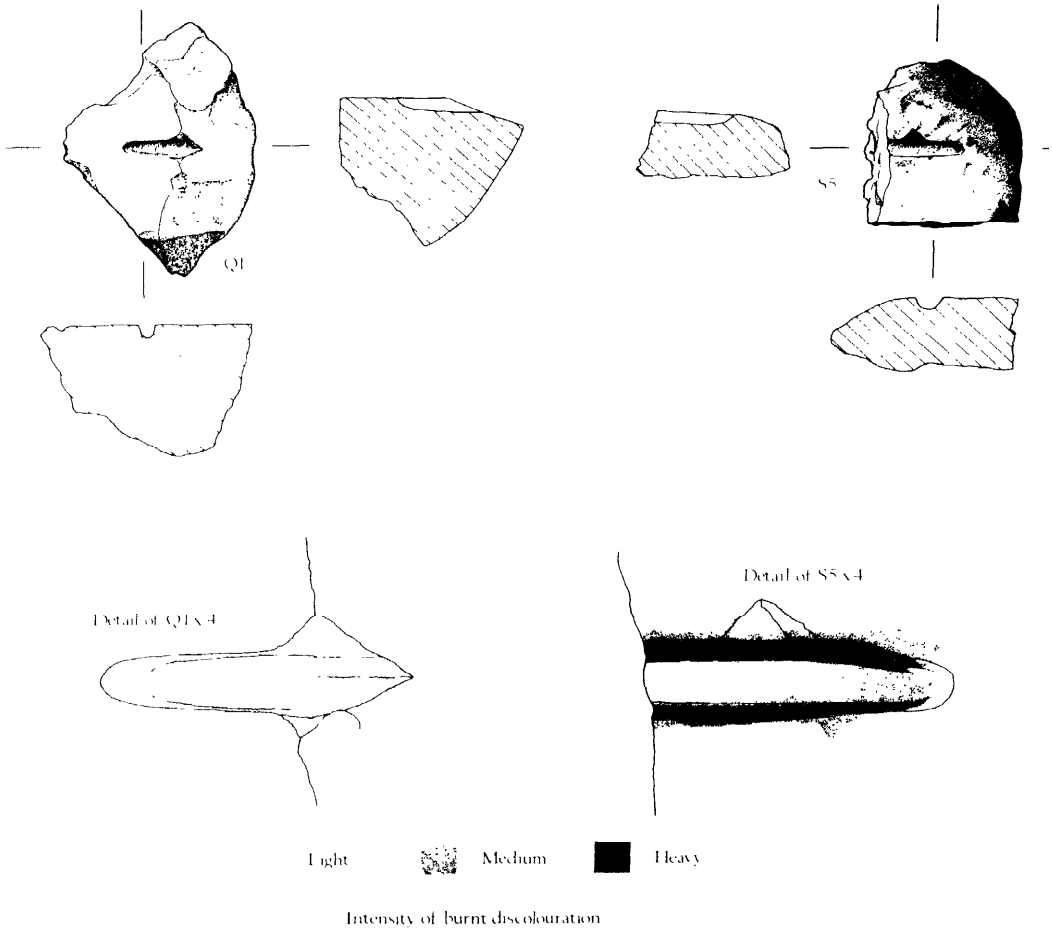


Fig 60 Stone moulds (1:4)

rounded end. The back has been hollowed and the edges show sign of wear. Two transverse nicks run across the worn edges. The traces of wear and the tapering thickness indicate that this did not form part of a knife handle. A comparison might be drawn with the Hodder and Hedges Type *Shb* weaving comb which has a 'rounded end, with or without a perforation'. The function and date of 'weaving combs' has come under much discussion but they remain 'basically a pre-Roman Iron Age phenomenon' (Hodder & Hedges in Collis 1977, 17).

Length 65 mm; Max Width 22 mm.

B2 B1578 B1585 Main Enclosure Ditch
Horse metatarsus, proximal end, worked into handle. Polished or smoothed exterior, epyphyces probably burnt. Length 115 m, diameter at cut 30 mm, diameter of cut hole 13 mm, depth of hole 55 mm. For parallel see Stanwick (Wheeler 1954, 50, fig 15, 6 and 7,).

B7 B1465 B1466 Subrectangular Enclosure I
Handle worked from horse metatarsus, probably from the shaft end. Worked at either end with hole cut through entire length. Maximum length 93 mm, diameter 22 mm, diameter of hole 13 mm. The dark brown colouring is probably post-depositional.

B8 C741 Layers over Main Structure Ditch
Spindle whorl made from cow femur head, Diameter at base 37 mm, hole diameter 9 mm.

B10 C334 Layers over Main Structure Ditch
Needle, probably of bone, circular pierced hole at blunt end, pointed end filed with a fine instrument. 39 mm long, 8 mm wide at blunt end. Hole 2 mm diameter and 2 mm thick.

B12 Cl28 Circular Structure 1
Worked red deer antler tine, ends artificially hollowed, lower end burnt during use. Probably a handle. Length 50 mm, hole diameter approximately 10 mm.

B15 C2433 Late Rectangular Enclosure Ditch II
Heavily eroded handle, from horse metatarsus proximal end, hole cut into top and with working around edge of break to form an external lip. 56 mm long, diameter at worked end 32 mm, diameter of hole 14 mm, depth of hole 32 mm.

The metalworking debris

by J. G. Mcdonell

Four types of residue were recovered from the site. Firstly furnace or hearth lining (715 g), strongly fired, often vitrified clay structure from either a furnace or hearth. The high temperature required to achieve vitrification normally excludes the domestic hearth as a source of the material. The lining cannot be ascribed to either a furnace or hearth, nor to a particular industrial process, ie bronze or iron working. The second category comprises fuel-ash slag and cinder or a fusion between the two, (1205 g). The material may be formed in a domestic hearth but is normally associated with industrial processes and iron working in particular. The third category is iron silicate slag (1425 g) - a result of either the iron smelting or smithing process. There is often great difficulty in distinguishing the smelting slags from smithing slags and this is a common problem in the Iron Age. Analysis of the material has not yet been undertaken but hand specimen examination suggests that none of the slags derive from the smelting operation. The fourth group of residues is represented by crucible fragments associated with non-ferrous working.

As yet furnace lining and fuel-ash slag/cinder provide no data for interpreting the technological processes carried out on the site, but do indicate some level of industrial activity. The crucibles have been non-destructively analysed, but no evidence indicating the type of non-ferrous working undertaken (eg bronze/copper/silver) has been obtained.

The iron slags indicate a low level of smithing activity. The slags derive from fifteen contexts. One large hearth bottom (a plano-convex conglomerate of smithing slag) was from the modern top soil (Context 2, slag weight 225 g). 570 g of slag derived from the Iron Age surface levels; the remainder was from the enclosure ditch. There was one concentration of slag and hearth-fill material (charcoal, fuel-ash slag etc) in the Phase IV enclosure ditch I (layer C 478).

The smithing process requires no purpose-built hearth and can be carried out anywhere. Hence deposits such as C 478 may represent the site of some brief smithing activity during the silting of the ditch, or the dumping of a hearth fill. The evidence for iron working (and non-ferrous working) from the Thorpe Thewles site is typical of the period.

Non-ferrous metalworking

D H Heslop

Evidence for small-scale, non-ferrous metalworking comes from three sources: crucibles, stone moulds and a very small quantity of slag.

The crucibles are typical of the period, being triangular and of small size. Only one example contained residues which were undiagnostic in character. The group is discussed in the Iron Age pottery section.

Stone moulds are also common on sites of this period, eg Tower Knowe, Northumberland (Jobey 1973, 72) and for a recent discussion see Bidwell 1985, 152 (Vindolanda) where five were recovered. S5 is unusual in bearing marked heat discolouration. The lack of such evidence on examples from Broxmouth, Rox. has called Hill to question their traditional interpretation (P. Hill, pers comm). The small spread of slag, and the low number of artifacts associated with this activity indicate a limited scale of operation. Two centres were noted, one around Circular Structure R, the other around Circular Structure K. The evidence would fit either the intermittent production of simple objects or the kind of repair work suggested for the ferrous activity.

The plant remains

by M Van der Veen

Introduction

The plant assemblage from Thorpe Thewles was made up entirely of charred or carbonized plant remains. The analysis was designed to answer three main questions:

1 Which food plants were present on the site?

2 Was there any evidence for the role of crop husbandry on the site

3 How did the plant remains compare with those from similar late Iron Age sites in other parts of the country, and in particular, was there any evidence to suggest that the type of crop plants and the role of crop production on this northern site were significantly different from those on southern sites?

This last question was put specifically because, while the old concept of a contrasting subsistence base in the north as compared with the south (Piggott 1958) is no longer accepted, very little has been put in its place.

In order to answer these questions a sampling strategy was designed which would collect a body of data representative of the site as a whole and which was also comparable with other late Iron Age sites (eg those in the Upper Thames Valley: Jones 1978, 1985).

Methods

Sampling

During the first season of excavation no flotation samples were collected, but during the second season the collection of flotation samples (each consisting of two buckets of sediment, approximately 28 1) became an integrated part of the excavation. Because of the large scale of the excavation it was not possible to collect samples from every feature, and a programme of random sampling was applied (Van der Veen 1984). Initial excavations had shown that the subsoil features fell into two categories: linear features (ie ditches and gullies), and point features, (ie pits and postholes). A random sample of 10% was taken from both categories using a table of random numbers.

The procedure adopted for the linear features was to take a 10% sample from their total length. The length of each ditch or gully was measured and these measurements were combined on a line (Fig 104); 105 random sample points were plotted on this line. A metre stretch of the feature was excavated and the sample taken from the section. The point features were sampled individually. They were numbered in sequence and 10% of them, chosen with the help of a table of random numbers, were excavated and sampled.

The programme of random sampling produced a collection of samples representative of the site as a whole. However, in addition to this objective strategy a subjective one was also carried out in which the excavator chose extra samples on subjective criteria like the occurrence of rich ashy deposits or the apparent gaps left by the random sampling strategy. These samples were numbered separately and were named 'judgement samples'.

The third category of samples was derived from the 'masking layers'. Levels of extant stratigraphy were sampled spatially. Areas were divided into a grid of one metre squares, and a sample was collected from one out of every fifteen squares. The deposits on the periphery of the extant stratigraphy were occasionally so thin that the entire square was needed to fill two buckets (the standard sample volume).

Seventy-three random samples were taken, whilst judgement and masking layer samples both totalled 28. The location of these three types of samples is given in Fig 105. A discussion of the determination of the optimal sample size in relation to the Thorpe Thewles sampling strategy is given in Van der Veen 1985b. Details of the extractive process and the computerized analysis are given in the fiche archive (5:El).

Results

Phasing of the samples

Microfiche Table 40 (5:E2-4) combines the results of all three categories of samples for each of the phases and gives the average number of seeds for each sample within each phase, (when the figure was less than 0.5, this is indicated with a+ (<0.09) or++(0.l-0.49)). Table 14 summarizes these results:

Table 14 Carbonized grain samples by phase

Phase	general description	Samples	Seeds
I	Pre-settlement fields	2	282
II	Main Enclosure and Central House	44	8501
III	Open settlement	29	6260
IV	Boundary ditches	12	1388

Notes on the identifications

Two types of cereal grain were found: wheat and barley. Four caryopses were tentatively identified to *Triticum dicoccum* (emmer wheat), but no chaff fragments of this species were found. Most of the wheat grains were poorly preserved, preventing an identification to species level. However, the shape of the better preserved caryopses suggested they belonged to a hexaploid wheat. The barley grains were equally poorly preserved. In fact more than half of the cereal caryopses could not be identified beyond 'Cerealia indet'. The better preserved barley grains all showed the ridges on the dorsal surface and the slightly angular cross-section characteristic of a hulled barley. The ratio of lateral to central grains, which in six-row barley is 2:1, was 2.65:1 (88 lateral grains to 33 central grains). The barley grains can thus be identified as *Hordeum vulgare,* six-row hulled barley (the slight under-representation of central grains is probably due to the poor state of preservation of the grains). The large numbers of chaff fragments in the samples enabled a further identification of the cereal grain. The identification of the barley grains as *Hordeum vulgare* was confirmed by the rachis internodes found.

Glumebases of a hulled wheat were found in large numbers. All of the well preserved glumes showed the venation pattern characteristic of spelt wheat, *Triticum spelta,* ie a prominent primary keel and a secondary 'keel'

undistinguishable from the strongly developed tertiary veins. The angle between the glume faces on either side of the primary keel was greater than 90º, while those on either side of the secondary 'keel' formed an almost smooth curve. No typical emmer wheat glumebases were found. The width of the glumebases (from the random samples) was measured at the level of the spikelet articulation (Helbaek's dimension B), and the measurements are given for each phases in Fig 106 (5:E7). The histogram approaches the curve for a normal distribution, suggesting that we are dealing with one species only. The range of the measurements falls clearly within that of spelt wheat, but is rather wider than the one Helbaek gave: 0.45-1.44 mm as against Helbaek's 0.95-1.44 mm (Helbaek 1952, 218). The histogram peaks at 0.9 mm for the Thorpe Thewles measurements, but at 1.06 for Helbaek's data. At Ashville (Oxon) the width measurements ranged from 0.57-1.64 mm, with peaks at 1.0 mm and 1.17 mm (Jones 1978, 104). In Denmark, at Vadgaard, measurements of spelt glumebases were found to range from 1.0-1.7 mm, with 1.26 mm as the average (Jorgensen 1979, 137). Thus the spelt-glumebases found at Thorpe Thewles are slightly narrower than those described in the literature.

Some of the rachis internodes also indicated that we were dealing with spelt wheat; 24 fragments had remained attached to the spikelet below, thus rising up from the spikelet, as against the internodes of emmer wheat which adhere to their own spikelet, forming a 'fork'. Four of the wheat: internodes were broken as if they belonged to a tough rachis wheat, while at the same time not showing any of the morphological characteristics of tough rachis wheat. They are here interpreted as accidental, tough internodes of a brittle rachis wheat.

A few chaff fragments of *Avena sp,* oat, were found. The floret bases all possessed the oval articulation scar characteristic of *Avena fatua,* wild oats. The awn fragments, unfortunately, cannot be identified to species. Equally, oat grains without the adhering floret bases cannot be adequately identified. However, as all the floret bases found belonged to wild oats it is assumed here that the oat grains belonged to this species as well, and not to the cultivated variety. They are, consequently, listed in Table 40 under the Gramineae.

The fact that only very few grains and no chaff fragments of *Triticum dicoccum* (emmer wheat) were found suggests that this species was not grown as a crop in its own right, but occurred as a 'weed' in other cereal crops. The evidence from the chaff fragments would suggest that the only other wheat species present in the samples was *Triticum spelta.* Thus the only two cereal crop plants found at Thorpe Thewles are *Hordeurn vulgare,* six-row hulled barley, and *Triticum spelta,* spelt wheat.

The only other remains of food plants in the samples are the shell fragments of hazelnut, *Corylus avellana,* and one fruit stone of hawthorn, *Crataegus monogyna,* the fruits of which might have been eaten.

The seeds of the other species present, mainly weeds, have been identified using modern reference material and the standard seed atlases (Beijerinck 1947, Berggren 1969 and 1981, Clapham *et al* 1962, Katz *et al* 1965). It was not always possible to identify each plant down to species level. The seeds of *Bromus sp* were very broken up, which prevented an identification. However, they probably belonged to the group *Bromus secalinus/mollis/arvensis.* The small grasses have been split into two groups; the cf *Phleum pratense* are the rounder, more globular seeds, with a small, roundish embryo and a clear reticulate surface pattern. The seeds in the 'small grasses' category are more varied; they are oval-shaped, more pointed at the ends, and only some of them possess a reticulate surface pattern. This group almost certainly includes *Poa annua,* but other species as well. A very large number of culmbases of grasses were found. Only one type could be identified further, the bulbous, slightly pear-shaped tubers which were identified as *Arrhenatherum elatius, var bulbosum* (Godwin 1975, 404).

It is worth mentioning that the seeds listed under *Ranunculus sp* are the seeds found inside the achenes, and not the achenes themselves, which is the usual pattern, This phenomenon, as far as the writer is aware, has not been described in the literature before. The seeds probably belong to the *Ranunculus acris/bulbosum/repens* group.

The *Rumex* seeds were often poorly preserved, being broken or puffed by carbonization. It is very difficult to make reliable identification of these seeds, but the shape of some of the better preserved ones suggested they might belong to *Rumex crispus* (Berggren 1981, 23).

The seeds of *Tripleurospermum muritimum* (scentless mayweed) can be identified as subspecies *inodorum,* because of the presence of round oil glands (Clapham *et al* 1962, 853).

It is notoriously difficult to identify seeds from the sedge family, *Cyperaceae.* In this case only two types have been identified down to species *(C pilulifera and C pulicaris).* The others have been ascribed to types or groups (using the key given by Nilsson & Hjelmqvist 1967, and Berggren 1969). The *Carex flava* group comprises *C flava, C lepidocarpu, G demissa and C serotina;* the *Carex nigra* group comprises *C recta, C uguatilis, C acuta, C nigra, C elata and C bigelowii;* and the *Carex muricata group* contains *C muricata (orpairaei), C spicata and Carex divulsa* (Jermy *et al* 1982).

Interpretation

Chronological and/or lateral variation

Before discussing the character of the plant assemblage and its economic and ecological significance, it is important to assess first whether or not chronological and/or lateral variation can be detected in the samples. At first sight the data as presented in Table 40 show no chronological change, The two crop plants (spelt wheat and six-row hulled barley) are present in all phases, and the type of chaff fragments and range of weed species recovered is roughly the same for all phases. The only difference that can be detected is the absence of certain species from phase IV *(eg Raphanus raphanistrum, Sisymbrium sp, Polygonum Convolvulus, Hyoscyamus niger, Eleocharis sp, Carex pilulifera).* It is difficult to assess whether these species are really absent, or whether this is a product of the rather lower number of samples and seeds from this last phase (see below).

However, the sheer quantity of the data (129 samples, 89 plant categories and 24, 727 seeds) made it virtually impossible to detect changes, chronological or lateral, by eye. For this reason the data was subjected to two types of multivariate analysis (an ordination technique called

'detrended correspondence analysis' or 'DECORANA', (Hill & Gauch 1980, Hill 1979a) and 'TWINSPAN', a further development of a method known in the literature as 'indicator species analysis' (Hill *et* al 1975).

When the Thorpe Thewles data were plotted with DECORANA, all samples were positioned in the same cluster. No division was produced, suggesting that there was neither chronological nor lateral variation in the samples. The only information that could be detected was that the samples from Phase II showed the most variation in the samples, followed by those from Phase III. The samples from Phase III/IV showed the least variation. This might well be explained by the fact that the samples from Phase III/IV came from much less varied archaeological contexts. All but one sample from Phase III/IV came from the 'masking layers', while the samples from Phases II and III came from a variety of subsoil features (including post-holes, house gullies, ditches, enclosure ditch etc).

The two-way table resulting from the application of TWINSPAN to the Thorpe Thewles data did present groupings of the samples, but they could not be identified with chronological phases, nor could they be strongly associated with particular types of archaeological features. The species used as indicator species did not make ecological sense, nor did their classifications. This, again, indicates that no real groupings existed in the samples, ie that there was neither chronological nor lateral variation present in the samples. Instead, the groupings were entirely based on degrees of abundance of seeds and hence species.

The 'richer' samples, that is the samples with high numbers of seeds and species, came largely, though certainly not exclusively, from the main central house (Fig 105, 5). Other rich samples came from two Circular Structures (N and K), the former tentatively interpreted as houses by the excavator (Fig 105, 27 and 2l), from a clay (?) pit (Fig 105, 28), from the area just south of the Subrectangular Enclosures (samples 507, 927 and 928) and from a section in the Main Enclosure Ditch (Fig 105, 3).

The poorer samples were largely, though again not exclusively, associated with the area of the Subrectangular Enclosures and the recuts of the original enclosure ditch (Fig 105, 15, 16, 30). The tendency for the rich samples to be associated with the house-structures might well explain the relative poorness of species mentioned above for Phase IV, as no domestic structures dated to this phase have been found within the excavated area. However, it should be stressed that the 'poorness' in species for Phase IV is not very significant.

In conclusion, the analyses have failed to detect any chronological or lateral variations in the plant assemblage. The plant material appears to be very mixed up and to vary only in the quantities in which it was found in the various features, but not in quality. The assemblage was strikingly homogeneous from phase to phase and from area to area of the site.

The arable economy

As no chronological change has been detected in the samples, the material is treated as one group. The two main crop plants at Thorpe Thewles were *Triticum spelta,* spelt wheat, and *Hordeum vulgare,* six-row hulled barley. *Triticum dicoccum* (emmer wheat) was only present in very small numbers. The first two species were also the dominant crop plants in other Iron Age sites, such as Ashville (Jones 1978), Farmoor (Robinson 1979), both in Oxfordshire, sites in Central Hampshire (Monk & Fasham 1980) and sites in the Breckland (Murphy 1983). Emmer wheat is also present on these sites, but as at Thorpe Thewles, only as a small component. On all sites oat grains, *Avena sp,* were present, but on none of the sites could a definite identification of the cultivated oats be made. Only at Ashville and the Breckland a trace of *Triticum aestivo compactum* (bread/club wheat) was found, while at the Central Hampshire sites pulses were recovered. Thus the record of crop plants for Thorpe Thewles is very similar to contemporary sites in other parts of the country. This is very interesting, as it represents the first group of data to fill the gap which arose when Piggot's 'Stanwick-type economy' for the north of England fell into disregard (see also Van der Veen 1985a). The presence of spelt wheat is especially important, as it contradicts Jones's suggestion (Jones 1981) that during the Iron Age emmer wheat remained the commonest wheat in northern Britain, while in the Lowland Zone it became secondary in importance to spelt wheat. The presence of spelt wheat at Thorpe Thewles does not represent an isolated occurrence. The species has also been found at a pre-Roman farmstead at Coxhoe, Co Durham, (Van der Veen & Haselgrove 1983) and in the preliminary analysis (by the present writer) of soil samples from Thornborough Scar, Northumberland.

One of the most important and at the same time most difficult questions to answer is that of the role of crop husbandry in the overall subsistence base: was the site a 'nett producer' or a 'nett consumer' settlement? Hillman suggested that we could attempt to answer this question by recording in detail the types of harvest refuse found on the site (Hillman 1981). When the crop is emmer or spelt wheat, both types of settlement will generally contain chaff remains. But only at producer settlements does one expect to find the heavier straw nodes and culmbases. At Thorpe Thewles very few culm or straw nodes have been found (5) and no culmbases of cereals. However a very large number of culmbases of grasses were found. These probably became incorporated in the samples when the cereals were harvested. They would have been removed from the crop through threshing and first sieving and are unlikely to have been present in an imported crop. The presence in large numbers of these grass culmbases thus seems to suggest that the cereals were grown locally.

A different way of addressing the problem is to characterize the assemblage as a whole, an approach developed by Martin Jones 1985. The underlying assumption of this approach is that the type of refuse generated on site is directly related to the role of the plant remains in the subsistence base, that is, activities like production and consumption will generate different types of refuse assemblages. For this approach the composition of the samples is grouped into three categories: cereal grain, chaff and weed seeds. The relative proportions of these three categories are calculated for each sample and plotted onto triangular diagrams. Each circle represents one sample, and the diameter of the circle represents the number of fragments in one litre of sediment (thus providing a degree of accuracy for the data). Three

triangular diagrams are presented here: one each for the random, judgement and masking-layer samples (Fig 61). The proportions are calculated on the basis of one seed one vote, but several small fragments of cereal grains or *Bromus* seeds were combined to make up one grain or one seed. The chaff elements all counted as one, thus a spikelet fork would count as three and five attached internodes as five. The grass culmbases, hazelnut shell fragments and the *Crataegus* fruitstone have not been included in the calculation.

As will be apparent from the diagrams the results from the three categories of samples are remarkably similar (see below). The proportion of cereal grain is consistently low - generally below 30% and rarely above 35%. The proportion of chaff is generally below 40% and rarely above 50% while the weeds are normally dominant, often making up 50% and frequently more than 70% of the samples.

The general spread of the samples across the triangular diagrams is used by Jones as a way of detecting producer-consumer assemblages (Jones 1985). He analysed the plant remains of four Iron Age settlements in the Upper Thames Valley, On the basis of the information obtained from the diagrams, in addition to topographical data and information from waterlogged plant remains, he concluded that two of the sites were likely to have been producer sites, producing a surplus (Ashville and Mount Farm), while the other two were interpreted as pastoral or consumer sites (Claydon Pike or Lechlade and Hardwick). The assemblage of the producer sites was characterized by a high quantity of cereal grain. In the majority of the samples cereal grain took up more than 40% of the total, and even samples with 80-100% cereal grains were present. The samples rarely contained more than 30% chaff, while the proportion of weed seeds was rarely more than 50%. In contrast, the samples from the pastoral sites contained many fewer cereals. The proportion of cereals in the samples was rarely above 35% and many samples contained no cereals at all. The proportion of chaff fragments was only occasionally above 30% (but also regularly 0%), and most samples were dominated by weed seeds, which usually took up more than 40% and even 80-100%.

When we compare the Thorpe Thewles diagrams with those from the Upper Thames Valley, it is clear that the Thorpe Thewles assemblage is very different from those of the producer sites. At the same time the assemblage also differs from the consumer sites in that while the proportions are roughly similar, the Thorpe Thewles samples contain much larger numbers of plant remains and all but five samples contain cereal grain. As the producer-assemblages are interpreted as those of settlements producing for a surplus, while the consumer settlements are thought to have obtained all their plant remains from outside, it might be possible to see Thorpe Thewles as a third category, ie as a self-sufficient settlement, producing a small amount of cereals sufficient for own consumption. This conclusion would agree with the evidence for local production of the crops mentioned above.

The triangular diagrams for the three different categories of samples present some additional information which is also briefly discussed here. When we compare the diagrams of the random samples and the judgement samples, the similarity is striking. The main difference lies in the fact that the quantity of seeds in the judgement samples is greater than in the random samples, which corroborates the point often made: that excavators prefer to select the rich, ashy deposits on the site (deposits which are often unrepresentative of the site as a whole). The average number of seeds in the random samples is 110, as against 372 in the judgement samples. The fact that the judgement samples show the same results as the random samples can be explained by the fact that on this particular site all features contained more or less the same categories of plant remains. As already discussed in the previous section, no lateral or chronological variation was detected in the samples.

The results from the masking layers (Fig 61) are again very similar, but the circles form a much tighter scatter on the diagram; they show much less variation than the samples from the subsoil features. This corroborates the results from the DECORANA analysis discussed in the previous section. This can be explained by the fact that the random and judgement samples are taken from a wide range of different subsoil features, while the masking layer samples all came from a restricted area of extant stratigraphy.

Landscape and environment

Pollen analysis

Before discussing the ecological information obtained from the samples, the evidence provided by pollen diagrams in the vicinity of Thorpe Thewles will be briefly mentioned (see also Bartley *et al* 1976 and Van der Veen 1985a). Three pollen diagrams are available from locations just north of the site (Bishop Middleham, Hutton Henry and Thorpe Bulmer). These diagrams suggest that a period of large-scale deforestation and agriculture started as early as the Middle Bronze Age (Hutton Henry: 1594 ± 80 bc and Bishop Middleham 1410 ± 80 bc). The arable indicators reach their highest level during the Late Iron Age/early Romano-British period (Thorpe Bulmer 114 ± 60 bc and Hutton Henry ad 108 ± 70). At Morden Carr, the diagram nearest to Thorpe Thewles itself (7 km north-west), the Bronze Age clearance was more moderate in scale. As in the other diagrams, there was an increase in the cereal curve in the later part of the diagram but, unfortunately, no radiocarbon dates are available for these levels. At Neasham Fen, 15 km south-west of the site, no large-scale clearances were recorded until the 8th century AD. The overall picture for the Late Iron Age/early Romano-British period is that of an open landscape, rather similar to that of today, with only small stands of trees and with arable agriculture as a dominant element (with the area around Neasham Fen, an area with badly drained soils, as the only exception).

Weed seeds

Turning now to the evidence from the macrofossils, the samples contained over 14,000 seeds of wild plants. The majority of these (58%) belonged to the family of the *Gramineae,* the grasses. Wild oats *(Avena sp),* brome grass *(Bromus sp)* and annual poa *(Poa annua)* are very common and often serious weeds of arable land. Timothy grass *(Phleum pratense)* is often found in meadows, but is also

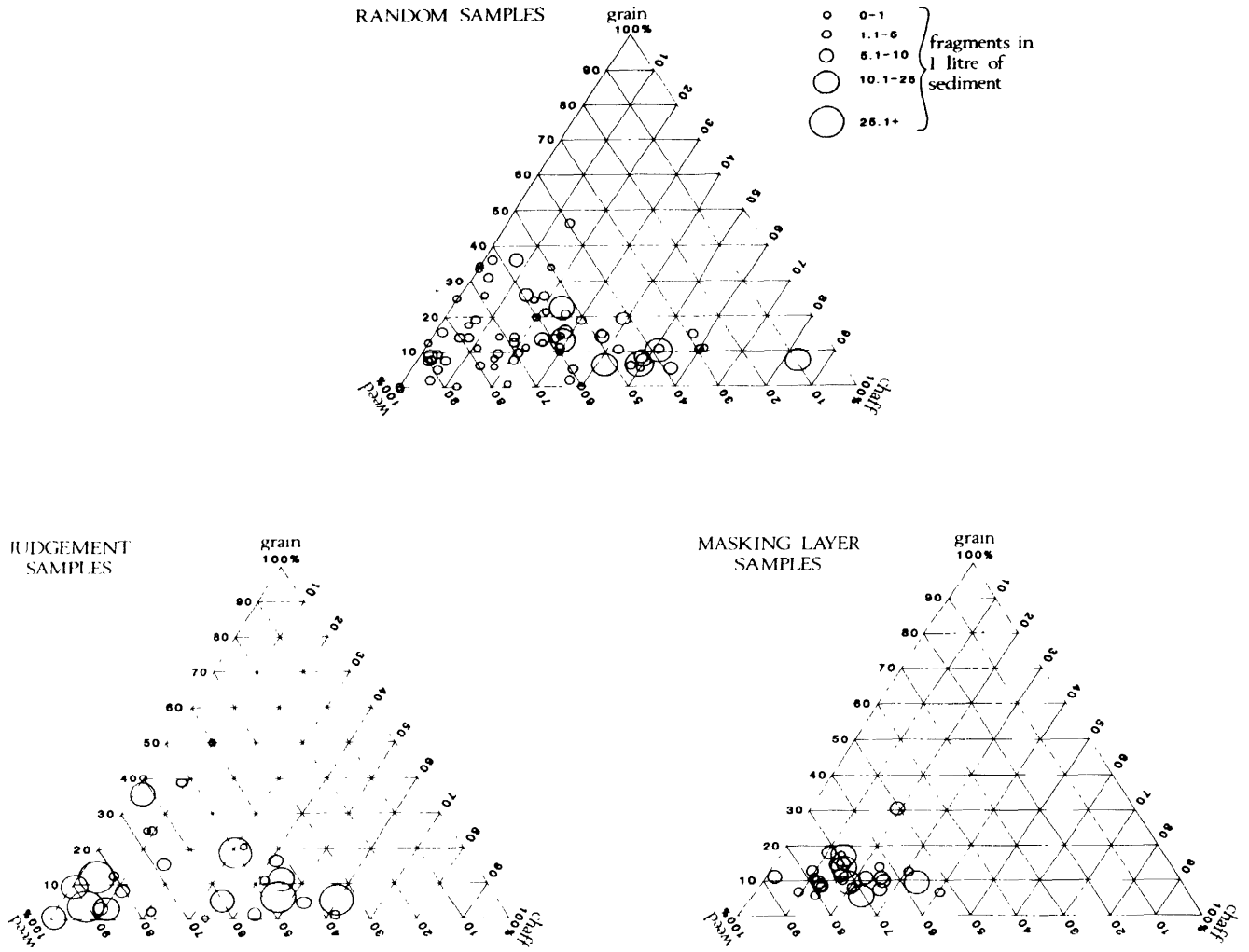


Fig 61 Triangular diagrams showing the relative proportions of cereals, chaff and weed seeds

common on field margins, road sides and waste places (Hubbard 1968). With its 4,782 seeds *Sieglingia decumbens* (heath grass) is the most common species in all samples, taking up 58% of all grass seeds and 34% of all weed seeds. At first sight this may seem surprising as this species is not known as an arable weed in Britain today. It occurs on moorland, heaths and the poorer types of hill grassland, usually in somewhat moist or wet places (Hubbard 1968), and it is also found in wet grassland vegetation in Co Durham (Wheeler 1980).

The species also occurred in large numbers in samples from the Late Iron Age/ Romano-British site at Cefn Craenog, Gwynedd, Wales, often in association with chaff waste (Hillman 1981). Hillman suggested that the absence of heath grass in arable fields today was a product of the efficiency of mouldboard ploughing since the medieval period. Ard ploughing, practised in the prehistoric period, disturbed the soil sufficiently little to allow the survival of many perennial and biennial weed species, like *Sieglingia* (Hillman 1981). A number of the *Sieglingia* seeds are still enclosed in their lemma and palea.

The presence of the tubers of *Arrhenatherum elatius, var bulbosum* (onion couch) is also of interest. The lowest stem internodes of this species are swollen and form 'bulbs', usually 4-9 mm in diameter, which can regenerate the plant. The species can become a very serious weed of cultivation, as it propagates easily in arable fields, where ploughing disperses the 'bulbs'. It is commonly found on well aerated neutral soils of high to moderate fertility (Pfitzenmeyer 1962). The tubers or 'bulbs' of this species have so far only been found on a few early prehistoric sites: in a Bronze Age ditch on Rockley Down, Wilts (Godwin 1975), in Bronze Age cremation pits at Abingdon, Oxon (Jones 1978), and in a Middle Bronze Age context at Mount Farm, Oxon (Jones, *pers comm).* The presence of these tubers at Thorpe Thewles is the first occurrence of this species for the Iron Age known to the writer. Their presence might be explained in similar fashion as the presence of the many culmbases of grasses (see below).

The presence of large numbers of grass culm- or stembases (1,238) suggests that the grasses were uprooted and that the whole plants were brought into the settlement. However, no culmbases of cereals were found, indicating that they were probably not harvested by uprooting. A possible explanation for the presence of grass culmbases and tubers of *Arrhenatherum,* is that the crop was harvested low with a slightly blunt sickle, which would cut the brittle cereal culm, but uproot the still green grass culms that grew as weeds within the cereal crop (Hillman, *pers comm).* Grasses tend to remain green much longer into the summer, when the cereal culms have already become ripe and brittle.

Also very common in the samples are the seeds of blinks, *Montia fontana spp chondrosperma,* which usually occurs on light, acid soils, usually sandy or gravelly, with a high water table, at least in spring (Walters 1953). The presence of buttercup, *Ranunculus acris* and *repens,* and lesser spearwort, *R flammula,* also indicates damp, if not wet conditions in the fields. Fat hen *(Chenopodium album),* vetch *(Vicia/Lathyrus),* small, seeded legumes *(Leguminosae),* docks *(Rumex spp),* scentless mayweed *(Tripleurospermum maritimum, spp inodorum)* and goose grass *(Galium aparine)* are all species found in arable fields.

A regular feature of all samples was the presence of seeds from the *Cyperaceae* family. As mentioned above, the seeds of this family are difficult to identify, especially seeds of *Carex spp* (sedge). They are thus often listed as *Carex spp* and used as an indicator for damp or wet conditions. However, not all *Carex* species prefer damp habitats. Here, an attempt was made to identify the seeds more closely, which resulted in a few identifications to species level, and some to type or group. This showed the presence of *Carex pilulifera,* which prefers acid but not damp conditions. The species of the *Carex muricata* group also prefer so-called 'fresh' conditions, while in contrast *Carex pulicaris, C hostiana, C rostrata/vesicaria and Eleocharis sp* indicate wet conditions. While *Carex pilulifera* indicates acid soils, *Eleocharis sp* and species of the *Carex flava* group indicate the presence of neutral soils.

The presence in the samples of *Papaver argemone, Malva sylvestris and Valerianella dentata* is worth mentioning at this stage, as all are listed by Godwin (1975) as species not recorded from Flandrian contexts earlier than the Roman period. Most of these species have, however, also been found in recent years in other Iron Age contexts (Jones 1978, Robinson 1979).

The ecological preferences of some of the most frequent weed seeds have been discussed. A more satisfactory way of presenting the ecological evidence may be found in using Ellenberg's indicator values (Ellenberg 1974, Willerding 1978, Van Zeist 1981 and Behre 1983) which suggest (see fiche archive) that the area around the settlement was an open, agricultural landscape. The temperature and continentality values suggest a climate similar to that of today. The three soil-factors - moisture, acidity and nitrogen - suggest the presence of a wide spectrum of soil types around the site with both 'fresh' and damp/wet soils, acid and neutral soils, and poor and nitrogen-rich soils.

Soils

The whole area is covered with a thick layer of till or boulder clay, making information concerning the solid geology largely redundant. The 1:250,000 scale soil map for the region gives as the dominant soil types for the 5 km radius around Thorpe Thewles: a pelostagno-gley soil (Salop series) and a typical stagno-gley soil (Crewe series). Both soil types are clay loams with varying degrees of clay and consequently varying drainage properties (Crompton & Osmond 1954, Alexander 1980). In poorly drained areas waterlogging can occur for a considerable part of the year. The surface soil is usually slightly acid, but the subsoil generally has a pH of 7 or more (this decrease in acidity down the profile is a feature picked up in the animal bone analysis, with improvement of preservation conditions in the lower levels; see animal bone section). In dry districts (the area around Thorpe Thewles does classify as dry) and on the less poorly drained areas the soils can produce excellent cereal crops.

To the south-east of the site, within the 1 km radius, some wet alluvial soils are present. North-west of the site, at the edge of the 5 km radius, two different soils are present, although in relatively small patches: one is a well drained, nutrient-poor, typical brown sand, the other a well drained, nutrient-rich, typical brown earth. They are rather far away from the settlement, so it is

questionable whether they were used for cereal cultivation. The modern land-use classification map classifies the majority of the soils in the area as Grade 3, but the site itself is situated on the edge of a small area of Grade 2 soil. This exact location suggests that the inhabitants of the site had recognized its better quality and deliberately located the site in this position. The reason for its Grade 2 classification is almost certainly a matter of better drainage properties, related to local relief (M Alexander *pers comm)*. When we look at the area within a 1 km radius from the site, the area within which according to Chisholm (1968) the majority of cultivated land will be situated, we can see that only *c* 10% of it classifies as a Grade 2 soil (ie a well drained, stagno-gley soil), *c* 15% as wet alluvial, and the rest as less well drained, stagno-gley soil. This would fit well with the range of soils indicated by the three soil ecodiagrams (Fig 107 5:E5) suggesting that the soil conditions during the Late Iron Age were similar to those of today.

Conclusions

The random sampling strategy carried out on the site worked very satisfactorily and resulted in an important plant assemblage, representative of the site as a whole. The evidence from the so-called judgement samples, taken in addition to the random ones, presented a similar assemblage although the average number of seeds in those samples was much larger. The analysis of the material, including two types of multivariate analysis, suggested that there was no chronological or lateral variation in the samples. The plant remains did not represent *in situ* material, but should all be considered as secondary deposited refuse. Two main crop plants were present: spelt wheat and six-row barley, with very small quantities of emmer wheat.

The range of crops and other plant material was very similar to that of other Iron Age sites in the country. The presence of spelt wheat as a main crop is important, in the light of previous suggestions that emmer wheat had remained the principal wheat crop in the north. The weed assemblage indicated that the landscape around the site was an open, agricultural one. The inhabitants of the site cultivated the well drained, fertile soils immediately to the south-east (presently classified as Grade 2), but also utilized the less well drained soils in the rest of its catchment area. The weed evidence suggests that in at least some of the fields waterlogging must have been a serious problem. The chaff evidence and the composition of the assemblage as a whole suggest that the site produced its own crops, but do not support the idea that it could have grown cereal crops for a surplus.

The picture that emerges from the plant remains is that of a small, self-sufficient farming community. The changes in the physical outline of the settlement, from an enclosed, simple farmstead (Phase II) to an unenclosed, multi-farm settlement (Phase III) and finally to an enclosure without evidence for domestic structures, at least within the excavated area (Phase IV), were not accompanied by changes in the crop husbandry of the site. The assemblage of plant remains is remarkably homogeneous from phase to phase and from area to area.

The plant assemblage from Thorpe Thewles forms the first substantial evidence for arable agriculture in the north of England, adding detail to the picture obtained by pollen analysis, and at least partly satisfying a much felt need for information from this part of the country.

Acknowledgements

First of all I would like to thank Martin Jones for all his help and encouragement during all stages of this work. I would like to thank Janneke Buurman, Gordon Hillman, Martin Jones, Jan Peter Pals and Wim van Zeist for their help with the identifications and useful suggestions for the analysis. I would like to thank Brian and Jacqui Huntley for their assistance with the computer analysis of the date, and Mike Alexander for his help in understanding the soils. Finally, I would like to thank Yvonne Brown for undertaking the drawings and Jon Scholes for typing the manuscript.

The animal bone

by D James Rackham

Introduction

The excavations at this site have produced the only sizable collection of Late Iron Age and early Roman animal bones from a rural native settlement in northern England. As such it presents a relatively important opportunity to analyse many of the economic aspects of sites of this type and period in the north, in contrast to more southern areas for which a number of excavation reports and analyses have now been completed.

Nevertheless, despite the potential interest of this site and its reasonable sample size of over 8,000 fragments of bone, there are a number of fundamental problems that restrict or potentially restrict the utility of this collection. Some of these are common to a number of sites of this type and period, but others are more specific to Thorpe Thewles. It is necessary that all should be detailed in order that the limitations of the sample are recognized and where possible eliminated or reduced by careful selection of the analytical method or treatment. Some of the conclusions presented below will necessarily be generalizations and it is the degree to which this is so that is important for other workers to recognize.

Aspects of the site and sample that influence the analysis and interpretation

The problems associated with this collection are fairly obvious and generally applicable to many sites. The period of occupation of the site spans more than three hundred years and has been divided into four archaeological phases. Structural subphases were recognized within these phases, but for many deposits it was not possible to assign them to a subphase. The phases span the Late Iron Age and early Roman period, and as such present an interesting opportunity to test whether any changes in agricultural economy took place during this period,

particularly coincident with or resultant upon the Roman occupation.

Problem 1 Although 8,000 bone fragments appears to be a reasonable sample, division into four phases reduces the sample sizes to 2,669 in Phase II, 3,759 in Phase III and 463 in Phase IV, with a further 968 bone fragments from deposits which could only be assigned to two phases or more. From the point of view of the chronological change the analysis is largely restricted to Phases II and III, which perhaps have just sufficient sample sizes for comparison.

Another aspect of the site is the large number of individual structures and the variety of settlement boundary features. Many of these can be assigned to different phases, but within any one phase there are a number of potentially contemporary structures and ditches. This is not necessarily a problem unless it can be argued that the structures are functionally different and might therefore be expected to produce distinct collections of refuse such as bone.

Problem 2 If this is so then the sample from each structure must be compared with those from contemporary structures in order to discover the existence and scale of any variation that may be attributable to functional differences. It is apparent at the level of interpretation that if the collection is dominated by a sample from one functional unit that is selective in terms of its bone collection with reference to the other structures on the site (excavated or unexcavated), then this may not be a suitable sample for a generalized appraisal of the site economy but should more appropriately be directed towards the analysis of 'that functional unit'. For example, the deposits in Phase III can be divided into a number of structures and feature groups from which the largest sample is 999 bones.

It has been found on excavations elsewhere (Wilson 1978b; 1985) that bone samples may vary proportionally with distance from the main focus of the site.

Problem 3 This is likely to be due to a number of factors, such as disposal practices and housekeeping, which I shall not discuss here but which indicate another dimension in which the bone sample must be analysed for variation. The importance of such differences to the interpretation of the collection is clear if considered in terms of only the central structure being excavated, or only the peripheral areas, each of which might produce significantly different assemblages.

There is one more 'dimension' to be considered, that of depth, which at this site may be considered significant. The nature of a contemporary feature is one of the most significant circumstances in its potential for acting as a receptacle for bone debris. On this site there are no pits, probably occasioned by the nature of the clay subsoil, but the features vary from shallow eaves drips, floor layers or drainage channels around structures to the deep and wide main enclosure ditch.

Problem 4 There is a potential for some selectivity among the bone debris being incorporated into these features and therefore it is important to analyse the collection with respect to the depth of the feature in an effort to determine whether selectivity has occurred.

Problem 5 One further aspect of some significance and also correlated with the depth of the feature discussed above is preservation. It was expected that preservation might be poor and four levels of erosional destruction were scored during the cataloguing of the collection in order that varying degrees of preservation likely to affect the analysis and interpretation might be recognized. This was of particular significance with respect to depth where it was envisaged that a gradient of pH and preservation might exist and it would therefore be necessary to relate depth and degree of erosion in order to assess the significance of such a gradient should it exist.

Problem 6 One final problem specific to this site, although obviously important on many other excavations, was the modern and ancient breakage of bone. The matrix of the site was clay, and inevitably during excavation many bones were broken owing to the cohesive strength of the clay and the brittleness of the bone, which although superficially well preserved had lost most of its organic material. Also in many cases bones had been whole when deposited but subsequently, during freeze, thaw and dessication of the soil, had been broken up by the movement of the clay and were superficially whole only because the clay held the fragments together. Upon excavation and washing many of these bones fell to pieces and one or two examples, such as a horse skull which was composed of over 140 fragments of bone, serve to illustrate the severity of this process. During the cataloguing of this collection fragments recognizably belonging to the same bone, whether broken due to natural agencies in the soil or during excavation and subsequent treatment, were catalogued as one unit, the number of fragments being recorded in the data record. Individually, therefore, the number of bone fragments from the site is considerably greater than the 8,000 catalogued units and it is apparent that many of these latter fragments may well have been unrecognized fragments of already catalogued items.

It is apparent that although superficially 8000 fragments might appear to be a reasonable sample size from which to analyse and interpret the economy, when all the problematic dimensions of the sample are taken into account many of the potential sources of variation that require study before any interpretations can be made cannot be tested owing to the small sample size. The first table (Table 42 5:G9) illustrates the dependent hierarchies of the sample and the level at which the samples become of sufficient size for the assessment of intra-site variability.

Within a hypothetical system it must be recognized that the level, number per phase, at which intra-site variability becomes a conceivable aim at this site is so high up the hierarchy of potential depositional variability that variation at this level may be independent of phase, being largely determined by the depositional and recovery biases of the levels lower in the scale for which no check could be made.

It is within these parameters that interpretive generalizations based upon the higher levels such as phase groupings or the whole site must be assessed.

The next level of analysis is devoted to assessing variability between phase, depth and feature to assess how the burial environment affects the sample, and this is then linked to spatial and chronological variation between species and bone type. A full account of these results is published in the fiche archive and the conclusions utilized below.

It is now possible to make some broad generalizations as to the transformations to the original population that

have occurred, and possibly correct for these in a crude fashion.

1 A proportion only of the site has been excavated and therefore only a percentage of the potential recoverable bone sample was recovered.

a) Within Phase II most of this unexcavated sample would derive from the Main Enclosure Ditch. The depth of deposit and results from the two sections sampled would suggest that this will produce a slightly higher proportion of cattle than that recovered so far from Phase II, and therefore alter the overall figure for Phase II in favour of cattle fragments.

b) The Phase III deposits are mainly shallower features and contain less cattle and more pigs and sheep overall (Table 55 6:A6) than Phase II. Rather less of the settlement in this phase appears to have been excavated, and no peripheral ditch which may or may not exist. In the absence of a peripheral ditch the excavated sample possibly includes most of the biases to be expected in this phase and a directional change in fragment proportions cannot be predicted.

2 On the basis of the recovered sample a further 22,000 unrecovered bone fragments from the unexcavated deposits of Phase II can be predicted and perhaps a further 10,000 from the Phase III deposits. The sample analysed in this report is both a biased sample and only approximately 16% of the potentially recoverable bones from the whole site.

3 Much variation occurs throughout contemporary deposits, but it would be unrealistic to try and predict the degree of loss and destruction for each in relation to its composition, degree of erosion and proportion of the feature excavated. But the generalized destructive loss of bones of individual species can be assessed.

a) Of the major domestic species, pig bones are certainly the least well represented, that is they have suffered the greatest degree of pre-and post-depositional destruction, and this has probably been greater in the Phase III deposits.

b) The sheep bones have also suffered a relatively high loss by comparison with the cattle bones, but there is little evidence that loss was differential between Phases II and III.

c) Although much material of cattle, and probably also horse has not survived, this species is relatively over-represented in the excavated sample due to its greater survival potential. Its survival in different phases appears similar.

Abundance

In summary, Table 55 (6:A8) probably under-represents cattle on account of excavation bias, but also under-represents pig and, to a lesser degree, sheep due to preservation bias in Phase II.

In Phase III the under-representation of pig appears to be substantial, apparently resulting from preservational bias, and that of sheep is probably more significant than any biases against cattle, although there apears to have been a substantial loss of juvenile cattle bones in this phase (see below) that might counterbalance any biases in favour of sheep.

This summary must be viewed as a best approximation after taking into account the variation and biases discussed above and in fiche. If it is to be accepted, it exaggerates the differences already present between the frequency of fragments from Phase II and III (Table 41 and 55), indicating a decrease in cattle from Phase II to III, with an increase in pig and sheep bones. The decrease in horse bones may be real and it is possible that the trend outlined for cattle may also apply to horse bones.

Because of the differential bias for species indicated above, estimates of relative abundance have been restricted to those based on fragment counts discussed above. Minimum numbers are likely to be affected by the differential survival of jaws, and the method proposed by Rackham (in prep, a), is seriously upset by the differential survival of bone elements between species indicated by Fig 120a (6:C1). The method can absorb and correct for some of this bias, but due to the obvious gross differences in survival suggested by Figs 108, 109 and 110 (6:A12-14), the method would measure the proportions in the sample and not in the original population as designed.

The remaining discussion will concern itself with the individual species.

Cattle

Identified cattle fragments are the most abundant remains at this site. Nevertheless there appears to have been considerable loss through differential destruction and recovery efficiency. This is readily apparent in Figs 108 and 115a (6:A12 and B10). Most of the later fusing and more fragile epiphyses occur with nearly 60% less frequency than the denser early fusing epiphyses (Fig 115a), and reference to Fig 108 shows that fragments of pelvic girdle, vertebrae, skull, carpals and tarsals are extremely under-represented with respect to the major limb bones. It is certain that at least two factors have been contributing to this picture: pre-and post-depositional preservation, particularly scavenging and erosion, and recovery efficiency. The low frequency of all the smaller foot bones (even the first phalanx is relatively under-represented) is particularly obvious, as it is for all the more fragile parts of the skeleton, particularly the skull. A good deal of this latter may be due to fragmentation rather than total destruction, since increasing fragmentation of skull, pelvis and vertebrae considerably reduces the potential for identification.

Most of the obvious lacunae in the distribution of skeletal elements can be explained in this manner and it does not appear that contemporary human behaviour has produced any significant biases. However, as has been noted above, the shallow deposits in Phase III (Fig 111a) show a disproportionately high frequency of bones of the lower hind limb. The sample is fairly small, and these bones are some of the more robust items in the skeleton. Moreover, since the finds cannot be placed in any area of the site this discrepancy is not readily interpretable.

Age of the cattle

All age figures in years are based upon modern and recent stock, as published in Silver 1969; Habermehl 1961; Schmid 1972; Grigson 1982.

The age of the slaughtered beasts has been analysed using three methods:

1 The proportion of fused and unfused epiphysis.

2 The eruption and wear on the mandibular and maxillary teeth.

3 A small programme of sectioning the mandibular molar 1 to study the cementum layers.

It is immediately apparent from the above discussions that method 1 is likely to be heavily biased by differential loss of the less robust juvenile bones or unfused epiphyses. This is readily illustrated below when comparing the results of methods 1 and 2 for Phases II and III.

A fourth data set has also been used to qualify the results from methods 1 and 2. This was the proportion of identifiably juvenile bones, ie extremely small and porous, in which the epiphyseal junction did not survive and therefore would not be counted in method 1.

The results of the epiphyseal fusion data are presented in Figs 121, 122 and 123 (6:C2-4) for Phases II and III and the whole site together, in the manner of Rackham (in prep, b). The figures document the increasing proportion of unfused epiphyses in the sample with increasing age at which fusion occurs, and therefore allow an estimate of the percentage of the slaughtered population at particular levels of skeletal maturity. The samples are fairly small, particularly in respect of the later fusing epiphyses. The figures are characterized by very low numbers of unfused epiphyses (7% of all epiphyses) up to the time at which the distal metapodial epiphyses fuse, about 2-2.5 years in modern animals (Silver 1969). This certainly under-represents the true picture, and the presence of over 10% of fused or fusing distal epiphyses of humeri in Phase II probably represents a minimum proportion being slaughtered in their first year.

A similar result is found in Phase III, but in this Figure (122) the slightly earlier fusing epiphysis of the distal tibia (about 2-2.5 years) has risen to 20% unfused and, in combination with the results from the teeth below, is probably a more accurate reflection of the proportion killed at this age than the metapodials in this figure suggest. Although the sample sizes for the late fusing epiphyses are small, there is a slight suggestion of a larger proportion of the juvenile condition in the Phase III deposits. If the presence of epiphyses in the process of fusing can be used as a guide to the actual ages at which slaughter occurs, then the evidence suggests animals being certainly killed at about l-l.5 and 3.5/2-4 years of age, and between 6 and 9 years of age.

The results of the analysis of the teeth are presented in Fig 124 (6:C5 and 6). In this figure the percentage frequency of unerupted and erupted teeth at different wear stages is recorded for each tooth type and arranged in the approximate order of eruption in the mandible. The premolars 2 and 3 are characteristically under-represented in this type of figure due to their tendency to be lost from the adult jaw. The juvenile condition is therefore over-represented, since, even if the deciduous tooth is lost, the permanent dentition survives within the jaw in the unerupted position and can therefore be counted; obviously shed and loose deciduous teeth are not scored. Molar teeth lost from jaws are not counted since these may occur as unassociated teeth which would result in double counting. In contrast to the results from the epiphyses it is clear that a substantially larger number of juvenile animals are represented by their teeth in Phase III, by comparison with Phase II. There is a consistant increase of between 15 and 30% in the proportion of unerupted specimens for all teeth except the P4. On the other hand there appear to be comparatively fewer teeth in the slight wear category in Phase III.

The interpretive analysis of this data for Phase II is as follows: approximately 5% of the slaughtered population were killed before the eruption of the Ml, within the first six months, with only a small additional number being killed between then and the eruption of the third molar at about 2.25 years. 60% of the sample population appear to have been slaughtered by about 2.75 years, and the 26% of M3 and 37% of M2 with only slight wear suggest this substantial slaughter at a tooth age equivalent to 2.5-2.75 years in modern stock. The sample for P4 is small, but of the remaining 40% none appear to have been killed between the age of eruption of the P4 and the development of medium wear (Grant 1982 - wear stages f-j). The 27% of M3s with well worn occlusal surfaces (Grant stages k onwards) suggests a small proportion of old adults in the sample.

In the Phase III deposits up to 20% of the slaughtered animals had an unerupted Ml equivalent to an age of less than six months in modern stock. A further 9% were slaughtered in the following nine months and by the time of eruption of the M3, 37% had been slaughtered. This is a definite increase in the proportion of animals killed at various stages in the first three years. By the time that the P4 has erupted and is in slight wear, about 2.75-3 years, 68% of the sample population has been slaughtered. This phase may be characterized by slightly fewer aged adults, although 22% of the M3 and 6% of the P4s are well worn.

As a further check on the pattern of slaughter suggested by the teeth in contrast to that from the epiphyses, the material was studied for definite juvenile bones from animals probably slaughtered in their first year, which had lost their epiphyseal junctions due to destruction. Within Phase II deposits six bones fell into this category: one scapula from a very small juvenile, and two femora and three metatarsi shafts from animals classed as small juveniles on the basis of the size and porosity of the bones. Within the Phase III deposits this list includes eighteen bones assigned to small calf, or juvenile, and one probably from an extremely young animal. These included three scapulae, five humeri, one ulna, one metacarpus, two innominate fragments, four astragali and two metatarsi. This is proportionally, despite the small sample, three times as many juvenile bone shafts as in Phase II and supports the evidence from the teeth.

In order to obtain some idea of the longevity of the animals in the sample, and possibly their absolute age, a number of mandibular Mls were sectioned longitudinally and their cementum studied for lines. The method is described in microfiche (5:G5), and the results are ordered in terms of the tooth's surviving crown height in Table 58 (6:All). Preservation was poor, and a number of teeth had no discernible lines in the cementum due to degeneration of this material. All those teeth that did produce visible lines were from jaws in which the full adult dentition had erupted and was in wear, or at a wear stage commensurate with this stage of development. All specimens must therefore be presumed to have a minimum age of three years.

The teeth are classed by crown height, broad wear categories and the minimum and maximum number of recorded annual rings. The validity of this method is discussed elsewhere (Stallibrass 1982; Coy *et al* 1982). This sample was complicated by poor readability of some

teeth. The recorded number of rings was therefore less than those originally present for some teeth, but a number of the most heavily worn teeth survived very well and showed sections with a minimum number of 'annual' rings of 10-l1 and a maximum of up to 17, suggesting ages a little older than the number of increments. The discrepancy between the minimum and maximum figures is due to differences in the number of lines counted for a single specimen on different days. It was surprisingly difficult to duplicate a count taken previously.

While not giving any absolute ages to the population in general, the results do place a possible terminal age to most of the older jaws and therefore assist in assessing the proportion and age of the older animals being killed. Most of the older specimens with low crown height, heavy wear and the most recorded lines fall into Phase II, possibly suggesting a greater longevity before slaughter for the adult cattle in this phase. But poor survival in the Phase III deposits and inability to read the lines of some of the teeth from this phase may be responsible for this bias.

The collection has not been analysed for the relative proportion of meat-bearing and non-meat-bearing elements, or for methods of butchery. The latter was recorded in the catalogue, but the poor preservation suggests that an analysis of either of these aspects is unlikely to produce a true picture, since the visible evidence of butchery was relatively sparse.

Metrical analysis

A number of the bone fragments could be measured. The measurements follow Von den Driesch (1976) and Jones (unpublished) with some additional measurements. A number of bivariate scatterplots of the more commonly taken measurements are presented in Figs 137-142 (6:D6-11).

The analysis has been directed to determining the presence of bones from animals of different sex, or castrates, and comparing the material from this site with similar period material from other sites.

All the scatterplots indicate one or two large specimens widely separated from the remainder. Since these measurements occur at the top end or above the range of Iron Age material from other sites these may be interpreted as bulls, and constitute between 5 and 10% of the measured specimens. Although some of the scatterplots appear to indicate a further division in the data points, the separation is not good and it would be unwise to let a too vivid imagination interpret cows and steers on such small samples. For this reason also the specimens are not marked as to phase on the scatterplot, although this information can be found in the lists of measurements.

I have not presented any mean or standard deviations for these measures because in collections of unknown sexual composition, the presentation of such data for measures that are believed to be dimorphic for sex would be meaningless and considerably less useful than the data itself.

The measurements of the cattle bones on this site, while closely comparable with the figures presented by Wilson (1978a, table XIX) for a number of Iron Age sites, include larger specimens for a number of measurements and extend into the upper half of the range indicated for the Romano-British samples in the same table. These measures are those taken on the larger bones already interpreted as bulls. While it is possible, though unlikely, that the sites listed by Wilson did not contain any measurable bull bones, sample size or selectivity for breeding and nutritional status could easily be responsible for creating larger bulls at Thorpe Thewles than sites further south, and a larger type of cattle certainly need not be postulated.

Pathology

Few of the surviving bones exhibited pathological features. Of these, five deserve some mention. The anterior zygapophyses of an anterior thoracic vertebra was heavily pitted and eburnated (Plate 8) testifying to a breakdown of the cartilage and severe inflammation. The other four bones illustrate stresses on the feet. The distal end of a metatarsus has a heavily splayed medial condyle (Plate 9) with associated exostosis and malformation around the articular surface on this side. Three phalanx 1s also exhibit pathological morphology (Plate 10) involving the splaying of the distal articular surface and exostosis around this facet and also the proximal facet. In the case of the centre specimen (Plate 10) the distal articular surface has become inflamed, pitted and eburnated producing a serious arthritic lesion unlike the other two. Morphological changes of this sort have generally been attributed to stresses incurred by labour or traction (Baker & Brothwell 1980), but this is as yet unproven and many malformations and diseases of the feet occur independently of such loading.

Sheep

The bones of sheep are the second most abundant at the site. The few goat bones from this site were readily identifiable, being considerably more robust than the typical gracile sheep of the period. All the material therefore catalogued as sheep/goat can be taken to be sheep. The sheep bones have suffered in the same way as the cattle (see above), although it is apparent from Fig 119a (6:B14) that the relative loss of epiphyses is much greater in this species, and therefore the results on aging are potentially further from the true picture than is the case for cattle.

Bone loss is extreme for most of the smaller elements (Fig 109 6:A13), and the disproportionate loss of many bones in the deeper deposits suggested by Fig 112a (6:B3) makes the analysis of skeletal representation useful only as a guide to preservation and recovery potential.

There are no substantial differences between the phases, although as the evidence above suggests the proportion of sheep increases in the Phase III deposits, a change that was probably greater than the fragment frequencies.

Age of the sheep

The epiphyseal data on the sheep bones is not large enough for a comparison of the phases and this has therefore been amalgamated for the whole site in Fig 125 (6:C7). This is unfortunate since it has been suggested that the species proportions change, and the cattle slaughter pattern has certainly altered. It is therefore possible that some changes occurred in the husbandry and slaughter of sheep. The lumping together of data might therefore be combining different patterns of

exploitation. Nevertheless, we can either not interpret this data, or treat it as a homogeneous collection for interpretation. The latter course is adopted but with the provisos noted above. A small proportion, perhaps 10% of the sample population was slaughtered before the fusion of the proximal epiphysis of the first phalanx, probably in the first year, and a further 20% by the time the distal metapodials and tibia had fused, perhaps two years old. Between the fusion of the metapodials and the proximal calcaneum (at about three years), 15% were slaughtered, after which probably no animals were slaughtered until skeletal maturity. Therefore between 50 and 55% of the sample population were slaughtered after an age of about four years. If we follow the pattern suggested by the evidence in the first section, then all these figures are likely to over-represent the adult condition, but by how much is difficult to assess.

The teeth are analysed as a check against the epiphyseal data. The percentage erupted and worn within each phase are given in Fig 126a and b (6:C8 and 9). There is no appreciable difference between these two groups, and a breakdown of the degree of wear in broad limits on the M3 shows a very similar pattern in both phases. There seems therefore to be no evidence for a change in slaughter pattern and the epiphyses and tooth eruption data can be compared directly in order to assess the degree of loss of juvenile material. It is not possible at present to correlate these two lines of evidence. If there had been no loss the 50% unerupted P4s would correspond with the 45-50% slaughtered before the fusion of the proximal calcaneum. This latter bone fuses at about three years, but the P4 erupts at two years. While it is quite possible that this difference in modern stock is due to a different relative maturation rate for the teeth and skeleton by comparison with ancient animals, it could equally be due to a relative loss of 15-20% juvenile bones. The animals with the P4 unerupted corresponded to those in which the distal tibia and metapodial and proximal femur were unfused (ie 30-37% of the epiphyseal sample population). In fact if the data in Bullock & Rackham (1982) for feral goats is studied, their results suggest that the P4 should have been up and in wear well before these latter bones fuse, which would suggest a much greater relative loss of juvenile material than 20%. If the data are compared with the partial skeleton of an Iron Age ewe at Ashville (Wilson 1978a) in which the proximal calcaneum (Tuber calcis) is fused but the P4 is unerupted, the opposite picture is given and there ceases to be any serious discrepancy between the epiphyseal fusion and tooth eruption data. Until a more detailed analysis of the skeletal maturation of these old stock is carried out this cannot be resolved, and although it seems probable that the epiphyseal data in Fig 125 (6:C7) substantially under-represents the juveniles, and that the tooth eruption data suggesting that 50% of the animals had been slaughtered by the time the P4 erupted - about two years - may be more reliable, one is encouraged by Wilson's results from Ashville (p 124) to view the eruption and wear sequence with suspicion. It seems plausible that the dental maturation is relatively rapid in relation to epiphyseal fusion in modern stock.

In extending an interpretation to this data we are considerably hindered by the complications alluded to above. There is however little evidence for very young animals, except for one lamb with the deciduous teeth only just showing (therefore still suckling), and 26% only of the sheep mandibles and maxillae had the M3 unerupted. A consideration of the wear on the 79 M3s from the site shows a high proportion (57%) with only slight wear (ie third cusp not or only just in wear), 34% with all cusps evenly but not heavily worn and only 8-9% with heavily worn occlusal surfaces. Barely 7% of the whole sample population lived to be 'old' and 42% were killed within a few months of the complete eruption of the M3, the remaining 25% being killed between these two categories.

One layer (Area C, 847) produced a partial skeleton of a sheep. In this specimen all the surviving limb bones had fused epiphyses - femur, humerus, phalanges, metapodials, ulna - and a number of the anterior vertebral epiphyses had fused and the posterior epiphysis on a cervical vertebra, the remaining vertebral epiphyses being unfused. The mandibular and maxillary M3s were just in wear (Grant staged on mandibular M3) and the crown height using Carter (1975) suggests an age of 30-33 months, but I would suggest, using the epiphyseal fusion data in Bullock & Rackham (1982), that this animal could be 5-6 years old. This is further evidence questioning the reliability of tooth eruption and wear when using ages from relatively modern stock and even Silver's (1969) 18th century data may underage material. This discrepancy that might arise in aging stock has considerable implications for the interpretive analysis of economic husbandry.

One jaw illustrated the later sequence of eruption This specimen carried a heavily worn DP4 on the point of being lost with the P4 half up. The P3 is just in wear, the Ml and M2 at Grant's stage g-h, and the M3 at stage d-e, giving a MWS of 34 (after Grant 1982). This mandible is at the same stage of wear for its molar teeth as the partial skeleton above. Interestingly the eruption and fusion pattern on the goat (see below) is completely different. These data are not consistent with the Ashville ewe which, it might be predicted, was 4-5 years old, although sheep in northern England at this time may well have been a slower maturing type than the animals in southern England.

A second partial skeleton from layer 1880, Area C, exhibited the fused condition on all the appendicular and the majority of the vertebral epiphyses with two vertebral epiphyses just fusing. By analogy with the specimen above this animal was probably over six years old. Unfortunately the head did not appear to have been buried with the skeleton, although this was incomplete and had probably suffered disturbances and erosion.

As for the cattle, the survival does not permit an analysis of skeletal elements for meat-bearing bones and butchery. Apart from anomalies in tooth wear, no pathological features were observed on any of the sheep bones.

Few measurements could be taken on the sheep remains. These are listed in the microfiche (6:Ell). Twelve distal tibia survived to be measured, and despite the small sample a scatterplot of the maximum distal width against the distal depth (Fig 143 6:D12) gives some suggestion of grouping, which may reflect sexual morphs. The size ranges indicated by the measurements fall within the ranges found on other Iron Age sites (Wilson 1978a; Harcourt 1979; Grant 1984). The presence of rams among the remains is indicated independently by their horn cores which are robust and suggest a large

outward-curving horn (Plate 11).

Goats

Goats are positively identifed from Phases II and III (Table 42 5:G9). The remains from Phase II included a partial skeleton recovered from a post-hole in the main structure (C1276) consisting of 33 bone fragments. The goat bones are noticeably larger than the sheep remains at this site.

The skeleton is of a young animal with the phalangeal epiphyses fused but the distal metapodial epiphyses unfused. Two anterior cervical epiphyses are fused, but all other vertebral epiphyses are unfused. The permanent molars are all erupted with the mandibular M3 at Grant stage b. Using the figures in Bullock & Rackham (1982) this would suggest an animal probably between 30-48 months using the epiphyses, and the teeth suggest an animal of approximately 36 months. The absence of animals between 15 and 35 months and 36 and 47 months in this article *(op cit)* makes it difficult to be precise, but by comparison with the feral goats these authors studied, the teeth may be developing a little earlier in relation to the post-cranial skeleton (except for one animal in Bullock & Rackham). It is unlikely that skeletal maturation developed more rapidly in Iron Age goats, which would indicate that the dentition may have been developing more slowly in relation to the post-cranial skeleton than the Moffatdale specimens. This specimen could therefore be nearly four years old if the Moffatdale post-cranial data are used for reference, but is probably between three and four.

Of particular interest is the fact that the tooth row of this goat and the sheep skeleton above are at a similar stage of development, however, the post-cranial skeletal development is markedly different. If development is presumed to be at the same rate in these two specimens, then wear stages c and d (Grant 1982) would have to correspond with a time period similar to that during which all the appendicular epiphyses after the distal tibia fuse, which represents a further three years if the data from Bullock & Rackham (1982) are employed. I feel therefore that skeletal development is likely to be a more accurate method of assessing the absolute age at slaughter than tooth wear.

A few measurements for the goat bones are recorded in microfiche (6:E12-F2).

Pigs

Pig is almost certainly the most under-represented of the three major species at this site. The combination of a high proportion of juveniles and extremely poor preservation has resulted in the most severe loss of bones of this species (Table 45, 5:G 12). There appears to be some evidence of this loss being differential between phases (Fig 118, 6:B13).

The survival of the different pig elements (Fig 118b) contrasts with both sheep and cattle, and the five most frequent epiphyses (Fig 119b, 6:B14) show a much less substantial fall-off than for these latter species. The bones of this species appear to have a more consistent survival potential, except for the jaws, than either sheep or cattle, but this may be in part an artifact of small sample size. The percentages in Table 55 (6:A8) suggest that the proportion of pigs increases in Phase III, and the evidence for an apparent drop in survival (Fig 118a, 6:B13) of pig material reinforces this change.

Age of the pigs

More than for any other species the data for pigs is likely to underestimate the proportion of juveniles slaughtered. The analysis is further complicated by very small samples of all the later fusing epiphyses. Nevertheless, apart from one or two bones from adult animals, very nearly 100% of the sample population represented by Fig 127 (6:C10) were slaughtered before the epiphyses of the distal metatarsal and proximal calcaneum fuse, an approximate age of 2-21/2 years. About 50% of the animals slaughtered before this appear to have been killed after the fusion of the acetabular symphysis, scapula tuberosity and the proximal radius, but before the distal humerus, perhaps suggesting this epiphysis fuses a bit later. This would correspond with about one year (Silver 1969). The other 50% were perhaps killed at the end of their second year after the distal tibia had fused, but most of the metapodials were unfused.

Again these results are compared with the data for the state of development of the dentition.

The proportion erupted and the general state of wear or the premolars and molars of mandibular teeth are given in Fig 128 (6:Cll). The premolars 2 and 3 are unreliable owing to loss but the trend in eruption and wear can be seen for the other teeth. Sample sizes are again restrictive, but the surviving material perhaps suggests a slight increase in Phase III in the number of animals slaughtered before the eruption of the M3. In the much smaller sample of maxillae this difference is further exaggerated, the Phase II deposits having one unerupted M3 and five erupted but only recently in wear; the Phase III deposits have six unerupted M3s, two erupting and three just in wear. If these data reflect a real situation, then there appears to be a change in slaughter pattern on the evidence of the teeth. The data from epiphyseal fusion would therefore average the pattern from both phases with a slight bias towards the larger Phase III sample.

A comparison of the epiphyseal and tooth data would suggest that animals with the M3 just erupted and in wear would have all epiphyses that fuse before the distai tibia fused and some of the tibia and all later ones unfused. This is not too inconsistent with the published information for old stock and wild pigs on fusion and eruption times (Silver 1969; Bull & Payne 1982), in which the tibia is said to fuse at about two years and the M3 to erupt at various ages, depending on author, between 16 and 30 months, the concentration of records being before or just on two years (see Bull & Payne 1982, table 1). Nevertheless, even this compatability of data is somewhat doubtful since we have postulated a greater destruction of the juveniles in relation to fused epiphyses. If we compare the total proportion of mandibles (Phase II and III) with the M3 in medium wear (Grant wear classes f-h), 15% with the sample of fused distal tibiae, 44% of a very small sample, then this tooth must either be erupting during the period the distal epiphysis of the tibia fuses or else up to nearly 80% of the juvenile bones must have been lost. This indicates the two extremes of these data and reinforces the difficulty of interpreting them. Furthermore, whether these events actually took

place at two years of age rather than later is problematic. The discussion of sheep above has already suggested that the ages traditionally used for interpretation could be largely underestimated.

Although a small percentage (18%) of the sample population survived to the age at which their M3s show medium wear, there are very few later fusing epiphyses fused (two specimens) and the number of animals with fully mature skeletons must have been very low (Fig 127, 6:Cl0).

Confident interpretation of these data is restricted by the generally small sample size of both epiphysis and teeth.

The only measurable pig bones in the collection were those with early fusing epiphyses, and these might be expected to undergo some increase in size with increasing age even after fusion. The measurements are listed in microfiche (6:F3 and 4), but no analysis or comparisons have been made.

Horse

Fragments of horse bones are common in the collection and in Phase II occur with greater frequency than pig (Table 42, 5:G9). Some of the contexts contained more than one bone from the same individual. This was particularly true of vertebrae and contrasts with the other species discussed above in which the only associated finds were those partial skeletons already noted.

It can be seen from Fig 130 (6:C13) that the survival of horse elements is not similar to cattle. This species also appears to have had the least bone loss (Fig 129, 6:C12 and Table 56, 6:A9) by comparison with pig, sheep and cattle. Although no complete skeletons were found, the frequency of occurrence of more than one bone from an animal and the considerably reduced bone loss indicated by Fig 129 and Table 56 (49.4%) suggest that this species has not undergone the degree of dismemberment and butchery that the other species have. The lack of visible butchery evidence is not conclusive because it survives so infrequently at this site, but the bones are characteristically less fragmented than the cattle bones and it is possible that horses were not eaten, at least by the humans, although the degree of disarticulation is substantial.

The survival (Fig 129, 6:C12) is indicative of an over-representation of this species in the fragment counts, since this collection almost certainly represents a smaller number of animals than a similar number of cattle bones would. The percentage figures in Table 55 (6:A8) are therefore too high for a true picture of contribution in terms of animals to the sample. Further support for this is given by the fact that all the remains are adult and this species has not lost juveniles through erosion. The collection of horse bones is therefore likely to be less affected by the many destructive factors than any of the other species and most closely represents the original deposited fraction,

Age of the horses

The epiphyses (Table 57, 6:Al0) indicate at least a 90% sample of adults at skeletal maturity. This result is supported by all but one jaw, an animal with its deciduous molars in slight wear only, probably less than one year. All the other dental remains indicate adult animals.

There are no visible pathological features on the bones, and the fairly gracile characteristic of the bones suggests these are riding ponies. The measurements taken on these bones (microfiche 6:F5-7) show them to be in the same size range as other material of this date from England (Wilson 1978a, 118; Grant 1984; Harcourt 1979).

Three horse skulls were recovered, one from the gully of Subrectangular Enclosure I in Phase II, and two from Phase III deposits in the masking layers and the Curvilinear Enclosure Ditch. In each case the skull had completely fragmented and some bone had corroded. In two cases there were no other horse bones in the layer and in the third a third cervical vertebra, probably from the same animal.

Dog

Thirty-three bones of dog were identified, plus one specimen that could not be distinguished from a fox (Table 42,5:G9). Apart from part of the skull of a juvenile animal in Phase II, all the remains are from adult animals. The measurements of the few bones sufficiently well preserved are listed in microfiche (6:F8). The size of the animals represented by these bones equate with individuals rather smaller than an adult Alsatian skeleton in my reference collection, but one mandibular ramus fragment is from a dog somewhat bigger than this Alsatian These animals occur within the size range of Iron Age dogs described by Harcourt (1974, 1979). Apart from three vertebrae from the same animal all the remaining bones are isolated and eroded fragments, no different in preservation or circumstance from the rest of the collection.

Fox

Five fox bones have been identified (Table 42, 5:G9) from Phases II and III, two bones - a humerus and an ulna - from the same limb. One specimen catalogued as a dog or fox is a small humerus that appears a little too stocky for a male fox by comparison with the reference material in the collection of the Biological Laboratory. This specimen may therefore represent a second, much smaller type of dog at this site. Finds of fox are not infrequent on Iron Age sites (Hodgson 1967; Harcourt 1979; Grant 1984), although rarely in substantial numbers.

Cat

A single distal humerus of cat was recovered in Phase III deposits. This specimen has been compared with examples of wild cat in the British Museum (Natural History), and a number of domestic cat skeletons in the British Museum (Natural History) and the Biological Laboratory reference collection. Measurements are given in microfiche (6:F8). The distal width measurement is large, falling above all but one of the domestic specimens, but the shaft diameter is narrow and below most of the domestic specimens. Although only the distal half is present, the measurements suggest a much larger and altogether more gracile bone than the domestic specimens studied. In the absence of measurements of early domestic cats the similarity of this specimen to wild cat

is by no means conclusive. Harcourt (1979) and Grant (1984) have both suggested the presence of the domestic cat in Iron Age England in deposits probably appreciably earlier than those at Thorpe Thewles, so the identification of this specimen must remain inconclusive.

Red deer

Two fragments of red deer antler were identified, both of which were finished artefacts and are briefly discussed above (Objects of worked bone). A third fragment possibly of an antler pedicle was noted.

Human

One context in Phase III produced two human teeth.

Hedgehog

The only small mammal recovered from this site (although no sieving was carried out), was a mandible of Hedgehog, *Erinaceus europaeus,* from a masking layer in Phase II/III.

Fowl

Two bones of domestic fowl have been identified: a humerus from Phase II/III and a femur from Phase III. The specimens are small but too fragmented to measure. These represent the earliest finds of this species in northern England - although seven bird bones were recovered at Catcote (Hodgson 1967), but these were not identified. A number of finds of this species have now been recorded from Iron Age sites in southern England (Maltby 1981), and they would appear to have been introduced to northern England before the Roman conquest.

Goose

Two tibia of two individuals were found in the Phase II main structure ditch. Only the shafts have survived, and species determination is therefore not possible. However, the specimens correspond in size to pinkfoot *(Anser trachyrhynchus),* or whitefronted geese *(A albifrous),* and are certainly from wild birds.

For a few bones it has not been possible to determine them to species. These include the shaft fragment of a bird tibia and a fragment of shaft of a second indeterminate bird long bone.

Interpretation

Many of the problems associated with this collection have been discussed in some detail above and in microfiche (5:Fl) and, as the introduction suggested, the economic interpretation of the data recovered must of necessity be generalized. The analyses above have enabled us within very broad limits to correct for some of the more obvious biases present in the sample, and it is therefore possible to utilize information in broad, non-specific interpretations for the site as a whole and changes with time, but it must be remembered that the size of the samples is small.

Cattle are obviously the major contributor of meat throughout the history of the site, but it would appear that there is a change in husbandry practice and exploitation of this species during the occupation. This appears to be manifested by a drop in the relative abundance of cattle in Phase III and a change in slaughter pattern that can be summarized as a 15-20% increase in the slaughter of stock of about 12(±4) months in Phase III and perhaps a further 10% increase in animals killed between 15 and 30 months. This represents an overall increase in the slaughter of juveniles of perhaps 30%. These figures may be depressed by the generally poorer state of preservation in Phase III.

This interpretation suggests a substantial change in exploitation towards beef production with over 60% of the slaughtered animals in Phase III being young casualties, culls or prime beef, although the hides of these young animals may have been an important commodity. Little over 40% of the Phase II cattle had been slaughtered or died at comparable ages. The tooth cementum analysis suggests that some of those animals surviving beyond dental maturity may have reached ages of between 12 and 16 years before slaughter and these animals are likely to have been breeding, milking or working stock. About 20-30% of the slaughtered population in both phases were killed between about 3 and 12 years of age, representing a cull of breeding, milking and working animals possibly to maximize the efficiency of this stock. The Phase II farmers appear to have retained a slightly larger proportion of their stock into the later age groups.

A comparison of this pattern with those of other sites is not particularly constructive, since most of these lie in very different geographical regions. The epiphyseal fusion data for cattle from Ashville (Wilson, 1978a), Danebury, late phase B (Grant, 1984) and Stanwick (Gidney, unpublished) are presented in Figs 131-l33 (6:C14-D2). The pattern at the closest site, Stanwick (Fig 133), is similar to that at Thorpe Thewles (Fig 123, 6:C4), but the site may not have been subject to the same preservational problems. The data from both Ashville (Fig 131) and Danebury are similar to the reconstructed slaughter pattern at Thorpe Thewles, but suggest a generally smaller juvenile cull, unless these collections were also subject to preservational biases. There appears to be a larger proportion of adults surviving to maturity and old age before slaughter at Thorpe Thewles than the stock at Gussage all Saints (Harcourt 1979, 151). There are insufficient data from two local sites of similar period, Coxhoe (Rackham 1982) and Catcote (Hodgson 1967; 1968), for comparison.

The sheep bones are generally under-represented at the site but seem to increase in importance in Phase III. They are likely to contribute only a fraction of the meat gained from cattle but have obviously been exploited for other products. There is little evidence of substantial slaughter of young animals although 5-10% were killed or died at about 8-10 months with a further 5-10% being slaughtered probably as second or third year 'lambs'. The 30-40% slaughtered between the eruption of the M3 and the P4 would suggest a high cull of third year animals, but it has been suggested above that the deciduous P4 may not have been lost until 4-5 years. This would suggest that a few seasons' wool crop and possibly a lambing were important before slaughter of the wethers and unwanted ewes for meat. This would contrast with

an interpretation of mainly meat exploitation for this category if they were killed in their third year. About 40-50% of the animals are fully adult and represent breeding animals and those exploited for wool and milk.

The partial sheep skeleton bore knife cuts on the proximal metatarsus suggesting skinning, and the skin of these animals, particularly the younger ones, may have been an important product. The measurements on the distal tibiae (Fig 143, 6:D12) perhaps indicate a majority of wethers in this adult group, a situation to be expected in a flock with a small kill-off of lambs and therefore less need for a large number of breeding ewes.

These figures contrast with those from southern England and the synthesis presented by Hodgson (1968) for the site of Catcote. Reference to Hodgson's thesis (1967) permits a consideration of his basic data on aging as evidenced by the mandibles and maxillae. His adherence to the method and age estimates given by Ewbank *et al* (1964) have led to what I believe are unrealistically young estimates for slaughter. The data from both Catcote and Barley (Fig 134,6:D3) are presented in a similar manner to that of Thorpe Thewles although they are based upon only the mandibles, and missing teeth have been included and an estimate of eruption state and wear made. The figure for Catcote is not dissimilar to that for Thorpe Thewles. Taking into account the comments made above, over 50% of these jaws derive from animals certainly over three years and possibly as old as four or five (see Bourdillon & Coy 1979 for a similar conclusion). This contrasts with Hodgson's (1967; 1968) interpretation of these data in which he not only discusses the season of kill - an unreasonable interpretation of his data - but estimates that over 67.5% of the sheep in this sample had been slaughtered by the age of two.

The figure also illustrates the difference in slaughter pattern between these two northern sites and Barley where a significant proportion of very young animals were slaughtered. The data from Ashville (Wilson 1978a) and Danebury, late phase B (Grant 1984) (Figs 135 and 136,6:D4 and 5) both indicate a much higher proportion of young animals being killed, as do the figures for Gussage all Saints (Harcourt 1979), Barley (Ewbank *et al* 1964), Balksbury and Winnal Down (Maltby 1981).

These data not only indicate meat as an important aspect of the husbandry but also suggest that these flocks in southern England may have been much larger, a circumstance supported by the frequency of this species in the bone samples. The Thorpe Thewles flock may therefore be viewed as mainly a wool flock with perhaps milk, cheeses and meat of secondary importance. The contrast presented by these northern and southern groups is almost certainly exaggerated by the poor preservation at Thorpe Thewles, and although the teeth have formed the basis of the interpretation a higher proportion of juveniles than recorded were almost certainly slaughtered.

The goat bones are few on most sites of this period, and although it has been a folk practice of farmers to keep goats to protect their cattle from brucellosis this species' most likely function was for dairy produce. The number of animals required for this production at subsistence level is fairly small.

The pigs at this site were small and slaughtered young. Owing to the differential loss of this species, the discrepancy in terms of fragments (Table 55, 6:A8) between sheep and pigs is probably not mirrored by their meat contribution and the pigs may have supplied a little more meat than the sheep. The slaughter pattern illustrated by Figs 127 and 128 (6:C10 and 11) indicates meat and lard as the only significant contribution of pig, the whole population bar a few breeding animals being killed off probably in their first three years. The reproductive rate of this species is so high that few breeding animals are necessary to maintain a herd, and this is almost certainly the reason for so few adult animals. This species must have been an important meat contributor for this reason and may have acted as a buffer for the increasing beef production in Phase III where although there was probably an increase in herd size this mode of exploitation puts the herd at higher risk. It is traditional for pigs to be grazed in woodland pannage although sty husbandry may have taken place. The proportion of pigs in the sample suggests significant numbers of animals, and although the pollen evidence for the area is generally indicative of an open landcape (see Van der Veen, this vol) some local woodland sufficent for supporting the settlement's swine is probable. The pig remains became relatively more abundant in the later phases.

The incidence of horse bones in the collection definitely drops with time (Table 55,6:A8). Although present in some frequency and generally disarticulated, the carcasses appear to have been treated differently from the other species and were probably not eaten. This species is proportionately over-represented and was probably considerably less frequent than its remains suggest. The animals on this site compare with those from other Iron Age settlements and their gracile form and largely adult age structure support the inference that they are riding ponies or possibly light traction animals. Harcourt (1979) has suggested that these animals were periodically rounded up and broken in, thus explaining the lack of juveniles. Thorpe Thewles contained at least one juvenile of about one year that had died, but otherwise there is no evidence that these animals were bred at the site. The reduction in the later phases suggests that the species was less important, the need for transport of persons or goods being less necessary. This could have been due to a change in farming practice or a social or economic change at the site.

The dogs may have been a functional animal on the site and their size would have been consistent with their use as working farm dogs. There is no evidence for them having been eaten. Their role as a destructive agency on the site has not been discussed, because although some bones were visibly gnawed many were so eroded that recognition of gnawing would not have been possible. There was therefore no advantage in quantifying the evidence. Dogs are very destructive (Payne & Munson 1985), and since they prefer to attack pig bones they may have generated a bias in the data.

The remaining species discussed above are likely to have little economic significance for the inhabitants, although fowl may have been more important than their remains indicate as a result of preferential destruction. The red deer antler fragments are finished artifacts and must have been brought onto the site since there is no evidence of deer bones. The foxes may have been killed as scavengers or for their skins (as might the cat if wild), or killed as potential predators of the lambs. This very small proportion of wild mammals and birds, even if

their absence is partly due to poor preservation, indicates a minimal exploitation of wild resources. This is a not unfamiliar pattern in Iron Age and Roman sites in England (Grant 1981), and the collection as a whole exhibits a typically prosaic agricultural dependence.

Conclusion

The collection has been subjected to many serious destructive forces, and substantial variation occurs in relation to depth, spatial distribution and phase. The analysis and recognition of these has enabled some assessment of the economy. This must be viewed in the light of the problems discussed above, and in fiche and the errors that must be present in the attempts to correct for these biases. Hence the interpretation has included limited quantification.

The interpretive conclusions to be gathered from this analysis are of a probable subsistence farming community relying heavily on domestic stock, particularly cattle, as a source of meat with other needs such as hides, wool for textiles, sheep skins, milk, cheeses, lard and transport being supplied through the management of the stock. The pattern of data appears to change between Phase II and III, perhaps resulting from a change to a farming pattern with a larger cattle herd concentrating on beef and hide production and an increase in the proportion of sheep and pigs being kept.

An alternative way of interpreting these changes may be that in Phase II the 'farm' is producing for a market and most of the prime stock is driven from the settlement on the hoof leaving the older cattle. In contrast in Phase III the settlement may have become a 'consumer' as well as a producer, and received prime stock from a settlement similar to that of Phase II or produced it for its own consumption. This interpretation might indicate a social change as well as or rather than a change in farming pattern, possibly being associated with an increase in status. This change is associated with an increase in the size of the settlement and the 'absence' of a peripheral enclosure ditch. The horse has become less important as a beast of burden or is being disposed of elsewhere in this phase. The end of this phase is thought to coincide with the middle of the 1st century AD. The subsequent Phase IV has too little material to document any changes that may be associated with the Roman occupation, but a significant change in agricultural economy appears to have occurred earlier in the 1st century BC.

Acknowledgements

I should like to thank Miss L Bailey, Department of Anthropology, University of Durham, for sectioning the cattle teeth and Miss Sharon Davies who recorded the finds from this exercise and assisted in typing the report while employed in the Department of Archaeology on an MSC programme. Enid Allison, EAU. University of York identified the two bird bones recovered from the site. Martin Jones kindly read and commented on the first draft and Bruce Lamden wrote the computer programs used to produce many of the figures.

IV DISCUSSION

The Thorpe Thewles excavation constitutes the most extensive investigation so far undertaken of a later prehistoric settlement site in north-eastern England. It also represents one of the very few excavations undertaken in the region on a prehistoric site situated on low-lying, high quality agricultural land and, as such, represents an opportunity to study a level of settlement development inhibited by a minimum of climatic, topographical and pedological restrictions.

The evidence itself was of variable quality. The intensity of settlement had subjected the earlier phases of activity to extensive post-depositional disturbance, which had tended to homogenize the botanical samples and produce an unassessable degree of residuality within the artifact assemblages. An acidity gradient through the archaeological deposits significantly biased the survival of faunal remains and artifacts. Variations in the degree of plough-erosion across the settlement area also resulted in differential survival which biased the quantity, distribution and interpretive value of the archaeological information recovered. However, most of these factors are common to the majority of prehistoric sites, and, indeed, most sources of archaeological information.

On the positive side this site has certain characteristics which are of great value to the study of the northern Iron Age. Perhaps the most important of these is the fact that the site was located on a relatively poorly drained subsoil, in this case boulder clay. Consequently the site includes a whole range of feature-types associated with the collection and dispersal of standing water, which are not found on lighter soils and permeable bedrocks. These were of great value in increasing the occurrence of feature interrelationships, and in greatly increasing the number of artifact and biofact receptacles beneath the threshold of plough-erosion.

The large number of features was complemented by a good general level of archaeological survival, including horizontal stratigraphy, across large areas of the site. The majority of lowland sites, especially those discovered by cropmark or plough-soil scatters, have been either severely eroded by later land-use, as at Little Waltham, Essex (Drury 1978), or covered by alluvium where feature recognition and excavation are only possible after machine-stripping, with all the practical difficulties that involves, as at Farmoor, Oxfordshire (Lambrick & Robinson 1979). The most severe erosion, at the base of the westernmost medieval plough furrows, removed an estimated 0.3 m of archaeological deposits, but the average estimated loss was between 0.1 and 0.2 m.

The site has a further two intrinsic qualities related to the dating and development of occupation. The later prehistoric archaeology of the north is bedevilled by a dearth of datable artifacts resulting in an unwarranted reliance on the chronological significance of the limited range of pottery and quern types that occur. The Thorpe Thewles sequence is well dated for the later phases (III and IV) and has absolute dating evidence, in the form of thermoluminescent dating, for the earlier sequence. The second bonus with this site is that the occupation span can be broken into stratigraphic horizons.

The chronology of the site

The dating evidence is derived from three discrete sources: the relative stratigraphic information of the site phasing, the association of externally dated objects, and the independent dating of the manufacture of the pottery using thermoluminescence.

Of the four phases, internal relative dating is only applicable to Phases II-IV, as the first phase, consisting of the linear boundary Cl836 and postulated pre-Main Enclosure Ditch boundary, could be of any date prior to the establishment of settlement. The remaining periods show marked continuity of landscape layout, particularly in terms of the north-south and east-west main alignments and the re-use of specific boundaries. The Phase II east-west partition line (Cl900 etc) was re-used during Phase IV (although with a break during the currency of Circular Structures B and M). The eastern Main Enclosure Ditch line was echoed by the western side of the successive Subrectangular Enclosure II re cuts and both sides of the Subrectangular Enclosure I ditches, in turn replaced by the Curvilinear Enclosure. The Phase III north-south ditches were located to link with the position of the Phase II Enclosure Entrance, and the Entrance Cobbling carried this access route through to the final period of settlement. The gentle curve of the southern side of the Main Enclosure Ditch was echoed both in Phase III (the Southern Enclosure Ditch) and IV (the Late Rectangular Enclosure Ditch II). In absolute terms Phase II encompassed at least two re-builds of the central House (Houses I-III) which could span several generations or centuries (Reynolds 1977, 38), depending on ground conditions and culturally set factors such as tolerance of decrepitude, incentive to rebuild. The location of this structure astride the summit of the hilltop and the scale of the surrounding drainage ditch may have been intended to create a dry subsoil environment. There was little or no time-span between the abandonment of the Main House and the subsequent re-use of the platform.

The sequence from the eastern side of the enclosure ditch revealed the erection of the bank and ditched circuit, a period of edge-derived filling and several episodes of refuse discard to the point where the ditch was approximately two-thirds full. The fill was then cut by a sequence of four north-south ditches (features outside Main Enclosure Ditch), in turn cut by the successive redefinitions of Subrectangular Enclosure I at a time when the Main Enclosure Ditch was only partly full. Phase III saw the creation, partial silting and causeway across the Curvilinear Enclosure Ditch; its upper layers contained imported pottery. This evidence shows that there was no break in occupation, that Phase II was considerably longer than Phase III, perhaps by a couple

of hundred years, and that the whole span could amount to four or five centuries.

Phase IV, while being influenced in location by earlier activity, constituted a break in the sequence. Two main episodes were recorded, each of unknown length.

The chronology of the finds

The clearest information comes from the Romano-British pottery and the few diagnostic metal objects. Coarse, hand-made pottery and querns are also considered.

Romano-British pottery was present in ultimate Phase III and all Phase IV features, starting around the mid 1st century BC and lasting for about a century; the earlier date can be taken as an approximation for abandonment. The relatively small quantities of pottery post-dating this suggest that there was settlement in the vicinity, but not within or immediately outside the excavated area. This evidence therefore provides a secure date for the end of Phase III and an indication of the duration of Phase IV.

The metalwork came almost exclusively from late Phase II and later contexts. This must be seen as a real distribution in view of the large volumes of earlier features excavated and the large quantities of other artifacts and faunal remains from Phase II. The earliest datable material is from layers associated with the abandonment of the Main House and the re-use of the platform; two brooches, M5 and M6, give early and mid 1st century AD dates for late Phase II and early Phase III contexts respectively. The exotic gold earring also dates from around the turn of the millennium; it came from a Phase III (?late) context but such an object could well have been of heirloom status. The Phase IV trumpet brooch accords with the evidence of the Romano-British pottery.

Coarse pottery is poorly dated in the north-east of England as a result of several factors, the most telling being the lack of corroborative absolute dating. As suggested in the Iron Age pottery report, production followed a basic minimal pattern, within which many variations inevitably occur. Moreover, the domestic nature of production allowed the pottery to be susceptible to influences within a social matrix that we do not understand. A further difficulty has been the lack of large stratified assemblages available for study; typologies to date have assigned chronological significance to a few unrepresentative profiles and decorative traits, creating superficial parallels and circular arguments.

At Thorpe Thewles the ceramic tradition is visible throughout the occupation. Discard appears to be continuous, although gross totals for Phases II-IV reflect the incidence of suitable excavated contexts. Formal analysis suggests that there are differences between Phases II and III, but these are not great; radical change occurs only after the introduction of imported pottery.

Plastic decoration, particularly finger-tipping, has been taken to date to the early 1st millennium BC (Challis & Harding 1975,49); although of minor significance in the assemblage as a whole (12 examples from a total of 1522), decorated sherds occur largely in Phase II. However, there is little independent evidence for this dating, and these traits are found on some sites that are more securely dated to the later Iron Age, such as Catcote, Cleveland (Long forthcoming). The coarse pottery evidence from Thorpe Thewles cannot, therefore, be used to date occupation, and the variety of forms occurring within stratigraphic horizons shows that dating by rim profile and even decorative motifs is based on discredited assumptions about the social and chronological sensitivity of a long-lived ceramic tradition best described as uniform in its diversity.

The presence of beehive querns in contexts commencing from early Phase II may provide broad dating evidence. The introduction of this type into the far better documented assemblages in southern England is a matter of some debate; Wainwright's suggestion of a 6th or 5th century BC date at Gussage All Saints (Wainwright 1979, 89) has been questioned by the much larger sample from Danebury where 'rotary querns were beginning to be introduced no earlier than the 4th century BC' (Cunliffe 1984). A later date for their appearance in the north-east, c 200 BC (Spratt 1982, 188) is based on suggested pottery dating and remains unsubstantiated, although where external evidence is available they are consistently found to date from the later Iron Age.

The purely artifactual evidence, therefore, cannot be used to date the establishment of occupation, but suggests that the change from a single-unit enclosed settlement to a multiple open settlement was around the turn of the millennium, that settlement ceased in the later 1st century AD and that the Later Rectangular Enclosure Ditches were full by the mid 2nd century AD.

This evidence is complemented by the results of 12 thermoluminescent dates (Table 15) obtained from 18 samples submitted for testing, which represents a good success-rate for coarse pottery (Bailiff this vol).

Mean TL dates of 485 BC (± 45; ± 190) and 135 BC (± 110; ± 190) for Phases II and III respectively, may be derived following the procedure of Aitken & Alldred (1972), and these can be shown to form two distinct groups.

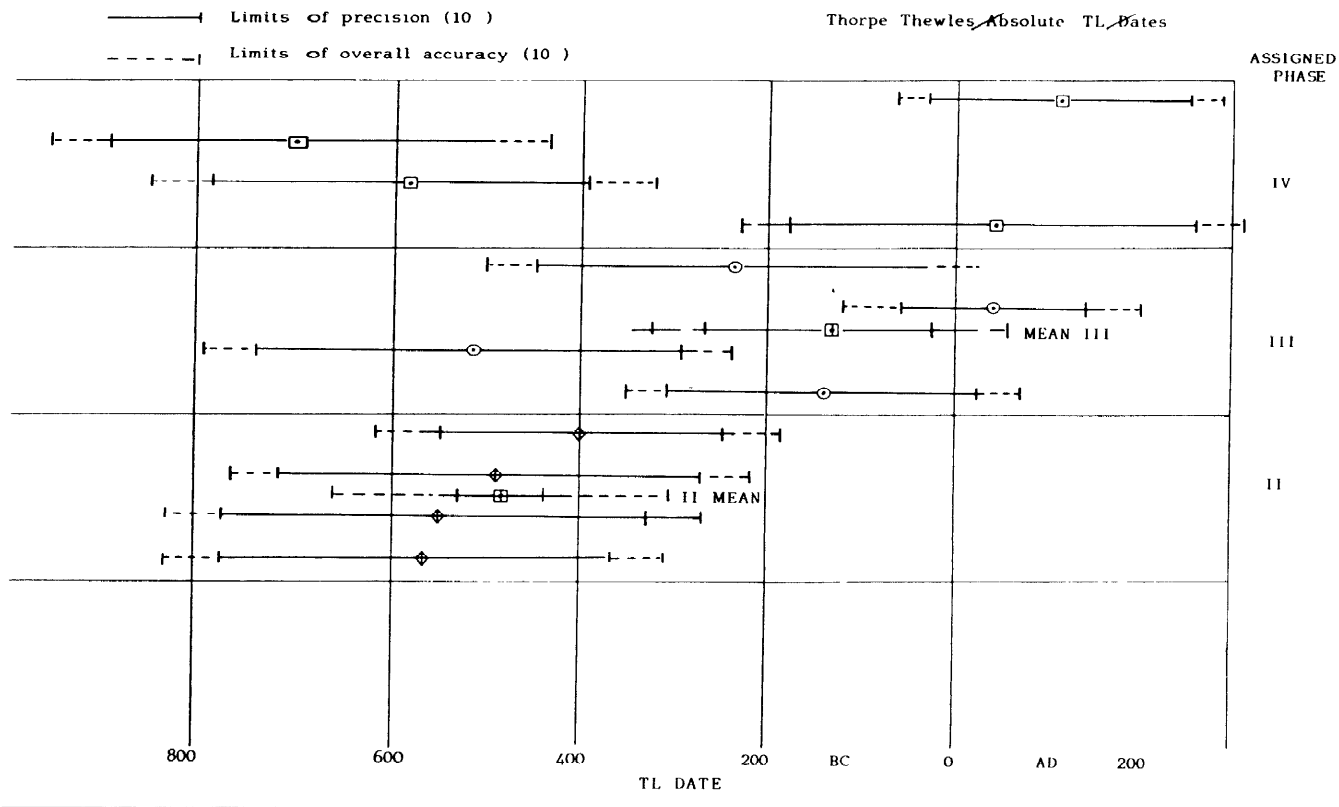
Of the Phase IV dates, all from the Late Rectangular Enclosure Ditch II and therefore in association with imported pottery, one was in general accord, centred on AD 40. Two others were noticeably earlier, and these may have been residual. The observation that the coarser fabric sherds gave earlier dates when in later contexts cannot be taken to show that coarser fabrics were earlier than fine, since analysis of the whole assemblage does not bear this out. The use of the black-burnished ware 1 sherd as an independently dated control (AD 110 ± 145; ± 175) further supports the consistency of the thermoluminescent dating framework.

In conclusion, the thermoluminescent evidence suggests a longer time-span for Phase II than would otherwise have been the case, and if verified would allow for the very early introduction of beehive-querns into the north-east. The mean thermoluminescent date for material from Phase III is slightly early, although, again, the inclusions of residual material (otherwise undetectable) may account for this.

Environment and location of the settlement

The contemporary environment into which the settlement was placed is reasonably well documented following pollen analysis at six sites in an area to the north and west of the Thorpe Thewles settlement and between 10 and 20 km distant. This work (Bartley *et al* 1976) and other palynological research, has recently been reviewed

Table 15 Thorpe Thewles absolute TL dates



and there is broad agreement that the earlier 1st millennium was substantially forested (Chapman & Mytum 1984; Haselgrove 1982, and Van der Veen, this volume). Clearances and an increasing rate of clearance allowed the generation of light-demanding species, notably grasses suggestive of pasture. There is, however, some doubt about the cause and character of these events.

The climate during the earlier 1st millennium had been steadily worsening, becoming wetter and with a fall of perhaps 2°C in average temperature in the 500 years from 1000 BC, although this was less severe along the east coast than the west (Tinsley 1981). Around the time of the establishment of the enclosure, however, there apparently followed a period of warmer, drier climate although the evidence for this is less convincing.

That the region was to some extent organized into territorial blocks is suggested by the presence of defended focal sites on the upland periphery (Spratt 1984), and in Durham (Haselgrove 1984, 12) together with evidence that mechanisms existed to allow for fairly extensive long distance exchange (MacGregor 1976, ll), implying a communications system. The incidence of metal objects in riverine locations may well have resulted from confrontation and/or conspicuous consumption between (Case 1983,6) or among (Fitzpatrick 1984, 178) kinship or caste authorities at points of entry and exit of territories which were based on major natural features.

It is unlikely that internecine stress and conflict was the result of land-hunger as any land shortage would arguably have increased the rate of clearance at an earlier date. What may have been at issue was the collection of resources in the broadest sense, and access to the exchange networks needed to maintain both external kinship links and internal social control. In this case territory may have assumed an amorphous, conceptual form, partly linear, involving rights of passage, partly physical, involving the settlements and their surrounding farmland, and partly symbolic.

The opening of the landscape, therefore, should not be seen as colonization of virgin land by pioneer groups and the application of such models is inappropriate (Bradley 1978, 10). Part of the problem lies in the view that large tracts of the landscape - the heavy soils - were uncultivable by the earlier Iron Age population. The extent to which soil type determined or influenced subsistence strategies is now being reconsidered ('Can we, therefore, get away from the idea that the claylands beget damp heavy soils and closed woodlands with impenetrable undergrowth?'; Evans 1982, 55). Moreover, boulder clay should not be seen as constituting a single environmental block, since variations in the character of the drift, bedrock geology, slope, aspect and previous land-use history can make crucial differences in the ease with which woodland could be cleared and subsequently utilized. Clearance may well have followed a path of least resistance, influenced by many factors, among which social control, soil-type and topography were important considerations.

It is important to distinguish between clearance and colonization, as there would have been instances of new settlement being placed on newly deforested land and instances where settlement developed as an intensification of existing clearance, fitting into an existing pattern of landscape use, as at Thorpe Thewles. Theoretically, these represent primary and secondary colonization, processes well attested from historical contexts where the latter can be seen, on placename evidence, to be later in date (Cant 1984, 169), although secondary infilling of an initial intake may precede the primary colonization of further clearance.

The distinction can be seen in the archaeological record only where an enclosure can be seen to have been added to an earlier boundary, as at Thorpe Thewles and other subrectangular enclosures of similar shape, eg Langley Park House East (Haselgrove 1982, fig 10). The D-shaped enclosures now known across an increasingly wide area of the Tees Valley (Still & Vyner 1986) are probably of this type, although none of this interesting group of sites has yet been directly linked to cropmark or earthwork fields or boundaries. Other examples have only come to light through excavation, as at Levisham Moor Enclosure A, which overlay an earlier ditch on the same alignment which formed one of a series of linear boundaries (Hayes 1983, 10). In general, excavation strategies have largely ignored the space outside the enclosure, and many more apparently free-standing sites may have been embedded in earlier landscapes.

The intensification of land-use suggested by the appearance of the boundary sites may have been associated with a secondary form of clearance, the clearance of grass-land for arable agriculture. This is both evidenced and dated by palynology as making a significant ecological impact in the last one or two centuries BC (Bartley *et al* 1976). However, it probably commenced in more favourable areas, as at Thorpe Thewles, in the mid Iron Age (Haselgrove 1984), at approximately the same time as seen in many parts of southern England (Hingley 1984, 74).

The enclosure at Thorpe Thewles was located, in common with a high percentage of recognized enclosures, on the boundary between two landscape or soil types. Here the change was in subsoil type, between clay and a sandier clay with some gravel. This would have been noticeable from the vegetation cover and must have significance for the purpose of the pre-enclosure field boundary.

Other enclosures, in areas of varied topography, are also located at the point of change between different landscapes. Haselgrove has noted a proximity to the 125 m contour for the Durham enclosures (1982, 65) and on the Eston Hills, Cleveland, three sites were located on the spring-line of the dip slope to allow for the exploitation of a broad spectrum of resources (Heslop 1978, fig 5). These were placed between rather than on the major streams, as was Thorpe Thewles, and their even spacing suggests some form of regulation of the location within the territory. A further factor influencing the location of the Thorpe Thewles enclosure may have been the high degree of visibility available from the hilltop.

Structure and use of the enclosure

A 'high-profile' location may have been consistent with the large size of the enclosure and the substantial size of its earthwork perimeter.

The construction of the enclosure required considerable effort, with between three and four thousand tons of clay cut from the ditch. This fact, coupled with the noted variation in profile and the rather irregular shape of each side, may indicate that it was the product of cooperative labour, using work-gangs from neighbouring settlements, in the way that it is suggested hillforts were built (Feachem 1976), rather than the work of the homestead occupants by themselves. Here again, a social aspect may have been involved, with the size of the earthwork expressing the degree to which the head of the group could attract or compel assistance. The profile of the ditch was broad and shallow, especially on the western side, and when full of water would have looked more impressive than it actually was.

As the hilltop sloped in four directions towards the enclosure sides, the upcast of the ditch cannot have formed a continuous internal bank as this would have impeded surface drainage, creating lakes of standing water on the lee of the bank (as happened in the corners of the trenches during excavation). Moreover, as the only point of egress for internal drainage, the entrance would have been particularly prone to waterlogging. The ditch sections suggest that if the position of the bank affected the rate of silting it was situated on both sides of the ditch, either as a result of periodic cleaning or as a primary feature.

This arrangement can be seen on surviving earthworks, for example Great Ayton Moor, North Yorks (Tinkler & Spratt 1978), where the inner bank was termed 'cleaning upcast' but could as easily have been primary. Double banks have also been inferred from other enclosure excavations, including Coxhoe, County Durham (Haselgrove & Allon 1982). External banked enclosures are known across the region (Challis & Harding 1975); local examples include Roxby Low Moor and Newton Mulgrave, both North Yorkshire (Inman *et al* 1985; McDonnell 1963, 66). A clue that the ditch was regarded as the principal element is found at Levisham Moor East (Hayes 1983), and Larberry Pastures, Cleveland, where the enclosure appears to have been embedded into the natural drainage system in the manner of medieval moats. In these instances the banks may have been used primarily to control the water in the ditch during different seasons.

The position and character of the bank, or banks, at Thorpe Thewles have a major bearing on the possible uses of the enclosure interior as an internal bank of perhaps 8 m width would have reduced the interior space from 0.7 to 0.56 ha. A smaller bank would have left approximately 0.6 ha usable.

The interior can be notionally divided into northern, central and southern thirds, with the former being outside the area investigated. The central portion contained the Main House, with the ancilliary structures L, J and possibly S and G. The southern third contained only Circular Structure E (and this for only a short period), after which a partition was laid out, east-west, formally separating the living and major work and storage space from remainder of the enclosure, which was presumably used for periodic livestock storage. A break provided access from the postulated entrance to the Main House, and this may have been partly paved.

These internal arrangements appear to have been fairly

long-lived, as the principle structures were rebuilt in their original positions. The only building to show any sign of 'wandering' during rebuilds was the flimsy structure located to the west of Circular Structure D, of which each phase is lettered separately (F, G, H).

The partition itself was redefined at least twice, the later lines enlarging the inner court at the expense of the outer by 2 m on each occasion. This ditch in itself would not have proved an effective partition; it was either supplemented by an above-ground element such as a hedge-line, or it represented the dividing line between differing states or values of space, the significance of which required no further physical substantiation.

There has been very little attention paid to evidence of the internal organization of enclosures outside those areas where such information can be easily recognized in the form of surviving earthworks (Jobey 1974, 1). Some comparison with the Thorpe Thewles plan (Fig 62, 1) can be applied to two sites within the area, the Great Ayton Moor enclosure and a site near Hutton Rudby (R Inman, pers comm) for both of which stylized space-use models are suggested (Fig 63, 1 and 2).

The three enclosures show clear signs of internal partition; the Hutton Rudby twin ditches may not be contemporary, but the pottery scatter recovered by field-walking shows that the inner bank marks a clear distribution boundary, with a density average of one sherd per 60 sq m within the inner ditched enclosure and one sherd per 375 sq m in the area between the ditches. Within the internal enclosure, concentrations of dark soil, rich in sherds, occupy the corners either side of the entrance and suggest the location of manure heaps or domestic middens. There is no Roman material associated with either the inner ditch or the interior; a single Romano-British sherd was found between the ditches, showing that this example does not conform with Burgess's (1984, 171) suggestion that the inner part of a double-ditched enclosure may mark a Romano-British contraction of a larger prehistoric site. At Hutton Rudby an inner, possibly domestic zone thus appears to be surrounded by an outer, livestock pound. At Great Ayton Moor the northern section of the enclosure appears to have been used for livestock, while the southern half, separated by a ditch or drain, contained the round house. Clearly, these three different sites divide space differently, even though the superficial evidence suggests that the same range of activities may have been common to them all.

Within this general pattern of interior zoning it is possible to speculate further about the use of space by examining the distribution of artifacts. It must be remembered that different artifact types are moved and deposited by mechanisms related to the artifact's specific function and the method by which each type enters more general discard patterns. The distribution of querns, for example, has two main facets. Firstly, they are located along metalled pathways and causeways. Secondly, they occur in deep, probably water-filled contexts, a distribution in no way resembling that of pottery finds. The pottery was concentrated in shallow deposits rich in other occupation debris (burnt clay, charcoal and bone) and can be taken to reflect more truly the pattern of refuse discard. It is notable how few sherds, for example, were found in the vast volumes of Phase II contexts associated with the features that cut the Main Enclosure Ditch, an area that was deliberately kept clean of refuse, as seen in the continual recutting of Subrectangular Enclosures I and II. However, even here, depositional context will blur the generally recognizable pattern; the majority of sherds in the area of the Main House were associated with moments of rebuild or destruction, which allowed for the rapid accumulation of material in a stable depositional environment. The sherds recovered clearly derived from the immediate vicinity of the House, but their distribution is concerned with the demise of the structure rather than its life-span.

In general terms, during the life-span of structures and activity areas in Phase II there seem to have been comparatively few opportunities for refuse to enter stable contexts below the threshold of later ploughing. This may be related to the character of artifact curation, or to a very rigorous control of refuse discard using temporary rubbish dumps. Additionally, although the distribution may show where refuse could have been discarded into negative features but was not, there is no way of knowing where refuse collected in the form of positive features. The small group of sherds in the east-west ditches may indicate the heaping of domestic refuse, as suggested above, within the inner area, in a position comparable with the middens at Hutton Rudby.

Little can be said about the function of the buildings associated with this phase, apart from the Main House itself. Four circular structures can confidently be allocated to this phase, provided that the recuts of L and the G and H groups represent straight replacements of earlier buildings. A further example, Circular Structure R, probably dates to this phase; this could have been built early in Phase III if its replacement, Circular Structure S, was short-lived. Circular Structures G and E were small and simple: E was surrounded by a ring-ditch of irregular shape and it may well not represent a round building. L may best be regarded as an annexe to the Main House, although its later phase, which was constructed 3 m to the south-west, may have been separate. All were noticeably devoid of finds, except Circular Structure K, which was associated with three crucible fragments.

At some point during the later stages of Phase III alterations were undertaken which left the Main Enclosure redundant and saw the creation of the small Subrectangular Enclosures I and II on the periphery of the settlement. The construction of the Southern Enclosure Ditch suggests a continuation of this process into Phase III. The shorter overall time span of this phase suggests a greater number of contemporary structures and landscape features.

The Phase III plan depicts a much more complex settlement (Fig 63,2). The constricting effect of the bank and ditch enclosure had been removed, allowing freer movement across the settlement. A change in the pattern of access is seen in the laying of cobbling over the upper fill of the Southern Enclosure Ditch and the construction of the causeway across the Curvilinear Enclosure Ditch. The north-south Phase III partition ditches resemble the double-ditched trackways usually associated with Romano-British cropmark landscapes. It is interesting to note that the distribution of metal small finds, which partly overlaps that of pottery, has a greater correlation with the presence of track ways; that is, they are concentrated around the south of the Main Structure (after the filling of the ring-ditch), the Cobbled Entrance, the

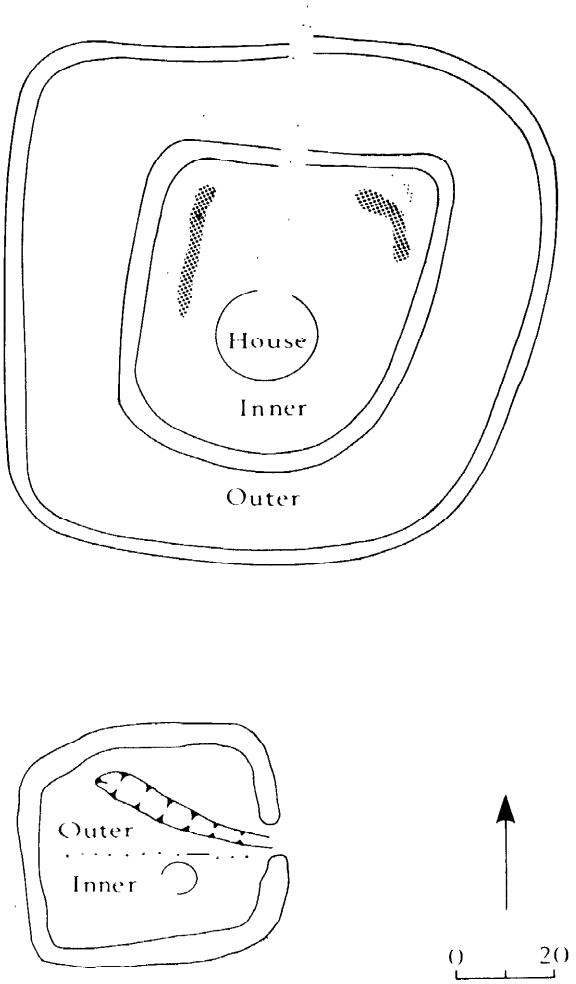


Fig 62 Enclosures at Hutton Rudby and Great Ayton Moor

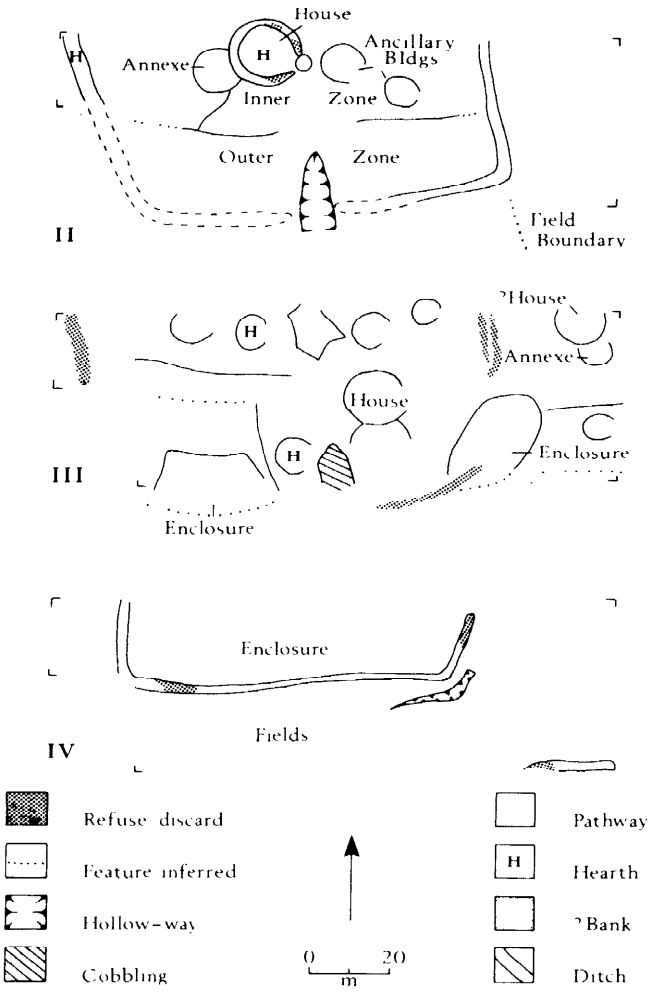


Fig 63 Thorpe Thewles: Phases II-IV

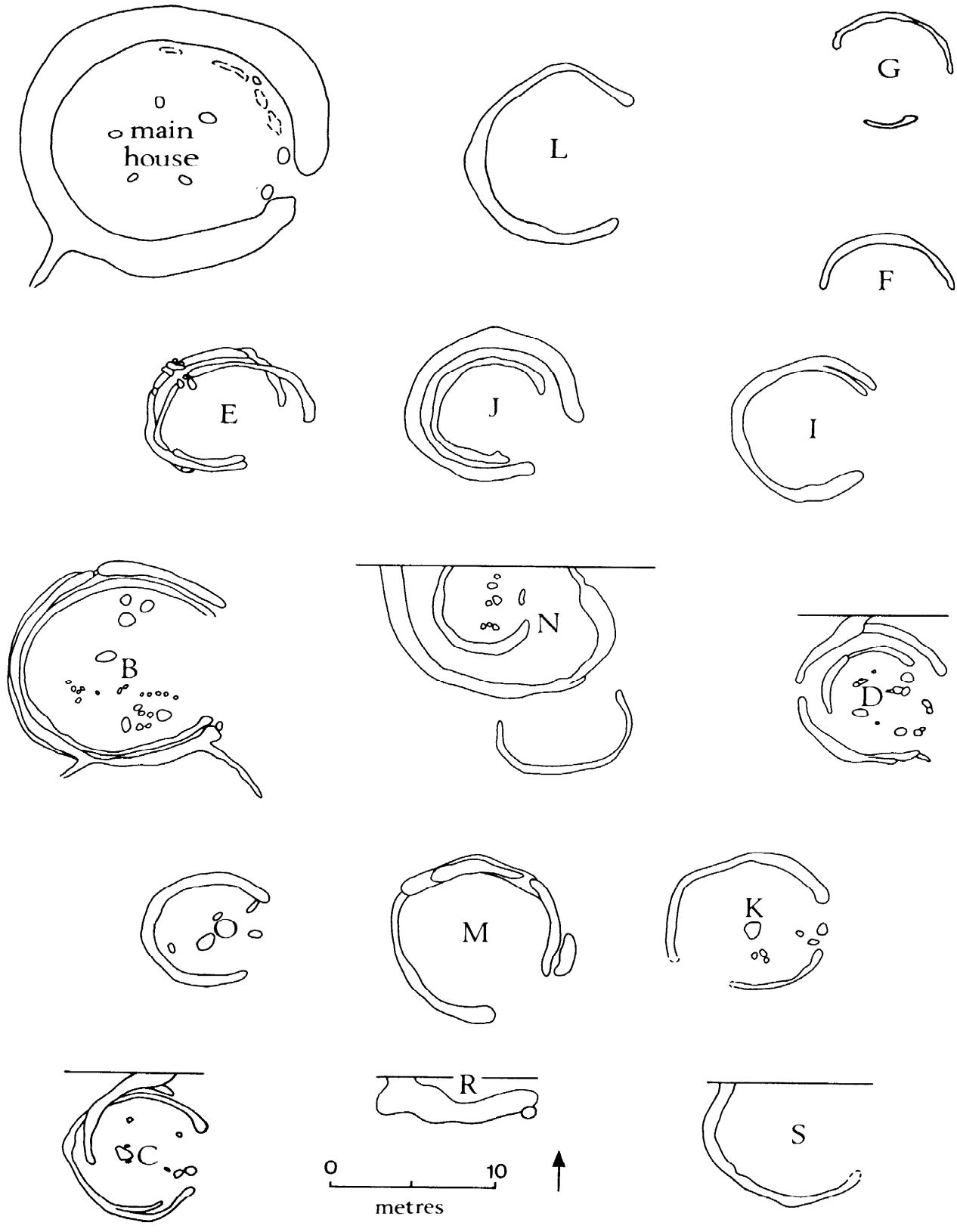


Fig 64 Circular Structures

Causeway across the Curvilinear Enclosure Ditch and the possible trample-hollow skirting the south-eastern corner of Late Rectangular Enclosure Ditch II. As the metalwork consisted largely of jewellery, this reflects casual loss and the smaller likelihood of subsequent recovery away from the living areas. Metalling was used sparingly, presumably because of the scarcity of stone.

The very simple pattern of refuse discard seen in Phase II can be compared with the pattern seen during Phase III. The area of the Main House was noticeably bare of finds; the examples from Circular Structure I and the stratigraphy over the ring-ditch are probably residual. The notable concentration across this part of the site has shifted to the area around the drainage ditch Q and may relate to activity (a Phase III house) immediately to the north.

Deliberate and permanent discard was taking place in the damp depressions over the almost full Main Enclosure Ditch. There is also a pattern in this, in that there is considerably more occupation debris on the western side, whilst along the eastern side the quantity decreases to the south. There is a further concentration of finds overlying the Cobbled Entrance; this reflects to some extent the survival of a suitable deposition location but this would not account for the density of the concentration.

The relationship between artifact distributions and the individual circular structures shows that the smaller structures were generally devoid of discarded objects; an exception is Circular Structure B, which was almost certainly a dwelling. Circular Structure N may also have been a house, although possibly a short-lived one. Both Circular Structures and the Main House were associated with querns.

The distribution of slag shows a concentration around Circular Structure K (Fig 103). This was derived from secondary smithing, for example tool repair; the small hearth located within the ring-ditch (C1629) would have been perfectly suitable for this purpose. A small ingot mould (S5) was recovered from the ring-ditch of this structure. At Roxby Low Moor, North Yorkshire, two of the four circular structures were interpreted as having been used as workshops on similar evidence (Inman *et al* 1985, 195).

The Phase III buildings are evenly spread across the size range (Table 16), unlike those of Phase II. A clear functional division between houses and ancillary buildings may have eroded during Phase III. The greater variety of structures, some of which had clear evidence for specialized functions, reflected the breaking up of the Main Enclosure zoning into smaller, less clearly defined areas of activity, although it is not possible to relate a social structure to the pattern as, for example, Clarke has attempted for Glastonbury (1972, 801).

The deduction of separate functions for the Circular Structures continues the theme of the division of the site into specialized spatial units. The analysis of these often enigmatic phenomena presents several problems. The single unifying characteristic is the presence of a circular, or partly circular, surrounding ditch (Fig 64). This could be either continuous or a set of short, deeper lengths, and often (Circular Structure B, Circular Structure E) the latter replaced the former. At Fengate, Peterborough, Pryor took discontinuous ring-ditches as constituting a separate building category, the form of which (double-doored or open-sided etc) was directly inferred from the position of the gullies (1984, 126). The evidence from Thorpe Thewles suggests that this variation primarily reflected drainage practice rather than building shape or function.

The larger, continuous ring-ditches (those around the Main House and Circular Structure B) were supplemented with run-off gullies presumably to move standing water away from the footings of the walls, suggesting that the ditches were proine to overflowing. The continuous variety would allow the water to flow round the circuit and collect on the downhill side, which would then flood during wet weather. The deeper, discontinuous lengths would prevent this from happening, as each section would act as a sump for its own catchment. In two instances, Circular Structure M and Circular Structure C, partial recutting was undertaken only on the uphill section of the circuit. In passing, it should be repeated that none of these ditches could conceivably have housed timber uprights as, for example, a quick glance at the plan of one of the double-ditched examples might suggest. The ring-groove of the Main House was totally different in section and fill and was easily distinguishable from the ring-ditches of the other structures.

The size of the ring-ditches varied considerably, from the 6 m internal diameter of Circular Structure O to 13.2 m for the Main House. Table 16 shows this range, omitting the outer ditch of Circular Structure N, the exposed portion of which was too irregular to measure. The only clear break in size was between the largest examples and the remainder, which showed a remarkably even distribution between 6 and 10 m internal diameter.

Table 16 Circular structure size range

Diameter	Phase II	Phase III
14·0		
13·0	Main House	
12·0		B
11·0		
10·0	L	M
		S
9·0	J (outer)	K
8·0		I, C, D
7·0	F/G, E	
6·0	J (inner)	N (inner)
		O

Linking other design aspects to size, the larger buildings show clear evidence for having been roofed, although the construction method showed some variety, and it must be remembered that any earthfast post-rings or stone-padded posts would leave no archaeological evidence. At Meare Village West, Somerset, a circular, trampled floor and hearth were recovered in conditions of such exceptional survival that even insubstantial structural remains would have been observed, forcing the excavator to conclude that this represented the remains of some form of tent (Orme *et al* 1981, 23)

Two types of roof support were found at Thorpe Thewles: a timber post-ring placed roughly midway between the centre point and the wall, and an uncommon type based on a central post. A third type which had the ring-beam placed directly on a mass-wall was very

strongly suggested, but by their nature it is impossible to tell whether or not the cob-walls which fortuitously survived were actually load-bearing.

The Main House was the best example of the post-ring type; the latest phase had five posts, axially symmetrical, with the pair nearest the door fronting onto a pair of massive door supports. The plan was probably oval, a design not unknown either locally, as at Great Ayton Moor (Tinkler & Spratt 1978), or from the south of England, as at Mingies Ditch, Hardwick, Houses 1 and 3 (Allon *et al* 1984, 94). However, such anomalous examples have not readily fitted the 'expected' standard types and have been largely ignored. Oval post-rings are hinted at in structures D, N and O, but these were less substantial and could not be convincingly resolved. All had circular ring-ditches like House 3, Mingies Ditch *(op cit* 94).

The central post type was evidenced in Circular Structure B, where a substantial post with stone-packing presumably played a structural role. The central pit of Circular Structure C may have represented a similar feature, robbed and left open to silt. Parallels are not common, but an example was recently excavated at St Germains, East Lothian (Watkins 1982, fig 4). Central posts in association with post-rings are also known, but are not common in the north (Glenachan Rig, Peebleshire and Hut 1, Braidwood, Midlothian (Reynolds 1982, fig 3). Subsidiary posts may have been present within Circular Structure B, in which case the majority failed to penetrate to the subsoil.

The walling, which forms an integral part of the roof support, was of two types. Firstly, a stake-wall and ring-groove construction was used for the earlier Main House walls; the earliest was of timber stakes, possibly plank-shaped and set c 0.4 m apart. The House II wall was set in a continuous bedding trench, but no other structures from this site displayed this form of walling, which is common across the north.

The second method used was a form of mass-walling using puddled clay mixed with vegetable binding and without a recognizable timber component. This form was recorded on the Main House final phase and also in Circular Structure B. The lack of posts or stakes along the wall-line of the other structures hints that this was the standard method of wall construction utilizing the most abundant raw material and large quantities of oxidized daub were recovered across much of the site (Fig 103, 5:D2). A 'dwarf-wall' is the most likely method, used principally to keep the ring beam and rafter-ends clear of the ground. Turf stripped from the platform may also have been employed in this way. The load-bearing properties of a mass-wall may explain why the post-rings of Circular Structures D, N and O were slight and irregular. Similarly, the scale of the Main House supports may suggest that these were performing additional functions to supporting the roof, for example carrying a substantial first floor or 'crag-loft'. A similar arrangement, but in a square instead of a pentangle, has been recorded at other sites in northern England, as at the large Late Iron Age house at Dalton Parlours, West Yorkshire (West Yorks CC 1981) as well as at a circular structure associated with the villa at Holme House, Piercebridge, which was clearly in the vernacular tradition and probably had a pre-Conquest precursor (Harding 1984, 3). The Holme House structure was also constructed with a mass-wall, in this case of drystone, as was a circular structure at Stanwick, uncovered during excavation in 1981, (Haselgrove & Turnbull 1984, fig 2). Buildings at Wheeler's Stanwick Site E, (Wheeler 1954, 8) and Catcote (Long forthcoming) where found in an excellent state of preservation but produced no evidence for either a timber component in the walling or an internal post-ring, again hinting at mass-wall construction. A change from timber to mass-walling may have been a feature of the later Iron Age and it is tempting to see this as an ecological adaption to a changing environment. It appears that timber-demanding structures like the West Brandon houses were not common by the 1st century BC, although sites of a status higher than the smaller farmsteads, like Holme House, Piercebridge (Harding 1984, 3), and Thorpe Thewles still had buildings of more than 10 m diameter. The use of clay or stone may have reflected the availability of raw materials locally, in much the same way as the post-medieval vernacular architecture of the Tees Lowlands formed a brick-belt between the stone buildings of North Yorkshire and the Durham plateau.

The site was probably at its most expansive immediately before it was abandoned. The latest layers in the major accumulative sequences contained a few sherds of early Romano-British pottery marking the point at which settlement was abandoned. The causes of the relocation of the settlement are unclear; the chronological proximity to the Roman Conquest must be noted but, apart from the burning associated with the final phase of Circular Structure B, there was no evidence for a violent conclusion to the period of occupation, Alternative explanations may be based on the fact that the siting was chosen in accordance with the requirements of a single-unit enclosure. By the 1st century AD the changing resource demands of the expanded population may have spurred relocation within the vicinity. One inherent fault with the siting was the distance from the nearest supply of running water; another was the degree of exposure of the hilltop generally. This may not have been particularly noticeable in the earlier period, when the surrounding landscape was probably more wooded and the site protected from the worst weather by an earthwork circuit.

Post-settlement activity consisted of the layout of fairly substantial enclosures across the hilltop. It is not possible to discover the extent of these boundaries as they have consistently failed to generate cropmarks. The small quantity of occupation debris suggests that there was some permanent occupation on the hill, but neither excavation nor fieldwork have succeeded in locating it. The pattern of artifact discard during Phase IV was of a small quantity of material clustered in patches along the southern length, particularly in the latest recut, with deposition ceasing in the early to mid 2nd century AD. A notable concentration of metallurgical debris occurred in the fill of C518. An Unassociated Point Feature, C135, situated 6 m to the south, was probably contemporary. The slag field was probably the result of a single firing.

A difference in land-use on either side of the Late Rectangular Enclosure Ditch II may have been partly responsible for the survival of the horizontal stratigraphy across the central section of the site with, perhaps, the interior of the enclosure being used as a stock-pound while the outer area was being ploughed. These features were short-lived and were followed by a long period with

no recognizable activity until the formation of the rig and furrow.

Economic basis of the settlement

The economic base of the settlement was undoubtedly mixed farming. Despite the degree of destruction and disturbance of the faunal and botanical samples, the basic outlines of the individual components of the subsistence strategy can be defined.

Cattle remains were the most abundant in the faunal assemblage, and considerations of cattle husbandry were probably the most significant single factor in the economy. Changes can be seen between Phase II and III which hint at both a slight drop in their relative abundance in Phase III and a substantial change in husbandry, which produced a significant increase in the discard of the bones of juvenile animals in Phase III. For example, only 5% of the Phase II population were being consumed before the age of 6 months and only a few more before 2<<years, whereas 20% of the Phase III assemblage was below 6 months and nearly 30% younger than 15 months at time of death.

Sheep were the second most important species overall, and their proportion against cattle increased in Phase III. However, the data do not allow a comparison between phases, and any change in husbandry would distort the following amalgamated results. Few ewes were allowed to achieve old age (7%) with over 30-40% killed before the eruption of M3 (perhaps four years), which would allow for two or three wool crops and a lambing to sustain the breeding population. Goats (which are easily distinguished) were present in low numbers. The link between sheep and agriculture noted by Cunliffe (1974) was probably less significant at Thorpe Thewles than across the chalk downs of southern England, as the heavier soils surrounding this site are less prone to nutrient leaching.

By contrast, the data suggest that the majority of pigs were slaughtered young, their high reproductive rate needing fewer adults to replenish the population, and the settlement may have eaten more pork than lamb and mutton.

Horses were probably not bred on site and were almost certainly not normally eaten. They seem to have been more valued in the earlier phases of occupation. None of the recovered metalwork has any equine association.

The character of the arable component has not been clearly defined at Thorpe Thewles. The broad outlines, however, can be sketched, and it is clear that the principal crop was spelt and not emmer, as had been thought (Jones 1981, 104). This allows for the possibility of a double harvest regime which would significantly improve the agricultural efficiency of the community and spread the risk of harvest failure.

The by-products of cereal processing suggest that cereal remains were not sufficiently abundant to allow for their frequent carbonization, but a direct parallel with southern sites showing similar botanical assemblages may be misleading. Thorpe Thewles was not a primary grain exporter, as has been proposed for Ashville in Oxfordshire (Parrington 1978, 109). However, it is unlikely that this site was as pastorally oriented as Farmoor, Oxfordshire - a consumer site with little agricultural capability which was situated on gravel terrace meadowland, yet with a similar cereal/chaff/weed ratio to Thorpe Thewles.

It is clear that cereal growing was an important element in the subsistence spectrum and the site was probably self-sufficient. It is impossible to define the role of the settlement in the wider social grouping without a range of local contemporary assemblages for comparison.

From the early stages of the occupation the processing of the harvest may well have utilized rotary querns; the stratigraphically earliest quern was a beehive from the lower levels of the Main Enclosure Ditch. This is a significant find and reinforces the general impression that these activities, taking place within an organized and cleared landscape and on soils of all types, would be expected from single-unit settlements across much of southern lowland Britain.

During the life of the settlement the pattern of steady development produced the conditions for changes in the subsistence economy. The cattle faunal assemblage suggests two models of husbandry, one accounting for change internally, the other suggesting that the changes were the result of interaction with neighbour communities. The near 30% increase in juveniles in the assemblage could have resulted from a change in slaughtering pattern, sustained by an intensification of beef production as the herds were geared to providing meat for the diet. This would result in a decrease in the numbers allowed to age, but would not necessarily alter the overall overwintering numbers. The alternative explanation is that the Phase II site exported prime stock on the hoof to other sites for consumption, while in Phase III the site was perhaps more likely to receive cattle from other Phase II type sites, but in any case was consuming the bulk of its own production.

These changes are reflected in changes in the structure of the site itself, particularly from enclosure to open settlement, and the frequent later changes in plan hint at variations in the emphasis of separate components of the economy. The proliferation of small enclosures around the periphery of the settlement (Subrectangular Enclosures I and II, the Southern Enclosure and the Curvilinear Enclosure) suggest more regulated, precise and home-based management of the stock.

The palaeobotanic evidence shows little evidence of change with time, but any differences may well have been 'ironed-out' by the extensive post-depositional mixing that characterizes this assemblage. A trend towards intensification can be deduced from a substantial increase in the number of beehive querns and the need to use poor quality lithic sources, close at hand. The high incidence of wetland weeds like heath grass may have been caused by the need to expand production onto the damper margins, as the optimum carrying capacity of the landscape was being approached.

The major social change, visible particularly in the layout of the settlement, seems to have occurred around the 1st century BC. By this time the inhabitants were owning and losing objects of bronze, silver, gold, jet, amber and antler, the possession of which required access to wider markets. The presence of antler is interesting, in that it must have been brought onto the site, either in the form of raw materials or as finished articles, since there were no deer carcasses in the fauna1 assemblage; the tools themselves do not display any skill in manufacture.

Other aspects of the material culture point to the

interaction of local communities. Firstly, Thorpe Thewles does not appear to have produced its own iron, presumably because iron objects were easily available from elsewhere, probably from specialists closer to the raw materials. Secondly, the comparison of the pottery from Thorpe Thewles with other, apparently contemporary, sites suggests that the area shares a common tradition, producing a broadly similar range of forms in fabrics produced by similar clay preparation and firing techniques. It could be argued that the pots were traded from site to site, but the evidence from Thorpe Thewles strongly points to on-site production; when the resources were available locally they were utilized. The diversity of individual pottery forms, decorative motifs and finishing detail may have been the product of the marriage pattern which produced the periodic introduction of slightly different ceramic designs into each community as new kinship ties were established, enlivening the long-lasting, common technological tradition.

The absence of exchangeable items during the earlier centuries BC is interesting; Dent suggests a general decline in European trade relations in the 4th and 3rd centuries BC (1983, 43). This would match the pattern from Thorpe Thewles, where the 1st century BC saw an opening of exchange routes, or an increased interest in gift exchange, and less evidence that the exchange was dominated by, or exclusively for, the upper levels of society. There is little evidence for ranking at Thorpe Thewles, although the gold earring (Plate 7), is a high quality, luxury item, but indications of social stratification among the Parisi come exclusively from the burial record and are absent from the settlement evidence *(op cit)*.

The Phase III small finds from Thorpe Thewles are of poor quality and were probably available to a wider range of social classes. It may be significant that virtually all the metalwork was jewellery and mainly of an apparently feminine nature. An acceleration in gift-exchange may have been needed to maintain social control as the population density increased.

At Thorpe Thewles we see the effects of social and economic change from the mid 1st millennium BC until the 1st century AD. It seems increasingly clear that this area of northern England was in step with developments in southern Britain, and was participating in the nation-wide intensification of the subsistence economy around the 5th and 4th centuries BC. This crucial phase saw the first widespread opening of the landscape and a steady expansion as the carrying capacity of the land was approached.

The 1st century BC saw further social and economic developments. For the first time a dichotomy between the upland and lowland elements of the same region becomes deeply emphasized; it was only the lowland areas that could support a high population density and therefore evidence the concommitant settlement types. In the Tees lowlands, developed sites have been excavated on a small scale at Ingleby Barwick (Heslop 1984, 29) and Catcote (Long forthcoming). These sites, along with Thorpe Thewles, point to the kind of settlements we might expect across the richer agricultural belts of the north-east. These sites are structurally complex, display a rapid rate of internal change and reorganization and are relatively rich in material culture. They probably formed the nodal points of the contemporary communications network.

By contrast, the sites on the upland periphery are small in size, static in appearance and display a marked poverty of material culture. The individual sites show an interesting diversity of form, but they are almost all single-unit settlements with a maximum of two or three small buildings. Roxby Low Moor, North Yorkshire can be taken as typical of these sites (Inman *et al* 1985, 181), other examples include Percy Rigg (Close 1972, 27) and Great Ayton Moor (Tinkler & Spratt 1978, 49). The extensive complex at Levisham Moor, North Yorkshire, at an altitude of 220 m, is situated on slightly better land, but this site with its substantial enclosures and dyked pastures may have served the inhabitants of a larger area, possibly on a seasonal basis.

The overall intensification of the economy led to the exaggeration of existing subtle distinctions in status between superficially similar sites, and changes in function would have emphasized these differences, effectively creating a settlement heirarchy. It was this period that saw the establishment of the foundations of the Romanized economy based on specialization and the production of an exchangeable surplus.

Bibliography

Aitken, M J & Alldred, J C, 1972 The assessment of error limits in thermoluminescent dating, *Archaeometry*, **14**, (2), 257–67

Aitken, M J, 1976 Thermoluminescence age evaluation and assessment of error limits: revised system, *Archaeometry*, **18**, 233–8

Aitken, M J, 1977 Thermoluminescence and the archaeologist, *Antiquity*, **51**, 11–19

Alexander, M, 1980 Soils, in (ed) Dunn, T C, *The magnesian limestone of Durham County*, Durham County Conservation Trust, 41–44

Allason-Jones, L & Miket, R F, 1984 *The catalogue of small finds from South Shields Roman fort*, Newcastle Upon Tyne

Allan, T, Miles, D & Palmer, S, 1984 Iron Age buildings in the Upper Thames Region, in Cunliffe, B and Miles, D (eds), *Aspects of the Iron Age in southern central Britain*, 89–101

Almgren, O, 1923 *Studien über nordeuropäische Eibelformen*

Baker, J R & Brothwell, D R, 1980 *Animal diseases in archaeology*

Bamford, H M, 1982 *Beaker domestic sites in the Fen Edge and East Anglia*, East Anglian Archaeology Report **16**

Bartley, D D, Chambers, C & Hart-Jones, B, 1976 The vegetational history of parts of south and east Durham, *New Phytol*, **77**, 437–468

Behre, K E, 1983 *Ernährung und Umwelt der wikingerzeitlichen Siedlung Haithabu, Die Ausgrabungen in Haithabu*, **8**, Neumünster

Beijerinck, W, 1947 *Zadenatlas der Nederlandsche Flora* Wageningen

Berggren, G, 1969 *Atlas of seeds Part 2, Cyperaceae*, Lund

Berggren, G, 1981 *Atlas of seeds Part 3, Salicaceae-Cruciferae*, Arlov

Bersu, G, 1977 *Three Iron Age round houses in the Isle of Man*, Manx Museum and National Trust

Bidwell, P T, 1985 *The Roman fort of Vindolanda*

Bourdillon, J & Coy, J, 1979 The animal bones, in Holdsworth, P (ed), *Saxon Southampton: Excavations in Melbourne Street*, 79–121

Bradley, R, 1978 *The prehistoric settlement of Britain*

Brain, C K, 1980 Some criteria for the recognition of bone-collecting agencies in African cabes, in Behrensmeyer, A K & Hill, A (eds), *Fossils in the making*, Chicago

Bull, G & Payne, S, 1982 Tooth eruption and epiphysial fusion in pigs and wild boar in Wilson, B, Grigson, C and Payne, S (eds), 55–72

Bulleid, A & Gray, H St G, 1911 *The Glastonbury Lake Village I*

Bullock, D & Rackham, J, 1982 Epiphysial fusion and tooth eruption of feral goats from Moffatdale, Dumfries and Galloway, Scotland, in Wilson, B, Grigson, C and Payne, S (eds), 73–80

Burgess, C, 1984 The prehistoric settlement of Northumberland: a speculative survey' in Miket, R & Burgess, C (eds), *Between and beyond the walls*, Edinburgh

Bushe-Fox, J P, 1928 *Second report on the excavations on the Roman fort at Richborough, Kent*

Bushe-Fox, J P, 1915 *Excavations at Hengistbury Head, Hampshire in 1911–12*

Cant, R G, 1984 Settlement, society and church organization in the Northern Isles, in Fenton, A and Palsson, H (eds), *The Northern and Western Isles in the Viking world*, Edinburgh

Carter, H H, 1975 A guide to rates of tooth wear in English lowland sheep, *J Archaeol Sci*, **2**, 231–3

Case, H J, & Whittle A W R, 1983 *Settlement patterns in the Oxford region*

Challis, A J & Harding, D W, 1975 *Later prehistory from the Trent to the Tyne*

Charlesworth, D, 1959 Roman glass in northern Britain, *Archaeol Aeliana*, 4 ser, **37**, 33–58

Charlesworth, D, 1979 Glass, in Hanson, W S, Daniels, C M, Dore, J N & Gillam, J P, The Agricolan supply base at Red House, Corbridge, *Archaeol Aeliana*, 5 ser, **7**, 58–61

Charlesworth, D, 1982, The glass, in Wacher, J S, *et al, Early Roman occupation at Cirencester*, Cirencester, 106–7

Chisholm, M, 1968 *Rural settlement and land use*

Clapham, A R, Tutin, T G & Warburg, E F, 1962 *Flora of the British Isles*, Cambridge

Clarke, D L, 1972 A provisional model of an Iron Age society and its settlement system, in Clarke, D L (ed), *Models in archaeology* 810–69

Close, R S, 1972 Excavation of Iron Age hut circles at Percy Rigg, Kildale, *Yorkshire Archaeol J*, **44**, 23

Collis, J, 1977 *The Iron Age in Britain*, Sheffield

Corder, P, 1958 Parisian ware, *Yorkshire Archaeol J*, **34**, 48–52

Coy, J P, Jones, R T & Turner, K A, 1982 Absolute ageing of cattle from tooth sections and its relevance to archaeology, in Wilson, B, Grigson, C and Payne, S (eds), 127–40

Crompton, E & Osmond, D A, 1954 The soils of the Wem district of Shropshire, *Memoirs of the Soil Survey of Great Britain*

Cunliffe, B W, 1971 *Excavations at Fishbourne, 1961–69*

Cunliffe, B W, 1974 *Iron Age communities in Britain*

Cunliffe, B W, 1984 *Danebury: an Iron Age hillfort*

Curle, J, 1911 *A Roman frontier post and its people; the port of Newstead in the parish of Melrose*

Déchelette, J, 1914 *Manuel d'archéologique préhistorique, Celtique et Gallo-Romaine*

Dent, J, 1983 The impact of Roman rule on native society in the territory of the Parisi, *Britannia*, **14**, 35–44

Drury, P J, 1978 *Excavations at Little Waltham, 1970–71*

Ellenberg, H, 1974 Zeigerwerte der Gefässpflanzen Mitteleuropas, *Scripta Geobotanica*, **9**, Gottingen, 1–97

Ettlinger, E, 1944 *Uber frükhaiserzeitliche Eibeln in der Schweiz*

Evans, J G, 1982 Review of 'The environment of British prehistory', *Scot Archaeol Rev*, **1**, (1), 49–56

Ewbank, J M, Phillipson, D W & Whitehouse, R D, with Higgs, E S, 1964 Sheep in the Iron Age: a method of study, *Proc Prehist Soc*, 423–6

Farrar, R A H, 1973 The techniques and sources of Romano-British black-burnished ware, in Detsicas, A P (ed), *Current research in Romano-British coarse*

pottery, 67–103
Feachem, R W, 1971 Unfinished hillforts, in Hill, D and Jesson, M (eds), *The Iron Age and its hill-forts*, 19–41
Fitzpatrick, A P, 1984 The deposition of La Tène metal-work in watery contexts in Southern England, in Cunliffe, B and Miles, D (eds), *Aspects of the Iron Age in central southern Britain*, Oxford
Francis, E A, 1972 The Pleistocene, in Johnson, G A L (ed), *The geology of Durham County*
Gidney, L J, (unpublished 1981) The animal bone from Stanwick
Gillam, J P, 1968 *Types of Roman coarse pottery vessels in northern Britain*, Newcastle upon Tyne
Godwin, H, 1975 *History of the British flora*, Cambridge
Grant, A, 1981 The significance of deer remains at occupation sites of the Iron Age to Anglo-Saxon period, in Jones, M K and Dimbleby, G W (eds), *The environment of man: the Iron Age to the Anglo-Saxon period*, 205–14
Grant, A, 1982 The use of tooth wear as a guide to the age of domestic ungulates, in Wilson, B, Grigson, C and Payne, S (eds), 91–108
Grant, A, 1984 Animal husbandry, in Cunliffe, B, *Danebury: an Iron Age hillfort in Hampshire*, **2**, 496–526
Green, H S, 1980 *Flint arrowheads of the British Isles*
Grigson, C, 1982 Sex and age determination of some bones and teeth of domestic cattle: a review of the literature, in Wilson, B, Grigson, C and Payne, S (eds), 7–24
Habermehl, K H, 1961 *Die Altersbestimmung bei Haustieren, Pelztieren und bei jagdbaren Wild*, Berlin
Haevernick, T E, 1960 *Die Glasarmringe und Ringperlen der Mittel-und spätlatenezeit auf dem europäischen Festland*, Bonn
Hanson, W S, Daniels, C M, Dore, J N & Gillam, J P, 1979 The Agricolan supply base at Red House,Corbridge, *Archaeol Aeliana*, 5 ser, **7**, 1–98
Harcourt, R A, 1974 The dog in prehistoric and early historic Britain, *J Archaeol Sci*, **1**, 151–75
Harcourt, R A, 1979 The animal bones, in G J Wainwright, *Gussage All Saints: an Iron Age settlement in Dorset*, 150–60
Harden, D B, 1962 Glass in Roman York, in *Eboracum Roman York*, 136–41
Harden, D B & Price, J, 1971 The glass, in Cunliffe, B W, *Excavations at Fishbourne 1961–1969* II – *the finds* 317–68
Harding, D W, 1984 *Holme House, Piercebridge: excavations 1969–70. A summary report*
Haselgrove, C C & Allon, V L, 1982 An Iron Age settlement at West House, Coxhoe, Durham, *Archaeol Aeliana*, 5 ser, **10**, 25–52
Haselgrove, C C, 1982 Indigenous settlement patterns in the Tyne-Tees lowlands, in Clack, P and Haselgrove, S (eds), *Rural settlement in the Roman north*, Durham
Haselgrove, C C, 1984 The later Pre-Roman Iron Age between the Humber and the Tyne, in Wilson, P R, Jones, R F J and Evans, D M (eds), *Settlement and society in the Roman north*, Bradford
Haselgrove, C C & Turnbull, P, 1984 *Stanwick: excavation and fieldwork. Interim Report*, 1 Durham
Hawkes, C F C & Hull, M R, 1947 *Camulodunum*, Oxford
Hayes, R H, 1966 A Romano-British site at Pale End, Kildale, *Yorkshire Archaeol J*, **41**, 577–81
Hayes, R H, 1968 A Romano-British glass bangle from Stony Rigg, *Yorkshire Archaeol J*, **42**, 125–6
Hayes, R H, 1983 *Levisham Moor; archaeological investigations 1957–1978*, Scarborough
Hayes, R H, Hemingway, J E & Spratt D A, 1980 The distribution and lithology of beehive querns in north-east Yorkshire, *J Archaeol Sci*, **7**, 7–94
Healey, E, 1982 Flint report, in Ehrenberg, M, Price, J & Vale, V, The excavation of two Bronze Age round barrows at Welsh St Donats, South Glamorgan, *Bull Board Celtic Stud*, **24**, iv, 776–842
Helbaek, H, 1952 Early crops in southern England, *Proc Prehist Soc*, **18**, 194–233
Heslop, D H, 1978 *Later prehistoric settlement in Cleveland*, Dissertation, University of Leicester
Heslop, D H, 1984 Initial excavations at Ingleby Barwick, Cleveland, *Durham Archaeol J*, **1**, 23–34
Hill, M O, 1973 Reciprocal averaging: an eigenfactor method of ordination, *J Ecol*, **61**, 237–49
Hill, M O, 1979a *DECORANA – a FORTRAN program for detrended correspondence analysis and reciprocal averaging*, New York
Hill, M O, 1979b *TWINSPAN, a FORTRAN program for averaging multivariate data in an ordered two-way table by classification of the individuals and attributes*, New York
Hill, M O, Bunce, R G H & Shaw, M W, 1975 Indicator species analysis, a divisive polythetic method of classification, and its application to a survey of native pinewoods in Scotland, *J Ecol*, **63**, 597–613
Hill, M O & Gauch H G, 1980 Detrended correspondence analysis: an improved ordination technique, *Vegetatio*, **42**, 47–58
Hillman, G, 1981 Reconstructing crop husbandry practices from charred remains of crops, in Mercer, R (ed), *Farming Practice in British prehistory*, Edinburgh, 123–62
Hingley, R C, 1984 Towards social analysis in archaeology: Celtic society in the Iron Age of the Upper Thames Valley, in Cunliffe, B and Miles, D (eds), *Aspects of the Iron Age in central southern Britain*, Oxford
Hodder, I, 1982 *Symbols in action*, Cambridge
Hodgson, G W I, 1967 *A comparative analysis of faunal remains from some Roman and native sites in northern England*, MSc Thesis, University of Durham
Hodgson, G W I, 1968 A comparative account of the animal remains from Corstopitum and the Iron Age site of Catcote near Hartlepool, County Durham, *Archaeol Aeliana*, 4 ser, **47**, 127–62
Hubbard, C E, 1968 *Grasses*
Inman, R, Brown, D R, Goddard, R E & Spratt, D A, 1985 Roxby Iron Age settlement and the Iron Age in north-east Yorkshire, *Proc Prehist Soc*, **51**, 181–214
Jacobsthal, P, 1969 *Early Celtic art*
Jermy, A C, Chater, A C & David, R W, 1982 *Sedges of the British Isles*
Jobey, G, 1973 A Romano-British settlement at Tower Knowe, Wallshaugh, Nothumberland, *Archaeol Aeliana*, 5 ser, **1**, 55–79
Jobey, G, 1974 Excavations at Boonies, Westerkirk and the nature of Romano-British settlement in eastern

Dumfriesshire *Proc Soc Antiq Scot*, **105**, 119–40
Jones, M, 1978 The plant remains, in Parrington, M (ed), *The excavation of an Iron Age settlement, Bronze Age ring-ditches and Roman features at Ashville Trading Estate, Abingdon (Oxon) 1974–76*, 93–101
Jones, M, 1981 The development of crop husbandry in Jones, M and Dimbleby, G (eds), *The environment of man: the Iron Age to the Anglo-Saxon period*, 95–127
Jones, M 1985 Archaeobotany beyond subsistence reconstruction, in Barker, G W and Gamble, C (eds), *Beyond domestication*
Jones, R T (unpublished) Computer based Osteometry, Data Capture User Manual (1), Ancient Monuments Laboratory
Jorgensen, G, 1979 A new contribution concerning the cultivation of spelt, Triticum spelta L in Prehistoric Denmark, *Archaeo-Physika*, **8**, 135–45
Katz, N J, Katz, S V & Kipiani, M G, 1965 *The definition of fruits and seeds*, Moscow
Kilbride-Jones, H E, 1938 Glass armlets in Britain, *Proc Soc Antiq Scot*, 366–95
Lambrick, G & Robinson, M, 1979 *Iron Age and Roman riverside settlements at Farmoor, Oxfordshire*
Lawson, A J, 1976 Shale and jet objects from Silchester, *Archaeologia*
van Lith, S M E, 1977 A Romano-British bangle from Valkenburg ZH, *Ex Horreo – IPP 1951–1976 Cigula*, **4**, 130–134
van Lith, S M E, 1979 Römisches Glas aus Valkenburg ZH, *Oudheidkundige Mededelingen*, 59–60, 1–150
Long, C, (forthcoming) Excavation at Catcote, West Hartlepool
Macgregor, M, 1976 *Early Celtic art in north Britain*, Leicester
Maltby, J M, 1981 Iron Age, Romano-British, and Anglo-Saxon animal husbandry: a review of the faunal evidence, in Jones, M K and Dimbleby, G W (eds), *The environment of man: the Iron Age to the Anglo-Saxon period*, 155–203
Manby, T G, 1979 Typology, materials and distribution of flint and stone axes in Yorkshire, in Clough, T H McK and Cummins W A (eds), *Stone axe studies*, 65–81
Marsh, G & Tyers, P, 1978 The Roman pottery from Southwark, in Bird J *et al* (eds), *Southwark excavations 1972–1974*, 533–86
Marshall, F H, 1969 *Catalogue of jewellery, Greek, Etruscan and Roman, in the Departments of Antiquities, British Museum*
McDonnell, J 1963 *A history of Helmsley, Rievaulx and district*, York
May, T, 1910 The Roman forts at Elslack, *Yorkshire Archaeol J*, **21**, 113–67
Monk, M A & Fasham, P J, 1980 Carbonised plant remains from two Iron Age sites in Central Hampshire, *Proc Prehist Soc*, **46**, 321–44
Murphy, P, 1983 Iron Age to late Saxon land use in the Breckland, in Jones, M (ed), *Integrating the subsistence economy*, 177–209
Newcomer, M H, 1971 Some quantitative experiments in handaxe manufacture, *World Archaeol*, **3**, 1, 85–94
Nilsson, O & Hjelmqvist, H, 1967 Studies of the nutlet structure of South Scandinavian species of Carex, *Botaniska Notiser*, **120**, 460–85
Orme, B J, Coles, J M, Caseldine, A E & Bailey, G N, 1981 Meare Village West 1979, in *Somerset Levels Papers*, **7**, 12–69
Parrington, M, 1978 *The excavation of an Iron Age settlement, Bronze Age ring-ditches and Roman features at Ashville Trading Estate, Abingdon*
Payne, S & Munson, P J 1985 Ruby and how many squirrels? The destruction of bone by dogs, in Gilbertson, D and Fieller, N (eds), *Palaeobiological investigations research design, methods and data analyses*
Peacock, D P S, 1977 Ceramics in Roman and medieval archaeology, in Peacock D P S (ed), *Pottery and early commerce*, 21–34
Peacock, D P S, 1984 *Pottery production in the Roman world*
Pfitzenmeyer, C D C, 1962 Arrhenatherum elatius, var bulbosum (Willd) Spenn *J Ecology*, **50**, 235–45
Piggott, S, 1958 Native economies and the Roman occupation of north Britain, in Richmond, I A (ed), *Roman and native in north Britain*, Edinburgh, 1–27
Potter, T W, 1979 *The Romans in north-west England*
Price, J, (forthcoming) The Roman glass (and a note on the production of Type 2 glass bangles), in Hayfield, C *et al* (eds), *Wharram Grange Roman Villa*, York
Pryor, F, 1984 *Excavations at Fengate, Peterborough, England*
Rackham, D J, 1982 The faunal remains, in Haselgrove, C C & Allon, V L, An Iron Age settlement at West House, Coxhoe, County Durham, *Archaeol Aeliana*, 5 ser, **10**, 25–51
Rackham, D J (forthcoming a) Chance and probability: a theoretical and practical assessment of species proportions in archaeological bone samples
Rackham, D J (forthcoming b) A method of analysis of the age structure of a species in archaeological bone samples
Reynolds, P J, 1977 *Experimental archaeology*
Reynolds, D M, 1982 Aspects of later prehistoric timber construction in south-east Scotland, in Harding, D W, (ed) *Later prehistoric settlement in south-east Scotland*, Edinburgh
Richter, G M A, 1915 *Greek, Etruscan and Roman bronze*
Rigby, V, 1973 Potters' stamps on Terra Nigra and Terra Rubra found in Britain, in Detsicas A P (ed), *Current research in Romano-British coarse pottery*
Riha, E, 1979 *Die römischen Fiben aus Augst und Kaiseraugst*
Ritterling, E, 1912 *Das frürömische Lager bei Hofheim im Taunus*
Robinson, M, 1979 The biological evidence, in Lambrick, G & Robinson, M (eds), *Iron Age and Roman riverside settlements at Farmoor, Oxon*, 77–120
Saville, A 1980 Five flint assemblages from excavated sites in Wiltshire, *Wiltshire Archaeol Natur Hist Mag*, **72**, 1–27
Schmid, E, 1972 *Atlas of animal bones*
Silver, I A, 1969 The ageing of domestic animals, in Brothwell, D R and Higgs, E S (eds), *Science in archaeology*, 283–302
Simpson, G, 1975 Haltwistle Burn, Corstopitum and the Antonine Wall: a reconsideration, *Britannia*, **5**, 317–39
Spratt, D A, 1982 *Prehistoric and Roman archaeology of north-east Yorkshire*
Stallibrass, S, 1982 The use of cement layers for

absolute ageing of mammalian teeth: a selective review of the literature, with suggestions for further studies and alternative applications, in Wilson, B, Grigson, C & Payne, S (eds), 109–26
Stead, I M, 1967 A La Tène III burial at Welwyn Garden City, *Archaeologia*, **101**, 62
Stead, I M, 1980 *Rudston Roman Villa*, Leeds
Stevenson, R B K, 1956 Native bangles and Roman glass, *Proc Soc Antiq Scot*, **88**, 208–21
Stevenson, R B K, 1976 Romano-British glass bangles, *Glasgow Archaeol J*, **4**, 45–54
Still, L & Vyner, B E, 1986 Air photographic evidence of later prehistoric settlement in the Lower Tees Valley *Durham Archaeol J*, **2**, 11–23
Tinkler, B N & Spratt, D A, 1978 An Iron Age enclosure on Great Ayton Moor, North Yorkshire, *Yorkshire Archaeol J*, **50**, 49–56
Tinsley, H M, 1981 The Bronze Age, in Simmons, I G and Tooley, M J (eds), *The environment in British prehistory*, London
Turnbull, P, 1982 Excavations at Rillington, 1980, *Yorkshire Archaeol J* **55**, 1–9
Veen, M van der & Fieller, N, 1982 Sampling seeds, *J Archaeol Sci*, **9**, 287–98
Veen, M van der & Haselgrove, C C, 1983 Evidence for pre-Roman crops from Coxhoe, Co Durham, *Archaeol Aeliana*, 5 ser, **11**, 23–5
Veen, M van der, 1984 Sampling for seeds in Zeist, W van and Casparie, W A (eds), *Plants and ancient man: studies in palaeoethnobotany*, Rotterdam, 193–9
Veen, M van der, 1985a Evidence for crop-plants from north-east England: an interim overview with a discussion of new results, in Fieller, N, Gilbertson, D G and Ralph, N (eds), *Palaeobiological investigations*, 197–225
Veen, M van der 1985b Carbonised seeds, sample size and on site sampling in Fieller, N, Gibertson D G and Ralph, N (eds), *Palaeoenvironmental investigations*, 166–70
von den Driesch, A, 1976 A guide to the measurement of animal bones from archaeological sites, *Peabody Museum Bulletin*, **1**
Wainwright, G J, 1972 The excavation of a Neolithic settlement on Broome Heath, Ditchingham, Norfolk, *Proc Prehist Soc*, **38**, 1–97
Wainwright, G J, 1979 *Gussage All Saints: an Iron Age settlement in Dorset*
Walters, S M, 1953 Montia fontana, *Watsonia*, **3**, 1–6
Watkins, T, 1982 Saint Germains Enclosure, Tranent, East Lothian in Harding, D W (ed), *Later prehistoric settlement in south-east Scotland*, Edinburgh, 106–16
Wenham, L P, 1968 *The Roman-British cemetery at Trentholme Drive, York*
West Yorkshire County Council, 1984 *West Yorkshire: an archaeological survey to AD 1500*, Wakefield
Wheeler, R M, 1954 *The Stanwick fortifications*, London
Wheeler, B D, 1980 Wetlands, in Dunn, T C (ed), *The magnesian limestone of Durham County*, Durham County Conservation Trust, 53–60
Willerding, U, 1978 Palaeo-ethnobotanische Befunde an mittelalterlichen Pflanzenresten aus Sud-Niedersachsen, Nord-Hessen und dem ostlichen Westfalen, *Berichte der Deutsche Botanischen Gesellschaft*, **91**, 129–60
Williams, D F, 1977 The Romano-British black burnished industry in Peacock D P S (ed), *Pottery and early commerce* 163–220
Wilson, B, Grigson, C & Payne, S (eds) 1982 *Ageing and sexing animal bones from archaeological sites*, London
Wilson, B 1978a The animal bones, in Parrington, M, *Excavation of an Iron Age settlement, Bronze Age ringditch and Roman features at Ashville Trading Estate, Abingdon (Oxon) 1974–76*, 110–39
Wilson, B 1978b Sampling bone densities at Mingie's Ditch, in Cherry, J F, Gamble, C & Shennan, S (eds), *Sampling in contemporary British archaeology*, Oxford, 355–61
Wilson, B 1985 Degraded bones, feature type, and spatial patterning on an Iron Age occupation site in Oxfordshire, England in Gilbertson, D and Fieller, N (eds), *Palaeobiological investigations, research design, methods and data analysis*, 81–96
Wilson, D, 1983 Pollen analysis and settlement archaeology of the first millennium bc from north-east England, in Chapman, J C and Mytum, H C (eds), *Settlement in north Britain 1000 BC–1000 AD*
Young, R, 1984 Potential sources of flint and chert in the north-east of England, *Lithics*, **5**, 3–9
Zeist, W van, 1981 Plant remains from Iron Age Noordbarge, Province of Drenthe, The Netherlands, *Palaeohistoria*, **23**, 196–93

Plate 1 The cropmark

Plate 2 The excavation in 1982, Area C

Plate 3a The Main Enclosure Ditch, Section 1

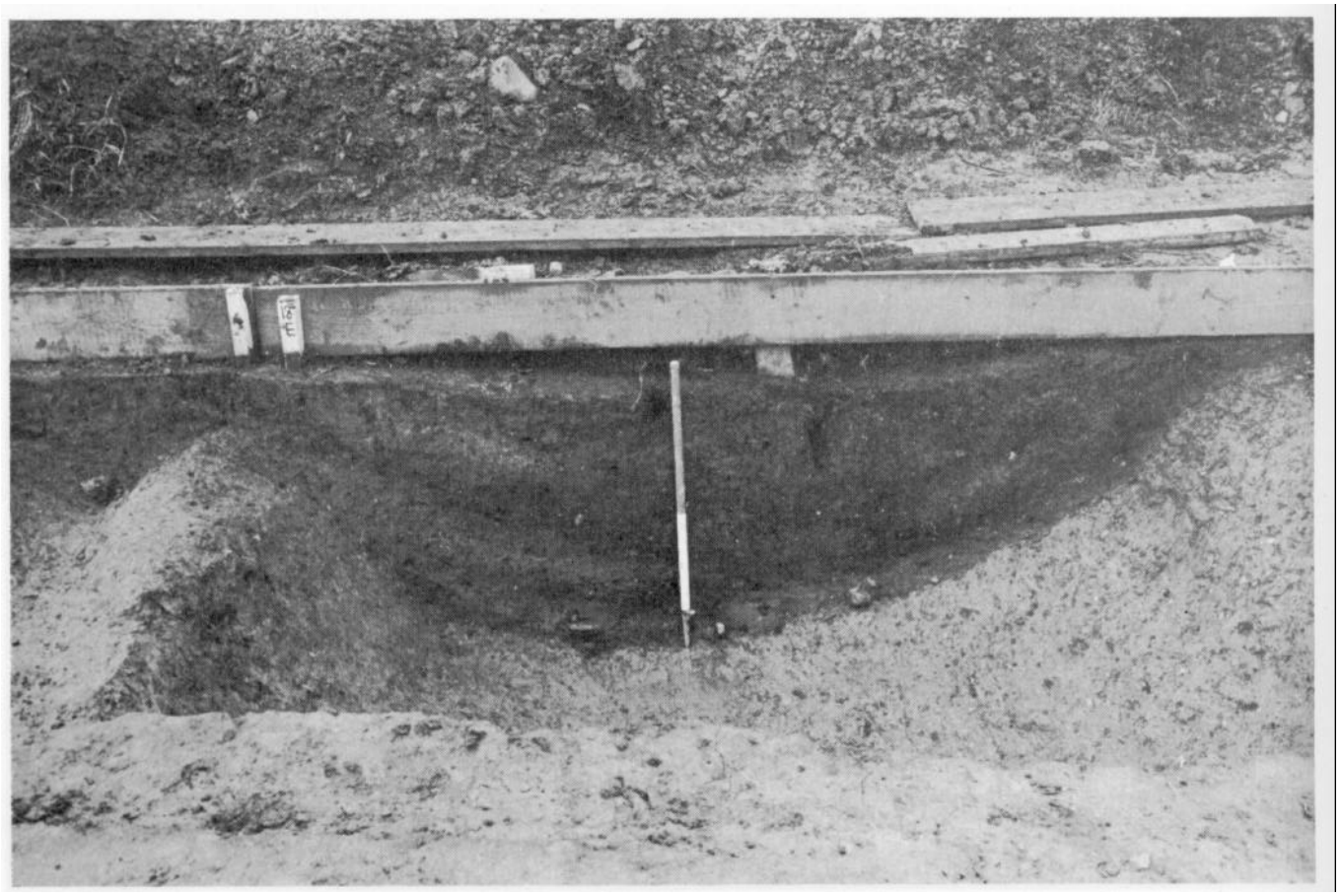


Plate 3b The Main Enclosure Ditch, Section 3

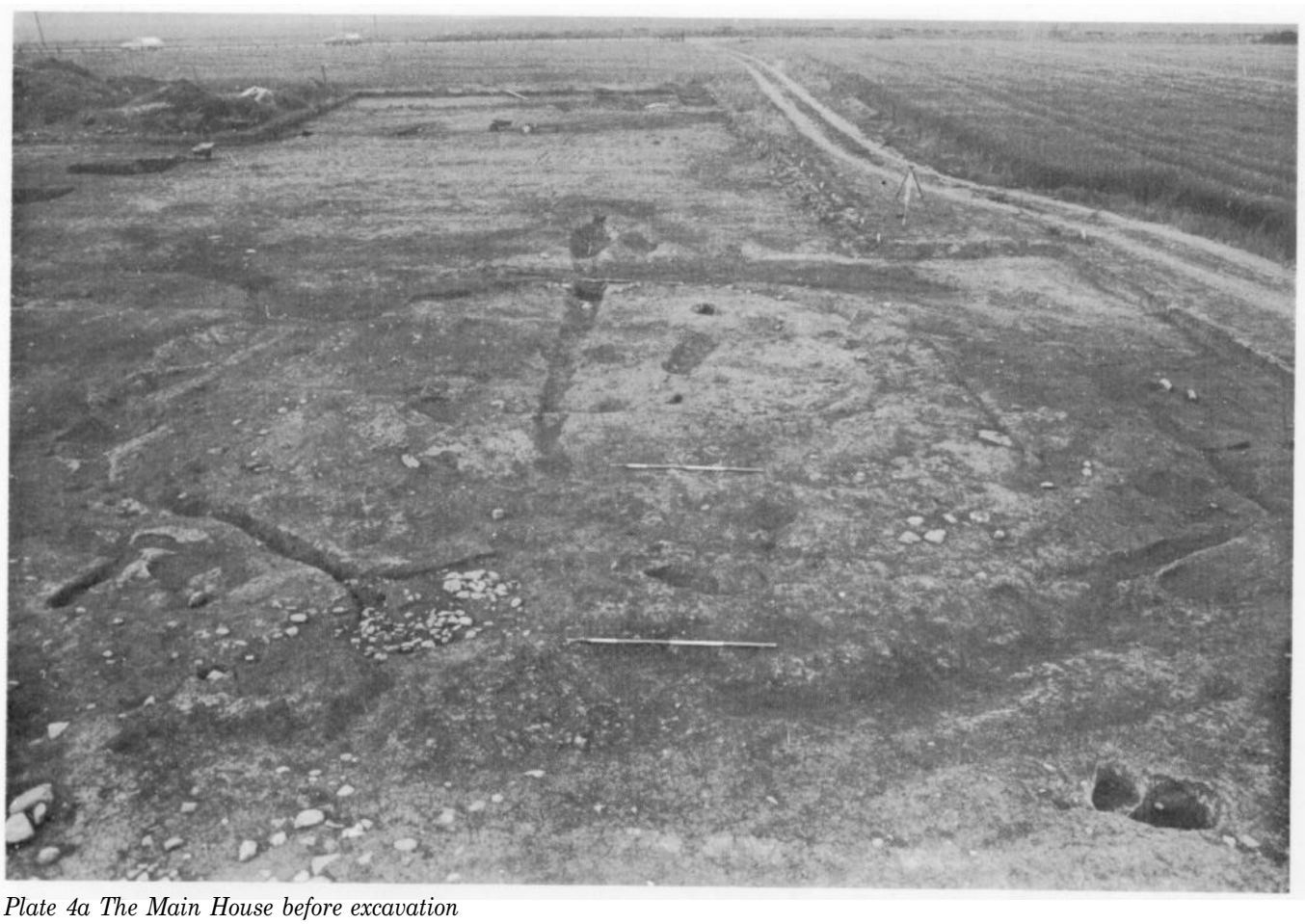


Plate 4a The Main House before excavation

Plate 4b The Main House after excavation

Plate 5a Circular Structure J

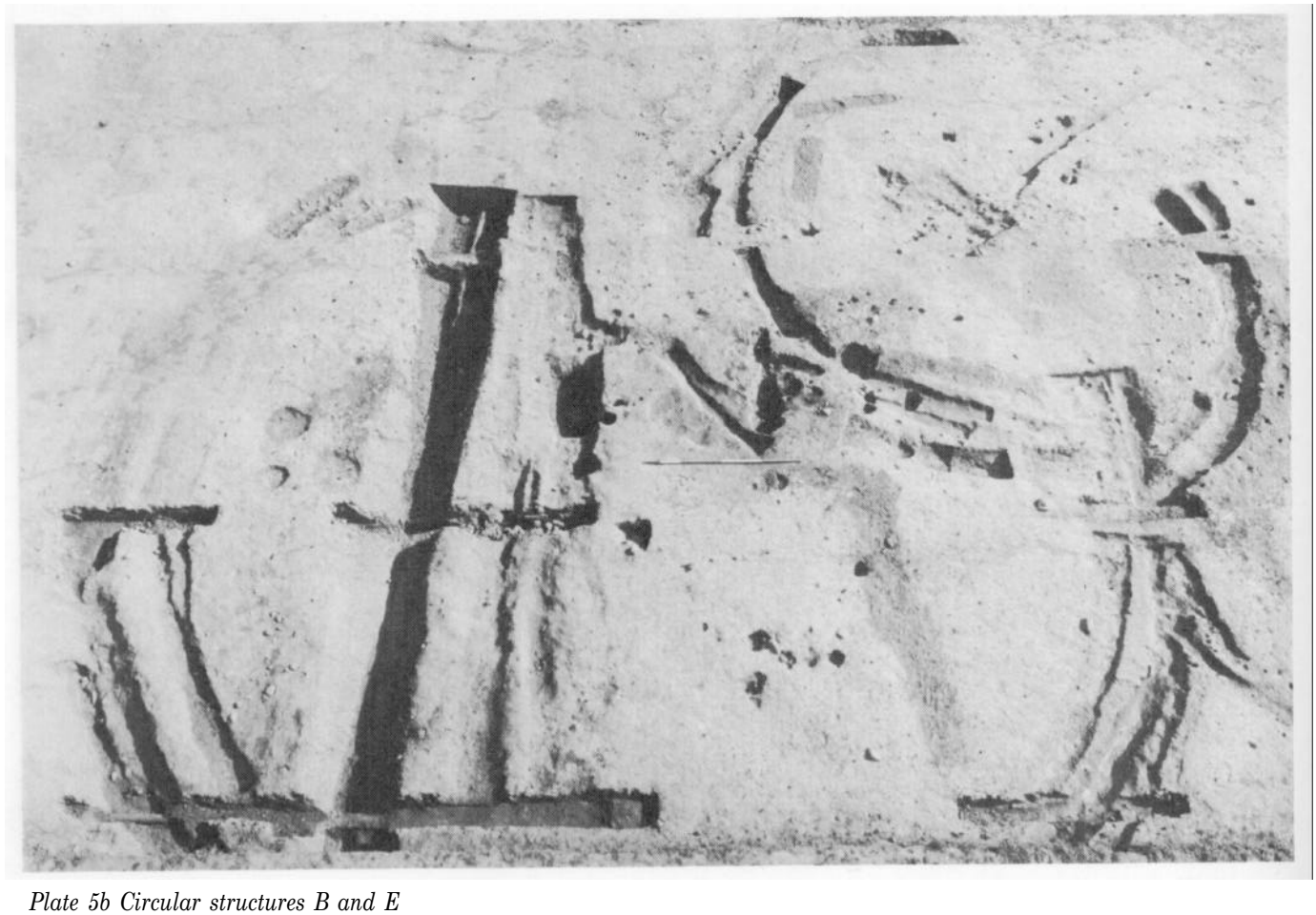


Plate 5b Circular structures B and E

Plate 6 Circular Structure M and the Late Rectangular Enclosure Ditch II

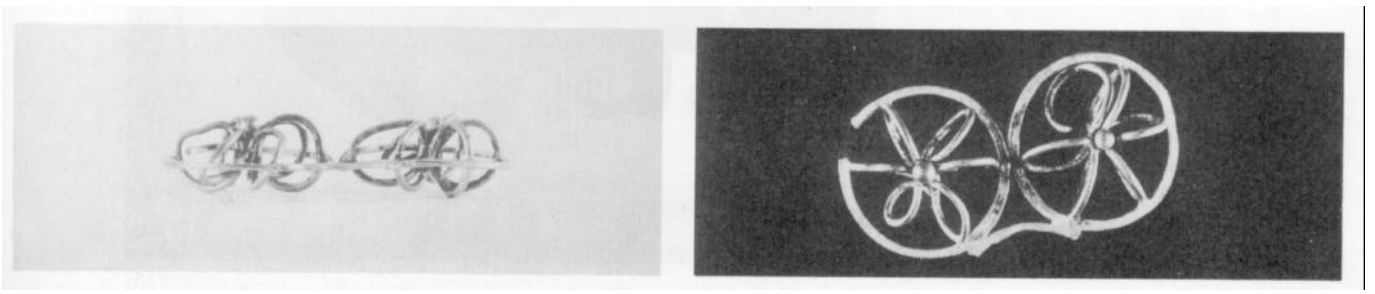


Plate 7 The gold earring, M1, 5 26.5 mm

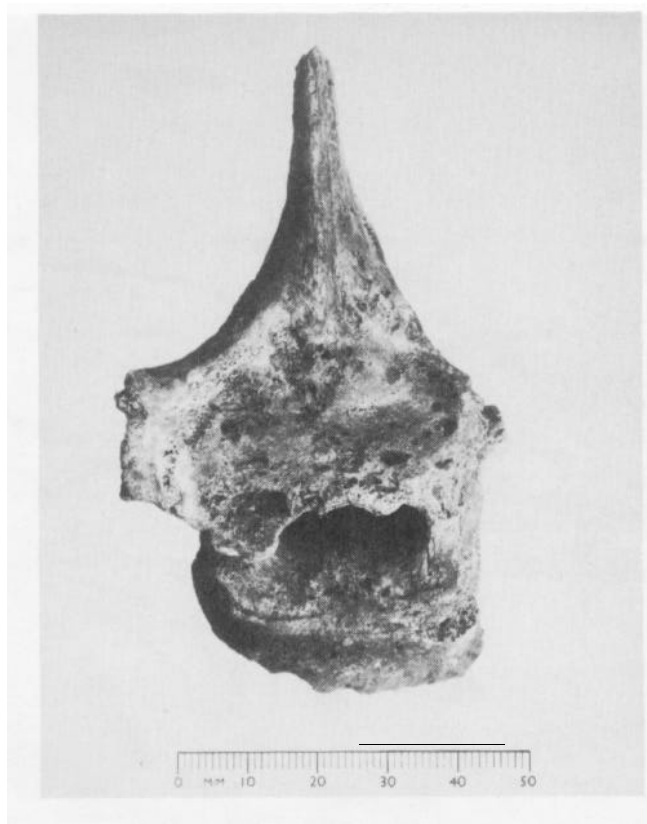
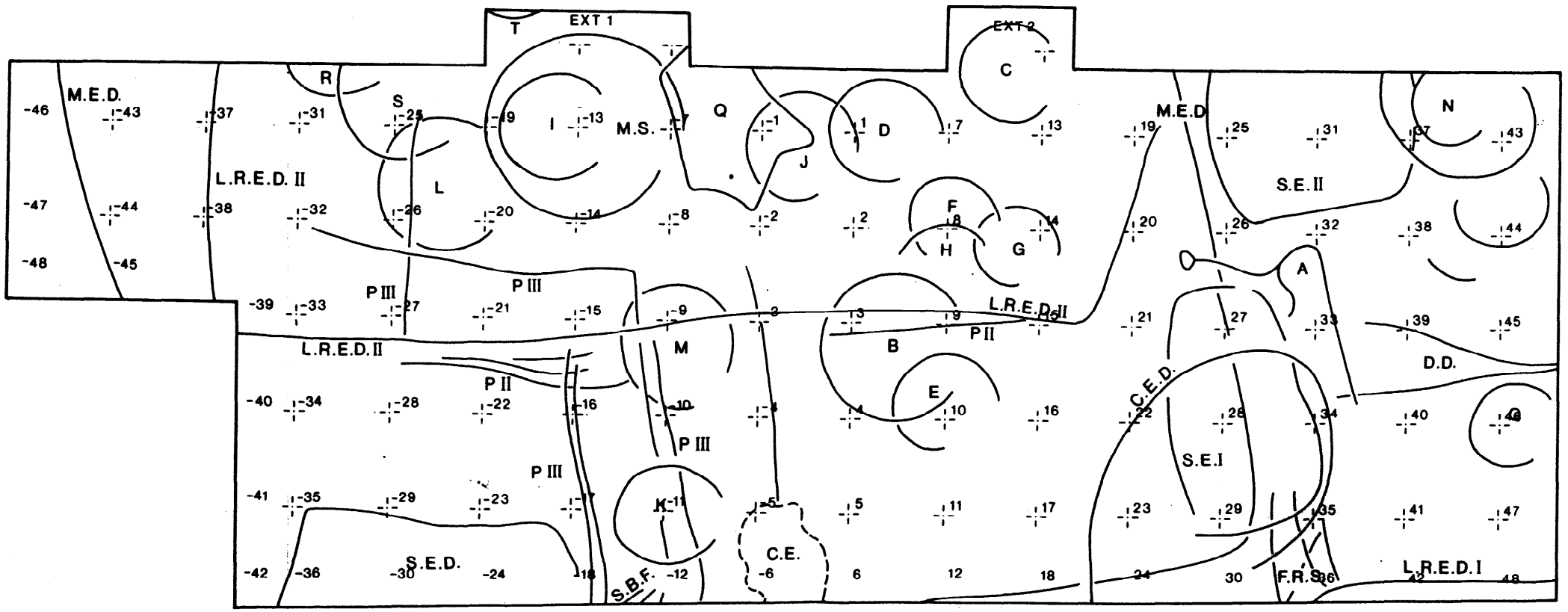


Plate 8 The anterior zygapophyses of a cattle anterior thoracic vertebrae testifying to a breakdown of the cartilage and severe inflammation

Plate 9 The distal end of a cattle metatarsus with heavily splayed medial condyle

Plate 10 Three cattle phalanges exhibiting pathological morphology

Plate 11 A sheep horn core



Site plan of Thorpe Thewles (Upper) excavated features and field drains; (Lower) simplified features and grid squares.