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## An Iron-Age Settlement and Remains of Earlier Prehistoric Date beneath South Shields Roman Fort, Tyne and Wear

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A. T. CROOM AND C. WADDINGTON

*Excavation of an area of over 750 sq. m during 1992-94 and 1999 revealed a multi-period prehistoric site preserved beneath the Roman fort. Flints attested mesolithic activity. In the early Neolithic a segmented ditch may represent part of a causewayed enclosure. By c. 3000 cal. B.C. this had been superseded (in this area) by pits and shelters associated with flint-knapping. Finds, but not structures, attest a bronze-age presence. Within the period 390-170 cal. B.C. a roundhouse with cultivation plot, part of an unenclosed settlement, occupied the area. This had been burnt and was rich in carbonised plant remains which provided information about the arable economy and spatial variations in the use of the roundhouse interior. In the later Iron Age the area was reclaimed by cultivation associated with an unlocated settlement. The nature of the occupation on the eve of the Roman period is not known.*

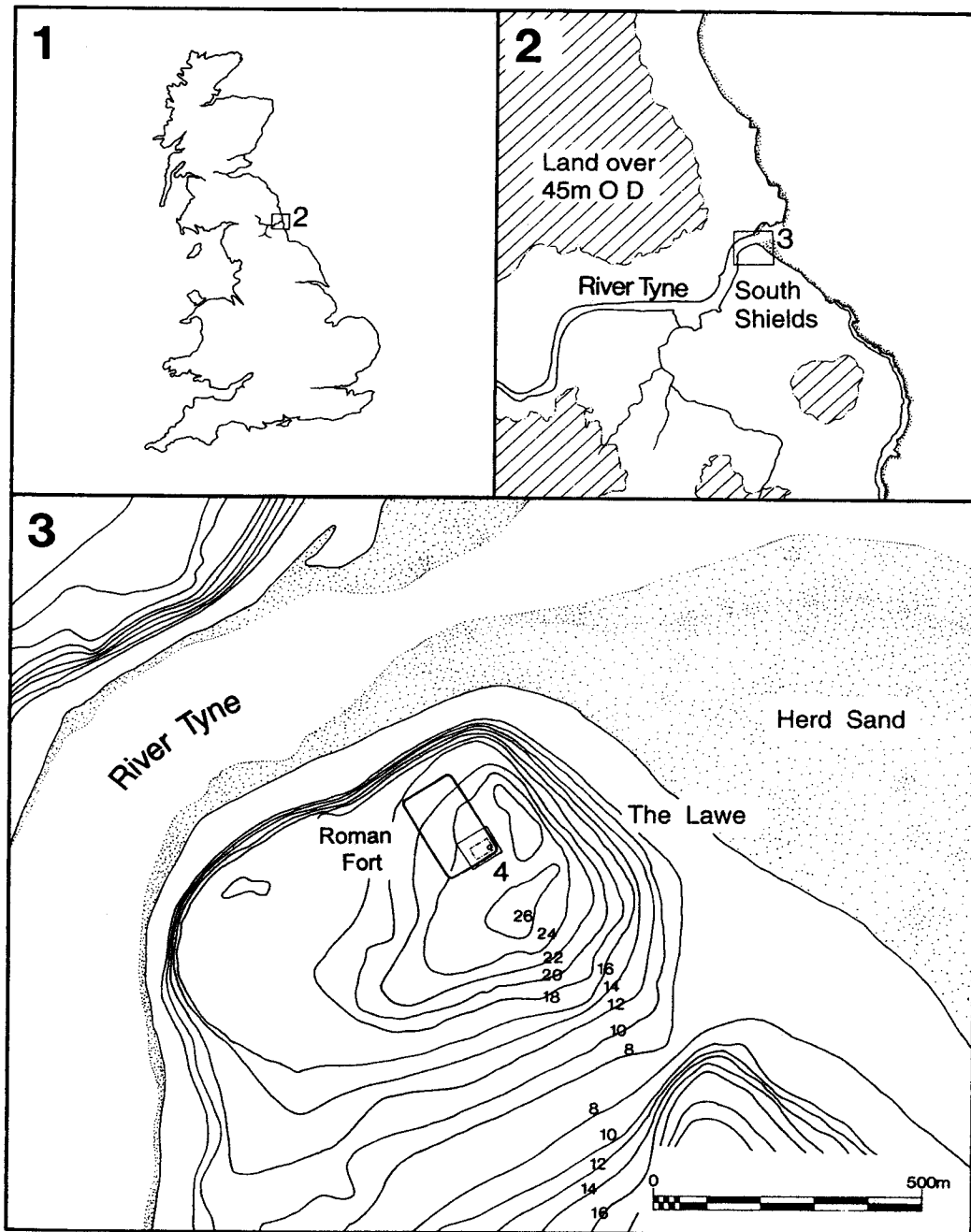
THE EXCAVATIONS by N. Hodgson and G. C. Stobbs

### LOCATION OF THE SITE (Illus. 1, 2)

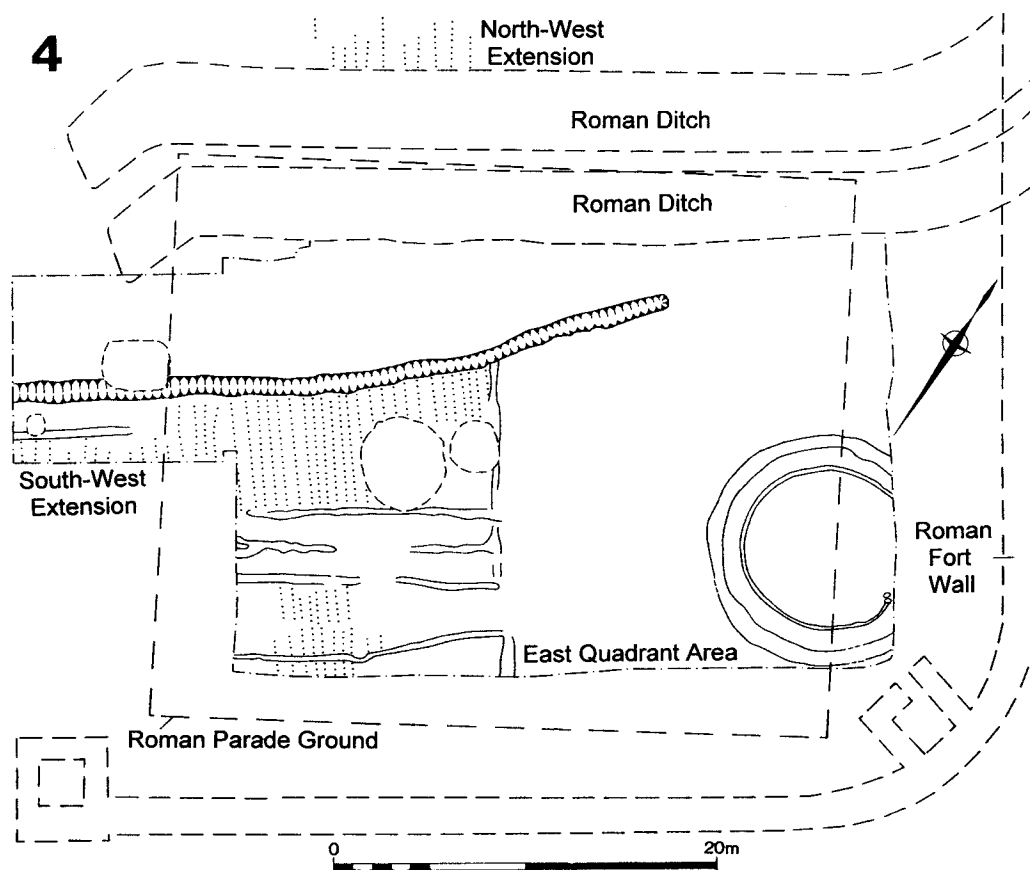
The Roman site at South Shields is well known as a supply-base controlling a port at the mouth of the river Tyne which gave access from the sea to Hadrian's Wall and the Tyne corridor. The stone fort, constructed in the second century A.D., was situated on the south side of the river at the head of a promontory which projects to the north and around which the Tyne bends to reach the sea. The promontory takes the form of a low but pronounced hill known locally as the Lawe. In order to command the best view of the river-mouth area the Roman fort lay on the gentle north-facing slope of the Lawe, with the hill-top some 150 m to its south. The elevation of the area covered by the fort rises from about 16 m O.D. to 22.50 m O.D.

### GEOLOGY

The subsoil over the Lawe consists of a post-glacial deposition of boulder clay, in places underlying sand. In the area of the east quadrant (dug to the natural), a distinction was visible between the north-western half, where the sub-soil was a stiff, orange boulder clay, and the south-eastern half, where a deposit of grey natural sand, deepening to the south-east, overlay the clay. See below in discussion on Earlier Prehistory (pp. 95-6) concerning the configuration of the coastline in these periods.



Illus. 1 Location of site. Contours in metres indicate the present-day ground level, 2–3 m above the prehistoric surface



Illus. 2 General plan of site showing main east-quadrant excavation area and additional areas, with extent of iron-age cultivation, in relation to Roman parade-ground and fort defences. Scale 1:400

#### CIRCUMSTANCES OF DISCOVERY AND REASONS FOR EXCAVATION

Excavations of the Roman Fort at South Shields and its surrounding area have taken place intermittently since 1875 (Bidwell and Speak 1994, 1-47), incidentally producing a number of prehistoric finds (see discussion in finds report). Before 1984 excavation was rarely carried down to the level of the natural subsoil.

In 1983 Tyne and Wear Museums began a new programme of research excavation inside the Roman fort. This entailed excavation in advance of the reconsolidation of the central headquarters building, excavation in advance of the building of a reconstruction of the south-west gate and the beginning of an ambitious programme of work on an area of over 1500 sq. m in the eastern quadrant of the fort. The policy in all of these areas was to carry out total area excavation to the natural. Beneath the headquarters building, despite a careful search, no prehistoric remains were found. At the south-west gate (150 m east of the area reported on here) evidence of pre-Roman cultivation was recovered beyond the fort ditches, but no structural remains.

However, the east quadrant (Illus. 2) did yield the first structural evidence for a prehistoric settlement. Work began here in 1983 and an almost continuous programme of excavation ran between 1986 and 1999. The primary objective was to combine increased public display of the fort interior with a better understanding of its history. The Roman stratigraphy was complex and multi-period, with five complete rebuildings across the site between the earlier second and the late fourth centuries A.D. Much importance was attached to excavating the complete sequence because it had become apparent that there were Roman structures pre-dating the known stone fort, and it was hoped to discover the character of the earliest Roman occupation of the site and in which direction its nucleus might lie. In — or rather beneath — the east quadrant this early phase was represented by a gravel surface, possibly a parade-ground (9487: Illus. 2, 19, 23). This, measuring 35 m by 30 m, was bedded on a massive foundation of boulders and clay, 0.40 m deep, itself cut through a deep (0.20–0.50 m) drift of wind-blown sand. In 1991, upon the removal of both the eastern area of this foundation, and the vestiges of the wind-blown sand which had escaped truncation beneath, a well-preserved roundhouse appeared.

The decision was rapidly taken to continue the policy of excavation to the level of the natural throughout the area of the east quadrant. Although the project had been intended to shed light on the history of the Roman fort, the exciting prospect was presented of exploring the transition from the iron age to the Roman periods at South Shields. Accordingly, in order to achieve the aim of recovering the complete structural sequence on this part of the site, a total excavation of the prehistoric remains was undertaken. The excavation of the principal available area of prehistoric remains, covering an area of 33 m by 22.50 m (some 743 sq. m) was mostly undertaken in 1992–94. Additional areas to the south-west and north-west were excavated in 1999.

In the event, the excavations did not shed light on the iron-age to Roman transition. The roundhouse settlement was found to have been abandoned at least two centuries before the arrival of the Romans, and while there was evidence for later iron-age agriculture this could not be precisely dated and no accompanying structures survived in the area available. The record of the prehistoric activity in this area is thus quite separate from that of the Roman fort. In order both to aid speed of publication and to make the prehistoric remains more easily accessible to the relevant specialists, it has been decided to publish this report independently, rather than incorporating it into a monograph that will be principally concerned with the Roman period.

## PRESERVATION AND METHODOLOGY

The prehistoric remains were well preserved, as there was no damage to them caused by later ploughing. Indeed, the overlying Roman stratigraphy, while removing some of the immediately pre-Roman horizon, had sealed and preserved the earlier iron-age structures and the contours of their contemporary ground surface. All deposits were totally excavated by hand. The sampling strategy employed for the recovery of plant remains is discussed below. In the event, carbonised plant remains occurred only in middle iron-age features affected by the fire that brought that period to an end. Sections were taken from the buried soils of the iron-age and earlier horizons using Kubiana tins; examination by J. P. Huntley found no surviving pollen. The location

of every artefact was recorded in three dimensions. Apart from a few scraps in the roundhouse, bone does not preserve on the site owing to the acidity of the sand making up the soil horizons.

#### PRE-STRUCTURAL PHASE: SOIL HORIZON A (MESOLITHIC?)

The natural boulder clay and sand was immediately overlain throughout the entire area by a distinct soil horizon, consisting of a firm, light to mid brown-coloured clay-sand (21225) approximately 0.20 m deep, further mottled with ferruginous, orange-tan flecks and containing small yellow sandstone fragments. The layer was sandier and slightly darker in colour within the south-eastern half of the area, where it overlay natural sand rather than boulder clay.

The earliest cut features on the site (Structural Phase 1) appear to have been dug from an intermediate level within this soil horizon. This suggests that the soil horizon was split into an earlier and a later component, which may be respectively labelled as 21225A and 21225B. No clear division between them was noted at the time of excavation, but this might be expected if the soil horizon represented a gradual accumulation.

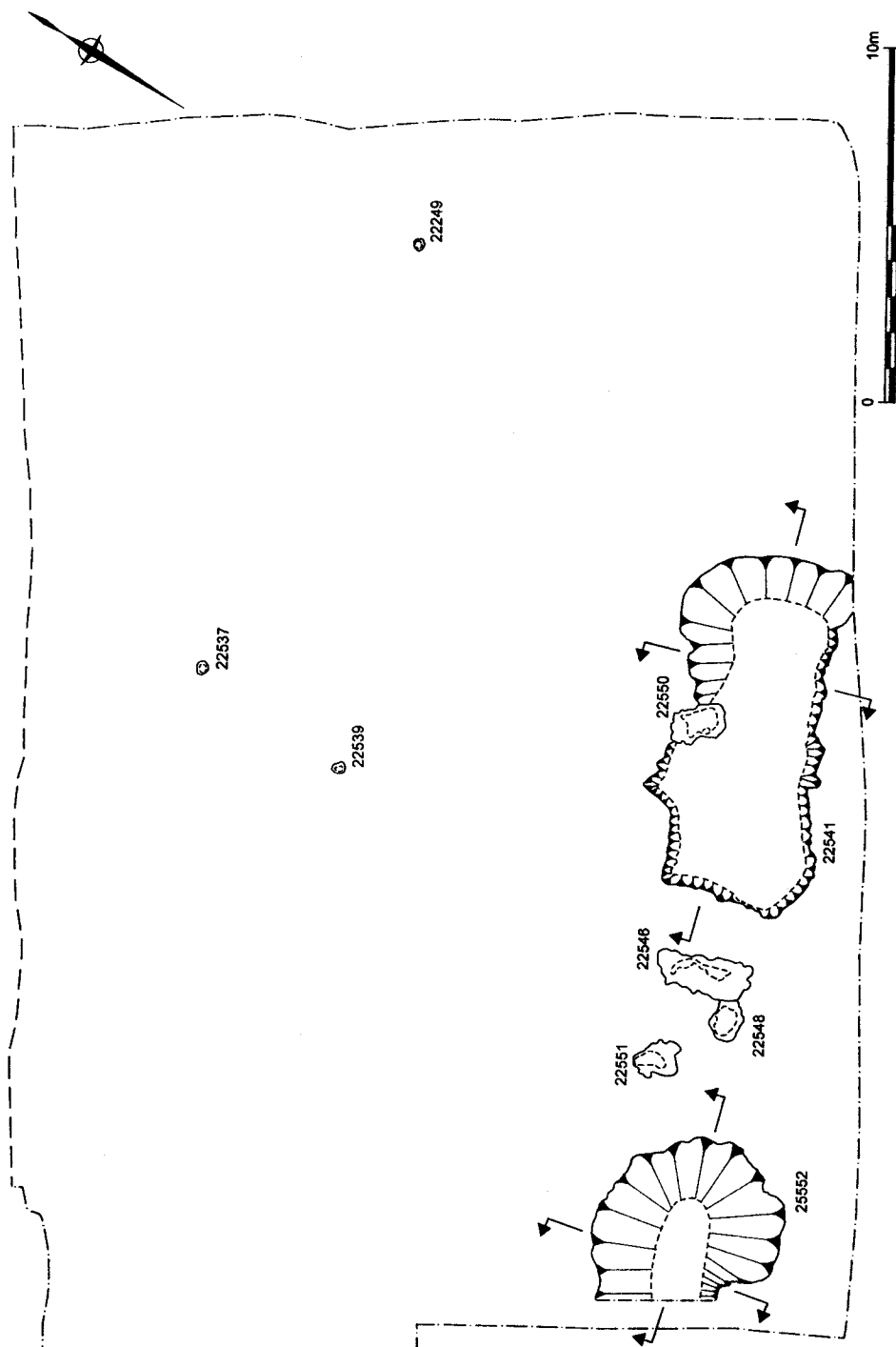
#### STRUCTURAL PHASE 1: EARLY NEOLITHIC (Illus. 3)

All of the features described in this section were cut from the intermediate level of layer 21225, i.e. from the top of 21225A. Earliest was an oval pit (22550), measuring 1.60 m by 1.02 m and 0.50 m deep, with steeply-sloping sides and a U-shaped base. It contained a mixed fill of firm yellow sand and orange clay.

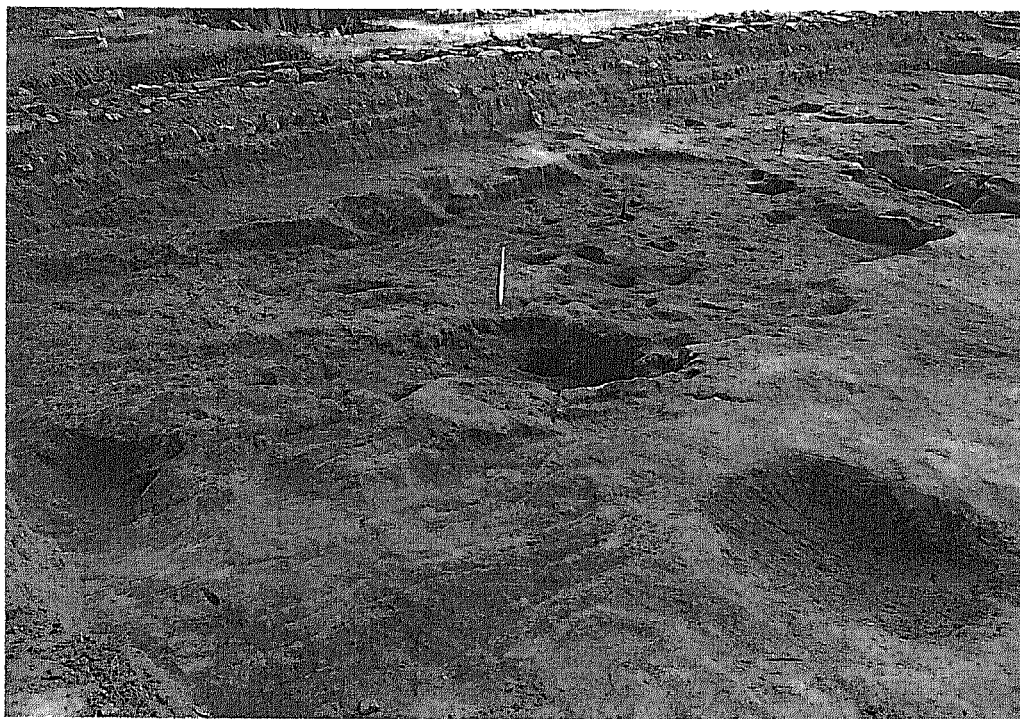
The filled pit was cut by a linear scoop or part of shallow and flat-bottomed ditch (22541) that ran north-east to south-west, just within the south-eastern edge of the excavated area (Illus. 3, 4, 5). This feature measured 8.50 m in length, 4.10 m in width with a maximum depth of 0.50 m. A squarish terminal was found at the south-west end and the base level rose up to form an indistinct terminal to the north-east. The primary fill (22543: Illus. 5) was of yellow and blue-grey sand, at most 0.10 m deep, which did not cover the entire base of the ditch. This material presumably represented silting of the feature while open and was covered by the main ditch fill (22540), a pale yellow clay containing occasional red sandstone fragments and some lenses of yellow sand.

A second length of scoop or shallow ditch (22552) lay some 6.40 m from the south-west terminal of the feature (22541) just described (Illus. 3, 5, 6, 7). With gently-sloping sides and a flat base, this was up to 0.53 m deep and up to 5.40 m wide: a length of 5 m survived in the excavated area. The area to the south-west has not been excavated to pre-Roman levels, but examination of the sections of an intrusion of Roman date suggests that the ditch did continue on in that direction for at least 8 m.

This ditch contained a primary silting (22553) of coarse yellow sand, stained grey-blue in places (Illus. 5). This was overlain by a series of lenses and tip-lines of orange and yellow clay and red-brown sand. After a series of these had filled the ditch in one operation (22559, 22558, 22557, 22554), a second and narrower (2 m wide) recut had



Illus. 3 Phase I: early Neolithic? Scale 1:200



Illus. 4 Emptied scoop or ditch 22541, viewed from north. 1 m scale visible

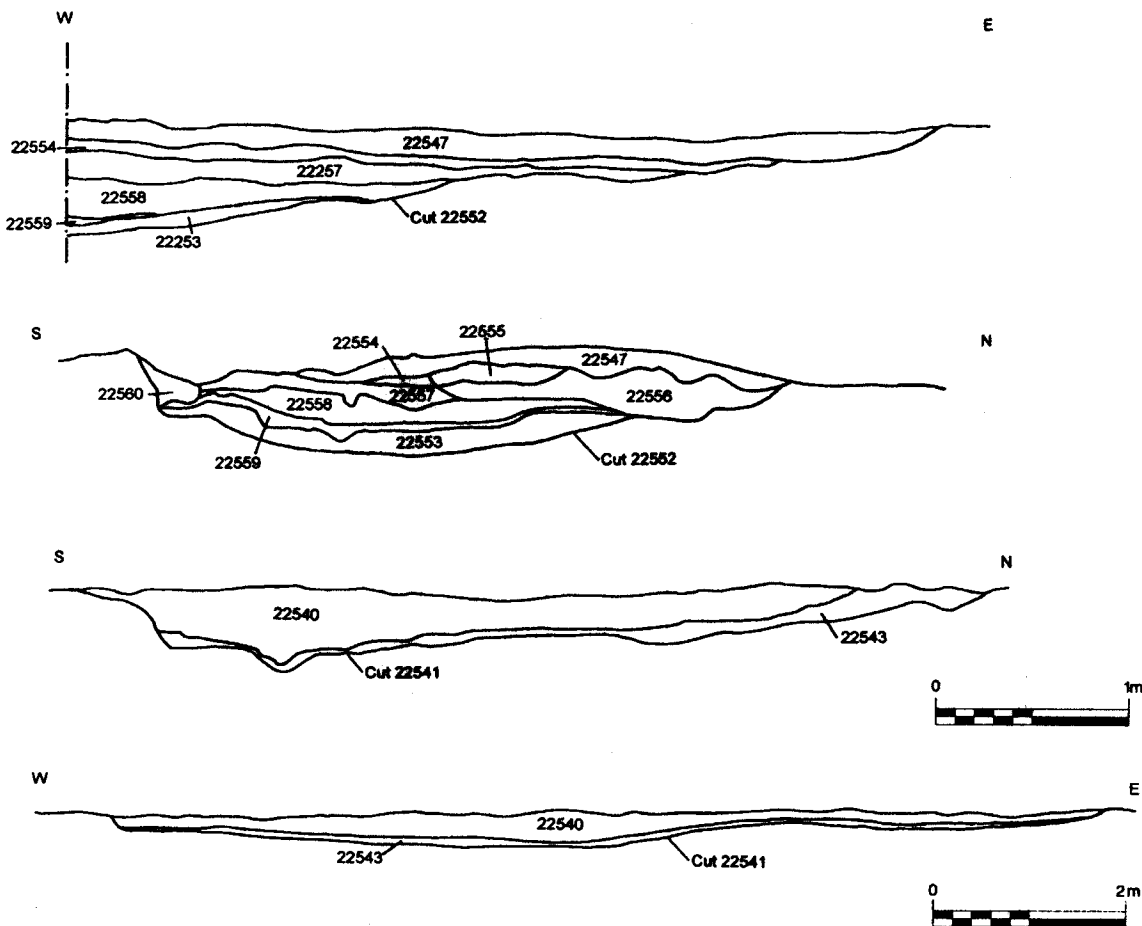
been made on its north-western side. This was filled in turn with mixed clays and sands (22556, 22555, 22547).

Between the two ditch terminals were found two pits (22548 and 22551), 0.30 m deep, and up to 1.20 m in diameter. These were filled and sealed by a yellow clay spread 0.10 m in depth, which also sealed the upper fill of the south-western ditch-like feature. This clay spread was also very similar to the main fill (22540) of the north-eastern ditch. This sequence suggests that the south-western ditch was filled first, but that the two pits and the north-eastern ditch remained open together longer, before themselves being then filled. Finally the clay spread was cut by a sub-rectangular pit (22546), at 2.58 m long, 1 m wide and 0.78 m deep, filled with mixed clays.

The only other activity belonging to this phase was represented by a scatter of pits in the north-western part of the area: 22539 at 0.07 m deep; 22537, 0.27 m deep; 21249, 0.28 m deep — each c. 0.35 m in diameter. All were filled by the soil horizon 21225B.

#### DATING EVIDENCE

No material suitable for radiocarbon dating was recovered from the ditch-like features or associated pits of Structural Phase 1. An absolute *terminus ante quem* for this phase is supplied, however, by the radiocarbon dates from features in the ensuing stratigraphical



Illus. 5 Sections of Phase I features. Scales 1:40 and 1:80

horizon: these come out at the later fourth millennium cal. B.C. The diagnostic pieces in the lithic material from soil horizons 21225A and 21225B were mesolithic in date, but the majority of the flint recovered was undiagnostic, being derived from blade technology typical of both the mesolithic and neolithic manufacturing traditions.

#### SOIL HORIZON B: EARLY NEOLITHIC?

The upper component (21225B) of the distinctive mottled soil horizon sealed the fills of the Structural Phase I features, presumably representing a gradual accumulation. This occurred consistently throughout the entire excavated area.



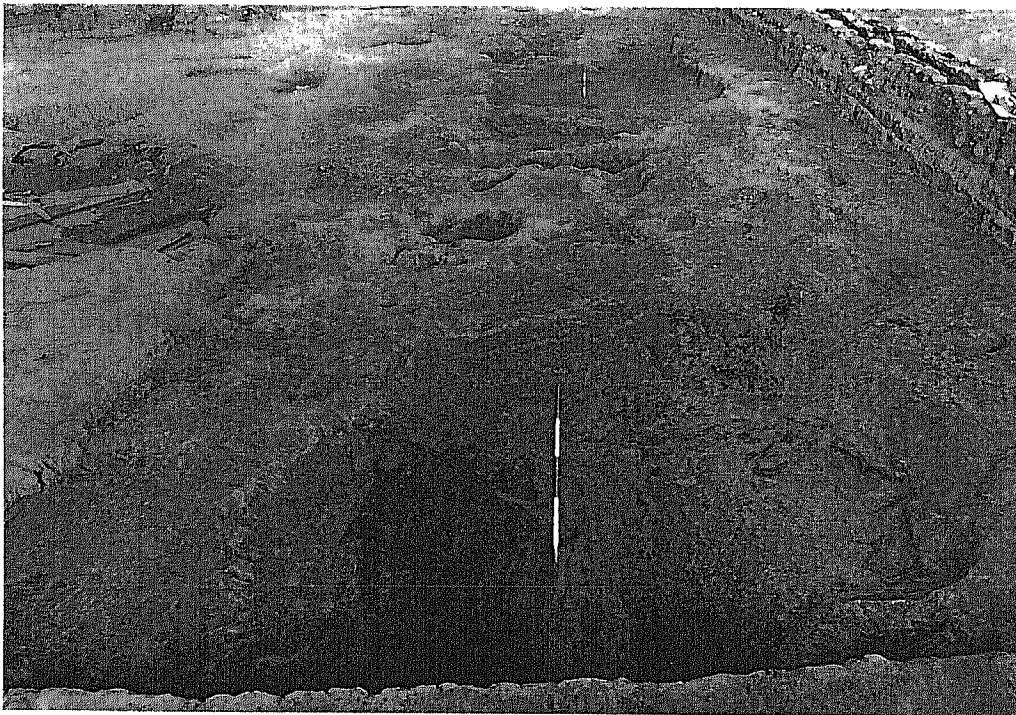


Illus. 6 Emptied terminal of ditch-like feature 22552, viewed from north. 1 m scale visible

#### STRUCTURAL PHASE 2: LATER FOURTH MILLENNIUM CAL. B.C. (Illus. 8)

The structural features of Phase 2 were found cut into the top of horizon 21225B. The features appeared as a scatter of individual pits, hollows or scoops, with some groupings apparent. Dimensions of the cut features and details of their fills are given in Table 1 and profiles shown in Illus. 9 and 10. A two-phase curvilinear feature (associated with a group of pits) at the north-western edge of the east quadrant represented the only apparent structure.

In its primary state, the curvilinear feature (22280) formed a steep-sided trench 7.00 m in length, between 0.40 m and 1.20 m wide and up to 0.40 m deep (Illus. 8 and 12). Three circular depressions, 80 mm in diameter and 40 mm deep, survived in the base, suggesting that the purpose of the trench may have been to emplace timber uprights. The trench was filled with grey-white clay, turning grey-blue near the base. This backfill (22236) contained many pieces of flint, including 13 from the same nodule: some of these refit, and are accordingly suggested below to be a structured deposition. A second, more curving feature (22238), at 7.60 m in length, between 0.25 m and 1 m wide and 0.10 m deep, was cut into the backfill of the first trench (Illus. 11 and 12). This later feature had a steep slope on the north-west side and a gentler gradient to the south-east; it was eventually filled with a grey-white clay.

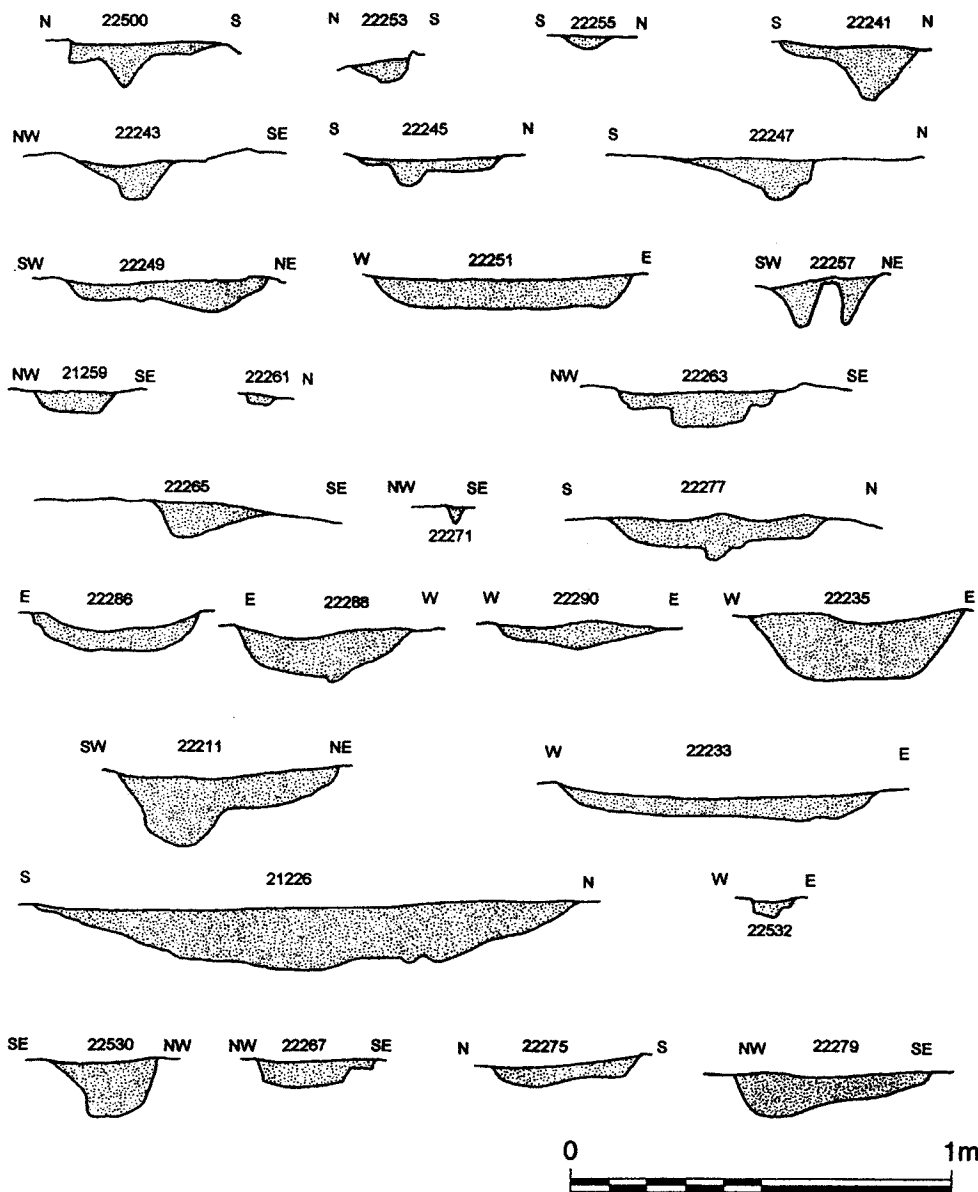


Illus. 7 Emptied feature 22552 (foreground) and emptied feature 22541 (in distance), viewed from south-west. 2 m scales visible

These successive features 22280 and 22238 formed the north-western boundary of an area of grey discolouration, itself containing a concentration of pits or possible post-settings (Illus. 11 and Table 1). There can be little doubt that the concentration of pits was associated with the curvilinear boundary. The latter, most noticeably in its second phase, embraced the pits within its crescentic shape. A drainage gully does not seem to be a likely interpretation, as the curvilinear feature had distinct terminals; more probably it accommodated the uprights of a timber wall or windbreak, forming a shelter in the lee of which activities represented by the concentration of pits could be carried out. Five of the pits (22257, 22253, 22241, 22245, 22247) yielded evidence for upright posts, possibly associated with a cover attached to this shelter. The putative structure was apparently always open towards the south-east. A careful search was made at the time of excavation to see whether the curvilinear perimeter extended to enclose the area of activity, but this was not the case; there is no question of the recorded feature forming one segment of the enclosure of a roundhouse or other enclosed structure.

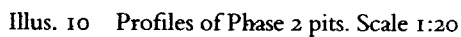
Most of the pits associated with feature 22280/22238 were irregularly shaped and on average 0.50 m in diameter or less. Most were shallow, the greatest depth being 0.22 m, and several were no more than scoops. The only sequence that could be established was that features 22253 and 22255 were cut by pit 22241. A cluster of four





Illus. 9 Profiles of Phase 2 pits. Scale 1:20

possible post-settings lay within one feature (22257). All fills were either of featureless sand and clay with inclusions of sandstone and charcoal or, in over half of the cases, sand and clay containing notable amounts of burnt clay or daub and numerous small fragments of charcoal which were recovered in wet-sieving for plant remains. Charcoal from pit 22243 has been radiocarbon dated (see below).



Two outlying pits existed to the south-west of this main group and another concentration lay to the north-east, amongst which a pit (22208) produced 19 flakes of flint from the same nodule/core, some of which refit, again indicating the deposition of waste material from a discrete knapping event. In this group, pit 22208

was cut by a further pit (22235) whose fill (the distinctive burnt daub and charcoal mixture so common in the shelter area to the south-west) has also been radiocarbon dated (see below).

The scatter of features running away to the south-east showed no clear patterns, though a concentration of stake-holes was apparent. Two pits (22275 and 22504) possessed fills of burnt daub and charcoal similar to those associated with the possible shelter.

TABLE I Features of Structural Phase 2

Cut	Fill	Dimensions	Depth	Comments
<i>Pre-dating structure 22280</i>				
22500	22299	0.47 x 0.30 m	0.19 m	
<i>Associated with structure 22238/22280:</i>				
22253	22252	0.15 x 0.14 m	0.11 m	Post-hole, burnt daub, charcoal
22255	22254	0.26 x 0.06 m	0.03 m	Slot? Burnt daub
<i>Both cut by:</i>				
22241	22240	0.43 x 0.34 m	0.22 m	Post-hole, burnt daub, charcoal
22243	22242*	0.79 x 0.29 m	0.15 m	Charcoal, burnt daub: GU-9174
22245	22244	0.50 x 0.34 m	0.10 m	Post-hole, burnt daub, charcoal
22247	22246	0.37 x 0.24 m	0.13 m	Post-hole
22249	22248	0.52 x 0.21 m	0.09 m	Slot?
22251	22250	0.70 x 0.33 m	0.09 m	Charcoal, burnt daub
22257	22256	0.31 x 0.24 m	0.15 m	Post-holes, burnt daub, charcoal
22259	22258	0.21 x 0.10 m	0.09 m	Burnt daub, charcoal
22261	22260	0.38 x 0.10 m	0.04 m	Burnt daub, charcoal
22263	22262	0.51 x 0.38 m	0.12 m	Burnt daub, charcoal
22265	22264	0.32 x 0.26 m	0.12 m	Circular, burnt daub, charcoal
22271	22270	0.06 x 0.06 m	0.06 m	Stake-hole; charcoal
22277	22276	0.53 x 0.31 m	0.12 m	
22286	22285	0.40 x 0.40 m	0.12 m	Square shape; cuts fill of 22280
22288	22287	0.44 x 0.38 m	0.13 m	Cuts fill of 22280
22290	22289	0.50 x 0.30 m	0.07 m	
<i>North-east of structure 22238/22280:</i>				
22209	22208	0.50 x 0.25 m	0.18 m	Disturbed by ancient roots
<i>Cut by:</i>				
22235	22234*	0.60 x 0.24 m	0.18 m	Burnt daub, charcoal: GU-9173
22211	22210	0.56 x 0.46 m	0.20 m	
<i>Cut by:</i>				
22233	22232	0.86 x 0.68 m	0.06 m	
21226	21227	1.40 x 0.45 m	0.20 m	Elongated scoop
<i>South-west of structure 22238/22280:</i>				
22532	22530	0.22 x 0.14 m	0.02 m	
22530	22529	0.28 x 0.28 m	0.17 m	
<i>Area to south-east:</i>				
22267	22266	0.40 x 0.36 m	0.11 m	Charcoal
22275	22274	0.32 x 0.24 m	0.06 m	Burnt daub, charcoal

22279	22278	0.57 x 0.28 m	0.12 m	Charcoal
22525	21270	0.60 x 0.25 m	0.24 m	Filled by Phase 3 soil
22526	21270	0.50 x 0.24 m	0.10 m	Filled by Phase 3 soil
22284	22283	0.30 x 0.30 m	0.04 m	
22282	22281	0.26 x 0.21 m	0.07 m	
22206	22205	0.55 x 0.43 m	0.07 m	Charcoal
22515				Stake-hole
22517	22518	0.28 x 0.07 m	0.07 m	Charcoal
22519				Stake-hole
22521				Stake-hole
22523				Stake-hole
22504	22503	1.90 x 0.70 m	0.32 m	Burnt daub, charcoal, stones
22514	22513	0.70 x 0.70 m	0.08 m	
22512	22511	2m x 0.09 m	0.38 m	Rectangular
21299	21298	0.35 x 0.20 m	0.04 m	
22506	22505	0.10 x 0.14 m	0.04 m	
22508	22507	0.12 x 0.15 m	0.04 m	
22510	22509	0.08 x 0.10 m	0.04 m	
22203	22202	0.48 x 0.27 m	0.04 m	
22201	22200	0.64 x 0.38 m	0.12 m	
22295	22294	0.80 x 0.67 m	0.45 m	Post-hole
22297	22293	0.28 x 0.10 m	0.04 m	
22298	22296	0.80 x 0.70 m	0.08 m	Burnt clay
22534	22533	0.59 x 0.35 m	0.18 m	
21246	21245	0.75 x 0.50 m	0.13 m	Grey silt and charcoal

In the east corner of the excavation area, underlying a roundhouse of iron-age date, the mottled soil horizon 21225B was overlain by a 0.10 m deep spread of light grey silty clay with lenses of a darker blue-black clay (21285) affected by burning. Rich in flints, this material must represent a soil horizon or occupation deposit: one perhaps seeing repeated disturbance, arguably at the same time as the features of Structural Phase 2. Disturbance of earlier soil horizons was suggested by the presence of mesolithic flint tools. See below for indications of flint-knapping and a high concentration of recovered flints in this area.

#### ABSOLUTE DATING

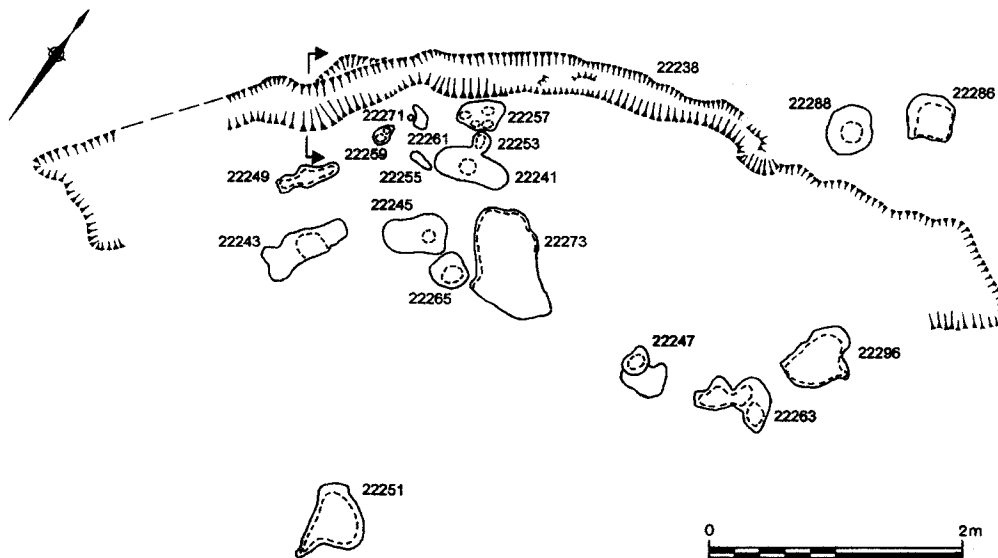
Samples from two of the pit fills near the possible shelter were submitted for radiocarbon dating with the following results. The uncalibrated dates are:

Context 22234 (charcoal)  $4560 \pm 60$  B.P. (GU-9173)

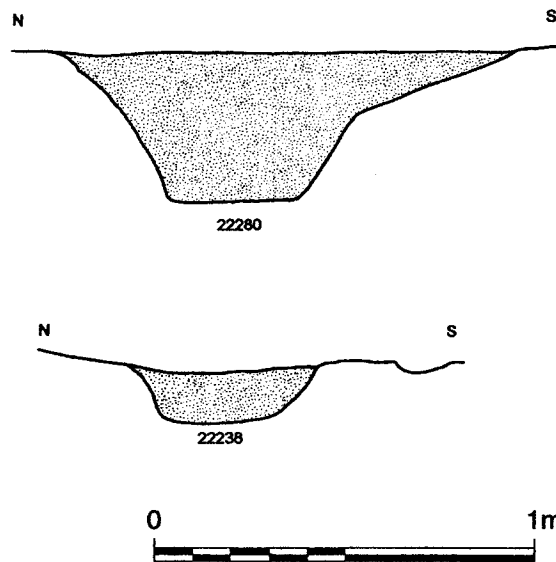
Context 22242 (charcoal)  $4400 \pm 80$  B.P. (GU-9174)

The calibrated dates are 3368–3104 cal. B.C. (GU-9173) and 3263–2911 cal. B.C. (GU-9174) at the 1 sigma probability level, or 3502–3040 cal. B.C. (GU-9173) and 3352–2881 cal. B.C. (GU-9174) at the 2 sigma probability level.

The dates derive from pits in different groupings. This fact, combined with the similarity of many of the pit fills and the relationship of the pits to the successive curvilinear features, shows that it is reasonable to group most of the features of this phase together, thus representing an episode which occurred in a definable time period. A later fourth millennium cal. B.C. date is thus indicated for the activities represented by the features cut into horizon 21225B.



Illus. 11 Phase 2 curvilinear feature 22238 and associated pits. Scale 1:60



Illus. 12 Profiles of Phase 2 curvilinear features 22280 and 22238. Scale 1:20

### SOIL HORIZON C — NEOLITHIC TO IRON AGE

A gradual soil accumulation had formed over soil horizon 21225B, the Phase 2 features and the flint-rich dark silt in the east corner of the area. This took the form of a layer (average 0.20 m thick) of mid grey sandy-clay which extended across the whole area



(9746, 9748). This layer contained lenses of orange sand and numerous charcoal flecks. The features of Structural Phase 3, that is of the middle Iron Age, were cut from the top of this horizon. Indications, though, exist to argue that it had accumulated over a long period of time: for example, an assemblage of flints from the same core, which could be refitted (70a, 70b and 70f, context 9746), suggested a discrete knapping incident, and yet this event had occurred at an intermediate level within the soil horizon.

#### EARLIER PREHISTORIC SMALL FINDS *by* A. T. Croom

No artefacts other than lithics were found stratified in the earlier prehistoric levels in 1992–94. However, a small number of prehistoric finds had been recovered from the site during the Victorian and later excavations of the Roman fort and its surroundings, most of which have been published already. The exact find-spots of most of these objects are unknown. The items earliest in date are mesolithic and neolithic flints and a polished stone-axe dated to the third millennium B.C. (Allason-Jones and Weyman 1983, fig. 83; Allason-Jones and Miket 1984, 12.70, 12.69) as well as a piece of rock art with cups dating to Neolithic/Bronze Age (unpublished, SF no. S215). A bronze-age V-perforated shale button has been re-used as a spindlewhorl, presumably during the Roman period when such jet spindlewhorls were popular (Allason-Jones and Miket 1984, 7.140), and there is a possible bronze-age jet bead (*ibid.*, 7.52).

#### THE LITHIC ASSEMBLAGE *by* Clive Waddington

##### INTRODUCTION

A total of 327 pieces of struck stone were recovered from the excavation of the prehistoric horizons in the east quadrant of the fort. This material is discussed here along with brief reference to other redeposited lithic material that has been retrieved from the Roman and modern layers above (69) together with those from more recent excavations in an area to the north and west of the east quadrant (106). Every flint was examined and catalogued and this information was recorded in the excavation archive. The following report provides an account of the raw material, artefact types and discussion of the assemblage with reference to stratigraphy, distribution and chronological associations.

The collection had an even vertical distribution through the three principal prehistoric soil horizons described above (21225A, 21225B, and 9746). There was no recognisable difference between the type of flint, flaking techniques or artefact types of the assemblages from the three horizons which could indicate a chronological progression. It was therefore thought most appropriate to treat the stratified lithics as a single artefact assemblage. It should be noted that the lithic assemblage appears to be exclusively associated with pre-iron-age activity. Those artefacts which occurred in Iron-Age contexts displayed none of the criteria defined by Young and Humphrey (1999) in their recent study of iron-age flint use.

The proportion of tools is small (8%) and together with the high proportion of primary and secondary flakes suggests that the area in the east quadrant was utilised

mostly for roughing out nodules and the production of blanks, although some artefact production appears to have taken place. A number of nodules can be refitted from flakes found in concentrations around the site. This provides clear evidence for the primary working of material and suggests that some raw material was probably collected from nearby sources.

TABLE 2 The total stratified east quadrant flint assemblage: typology

Type	Total no.	% of assemblage
Bashed Lumps	15	5%
Cores	33	10%
Flakes	219	67%
Blades	34	10%
Retouched/utilised flakes	12	4%
Retouched/utilised blades	7	2%
Scrapers	3	1%
Microliths	2	—
Burin	1	—
Leaf-shaped arrowhead	1	—
Total	327	

Most of the diagnostic finds are mesolithic types although some of the blade forms could be of either later mesolithic or early neolithic date. The leaf-shaped arrowhead demonstrates early-Neolithic activity on the site and this finds further support with the recovery of another leaf-shaped arrowhead and a polished stone-axe from the more recently excavated area to the north-west.

### THE RAW MATERIAL

The lithic assemblage is composed mostly of flint (91%) with a few pieces of chipped chert (7%) and quartz (2%). A wide variety of flint types is evident (over 30 different colours and shades). When grouped by dominant colour the following breakdown was noted: grey 54%, red 14%, brown 10%, orange 7%, fawn 7% and others 8%. There are also wide variations in the quality of flint with some pieces extremely fine-grained and translucent while others contain many impurities and fracture poorly. This exploitation of a wide variety of flint types implies that the material worked on site came from a range of different sources, both local and imported. This variation in flint types may be accounted for by changing preference patterns through time (see below).

The presence of cortex on many of the pieces allows the type and likely origin of much of the assemblage to be assessed. Glacially-derived flint accounted for 39%, nodular flint for 19%, beach flint for 2% and the remaining 40% of the assemblage was from unidentified sources. This breakdown indicates that, of the material that could be sourced, twice as much flint was from glacial sources than nodular flint with only very occasional beach-pebble flint being brought to the site. Considering the position of this site on high ground on the south side of the Tyne estuary, it has easy access from the shore below to beach-pebble flint (small pebbles of grey-brown flint, frequently stained orange with a water worn thick cortex: but see discussion below on the Earlier Prehistory which suggests that the site may not have been coastal then);

however access is also possible to the boulder clays which mantle the coastal strip. It is likely that much of the glacially-derived flint comes from these north-east boulder-clay deposits. Typical of Durham-coast assemblages is the orange-grey glacial flint (Haselgrove and Healy 1992) also found here. Another glacially-derived flint common on coastal flint-scatter sites in the north-east is the red lightly-speckled variety, often of good quality. This too was found in the east quadrant and accounted for 14% of the assemblage. The acquisition of the glacial flint probably took place where flint nodules eroded from natural scars in the boulder clay, such as those found along the sides of streams and in cliff sections. Beachcombing for flint freshly eroded from the boulder clays of the cliffs after high tides and storm events no doubt formed an important strategy. The occurrence of so many cores and flakes with large areas of cortex, together with refitting flakes that can form whole nodules, all indicates the direct import of nodules to the site rather than nodules that had already been part-processed. This observation adds further to the view that the source/extraction sites were not very distant from the site.

The nodular flint from chalk locations evidently came from further afield as no chalks exist in the north-east. The position of the site at the mouth of an estuary and close to beaching areas suggests that transportation of heavy and bulky materials such as nodular flint may have arrived through a process of coastal exchange which linked this part of the north-east into networks involving groups further to the south. The most likely contacts would include communities along the east coast of Yorkshire and Lincolnshire where good quality nodular flint from the Wolds was exploited.

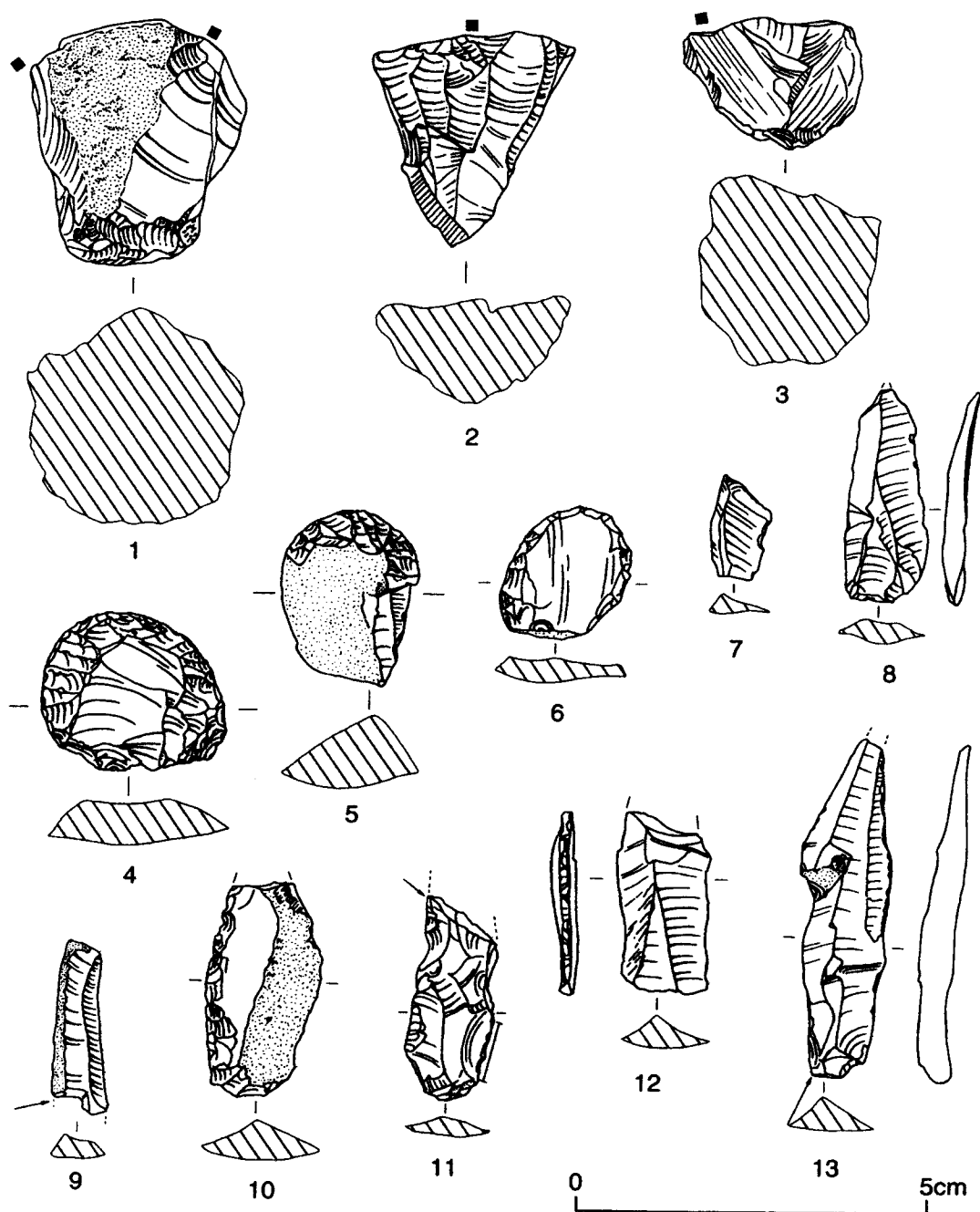
## TECHNOLOGY

No hammerstones were recovered with the assemblage, although many of the primary flakes have abraded surfaces and crushed striking platforms indicating that the initial flaking of many nodules took place using these tools. Visual inspection suggested the use of hard and soft hammers on the flakes and blades, with some particularly fine pressure flaking, presumably using a soft hammer, evident on various tools.

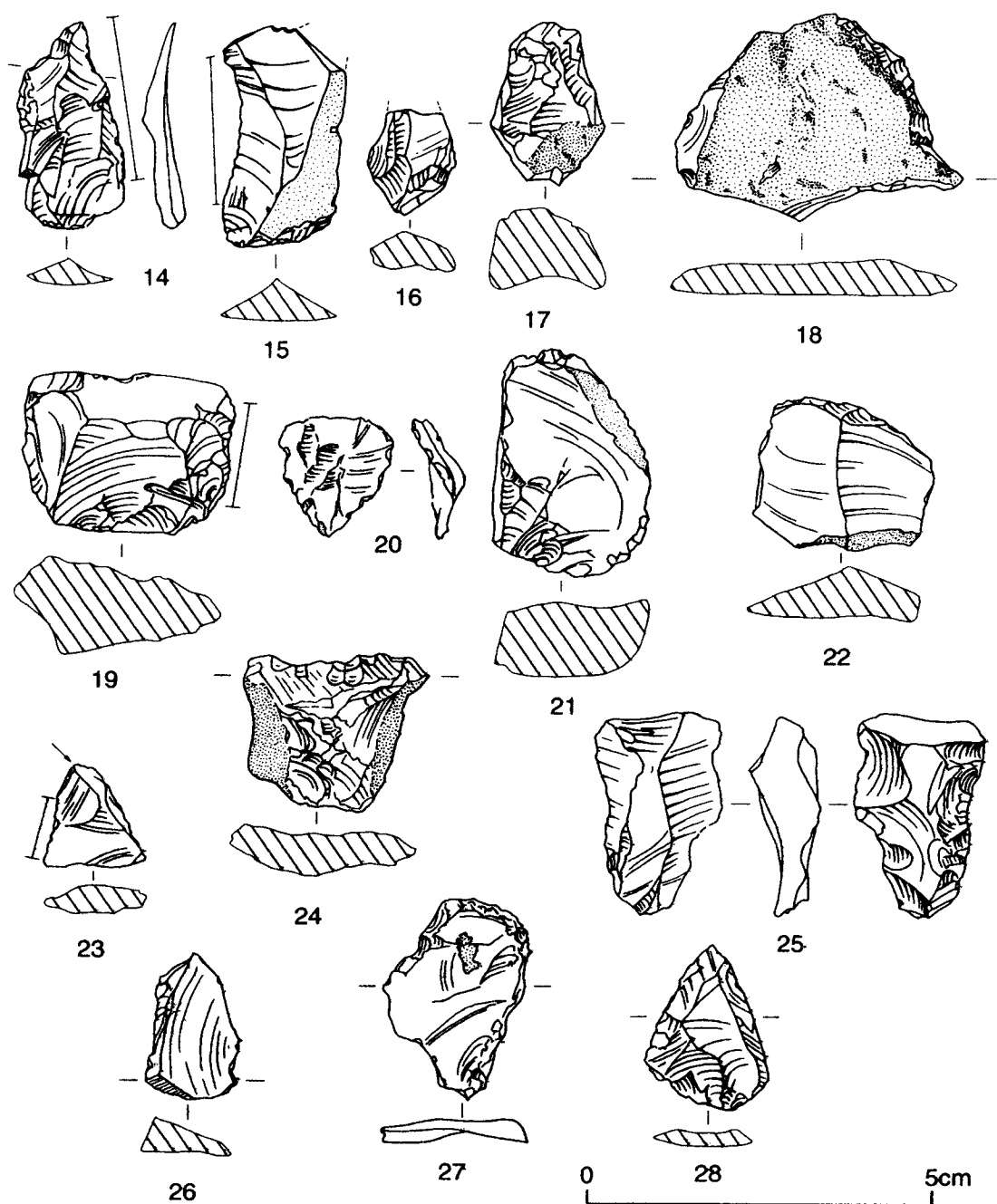
## THE ASSEMBLAGE

### BASHED LUMPS

Bashed lumps comprise 5% of the assemblage and their presence indicates the working of unprepared nodules of flint on the site. Together with the predominance of flakes and blades from the secondary and primary stages in the core reduction sequence it is evident that nodules of flint were being brought to the site where they underwent preliminary flaking for the production of blanks. The mean maximum dimensions of the bashed lumps is 50.5 mm which demonstrates that on average the flint nodules being brought to, and worked at, the site were generally of small size. Taking into consideration that, of the provenanced material, twice as much glacially-derived flint was being worked at the site as nodular, it is evident that small glacially-derived nodules (from local sources) comprised the main type of flint worked.



Illus. 13 Flints stratified in the eastern quadrant, nos 1-13. Filled square — striking platform; line — utilised edge; arrow — possible burin removal. Scale 1:1



Illus. 14 Flints stratified in the eastern quadrant, nos 14-28. Filled square — striking platform;  
 line — utilised edge; arrow — possible burin removal. Scale 1:1

## CORES

A total of 33 cores were retrieved which represents 10% of the total lithic assemblage. Multi-platform cores predominate, but there are occasional pyramidal and bi-polar cores. The mean maximum dimension of the cores is 32.5 mm and the maximum length of flaking scars is less than 20 mm in more than half the cases. Most of the flaking scars are for the production of narrow parallel-sided blades or bladelets. This demonstrates the production of microlith-sized blade forms on the site, consistent with the flaking techniques associated with northern mesolithic industries. The presence of diagnostic typological forms such as the pyramidal cores also indicates a mesolithic context of production for most of the core material. No diagnostic cores of other periods were identified.

Although many of the cores are very small in size, there are a number of much larger pieces which could easily have produced further flakes and blades but were instead discarded. The small size of the mesolithic cores, and mesolithic material in general from the site, suggests a frugal strategy of flint production and the extraction of blade forms down to the smallest useful size before cores were finally considered exhausted. The diversity in core sizes may be explained by chronological reasons with the mesolithic presence on the site accounting for the small cores and the neolithic for the larger core and flake material. The notion of a shift in the north-east from a parsimonious attitude towards lithic discard during the Mesolithic towards a more prodigal attitude in the Neolithic and later periods has been raised elsewhere (Waddington 1999, 103,120). The change in the strategies between the two periods may be explained by alteration in attitudes towards the scarcity of flint. The implication of such an increase in the availability of flint in the Neolithic is that networks for the exchange of more and higher-quality flint were established with flint-rich areas outside the region during this later period.

## UNRETOUCHED FLAKES

The unretouched flakes which account for 67% of the assemblage are dominated by small pieces with the mean average length and breadth measurements of 9.8 mm and 7 mm respectively. Considering that the majority of material is derived from glacially-derived flint of small dimensions, this diminutive average size does not mean that there is a high quantity of debitage but rather that it is the nature of the raw material itself that determines the outcome. Many pieces still retain areas of cortex on one or more faces which further suggests that the parent nodules from which they derived were of no great size. It also means that the provenance of a high proportion of the assemblage could be identified as either glacially-derived or nodular flint.

The small unretouched flakes are a concomitant of flint-knapping activity which took place on the site. With 25% of pieces belonging to the primary stage in the core-reduction sequence, 67% belonging to the secondary stage and only 8% to the tertiary stage, it is demonstrated that most of the knapping was associated with the early stages in the core-reduction sequence although the production of finished tools was probably also important. The stone-free sandy nature of the sub-soils was conducive to the recovery of tiny flakes by hand excavation. Thus the lack of small chips and debitage

usually associated with the tertiary stage in the core-reduction sequence probably reflects reality and is not a result of biases caused by the finds-retrieval strategy.

Evidence for individual knapping events on the site can be detected where groups of flakes from the same nodule or core, which can be refitted, were found either in the fills of discrete archaeological features or as tightly-defined spreads of material in the soil horizons. A number of the primary flakes refit to form nodules (such as 68a, 68b, 68c, 68e, 68f, and 68l) of red-brown nodular flint; further the flakes comprising small find 70 refit to form part of a nodule of grey-brown glacial flint: both sets come from context 9746/Soil Horizon C and therefore represent a knapping event later than the late fourth millennium cal. B.C.

Of particular interest, however, are the flints 294 and 308. Find 294 consisted of 19 flakes of brown-grey flint of the good-quality nodular sort: all are from the same parent nodule/core, and some refit. This cache of flints was recovered from the fill of a pit (22208), from the radiocarbon-dated neolithic Structural Phase 2. Similarly, find 308 consisted of 13 flints of a fawn-coloured nodular flint, again all from the same nodule, some of which refit. These were retrieved from the fill of a curvilinear feature (22236) of the same date. Therefore, it appears that two separate knapping events dating to the later fourth millennium cal. B.C. resulted in the production of waste material which was then deliberately deposited in discrete features. Although no bone, pottery or organic residues were recovered from these contexts, it is possible that the deposition of flint waste from a discrete knapping event in each case represents an act of structured deposition. In the case of the curvilinear feature, which was probably filled in preparation for the construction of a shelter, the possibility of a foundation deposit should not be discounted.

#### UNRETOUCHED BLADES

The small unretouched blades indicate the preparation of blanks on the site for an industry reliant on a narrow parallel-sided blade technology for the production of tools. The use of a blade-based technology indicates the existence of an economic production strategy as well as a preference for a light-weight tool kit (Bradley 1987, 183). This type of industry is typologically associated with late mesolithic and early neolithic flint-knapping traditions (Pitts and Jacobi 1979) and as such fits well with the mesolithic and early-Neolithic tools identified in the assemblage, as well as with the earlier neolithic radiocarbon date assigned to the features cutting soil horizon B.

The unretouched blades, accounting for 10% of the assemblage, are dominated by medium-sized pieces as reflected by the mean average length and breadth measurements of 36.9 mm and 15.2 mm respectively. Broken pieces, where the original length or breadth was not known, were not included in the calculation. All 27 of the unretouched blades belong to the secondary stage of the core-reduction sequence, indicating their preparation as blanks prior to further working into implements proper.

#### RETOUCHED FLAKES

A total of seven retouched flakes were identified, together with five flakes that had been edge-trimmed. Their mean average length and breadth measurements are 22.7 mm and 19.2 mm respectively, indicating that most of these retouched or utilised

pieces are small. The functions for most of these pieces can only be guessed at, but for some it can be suggested that they belong to the following tool categories: five edge-trimmed flakes; four scrapers and a single microlith. The retouching of these mostly irregular flakes appears opportunistic — to create implements that may simply have had an immediate use before being discarded. None of the pieces shows signs of extended wear or utilisation.

#### RETOUCHED BLADES

Some two retouched, two edge-trimmed and three utilised blades were identified in the assemblage. Their mean average length and breadth measurements were 33.4 mm and 13.8 mm respectively, indicating that they are of the classic narrow-blade form although all are quite short. The small size of the retouched blade forms, very similar to that of the unretouched ones, may reflect the concern for maximising the strategy of production whereby as many blades as possible were produced from any given core. The functions of these pieces can only be guessed at, but it can be suggested that they relate to tool categories in the following numbers: two microliths; one piercer; two edge-trimmed blades and two knives. One of the possible knife blades was made on glacially-derived flint, whereas the possible piercer and the pair of microliths were made on good-quality light grey, speckled flint which probably comes from the boulder-clay sources of north-east Yorkshire. The blades are all of regular parallel-sided form and would be typical of a late mesolithic context.

#### SCRAPERS

The three scrapers are fine specimens: tiny scrapers typical of the mesolithic assemblages in northern England. The scrapers have been made on flakes and have steep retouch. The largest of the scrapers (Illus. 13.4) is made from the orange-grey glacial flint local to the Durham coast and has maximum dimensions of 19 mm length, 26 mm width and 7 mm thickness. The slightly smaller scraper (Illus. 13.5) is also made from an orange glacially-derived flint, with maximum dimensions of 24 mm length, 21 mm width and 7 mm thickness. The smallest scraper (Illus. 13.6) is made of grey glacial flint and has maximum dimensions of 21 mm length, 16 mm width and 3 mm thickness. The scrapers have evidence of utilisation along their working edges, suggesting they served a functional purpose before they were discarded. This is significant as it suggests that the mesolithic activity on the site was not confined solely to the processing of nodules near to an extraction site, but included activities more often associated with domestic settings such as the working of skins, wood or plant materials.

A further two scrapers of possible mesolithic type were recovered from the recent excavations to the north and west of the east quadrant (Illus. 15.40–41). One is a broken core fragment with a steeply-retouched working edge and is heavily recorticated, while the other appears to be an exhausted core that has been steeply retouched to turn it into a scraper and has signs of use along its edge. The style of retouch and the remaining blade scars on the surfaces of the core-scraper are indicative of a mesolithic typology and as such suggest that the type of activity associated with scrapers extends beyond the east quadrant to the north.



### MICROLITHS

Two microliths were recovered from the east quadrant excavations. The first (Illus. 13.7) is made from an orange flint that probably comes from a local glacially-derived source. The piece has maximum dimensions of 15 mm length, 9 mm width and 2 mm thickness. It is a typical geometric form made on a bladelet and manufactured by the microburin technique. The typology of the microlith sets it within the narrow-blade, geometric industries of the later Mesolithic in northern England. The other microlith (Illus. 13.8) is made from a light grey flint and has maximum dimensions of 31 mm length, 12 mm width and 3 mm thickness. It is made from an ovate-form bladelet, little modified except for the subsequent thinning of the butt end where it was presumably intended for hafting. It does not fit exactly any standard typology, although its overall shape recalls those of obliquely-blunted forms.

A further four microliths have been recovered from the recently excavated area to the north and west of the east quadrant: they comprise a needle-point microlith, two obliquely-blunted microliths (one of which has started to recorticate and is abraded, suggesting it is considerably older than the other later-mesolithic material), and a crescentic-type microlith made on a piece of chert. These finds, together with a broken tranche-blade artefact (possibly a piece from a tranche axe), indicate that mesolithic activity on the site extended beyond the east quadrant (Illus. 15, 16).

### BURIN

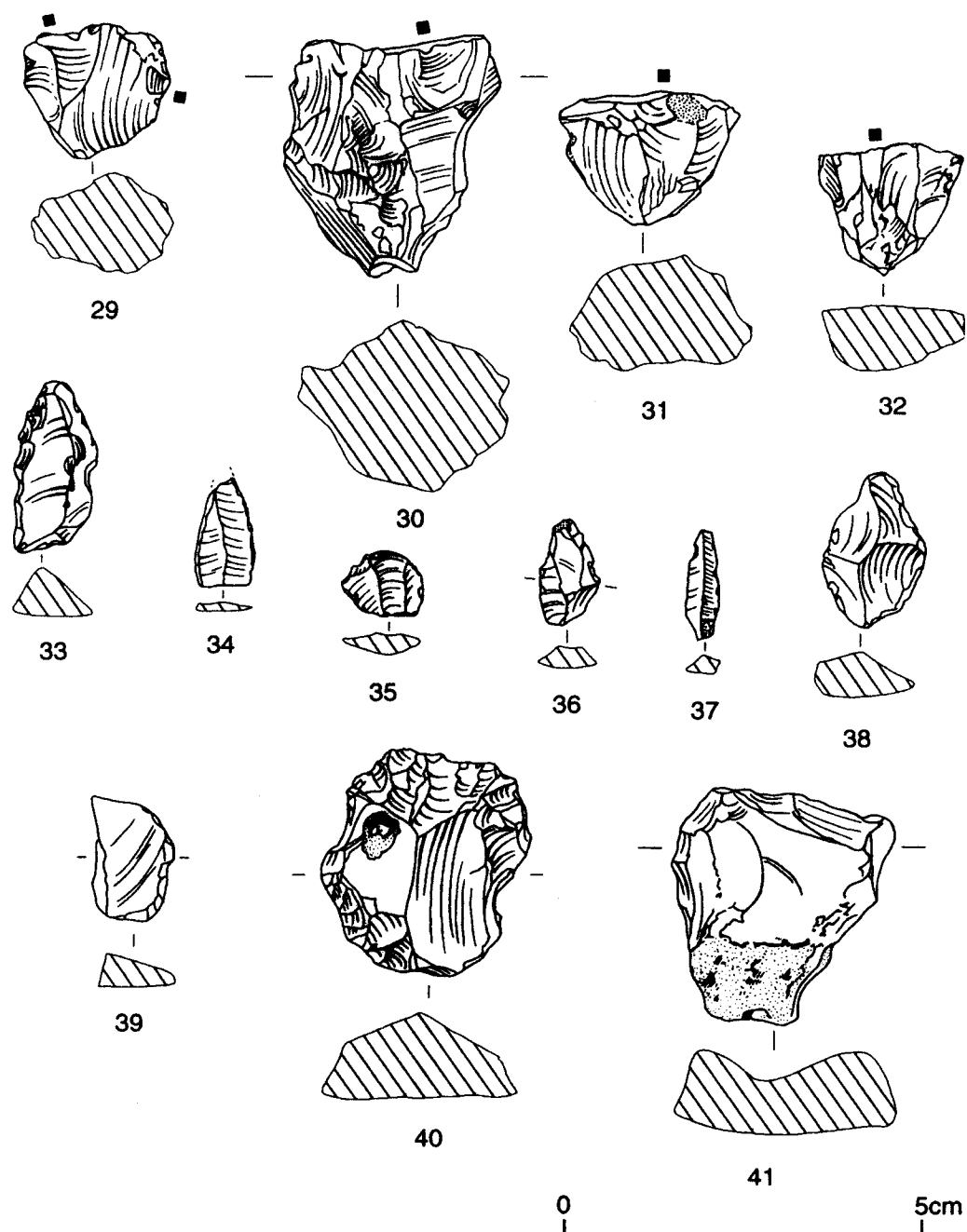
A possible burin was recovered from the excavations, made from a piece of orange glacially-derived flint (Illus. 13.9). The piece consists of a narrow parallel-sided blade with triangular section and one sharp long side. The bulb has been removed either by snapping or through use, while the distal end has a small splinter (burin removal?) missing — perhaps chipped out, as a very slight negative bulb can be observed at the edge of the removal. The typology of the piece aligns it with the tradition of narrow-blade industries of the later mesolithic.

### LEAF-SHAPED ARROWHEAD

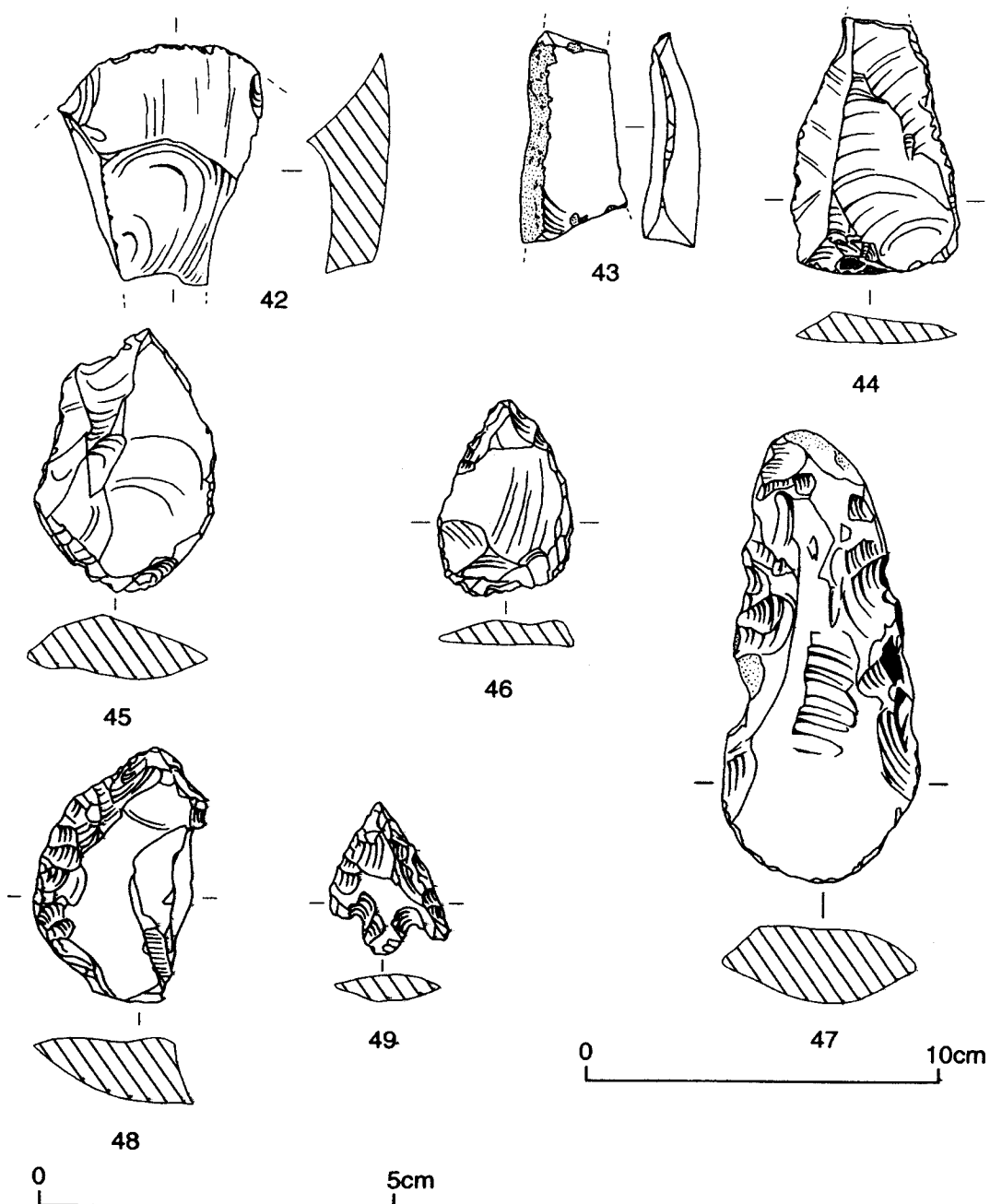
The leaf-shaped arrowhead (Illus. 14.28) is made from a medium grey, glacially-derived flint and is in pristine condition with its tip intact. The arrowhead has maximum dimensions of 24 mm in length by 18 mm width and 2 mm thickness. The point was made on a blade blank, that had itself been obliquely snapped across so as to create the triangular shape. The snapped edge has been retouched both to sharpen the side and to create a more symmetrical form. The narrow blade scar on the dorsal surface provides further indication that the piece was produced using a blade-based manufacturing tradition. This arrowhead is chronologically diagnostic of the early-neolithic period.

### LITHICS FROM AREA TO NORTH-WEST AND FROM ROMAN LEVELS (Illus. 15, 16)

In addition to the flints recovered from below the east quadrant of the fort a further assemblage of flints was recovered from the Roman layers above the prehistoric horizons together with other material from a recently-excavated area to the north and



Illus. 15 Flints from Roman levels or area to the north-west, nos 29-41. Filled square — striking platform; line — utilised edge; arrow — possible burin removal. Scale 1:1



Illus. 16 Flints from Roman levels or area to the north-west, nos 42-47. Filled square — striking platform; line — utilised edge; arrow — possible burin removal. Scale 1:1, except no. 47 at 1:2

west. These included a number of diagnostic pieces, some of which have already been referred to. Although not fully described in this report, the following tables and brief description summarise these assemblages.

TABLE 3 Diagnostic finds from the Roman and later layers of the east quadrant

Type	Total No.	Period
Microliths	3	All Mesolithic
Cores	5	All Mesolithic
Ground and polished flint axe	1	Early Neolithic

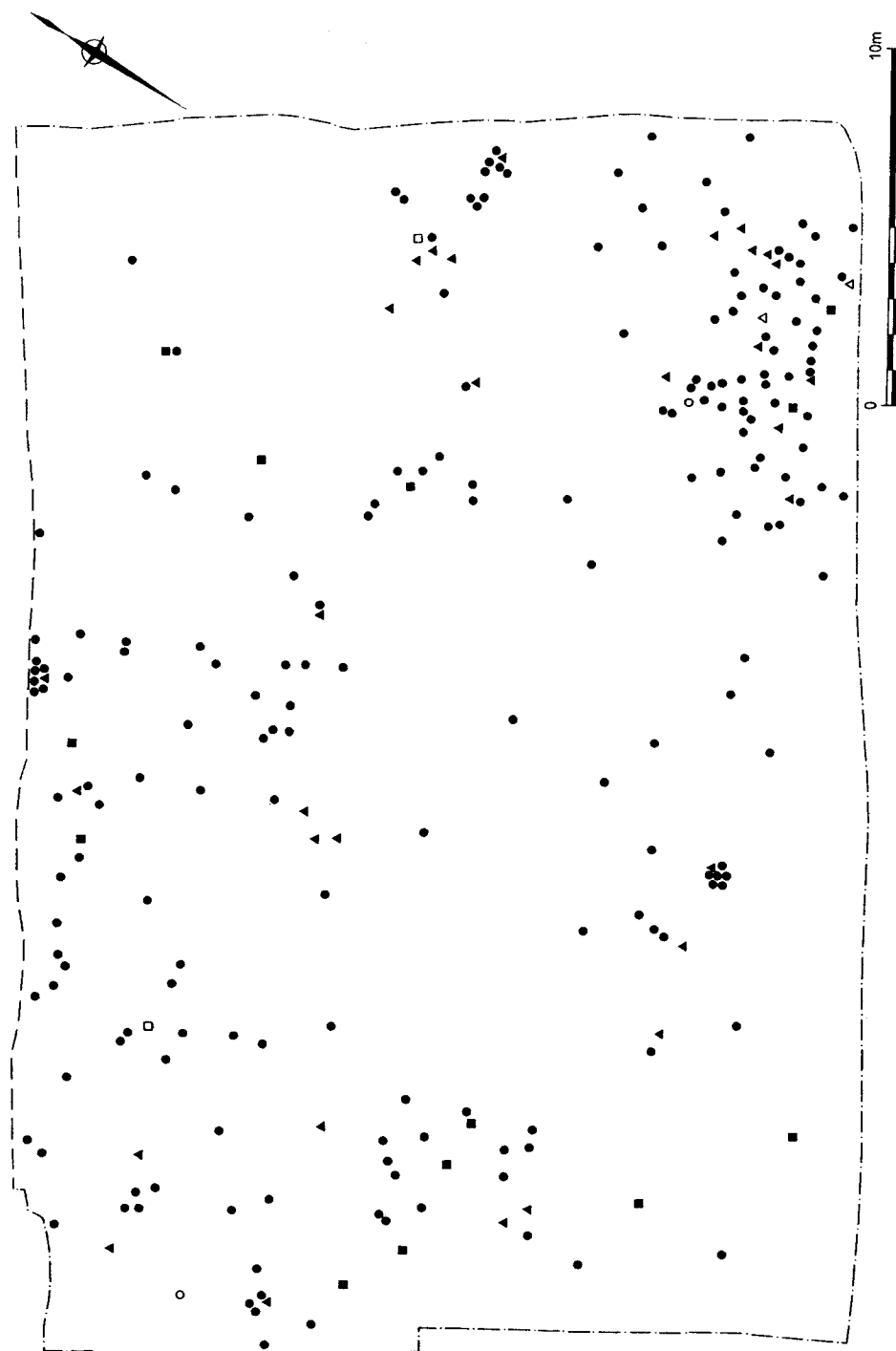
TABLE 4 Diagnostic finds from an area to the north of the east quadrant

Type	Total No.	Period
Pyramidal cores	2	Mesolithic
Microliths	4	Mesolithic
Scrapers	2	Mesolithic
Broken tranche blade implement	1	Mesolithic
Leaf-shaped arrowhead	1	Early Neolithic
Knife	1	Neolithic to early Bronze Age
Barbed-and-tanged arrowhead	1	Late Neolithic to early Bronze Age

These 21 finds together with the other 154 lithics indicate that the multi-period stone-age activity evidenced in the prehistoric layers of the east quadrant continued to the north and west but at a lesser level of intensity. Furthermore, there is clear evidence for both mesolithic and neolithic presence as well as a tantalising hint of late neolithic to early bronze-age activity as represented by the barbed-and-tanged arrowhead. The mesolithic pieces are of interest as two of the microliths (Illus. 15.33-38) are obliquely-blunted forms, one of which has started to recorticate, and another is a non-geometric form suggesting that earlier mesolithic activity at the site may have taken place. The leaf-shaped arrowhead (Illus. 16.46) has been made in exactly the same way as the one from the east quadrant and is the same shape. The ground and polished stone-axe (Illus. 16.47) is made from a grey flint and has been heavily used with the blade having been resharpened on at least one occasion. The barbed-and-tanged arrowhead (Illus. 16.49) is a fine example and is of a size and shape typical of these forms throughout Northumberland. A small knife (Illus. 16.48), made on a blade and sharpened with invasive retouch, is of probable neolithic or early bronze-age date. It is not a classic plano-convex knife but its form is yet suggestive.

## DISCUSSION

A distribution plot of the stratified lithics in the east quadrant revealed some patterning. Concentrations of cores, which account for half the find-spots of this class of object, occur in the middle of the north-east side of the area and in the east corner, suggesting that knapping was concentrated in these areas with a lower intensity of flintworking taking place elsewhere across the site. The microliths were also found in the area of



Illus. 17 East-quadrant stratified flint distribution plot. Filled squares--bashed lumps; filled triangles--cores; filled circles--flakes and blades. Open circles--scrapers; open triangles--microliths; open squares--other tools. Scale 1:200

concentrated knapping activity suggesting that some tool production may have taken place here as well as the preparation of blanks. The asterisks in Table 5 indicate the high number of implements occurring in the east corner. Besides this concentration, the highest densities of flints came from archaeological features of neolithic date on the north-west side. The lithics gathered up and deposited in these features are representative of the neolithic discard strategy, while most of the loose flints found within the soil horizons are thought to reflect one of mesolithic date. The apparent concentration towards the east corner contains both mesolithic and neolithic diagnostic types.

The predominant use of glacially-derived flint to make the mesolithic tools identified in the assemblage indicates that exploitation of locally-available flint resources was a characteristic of mesolithic stone-tool production. It can therefore be inferred that the economic organisation, of stone tool production at least, was based around a self-reliant strategy that did not necessitate inter-group contact for the acquisition of resources.

The types of activity which took place on the site during the mesolithic period included flint processing to produce blanks, as is evidenced by the quantity of material from the primary and secondary stages of the core-reduction sequence. The wide variety in glacial-flint types, as indicated by the vast range of colours and textures, suggests that the flint came from a variety of sources. This in turn suggests that the assemblage has probably accumulated over a long period rather than resulting from a single visit, or a few episodic ones. The occurrence of two obliquely-blunted microliths from the area to the north is indicative of earlier mesolithic activity, while the geometric and needle-point microliths represent later doings. Thus the mesolithic presence as represented by the material spans several thousands, rather than hundreds, of years. In short, the assemblage is probably the result of repeated visits over a long period.

The presence of scrapers, along with a probable burin and tranchet-axe segment, argue that other types of activity did occur from time to time during the mesolithic. These types of tools are frequently associated with domestic occupation (Schofield 1994) which implies that such may also have taken place on certain occasions. Indeed the range of mesolithic tools present in the assemblage conforms to the criteria recently set out by Young (2000, 187) as being representative of a base camp. However, such a deduction here would assume that a significant proportion of the mesolithic assemblage is contemporary and, although this is certainly possible, it cannot be proven. The presence of microliths and scrapers is suggestive of hunting activities and the processing of skins: potentially an important activity for some members of the group. Whether such settlement was ever associated with the flint-processing episodes cannot be ascertained at present but it remains an intriguing possibility. At the moment the full extent of the mesolithic site is not yet known. The whole site may spread over a much larger area, with different activities concentrated in different parts.

Neolithic activity on the site is indicated by the presence of diagnostic early neolithic tool types including leaf-shaped arrowheads and a ground and polished stone-axe. The leaf-shaped arrowheads are unused and are therefore unlikely to be stray finds resulting from hunting episodes. They are more likely to result from

ceremonial or tool-production activities, which could have been associated with the neolithic structures and possible enclosure. The used stone-axe, however, tells a different story: the heavy use of the blade indicates that this was a working tool, although this does not mean that it was necessarily discarded simply as rubbish with no formal consideration for its deposition. Despite the occurrence of diagnostic neolithic forms, the basic flaking tradition remains reliant on a blade-based technology.

The caches of nodular flints from within feature fills in the radiocarbon-dated neolithic horizon are of imported material: this fact has two important implications. Firstly, that the use of higher-quality nodular flint on the site may not have occurred until the Neolithic. This would correspond with the observation that of the pieces with diagnostic mesolithic affinities (37 pieces), 38% are made from local glacially-derived flint with 5% from imported nodular flint (the other 57% remains unprovenanced). Secondly, that exchange networks were in place during the earlier Neolithic that allowed for the distribution of high-quality nodular flint from the chalklands to distant regions such as north-east England. Sea transport in this respect was surely of importance in this regard, given the location of the site near the mouth of the Tyne estuary. Inter-group contact would appear, therefore, to be better established and more frequent during the Neolithic than in the preceding period.

TABLE 5 Illustrated flints

Flints stratified in east quadrant (1-28): the soil horizon (A, B or C) or phase (1, 2 or 3) in which each piece occurred is indicated in the final column. Asterisks denote flints from the concentration in the east corner of the excavation area. Thereafter (29-49), flints found in Roman levels above the east quadrant are indicated by R; whilst flints recovered from the pre-Roman soil horizon in the area to the north-west are indicated by Pre-R, or 'modern' if unstratified.

No.	Type	Find No.	Context	Horizons
<i>Stratified in east quadrant prehistoric levels</i>				
<i>Cores</i>				
1	Multi-platform core	F166	21285	B/2*
2	Pyramidal core	F185	21280	C*
3	Pyramidal core	F155	21272	3
<i>Scrapers</i>				
4	Tiny scraper	F206	21273	3
5	Tiny scraper	F360	21247	B/2*
6	Tiny scraper	F157	21284	B/2*
<i>Microliths</i>				
7	Geometric microlith	F53	9782	3*
8	Microlith made on unmodified blade	F156	21270	C*
<i>Burin</i>				
9	Probable burin with broken tip	F57	9782	3*
<i>Blades</i>				
10	Retouched blade with broken tip	F97	9748	C*
11	Edge-trimmed blade, possible burin removal	F98	21247*	B/2*
12	Trimmed blade	F248	21270	C*

<i>Piercer</i>				
13	Piercer with burin removal and broken tip	F249	21270	C*
<i>Utilised Blades</i>				
14	Utilised blade	F160	21260	3*
15	Utilised blade	F153	9746	C
<i>Retouched flakes</i>				
16	Retouched flake, possible microlith fragment	F322	21225	A/B
17	Retouched flake	F284	21225	A/B
18	Retouched flake	F277	21225	A/B
19	Retouched flake	F80	9748	C*
20	Retouched flake	F92	21247	B/2*
21	Retouched flake	F89	9746	C
22	Retouched flake	F86	21395	C
<i>Trimmed flakes</i>				
23	Trimmed flake, possible burin removal (trimmed edge indicated)	F257	21225	A/B
24	Edge-trimmed flake	F99	21225	A/B
25	Edge-trimmed flake	F173	21285	B/2*
26	Edge-trimmed flake	F220	21225	A/B
27	Edge-trimmed flake	F222	21273	3
<i>Arrowhead</i>				
28	Leaf-shaped arrowhead	F46	9743	C*
<i>From Roman levels and area to north-west</i>				
<i>Cores</i>				
29	Multi-platform core	F367		R
30	Bi-polar core	F355		R
31	Pyramidal core	F114		R
32	Pyramidal core	F454		R
<i>Microliths</i>				
33	Obliquely-blunted microlith	F370		R
34	Broken backed microlith	F126		R
35	Broken microlith	F134		R
36	Non-geometric microlith	F420		R
37	Blunted microlith	F474		Modern
38	Non-geometric microlith	F428		Modern
<i>Scrapers</i>				
39	Broken scraper fragment	F431		Pre-R
40	Scraper	F483		Pre-R
41	Scraper made on core tablet	F109		R
<i>Blades</i>				
42	Broken tranchet blade implement	F201		R
43	Retouched blade segment	F498		Pre-R
44	Edge-trimmed blade with broken tip	F132		R
<i>Retouched flake</i>				
45	Retouched flake	F494		Pre-R
<i>Arrowhead</i>				
46	Leaf-shaped arrowhead	F409		R



<i>Axe</i>			
47	Ground and polished flint axe	F389	R
<i>Knife</i>			
48	Knife	F445	R
<i>Arrowhead</i>			
49	Barbed-and-tanged arrowhead	F466	R

Find no. = Small Find Number in South Shields Roman Fort collection.

Later activity is also represented, albeit to a restricted extent, in the lithic record as the finds of a barbed-and-tanged arrowhead and a knife with plano-convex similarities: both imply late neolithic to early bronze-age activity on the site. As isolated finds, however, any inferences made from these pieces have to be limited. The presence of a fine piece such as the barbed-and-tanged arrowhead does, however, suggest that the Lawe Top remained a focus for activity in the Bronze Age.

#### EARLIER PREHISTORY: DISCUSSION *with* Clive Waddington

It is clear from the lithic assemblage that the excavated area (and that to the north and west) was frequented during the Mesolithic. Flint was being processed in these areas, but wear along the working edges of tools suggests that the mesolithic activity on the site extended to conduct more often associated with domestic settings. The wide variety in glacial flint types, including some possible early-mesolithic pieces, suggests a variety of sources. This and the range of implement types argues for repeated visits, perhaps over millennia, rather than an accumulation resulting from a single episode.

Early-neolithic activity is also represented in the lithic assemblage, both by occasional diagnostic forms and the occurrence of lithics in scientifically-dated features. The non-diagnostic flakes and blades that occurred in the second soil horizon (21225B) and later could date to the Mesolithic or early Neolithic. The early neolithic provides the best context for the apparent segmented-ditch feature running parallel to the south-eastern edge of the excavated area of the east quadrant: a date earlier than the Neolithic would find no parallel, while there is a firm late fourth millennium cal. B.C. *terminus ante quem*. It is possible that the ditch-like features define the north-western outer edge of an enclosure occupying the higher ground south-east of the excavation area. The interrupted ditch arrangement is reminiscent of the so-called 'causewayed enclosures' of the Neolithic.

The volume of lithic material retrieved from the area to the north and west of the east quadrant is approximately half that from the quadrant itself, showing that the flint density falls off towards in that direction, that is away from the highest part of the promontory to the south-east. Within the east quadrant excavation area itself, there was a growing concentration of flint towards the south-east (Illus. 17). This is significant as it implies that it was the top of the hill which formed the focus for the earlier prehistoric activity.

Such a location would be in keeping with the position of causewayed enclosures such as Hasting Hill (Newman 1976), situated 14 km to the south overlooking the

estuary of the river Wear, as well as the more famous southern sites. The evidence for earlier neolithic enclosures in northern Britain is increasing with sites such as Harehaugh (Waddington *et al.* 1998) in Northumberland, the Long Meg enclosure, Cumbria (Soffe and Clare 1988) and Green How, Cumbria (Horne *et al.* 2001) being recent discoveries. It is interesting to note that there may be an estuarine distribution for some of the north-eastern enclosures: Hasting Hill on the Wear, South Shields on the Tyne and the possible site at Lookout Farm near Seaton Burn in Northumberland (Newman 1976). Recent discussion of the phenomena of earlier neolithic enclosures in the north (Waddington, *in press*) has revealed that they form a more eclectic class of monuments than their more easily recognisable southern counterparts, which with the exception of the south-western sites, comprise the classic 'causewayed enclosure' form. Many of the northern examples in upland areas are now thought to have been made with stone banks, often of a single circuit, and to have integrated natural scarps as part of their perimeter. However, on the lower ground and softer sediments the more easily recognisable causewayed enclosure forms can also be found in the north, such as the sites recognised at Hasting Hill, Long Meg and perhaps Lookout Farm. It is with this last group of northern examples that an enclosure at South Shields would find its closest parallels.

If the ditch-like alignment does indeed represent part of an early-neolithic enclosure, it is notable that the features were filled by the end of the fourth millennium cal. B.C., by which time new activities were taking place on this part of the site. Of course the obliteration of the features within the excavation area does not necessarily reflect the history of the whole of whatever enclosure or monument occupied the higher ground; these could, for example, have been outer elements of a concentric system.

The activity occurring in the period just before 3000 cal. B.C. involved the knapping of flints and the construction of shelters of some kind. These doings were superseded by a gradual build-up of soil. Although no structural remains have been found, there is a tantalising hint of late neolithic to early bronze-age activity, represented by the barbed-and-tanged arrowhead and (in the Roman levels) a cup-marked stone which may have been removed from a funerary context.

In the account of the middle and late iron-age site that follows, the repeated deposition across the site of drifts of wind-blown sand is a striking feature. Not only was the burnt middle iron-age site buried in sand, but the succeeding agricultural regime also seems to have succumbed to the sand. This phenomenon continued in the Roman period: the 'parade-ground' occupying the east quadrant area was itself covered with some 150 mm of orange wind-blown sand before any succeeding structures were built. These sands are always clean, granular and laminated; they have the appearance of having been blown from a beach or from dunes of beach sand. Such depositions are conspicuously absent from the earlier part of the stratigraphic sequence as described above. Lenses of possible wind-blown sand begin to occur within the soil build-up characterised above as Soil Horizon C (Neolithic to Iron Age) which sealed features of neolithic date, but the first overall deposition attested was that which sealed the middle iron-age site. The soil horizon which accumulated before c. 3000 cal. B.C.

contained no wind-blown sand. If not a product of a local change of land use, the arrival of wind-blown sand in the stratigraphic sequence might possibly be associated with a rise in sea level. Such could have led to a change in the configuration of the coastline, bringing beaches or dunes closer to the site in the period 3000 cal. B.C.–1000 cal. B.C. South Shields lies in the transition between Holocene emergence and submergence (Shennan *et al.* 2000): it has been shown that south of the Tyne the sea level in this period was lower than at present. This observation serves as a reminder that during the mesolithic and neolithic periods South Shields may not have been a coastal site, as it later was.

### STRUCTURAL PHASE 3: MIDDLE IRON AGE (Illus. 18)

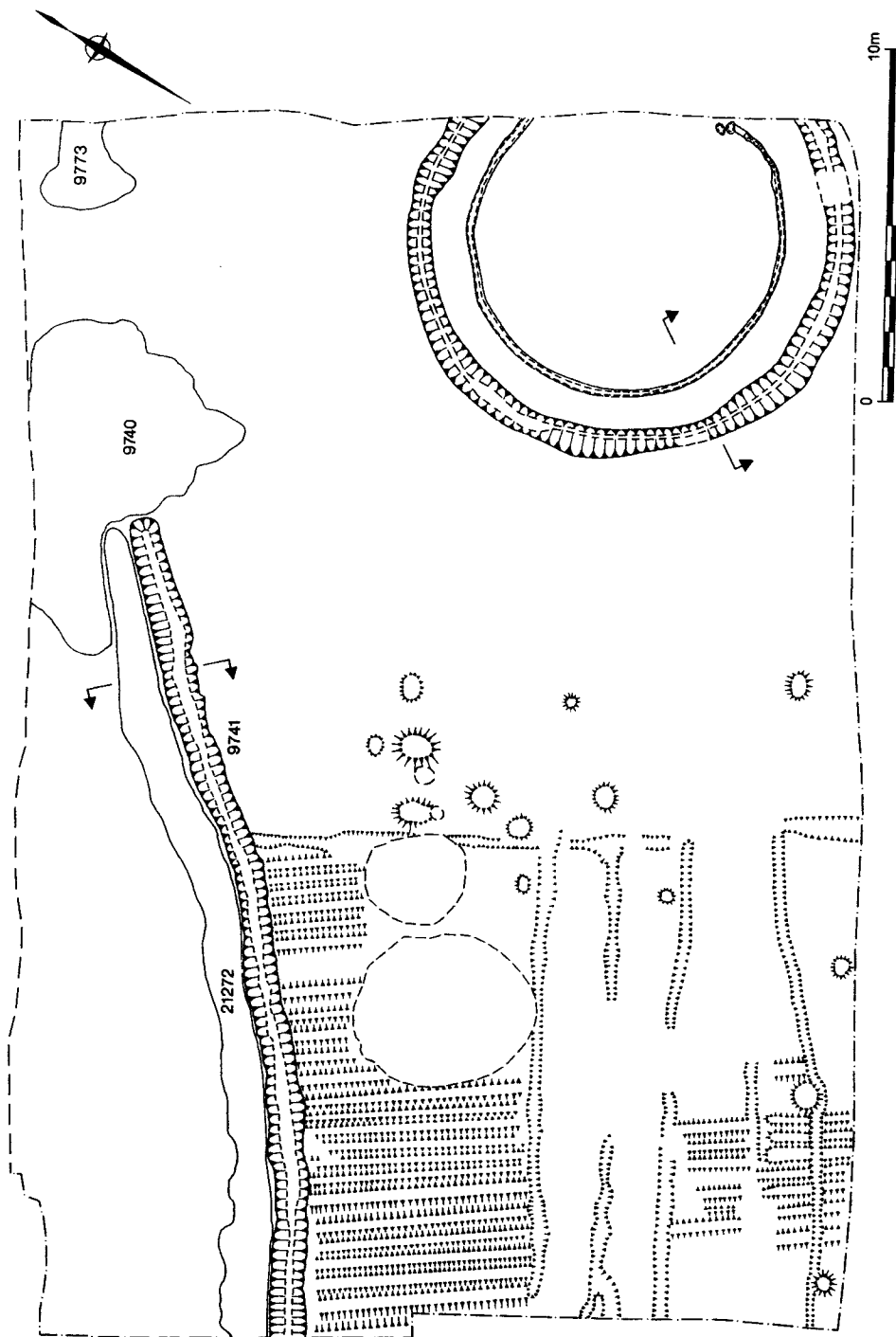
This phase disclosed the well-preserved remains of part of an iron-age farming settlement. There was a single building within the area studied, a roundhouse dominating the east corner. Ten metres south-west of the house began an extensive system of narrow rig cultivation running north-west to south-east. This was later cut by a boundary gully and bank (the bank on the side away from the roundhouse) which ran in from the south-west and terminated 11 m north-west of the roundhouse. On the south-east side of this there was now a more widely spaced system of rig-and-furrow cultivation, running south-west to north-east. Two areas in addition to the main trench were excavated in 1999 (Illus. 2). That to the south-west revealed the continuation of the boundary gully and the two superimposed series of furrows. To the north-west, more furrows on the earlier north-west to south-east alignment were revealed.

### THE ROUNDHOUSE

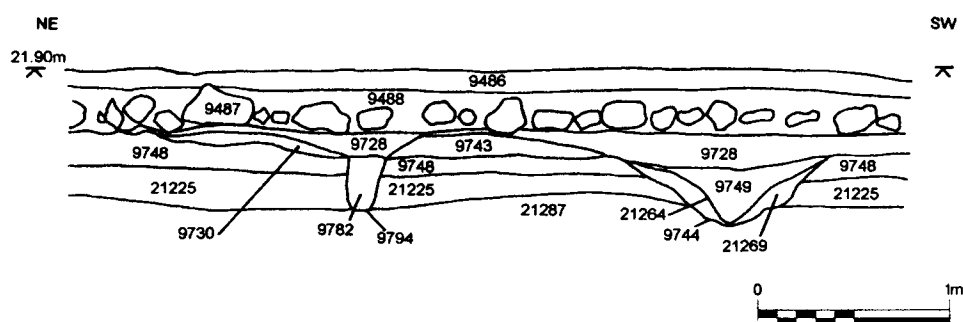
#### STRUCTURE

The building was 8.75 m in diameter, measured across its wall-slot. The wall-slot (9794) was 0.20 m wide and 0.33 m deep with vertical sides and a rounded base, giving a U-shaped profile (Illus. 19). The slot had been dug not as a continuous arc, but in a series of fairly straight two metre-long stretches (a technique discernible in a recently published circular building at Rock Castle, N. Yorks: Fitts *et al.* 1994, fig. 3). Circular post-impressions at 100–150 mm in diameter survived in places in the bottom of the slot confirming that it had held closely-spaced (c. 150 mm apart) uprights. One segment of the roundhouse lay beyond the north-eastern edge of the excavation. Just within the edge of excavation the wall-slot terminated at two post-holes, 250 mm in diameter and 400 mm deep, representing the south-west side of an east-facing doorway. The wall-slot (9794) was filled with a compact mixed grey and yellow sand containing charcoal and daub flecks (9782), probably representing a mixture of the decayed wall base and the destruction deposit above.

A gully (9744) lay 1.20 m beyond the slot. This had an average width of 1.20 m and a depth of 0.84 m, with its sides sloping down at roughly 45 degrees onto a concave base. A clay bank (9743), occupied the space between the gully and wall-slot, sloping away from the wall. A series of post-holes between 0.10 and 0.20 m in diameter and 0.20 m deep was cut into the bank between the slot and drainage gully on the north



Illus. 18 Plan of Phase 3: middle Iron Age. Scale 1: 200



Illus. 19 Section of roundhouse wall and drainage gully, with overlying sand and Roman parade-ground. Scale 1:40

side of the building. These presumably supported the eaves of the conical roof as it came down to the gully; as there were no such features on the west or south sides, this could represent a localised repair.

After it had filled with an accumulation of silty grey-brown sand (21269), the sides of the drainage gully had been recut on at least one occasion (21264). After a primary silting, mixed clays and silts with charcoal and burnt clay flecks accumulated in the recut gully (9749) (Illus. 19).

#### INTERIOR (Illus. 20, 21, 22, 23)

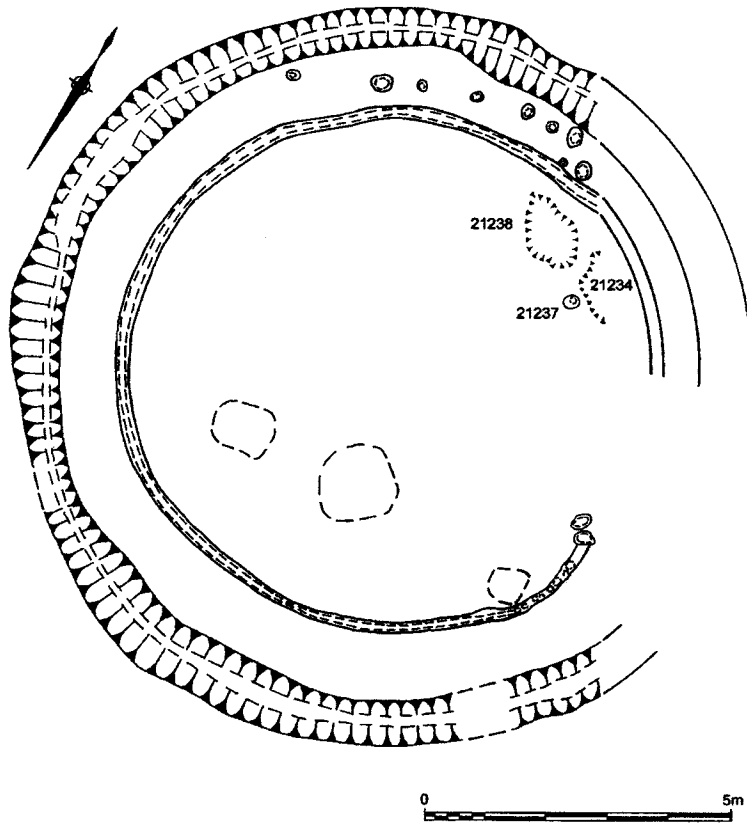
The interior floor surface of highly compacted sand-clay (9748) was very similar to the ground surface outside the structure. Overlying the floor surface in the northern segment was an occupation deposit (21230) of blue-grey silty-clay with patches of ash and charcoal (visible on Illus. 22). This sealed three underlying features which had been filled and floored over before the destruction of the house (Table 6).

TABLE 6 Earlier features in roundhouse

Context	Fill	Dimensions	Depth	Comments
Features sealed by occupation layer:				
21234	21230	Min. 2 m x 1 m	0.07 m	
21238	21230	1.31 x 0.80 m	0.11 m	
21237	21230	Diam. 0.22 m	0.14 m	Post-hole?

The preservation of the occupation layer 21230 in such a limited part of the house may be explained by the fact that it was sealed by a co-extensive layer of unburnt clay (9769). This had the appearance of unburnt daub and possibly represented a fallen section of the outer wall which had prevented plant material lying on the floor from charring as it had elsewhere in the building. The possible fallen wall material also sealed part of the fill of the wall-slot itself.

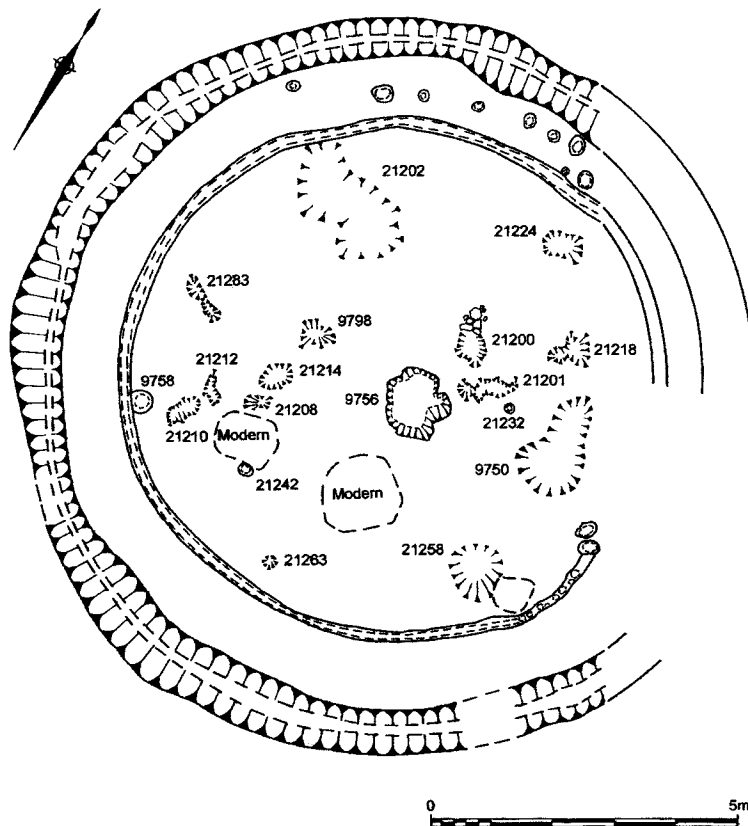
All other features in the house were open at the time of its destruction. A probable hearth (9756) lay near the centre of the floor. Measuring 1.05 m by 1.10 m, and 0.13 m deep, this feature contained a brown-grey clay mixed with ash and flecks of daub. It



Illus. 20 The roundhouse: early features

also contained many small sandstone fragments, some burnt, including two possible fragments of querns. Two stake-holes were found in the base. There was no clear horizon of burning or ash representing the last use of the hearth. Such evidence of use may have been indistinguishable anyway from the destruction deposit sealing the feature, but the possibility must be considered that the hearth had been cleaned out and backfilled with the stone fragments before the destruction of the house.

Immediately inside the door a scoop or hollow (9750), measuring 1.80 m by 0.10 m and 0.10 m deep. It contained ash and the remains of burnt wattle (9754), indicated by strips of carbonised wattle which averaged 80–110 mm in length by 15–20 mm wide. This was overlain by a deposit of burnt grain (9752), in turn covered by a mixed ash and silt fill containing small pieces of burnt daub and occasional flecks of charcoal (9753). At the time of excavation this feature was interpreted as representing a shallow pit, perhaps wattle-lined, for the storage of grain. Reviewing the evidence, however, this now appears unlikely. The doorway would have been an awkward position for a storage facility. Moreover the hollow had the same general appearance as others in the roundhouse which did not appear to be cut features and may simply have represented areas of wear through repeated activity on the same spot. A likelier explanation may

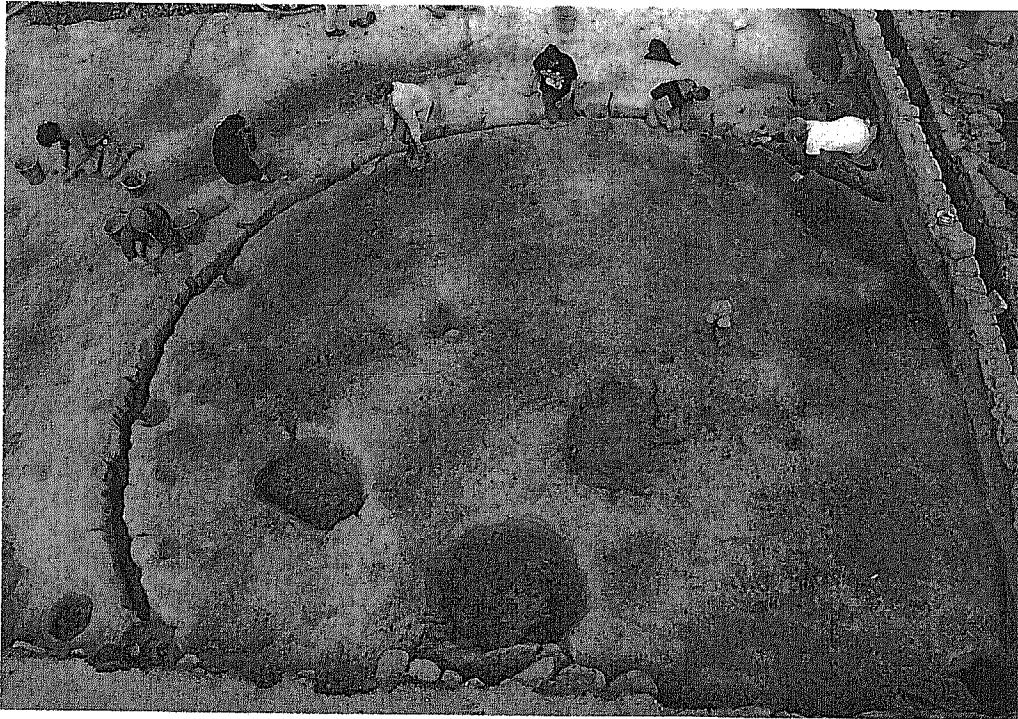


Illus. 21 The roundhouse: internal features at time of destruction

be that grain had been brought in a basket for cleaning or processing in the lightest part of the house, and that at the time of the destruction of the building the container was either abandoned, discarded in what was merely a hollow worn by traffic through the doorway, or had been deliberately placed there for some other reason.

Table 7 describes all other features found in the floor. Except for one possible post-hole and one small pit, all were shallow hollows of irregular shape, interpreted as areas of wear (as opposed to cut features). All except 21210, 9758 and 21258 possessed an identical fill of grey-brown ashy clay with flecks of charcoal and burnt clay, homogeneous with the general destruction deposit (9730) over the floor.

The distribution of the hollows was uneven: more occurred in a zone extending from the entrance to the back of the roundhouse. There seemed to be distinct groups of smaller hollows to the right upon entry (where there was a small patch of stone slabs) and in the southern zone of the area diametrically opposite the entrance. Single, more extensive hollows or areas of wear lay in the front part of the southern side and the back part of the north side. The last of these (21202) was extremely shallow, little more than an undulation in the floor surface (it is hardly apparent on Illus. 22 and 23):



Illus. 22 The roundhouse under excavation. View from south-east before excavation of south-east segment. Note central hearth and post-hole at side of door (bottom right corner). The two deep intrusions are modern. Note also concentration of dark material in hollows in area diametrically opposite door (top left).

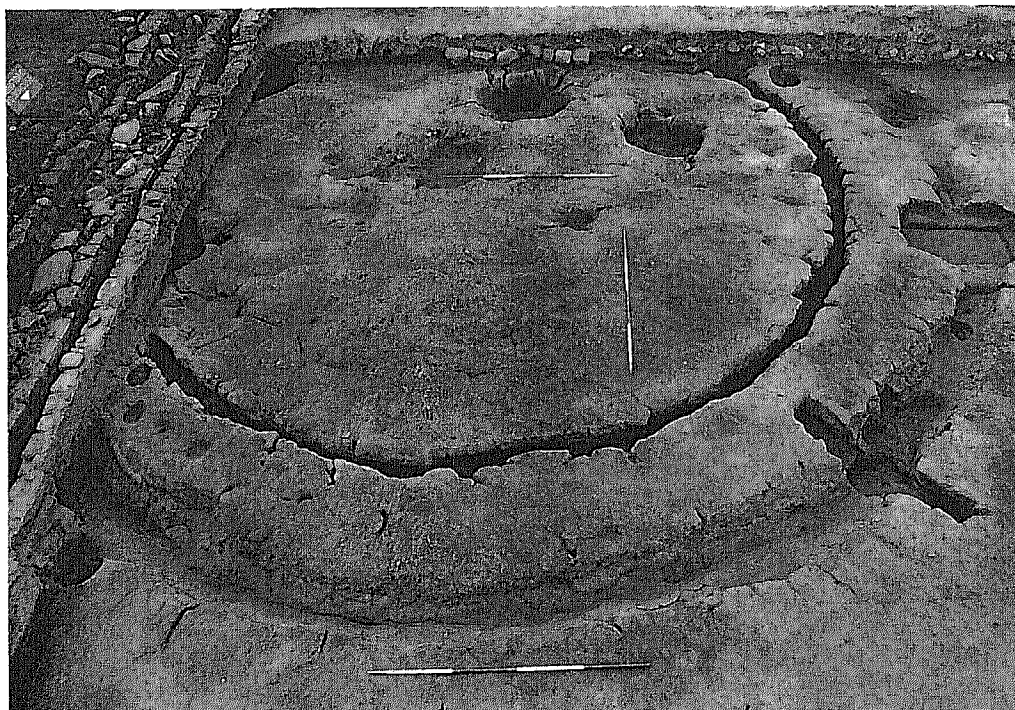
it does not indicate activity of the same frequency or the intensity as is implied by the hollows elsewhere in the house.

It is noticeable that metal artefacts (adze head, copper-alloy fragments) came from adjacent pits in the group opposite the entrance, one of which certainly had a fill distinguishable from the destruction deposit above; and further that all except two of 14 artefacts — which included numerous unidentifiable fragments of copper alloy — were concentrated in this area (Illus. 43). The adze had been buried, with its haft broken off, against the interior face of the wall, perhaps representing a propitiatory deposit. The implications of the combined evidence of the distribution of the hollows, the finds and the plant remains for understanding the use of the interior of the house are discussed below.

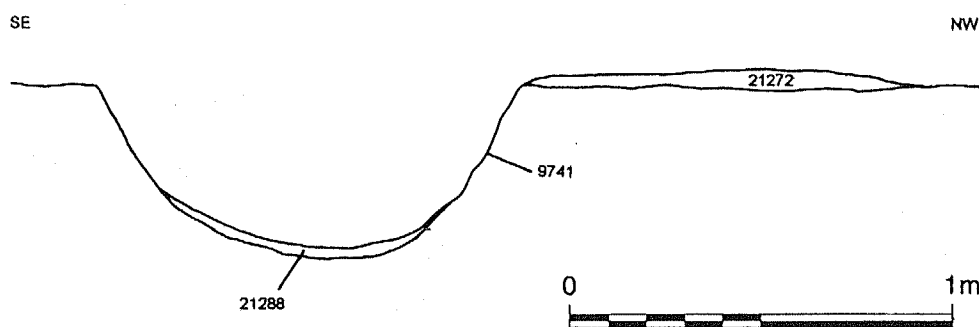
#### LAND USE OUTSIDE THE ROUNDHOUSE

A system of very narrow rig-and-furrow cultivation, orientated north-west to south-east, began 10 m to the south-west of the roundhouse and extended for at least 26 m in that direction (being found in the extension of the area to the south-west in 1999) (Illus. 2, 25, 26). Also in 1999 the same very narrow rig was seen 16 m north of that recorded in the east quadrant (Illus. 2). If this represents the same cultivation, it covered





Illus. 23 Excavation of roundhouse completed but before uncovering of south-east segment. View from north-west, after some weathering of the features. Note, in section, the foundation of the Roman parade-ground overlying roundhouse. The furthest scale points right to the concentration of emptied hollows in the area diametrically opposite the door. 2 m scales visible



Illus. 24 Profile of Phase 3 boundary gully and bank. Scale 1:20

a minimum area of 26 m by 36 m (936 sq. m) but could have extended much further. The furrows were approximately 0.70 m apart. The soil horizon forming the ridges overlay an earlier soil horizon (21225B) which showed absolutely no evidence of having been scored by ard marks.

TABLE 7 Roundhouse: internal features at time of destruction

No.	Fill	Dim.	Depth	Comments
<i>Features grouped to right on entry:</i>				
21218	21217	0.40 x 0.41 m	0.08 m	
21224	21223	0.60 x 0.40 m	0.04 m	
21200	21206	0.84 x 0.48 m	0.18 m	Poss. post-pad (21240) at N. end
21232	21231	0.15 m diam.	0.15 m	Post-hole?
21201	21204	0.90 x 0.44 m	0.06 m	
<i>Features grouped diametrically opposite entrance:</i>				
9798	9763	0.40 x 0.36 m	0.08 m	
21202	21205	2.02 x 1.24 m	0.04 m	
9758	9759	0.33 m diam.	0.08 m	Clay-silt fill; contained adze-head
21212	21211	0.80 x 0.15 m	0.04 m	Clay-silt fill; five Cu-alloy fragments
21208	21207	0.42 x 0.28 m	0.05 m	21211 = 21215
21214	21213	0.52 x 0.34 m	0.10 m	
21242	21241	0.14 x 0.19 m	0.07 m	
21283	21282	0.84 x 0.28 m	0.04 m	= 21229 and fill 21228
<i>To north-west:</i>				
21202	21205	2.02 x 1.24 m	0.04 m	
<i>To south-east:</i>				
21263	21262	0.20 x 0.20 m	0.15 m m	Pit?
21258	21257	1.13 x 0.67 m	0.06 m	Filled with grey-brown clay

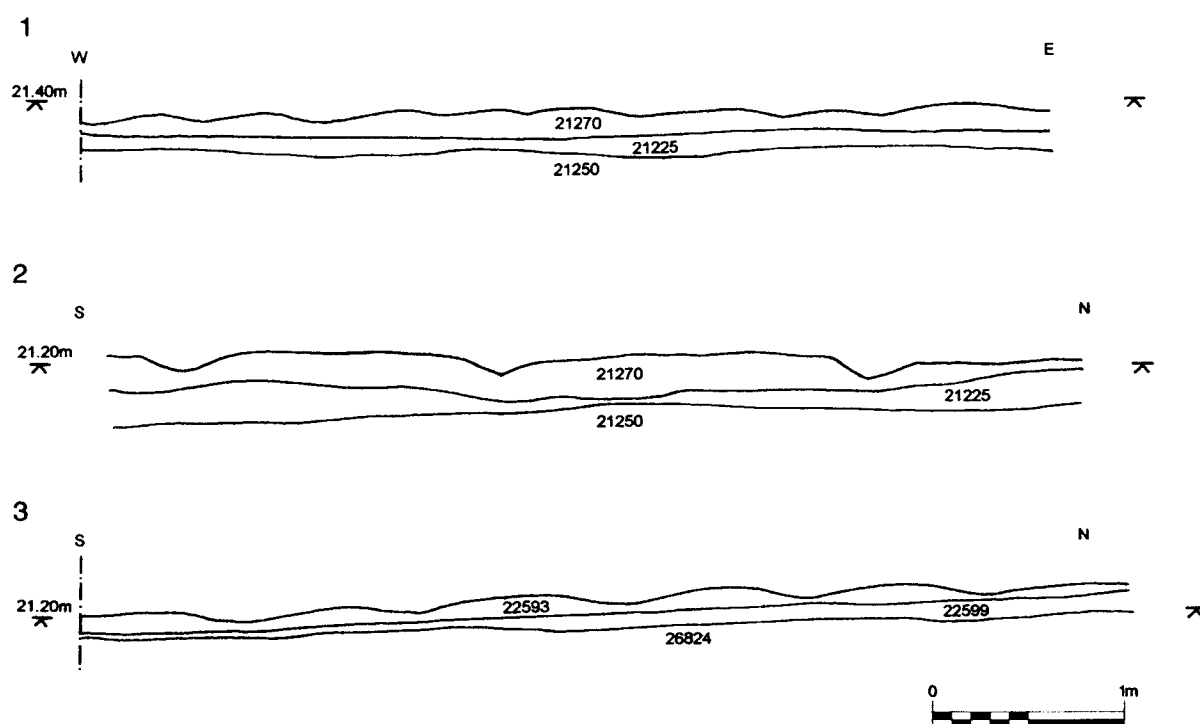
This narrow rig was cut by a boundary gully (9741) which began 10 m north-west of the roundhouse and took a curvilinear course towards the south-west (Illus. 2, 18, 24, 26). The gully was 1.10 m wide and 0.23 m deep, with a low bank of upcast natural clay (21272), 1 m wide and surviving to a height of 0.06 m, on its north-western side (away from the roundhouse). A very thin layer of silt lay in the bottom of the gully.

On the south-east side of (and presumably contemporary with) the gully was a new system of wider rig-and-furrow cultivation running perpendicular to the earlier furrows. The later furrows were approximately 2 m apart (Illus. 18, 25, 26). It is notable that the north-east edge of the later system was exactly coincident with that of the earlier, suggesting that the change of rig-and-furrow type occurred within a continuum of use of an existing north-eastern boundary which separated the cultivation plot from the roundhouse. This links the earlier system to the roundhouse and confirms its iron-age date. The later system did not, however, exist north of the boundary gully and bank.

Between the house and the cultivation area, and in places lying amongst the south-eastern area of ridges, there occurred a number of circular mounds in the ground surface, up to 1 m in diameter and 0.20 m high (Illus. 18). These did not appear to be man-made and had perhaps been caused by the growth of trees.

#### THE DESTRUCTION AND ABANDONMENT OF THE SETTLEMENT

The roundhouse had been destroyed by fire. Spreads of brown clay, burnt daub and charcoal representing the remains of the roundhouse walls were recovered from in and

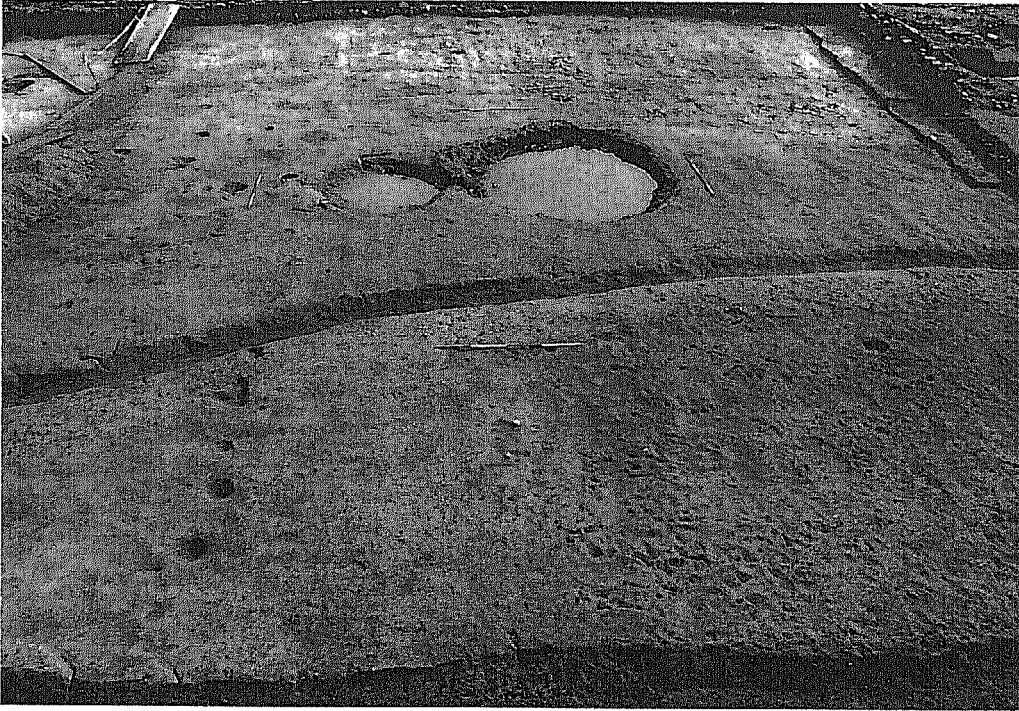


Illus. 25 Profiles of cultivation ridges: 1. Phase 3: Narrow rig 2. Phase 3: Later furrows 3. Phase 4: The latest furrows. Scale 1:40

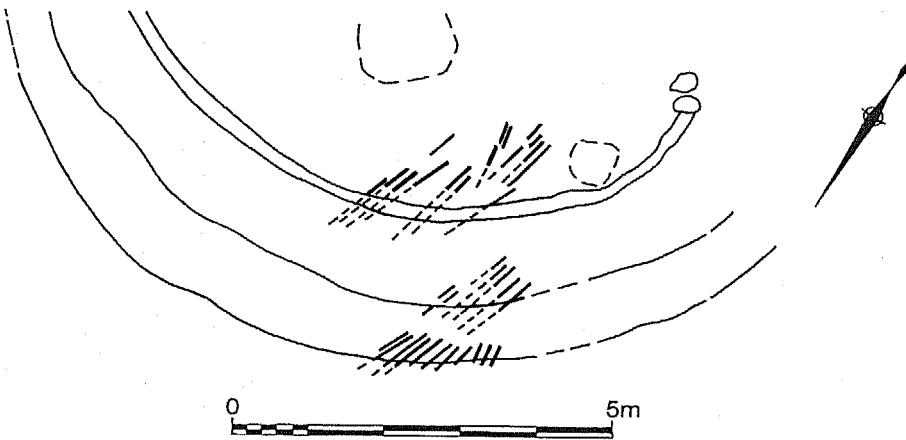
around the structure; a fire-destruction deposit of dark sandy silt and charcoal with abundant flecks of burnt daub (9730) covered the floor (Illus. 19, 22).

In the destruction deposit over the south-east limb of the structure was a series of parallel impressions, between 100 and 120 mm apart, each c. 40 mm wide with a semi-circular profile (Illus. 27). These did not have the character of ard marks. The impressions overlay both the drainage gully and the roundhouse wall-slot, and cannot, therefore, have been made by a collapsed section of the wall superstructure. An association with the roundhouse is certain, however, as the impressions were sealed by the succeeding sand horizon. Indeed the features were filled with sand from the layer above, presumably after their contents had rotted. The impressions probably represent fallen parts of the roof framework. These elements must have been unburnt, or carbonised remains would have survived. In general the intensely burnt material was confined to the interior of the house, suggesting that the roof had burnt and then collapsed within the walls, of which the lower parts remained either to collapse or decay. Some of the lowest part of the roof, forming the overhanging eaves, may therefore have escaped burning and have eventually collapsed onto the remains.

Six metres north-west of the roundhouse and lying immediately north-east of the terminal of the boundary gully, was an intensely burnt area of the clay-sand soil horizon, irregularly shaped, measuring some 6 m north-west to south-east and 7 m



Illus. 26 The Phase 3 (middle Iron Age) ground-surface in the centre of the east quadrant. View from north-west. Beyond the boundary gully (9741) the earliest narrow rig is faintly visible running towards the viewer, with later furrows cutting it perpendicularly in the background. The two central pits are of Roman date. 2 m scales visible



Illus. 27 Impressions over roundhouse. Scale 1:100

south-west to north-east (9740). To the north-west it was truncated by a Roman ditch. The deposit was rich in carbonised plant-remains which indicated that what had been burnt here was the processing residue of a spelt wheat crop. To the north-east, passing out of the excavation area and also cut by the Roman ditch, spreads of grey silty-clay overlay an area of burnt charcoal-rich silt (9773) which yielded the only sherds of prehistoric pottery to be found in the excavation of the pre-Roman levels.

### ABSOLUTE DATING

Samples for radiocarbon dating were taken from the destruction deposit in the house (9730) and the area of burnt crop-processing residue north-west of the house (9740).

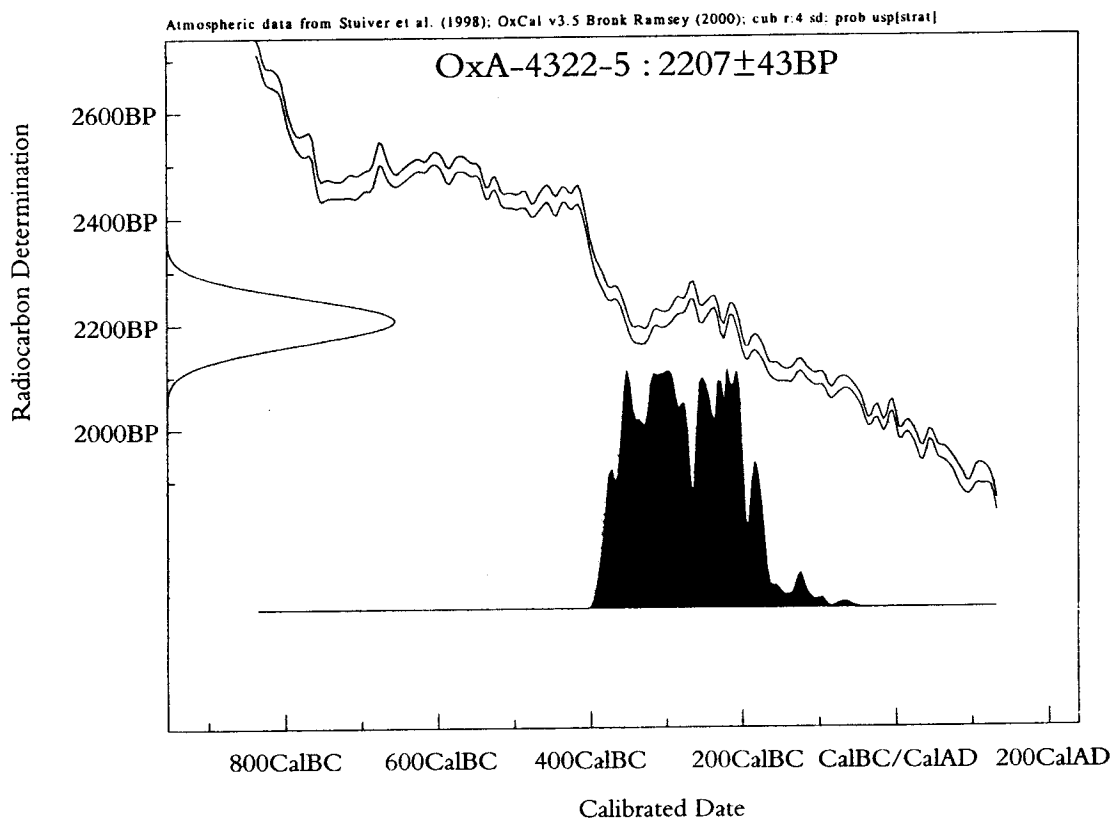
Four samples were submitted for radiocarbon dating with the following results:

Context 9730 (spelt grain)  $2280 \pm 60$  B.P. (OxA-4322)

Context 9730 (spelt grain)  $2175 \pm 55$  B.P. (OxA-4323)

Context 9740 (spelt glume bases)  $2170 \pm 50$  B.P. (OxA-4324)

Context 9740 (spelt glume bases)  $2215 \pm 55$  B.P. (OxA-4325)



Illus. 28 Radiocarbon determination using the maximum intercept method of Stuiver and Reimer (1986)

The four results (OxA-4322-5) are statistically consistent ( $T' = 2.3$ ;  $T'(5\%) = 7.8$ ;  $df = 3$ ; Ward and Wilson 1978), which means that they may all be of the same actual age, though this test does not demonstrate that they are. Our archaeological judgement is that the two deposits were created during the same fire and that the four dates derive from the same event. This allows us to take a weighted mean of the measurements before calibration and then calibrate the mean. The weighted mean of OxA-4322-5 is  $2207 \pm 43$  BP (2 sigma), which calibrates to 390-170 B.C. (Illus. 28), using the maximum intercept method of Stuiver and Reimer (1986) and data from Stuiver *et al.* (1998).

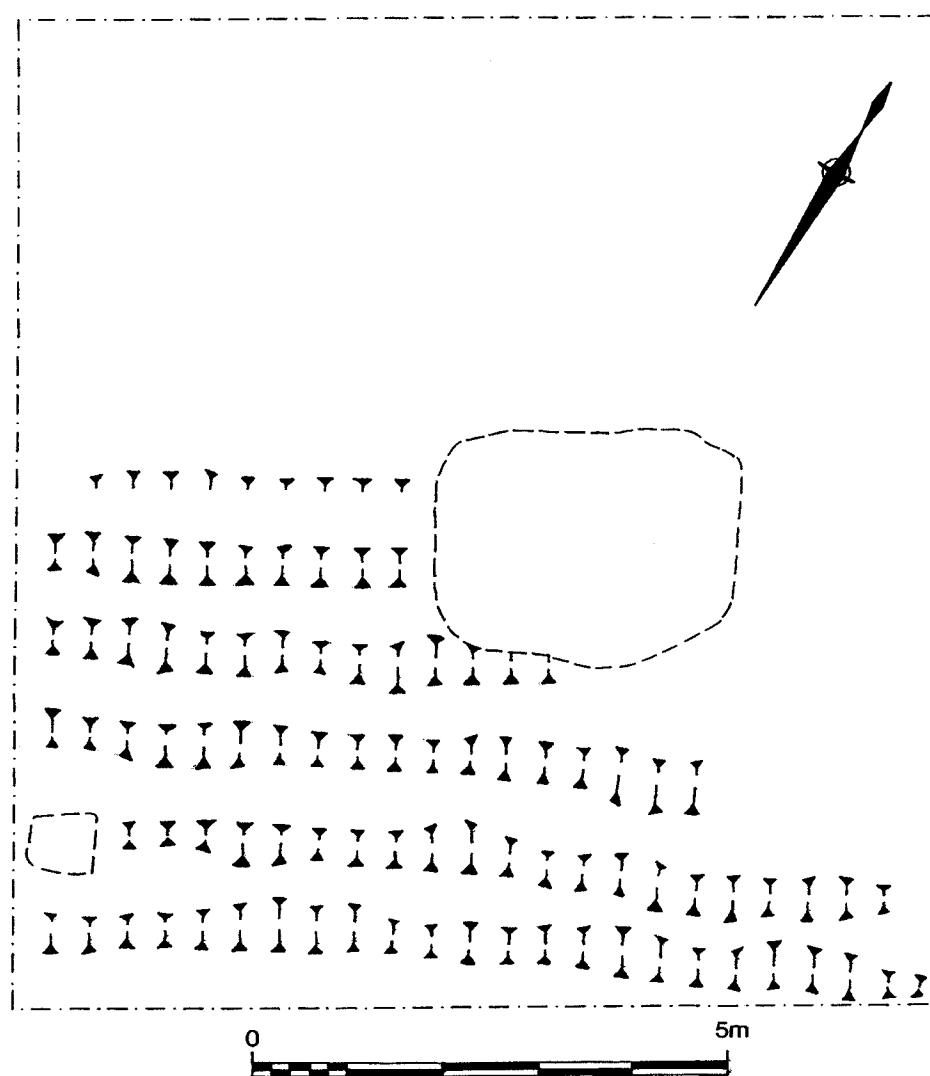
The latest possible date for the destruction of the settlement is therefore *c.* 170 cal. B.C., but the event could have occurred at any time between 390 cal. B.C. and that date.

#### STRUCTURAL PHASE 4: MIDDLE OR LATE IRON AGE

Following the destruction of the roundhouse, the whole of the area was covered by a thick (up to 0.50 m) deposit of both orange-yellow and silver-grey wind-blown sand (9728). This sand filled both the boundary gully and the upper part of the drainage gully around the roundhouse. The laminar nature of the sand showed that it was wind-blown rather than dumped. In the east quadrant area most of this horizon had been removed for the insertion of an extensive Roman foundation of clay and boulders (the base of a possible parade-ground) pre-dating the known Roman fort (9487, 9488). This had left only a 50 mm thin layer of sand overlying the remains of the roundhouse (see section, Illus. 19). The prehistoric stratigraphy deepened towards the south-west, however, with the result that the sand horizon was increasingly well-preserved in that direction.

Beneath the south-western edge of the Roman foundation, therefore, and in an additional area excavated south-west of this in 1999 (Illus. 2), it could be seen that a grey organic soil horizon, some 0.17 m deep, had eventually formed on top of the wind-blown sand. The sand beneath the humic layer contained some six superimposed alignments of ard marks (Illus. 30) containing soil from the turf horizon which had been pulled down during the use of the ard and which showed up with stark clarity in the yellow sand. The marks were between 30 and 50 mm wide and possessed crisp V-shaped profiles.

In the humic soil above the ard marks, becoming apparent in the south-western extension to the main east quadrant area and disappearing to the south-west, was a series of shallow ridges and furrows (Illus. 29). There was no correspondence between individual ard marks and the furrows. The shallow furrows were between 1.10 and 1.50 m apart. These features had gone out of use before the beginning of the Roman sequence, for they were overlain first by a thin (0.02 m) layer of iron-staining and sandstone chippings and pebbles, in turn covered by deep laminar deposits of wind-blown sand. This sand had mostly been removed by Roman activity, but survived intact at the extreme edge of the south-western extension to the main excavation area.

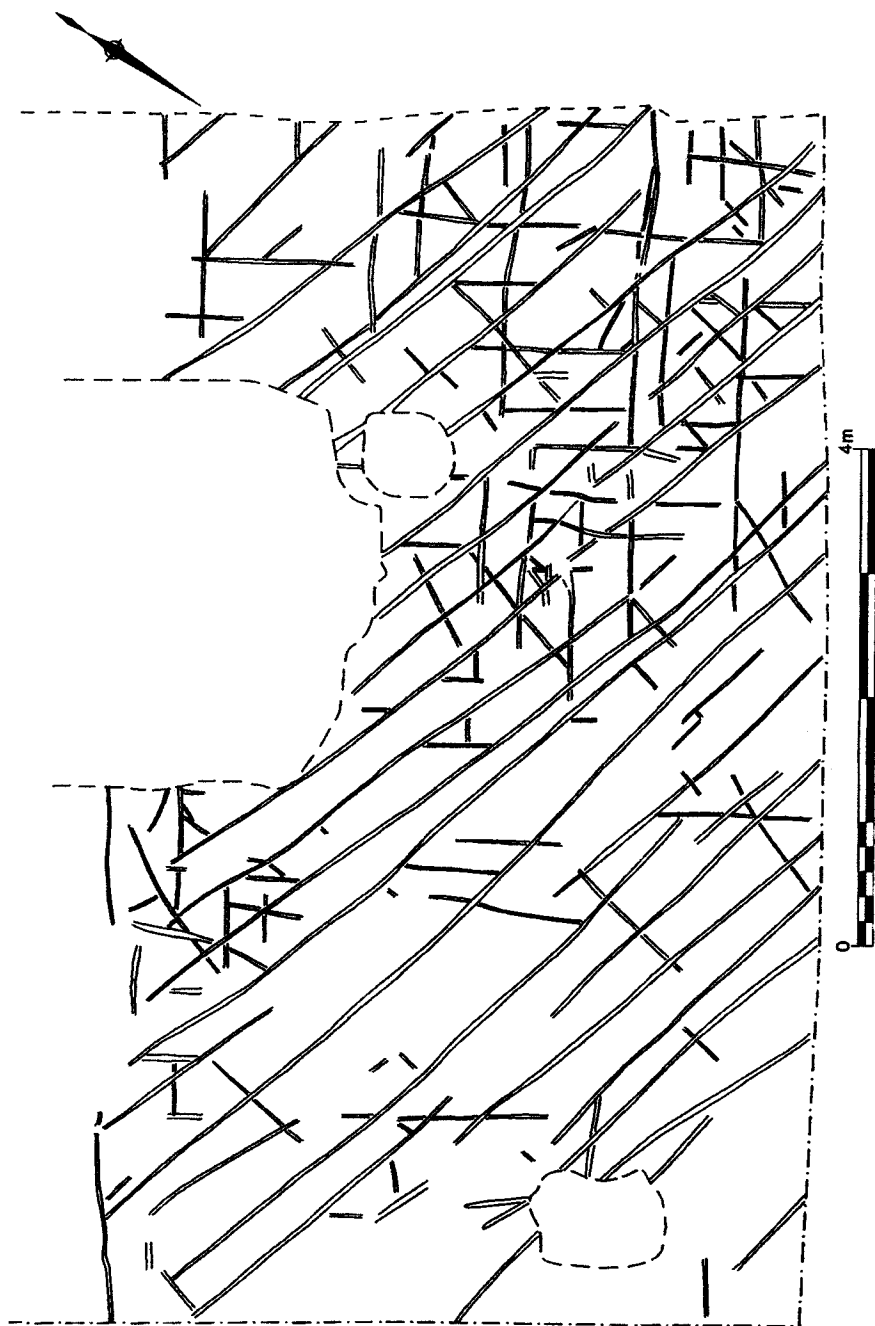


Illus. 29 Plan of Phase 4 furrows in south-western extension. Scale 1:80

### THE IRON-AGE PLANT REMAINS *by* Marijke van der Veen

#### INTRODUCTION

During the last ten years we have learnt a great deal about the role of arable farming in the iron-age economies of north-east England (Huntley 1995; Van der Veen 1992, 1994, 1999), but most of the evidence is still based on two relatively small clusters of sites (five in the Tees lowlands and three in Northumberland). The discovery of the iron-age roundhouse at South Shields offered an excellent opportunity to increase our knowledge and improve the geographical distribution of our database. The excavations



Illus. 30 Plan of Phase 4 ard marks in south-western extension



at South Shields offer additional advantages: firstly, the site has been buried underneath Roman occupation and has not been affected by plough damage and, secondly, the house had been burnt down in antiquity. These conditions meant that the preservation of plant remains could be expected to be better than normal for sites of this period, in turn allowing the opportunity to study the spatial patterning of plant remains in a roundhouse (something not normally possible on sites known only through subsoil cut features). The aims of the analysis were threefold:

- a) to reconstruct the arable economy at the site;
- b) to study the spatial patterning of the plant remains across the house/site;
- c) to assess the site in its regional context.

## METHODS

The strategy implemented was one of total sampling in order to study the spatial patterning of the plant remains. Bulk sediment samples were collected from all excavated features and at five metre intervals from each of the principal soil horizons: two buckets or *c.* 30 litres in volume where possible (the exact sample volumes are listed in the data tables). The two burnt layers (9730 and 9740) were sampled on a grid of one metre square, the linear subsoil-cut features were sampled at approximately one metre intervals and samples were also taken from the 'hollows' in the roundhouse (as many as four samples from the fills 9752/3/4 from feature 9750 that had been identified as grain-rich during excavation).

The samples were subjected to manual water flotation using an 0.5 mm mesh. The 'flots' were dried and then sorted under a binocular microscope using  $\times 15$  magnification; the seeds were identified using magnifications up to  $\times 100$ . Most of the samples were originally analysed by Leicester University students (see acknowledgements), but all have subsequently been checked and, where necessary, re-sorted and re-identified by the author. Several samples contain large amounts of seeds and these were divided into sub-samples using a riffle box (Van der Veen and Fieller 1982). In cases where only some of the sub-samples have been analysed, this is indicated by an asterisk (\*) in the data tables. In those cases the sample volume given is that representing the fraction sorted, not the actual sample volume.

The samples from layers 9730, 9740 and from the pits and 'hollows' inside the roundhouse have been fully analysed and the results are listed in Tables 8–10. The samples from the drainage gully contained very few plant remains; their results are not reported in full, but briefly discussed below. Lack of time meant that the samples from the wall-slot (9782) could not be analysed in full, but they were all 'scanned' and the results are also discussed below. References in the text to the total number of seeds identified and the mean density of seeds in the deposits refer solely to those contexts fully analysed and listed in Tables 8–10. No plant remains occurred in any of the pre-iron-age samples.

Nomenclature follows Clapham, Tutin and Warburg (1962) in order to facilitate comparison with the existing study of iron-age agriculture in the region (Van der Veen 1992). Recent changes in the nomenclature of some of the plants, as reported in Stace 1991, are given in Table 11. The identifications follow Van der Veen 1992 and

the reader is referred to that publication for descriptions and identification criteria. The term 'seeds' is used to refer to seeds, fruits and false fruits.

## RESULTS

A total of 19,787 seeds have been identified. The average number of seeds per litre of sieved sediment is 11.9, but this figure varies greatly between and within contexts (min 0.1, max 87.9; see below). The remains can be divided into four broad categories: cereal grains, cereal chaff, wild/weed species and 'other' plants. The results are listed under these categories in Tables 8–10.

### CEREAL GRAINS

The assemblage contains grains of both wheat (2,098) and barley (89), and in both those cases only one species was identified. The majority of the wheat grains belong to spelt wheat, *Triticum spelta*. The barley grains belong to six-row, hulled barley, *Hordeum vulgare*. There were a number of compact grains of wheat which could not be identified to species level. Some are thought to belong to spelt wheat as they show evidence of very faint compression lines just above the embryo; these may have been left behind by the glumes of a glume wheat. Others may represent a compact free-threshing wheat.

### CEREAL CHAFF

The remains of chaff are dominated by glume bases of wheat (4,902). Those that could be identified to species level belong to spelt wheat, *Triticum spelta*. It is highly likely that those glume bases identified as *Triticum* sp. also belong to spelt wheat. One rachis segment of possible bread wheat, *Triticum* cf. *aestivum*, was recovered (sample C, context 9740). This, combined with the small number of compact wheat grains mentioned above, means that we cannot rule out the possibility that bread wheat may have been grown at South Shields in small quantities (the remains of this species are notoriously underrepresented in charred archaeobotanical assemblages). A small number (107) of rachis segments of barley were found, mostly in context 9740.

### WEEDS/WILD PLANTS

Most of the samples contain large numbers of seeds of wild plants, mostly representing weeds growing in the arable fields. This category is dominated by seeds of grasses, especially *Bromus mollis/secalinus*, *Sieglingia decumbens*, and 'small grasses'. The latter category is rather imprecise, but may include species such as *Poa annua* and *Phleum pratense*. Other common species are *Galium aparine*, *Polygonum aviculare*, *Stellaria media*, *Sherardia arvensis*, *Rumex* spp., *Tripleurospermum inodorum* and *Carex* spp. The ecological information that can be extracted from their presence is discussed below.

### OTHER PLANTS

This category of plants contains several species that were probably purposely collected from the wild vegetation for food, such as hazelnuts (*Corylus avellana*), sloe (*Prunus spinosa*), rosehip (*Rosa* sp.), blackberry (*Rubus fruticosus*), as well as plants which may have been used for bedding or thatching, such as heather (*Calluna vulgaris*) and bracken



[illegible]

TABLE 9: Carbonised seeds from pits and 'hollows'

	Context:		Sample No.:		Volume in litres:										'Hollows' Total
	9752 ★	9753 ★	9754 ★	9754A ★	9757 30	9759 30	21,205 22.5	21,207 30	21,233 30	21,257 30	232.5				
<b>Cereals</b>															
Triticum spelta L. (spelt wheat)	89	161	29	2	1	4	5	1	3	1				296	
Triticum sp. (hexaploid wheat)	244	332	89	47	1	2	11	.	6	7				739	
Triticum sp. (compact grains)	.	6	.	.	.	.	.	.	1	.				7	
Hordeum vulgare L. (six-row hulled barley)	1	.	.	.	.	.	2	.	.	.				3	
Cerealia indet.	14	.	90	54	2	1	56	.	4	7				228	
<b>Chaff</b>															
glume bases Triticum spelta	28	13	24	30	2	3	51	2	29	95				277	
glume bases Triticum sp.	8	12	10	5	1	.	98	.	20	66				220	
rachis segments Triticum spelta	1	.	.	.	.	.	4	1	4	.				10	
rachis segments Triticum sp. (brittle rachis wheat)	.	.	.	.	.	.	9	.	1	7				17	
rachis segments Hordeum sp.	.	.	.	.	.	.	.	.	1	.				1	
basal rachis Hordeum sp.	.	.	.	.	.	.	.	.	.	.				0	
rachis nodes Triticum cf. aestivum L.	.	.	.	.	.	.	.	.	.	.				0	
awn fragm. Avena sp.	.	.	.	.	.	.	.	.	.	.				0	
culm nodes Cerealia/large grasses	.	.	1	.	.	14	2	.	2	7				26	
culm bases Cerealia/large grasses	.	.	.	.	.	1	.	.	.	.				1	
<b>Weeds</b>															
Ranunculus Subgenus Ranunculus	.	.	.	.	.	.	.	.	.	.				0	
Fumaria sp. (fumitory)	.	.	.	.	.	.	.	.	.	.				0	
Cruciferae indet.	.	.	.	.	.	.	.	.	.	.				0	
Viola Subgenus Melanium (pansy)	.	.	.	.	.	.	.	.	.	.				0	
Montia fontana, sp. chondrosperma (Fenzl) Walters (blinks)	.	.	.	.	2	.	1	.	.	4				7	
Stellaria media (L.) Vill. (chickweed)	.	.	.	.	1	.	2	3	4	12				22	
Chenopodium album L. (fat hen)	.	.	1	.	.	.	2	.	.	3				6	
Chenopodium sp. (goosefoot)	.	.	.	.	.	.	.	.	1	1				1	
Atriplex spp. (orache)	.	.	.	.	2	.	.	.	.	1				3	
Chenopodiaceae indet.	.	.	.	.	.	.	.	3	.	3				3	
Vicia/Lathyrus (vetch/pea)	.	.	.	.	.	.	.	.	1	.				1	
Leguminosae indet. (small) (small-seeded legumes)	.	.	.	.	3	.	2	.	2	2				9	
Aphanes arvensis L. (parsley piert)	.	.	.	.	.	.	.	.	.	.				0	
Potentilla cf. erecta (L.) Rausch. (common tormentil)	.	.	.	.	.	.	.	.	.	.				0	
Polygonum aviculare agg. (knotgrass)	.	.	.	.	4	3	7	7	2	12				35	
Polygonum convolvulus L. (black bindweed)	.	.	.	.	.	.	.	.	.	.				0	
Polygonum lapathifolium L. (pale persicaria)	.	.	.	.	.	.	1	.	.	.				2	

Polygonum persicaria L. (red shank, persicaria)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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TABLE 10: Carbonised seeds from context 9730

Context:	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730	9730
Sample No.:	5	8	10	11	12	13	15*	17	18	19	20	21	22	25	
Volume in litres:	7.5	30	7.5	3.75	15	30	5.6	7.5	15	22.5	15	30	22.5	15	
Cereals															
Triticum spelta L. (spelt wheat)	-	-	-	-	4	-	-	1	-	10	1	3	-	1	
Triticum sp. (hexaploid wheat)	-	-	-	1	1	1	-	-	3	9	3	4	2	1	
Triticum sp. (compact grains)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hordeum vulgare L. (six-row hulled barley)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cerealia indet.	-	-	2	1	4	5	-	-	2	13	1	10	1	-	
Chaff															
glume bases Triticum spelta	-	-	1	-	10	3	-	-	2	23	2	11	2	3	
glume bases Triticum sp.	-	-	5	-	4	3	-	-	1	24	3	6	-	2	
rachis segments Triticum spelta	-	-	-	-	-	-	-	-	-	2	1	-	-	-	
rachis segments Triticum sp. (brittle rachis wheat)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
rachis segments Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
basal rachis Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
rachis nodes Triticum cf. aestivum L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
awn fragm. Avena sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
culm nodes Cerealia/large grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
culm bases Cerealia/large grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Weeds															
Ranunculus Subgenus Ranunculus	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Fumaria sp. (fumitory)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cruciferae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Viola Subgenus Melanium (pansy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Montia fontana, ssp. chondrosperma (Fenzl) Walters (blinks)	-	-	-	-	-	2	-	-	-	-	1	4	-	-	
Stellaria media (L.) Vill. (chickweed)	-	-	2	-	2	2	-	-	12	14	-	-	-	7	
Chenopodium album L. (fat hen)	-	-	-	-	2	-	-	-	1	2	-	1	-	-	
Chenopodium sp. (goosefoot)	-	-	-	-	-	-	-	-	-	2	1	3	1	-	
Atriplex spp. (orache)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chenopodiaceae indet.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	
Vicia/Lathyrus (vetch/pea)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Leguminosae indet. (small) (small-seeded legumes)	-	-	-	-	3	1	-	-	1	1	-	2	-	-	
Aphanes arvensis L. (parsley piert)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potentilla cf. erecta (L.) Rausch. (common tormentil)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Polygonum aviculare agg. (knotgrass)	-	-	-	-	5	1	11	7	1	51	74	13	-	26	
Polygonum convolvulus L. (black bindweed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Polygonum lapathifolium L. (pale persicaria)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Polygonum persicaria L. (red shank, persicaria)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Polygonum lap/pers (persicaria)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Polygonum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Rumex acetosella agg. (sheep's sorrel)	-	-	-	-	2	2	-	-	-	-	-	3	-	1	
Rumex spp. (dock)	-	-	-	-	-	-	-	-	-	1	3	-	-	4	
Polygonaceae indet.	-	-	-	-	-	-	-	-	6	-	17	-	-	-	
Urtica urens L. (stinging nettle)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Odontites verna (Bell.) Dum. (red bartsia)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Veronica arvensis L. (wall speedwell)	-	-	-	-	-	-	-	-	-	2	-	-	-	-	
Rhinanthus sp. (yellow-rattle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Galeopsis sp. (hemp-nettle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ajuga reptans L. (bugle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Prunella vulgaris L. (self heal)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Plantago lanceolata L. (ribwort plantain)	-	-	1	-	1	-	-	-	-	1	-	-	-	-	
Galium aparine L. (goosegrass)	-	-	1	-	2	-	1	-	11	20	2	5	-	8	
Galium cf. palustre L. (marsh bedstraw)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sherardia arvensis L. (field madder)	-	-	1	-	-	-	-	-	-	1	4	1	-	1	
Tripleurospermum inodorum (L.) Schultz Bip. (scentless mayweed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lapsana communis L. (nipplewort)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Avena sp. (oat)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bromus mollis/secalinus (bromegrass)	1	-	2	-	8	4	-	-	3	35	3	14	2	7	
Sieghingia decumbens (L.) Bernh. (heath grass)	-	-	3	-	18	14	-	-	4	70	11	24	2	1	
small grasses (including Poa annua)	-	-	4	-	21	15	1	5	23	132	6	22	2	18	
Gramineae indet. (medium size grasses)	-	-	-	-	-	1	-	-	1	12	1	1	-	2	
Arrhenatherum elatius, ssp. bulbosum (Willd.) Spenn. (onion couch)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Carex pilulifera L. (pill-headed sedge)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Carex spp. (sedge)	1	-	2	-	9	-	2	-	-	1	1	6	-	-	
Other															
Corylus avellana L. (hazelnut)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Prunus spinosa L. (sloe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Rosa sp. (rose)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Rubus fruticosus agg. (blackberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pteridium aquilinum (L.) Kuhn, fronds (bracken)	-	-	-	-	-	-	-	-	-	2	-	-	-	-	
Calluna vulgaris (L.) Hull, flowers (heather)	-	-	-	-	2	-	-	-	-	1	-	4	-	-	
Calluna vulgaris (L.) Hull, flowers (leafshoots)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Indet.															
Indeterminate rhizomes/tubers	-	2	-	-	5	4	1	-	-	6	2	2	1	1	
Indeterminate seeds	-	-	10	-	7	7	1	3	16	10	2	17	-	19	
TOTAL	2	2	39	3	116	76	7	15	134	490	42	155	13	104	
Density of seeds per litre	0.3	0.1	5.2	0.8	7.7	2.5	1.3	2.0	8.9	21.8	2.8	5.2	0.6	6.9	

TABLE 10: Carbonised seeds from context 9730

	Context: 9730																
Sample No.:	26	27	28	29	30	31	32*	33	34	35	36	37	38	39			
Volume in litres:	15	15	22.5	15	3.75	30	15	15	30	30	22.5	22.5	15	30			
<b>Cereals</b>																	
Triticum spelta L. (spelt wheat)	1	3	5	1	-	2	3	2	18	1	8	-	-	2			
Triticum sp. (hexaploid wheat)	1	3	1	-	-	4	7	2	7	3	5	-	-	4			
Triticum sp. (compact grains)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hordeum vulgare L. (six-row hulled barley)	-	12	2	-	-	-	-	1	1	-	2	-	-	-			
Cerealia indet.	2	-	2	1	1	8	6	5	18	2	12	-	-	1	9		
<b>Chaff</b>																	
glume bases Triticum spelta	4	7	14	1	-	24	9	2	8	1	4	1	3	7			
glume bases Triticum sp.	6	5	8	-	-	5	9	1	8	1	3	2	7	8			
rachis segments Triticum spelta	-	1	4	-	-	-	3	-	-	-	-	-	-	-			
rachis segments Triticum sp. (brittle rachis wheat)	-	-	2	-	-	-	-	-	-	-	-	-	-	-			
rachis segments Hordeum sp.	-	-	-	-	-	-	-	1	-	-	-	-	-	-			
basal rachis Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
rachis nodes Triticum cf. aestivum L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
awn fragm. Avena sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
culm nodes Cerealia/large grasses	10	1	1	-	-	-	-	3	21	1	4	-	-	-			
culm bases Cerealia/large grasses	1	1	-	-	-	-	-	-	-	-	-	-	-	-			
<b>Weeds</b>																	
Ranunculus Subgenus Ranunculus	-	-	-	-	-	1	1	1	-	-	2	-	-	1			
Fumaria sp. (fumitory)	-	-	-	-	-	-	-	-	-	-	1	-	-	-			
Cruciferae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Viola Subgenus Melanium (pansy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Montia fontana, ssp. chondrosperma (Fenzl) Walters (blinks)	-	2	-	-	-	2	1	-	-	-	2	-	-	2			
Stellaria media (L.) Vill. (chickweed)	6	9	5	-	-	1	-	4	13	17	60	2	1	-			
Chenopodium album L. (fat hen)	-	-	1	-	-	1	1	1	4	1	2	-	-	-			
Chenopodium sp. (goosefoot)	1	-	1	-	-	-	-	-	4	1	11	-	-	1			
Atriplex spp. (orache)	-	-	-	-	-	-	-	1	-	-	1	-	-	-			
Chenopodiaceae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Vicia/Lathyrus (vetch/pea)	-	-	2	-	-	-	-	-	-	-	-	-	-	-			
Leguminosae indet. (small) (small-seeded legumes)	-	-	2	-	-	2	-	-	2	2	2	1	-	-			
Aphanes arvensis L. (parsley piert)	-	-	1	-	-	-	-	-	-	-	2	-	-	-			
Potentilla cf. erecta (L.) Rausch. (common tormentil)	-	1	-	-	-	1	-	-	1	-	1	-	-	-			
Polygonum aviculare agg. (knotgrass)	16	25	21	1	-	1	3	10	60	24	77	3	5	-			
Polygonum convolvulus L. (black bindweed)	-	1	1	-	-	-	-	-	-	1	2	-	-	-			
Polygonum lapathifolium L. (pale persicaria)	-	-	-	-	-	-	4	-	-	-	-	-	-	-			
Polygonum persicaria L. (red shank, persicaria)	-	-	-	-	-	-	1	-	-	-	-	-	-	-			
Polygonum lap/pers (persicaria)	-	-	1	-	-	-	-	-	-	-	-	-	-	-			
Polygonum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Rumex acetosella agg. (sheep's sorrel)	-	-	-	-	-	1	1	-	-	-	2	-	-	-			
Rumex spp. (dock)	3	3	5	-	-	-	2	1	1	2	2	-	1	2			
Polygonaceae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Urtica urens L. (stinging nettle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Odontites verna (Bell.) Dum. (red bartisia)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Veronica arvensis L. (wall speedwell)	1	-	-	-	-	-	-	-	-	-	-	1	1	1			
Rhinanthus sp. (yellow-rattle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Galeopsis sp. (hemp-nettle)	-	-	-	-	-	-	-	-	1	-	-	-	-	-			
Ajuga reptans L. (bugle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Prunella vulgaris L. (self heal)	-	-	1	-	-	-	-	-	-	-	-	-	-	1			
Plantago lanceolata L. (ribwort plantain)	2	-	-	-	-	-	1	-	1	-	-	-	-	-			
Galium aparine L. (goosegrass)	41	28	67	1	-	-	1	7	25	50	81	1	2	1			
Galium cf. palustre L. (marsh bedstraw)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sherardia arvensis L. (field madder)	5	1	7	-	-	-	1	1	2	8	17	1	-	1			
Tripleurospermum inodorum (L.) Schultz Bip. (scentless mayweed)	-	-	-	-	-	3	1	-	-	1	24	-	-	5			
Lapsana communis L. (nipplewort)	-	-	-	-	-	-	-	-	-	-	3	-	-	-			
Avena sp. (oat)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Bromus mollis/secalinus (brome grass)	4	27	15	1	-	9	14	3	35	7	11	1	1	8			
Sieglingia decumbens (L.) Bernh. (heath grass)	5	11	10	-	1	35	25	3	1	-	4	-	-	22			
small grasses (including Poa annua)	7	40	109	4	1	27	29	6	47	93	184	9	8	17			
Gramineae indet. (medium size grasses)	-	-	4	-	-	1	1	1	11	4	12	1	4	-			
Arrhenatherum elatius, ssp. bulbosum (Willd.) Spenn. (onion couch)	-	2	-	-	-	-	-	-	-	-	-	-	-	1			
Carex pilulifera L. (pill-headed sedge)	-	1	-	-	-	2	4	-	-	-	-	-	-	-			
Carex spp. (sedge)	-	6	-	1	-	19	7	1	3	1	1	-	-	20			
<b>Other</b>																	
Corylus avellana L. (hazelnut)	-	-	2	-	-	1	-	-	-	-	1	-	-	-			
Prunus spinosa L. (sloe)	-	-	1	-	-	-	-	-	1	-	-	-	-	-			
Rosa sp. (rose)	-	-	-	-	-	1	-	-	-	-	-	-	-	-			
Rubus fruticosus agg. (blackberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Pteridium aquilinum (L.) Kuhn, fronds (bracken)	20	-	-	-	-	-	1	-	4	-	-	-	-	-			
Calluna vulgaris (L.) Hull, flowers (heather)	-	3	-	-	-	-	1	-	-	1	-	-	-	1			
Calluna vulgaris (L.) Hull, flowers (leafshoots)	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
<b>Indet.</b>																	
Indeterminate rhizomes/tubers	2	9	-	-	-	20	5	1	2	-	-	-	-	2	4		
Indeterminate seeds	9	17	7	-	-	15	7	6	9	25	18	16	12	7			
<b>TOTAL</b>	<b>147</b>	<b>219</b>	<b>302</b>	<b>11</b>	<b>4</b>	<b>186</b>	<b>149</b>	<b>64</b>	<b>308</b>	<b>249</b>	<b>559</b>	<b>39</b>	<b>49</b>	<b>125</b>			
Density of seeds per litre	9.8	14.6	13.4	0.7	1.1	6.2	9.9	4.3	10.3	8.3	24.8	1.7	3.3	4.2			



TABLE 10: Carbonised seeds from context 9730

	Context: 9730															
Sample No.:	40	41	42	44	45	46	47	48	49	50	51	52	53	54		
Volume in litres:	30	30	22.5	30	22.5	15	22.5	30	22.5	26.3	7.5	30	30	30		
<b>Cereals</b>																
Triticum spelta L. (spelt wheat)	3	6	30	-	-	3	109	38	1	7	-	8	-	1		
Triticum sp. (hexaploid wheat)	6	11	15	-	5	6	88	46	1	23	2	7	-	1		
Triticum sp. (compact grains)	-	1	-	-	-	-	6	-	-	-	-	-	-	-		
Hordeum vulgare L. (six-row hulled barley)	-	1	-	-	1	-	3	-	-	2	-	1	-	-		
Cerealia indet.	19	13	10	-	8	5	203	57	3	19	1	11	2	8		
<b>Chaff</b>																
glume bases Triticum spelta	15	1	4	-	1	-	5	-	1	-	-	6	6	4		
glume bases Triticum sp.	11	-	2	-	1	-	2	5	-	-	-	8	6	9		
rachis segments Triticum spelta	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
rachis segments Triticum sp. (brittle rachis wheat)	-	1	-	-	-	-	-	-	-	-	1	-	1	-		
rachis segments Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
basal rachis Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
rachis nodes Triticum cf. aestivum L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
awn fragm. Avena sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
culm nodes Cerealia/large grasses	-	13	12	-	4	6	-	2	1	2	-	1	-	-		
culm bases Cerealia/large grasses	-	-	1	-	-	-	-	-	-	-	-	-	-	-		
<b>Weeds</b>																
Ranunculus Subgenus Ranunculus	-	-	-	-	-	1	-	1	-	-	-	-	-	-		
Fumaria sp. (fumitory)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cruciferae indet.	-	-	-	-	-	-	-	-	2	3	-	-	-	-		
Viola Subgenus Melanium (pansy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Montia fontana, ssp. chondrosperma (Fenzl) Walters (blinks)	-	-	-	-	-	-	-	-	-	-	-	-	-	1		
Stellaria media (L.) Vill. (chickweed)	-	15	44	-	15	3	-	2	34	71	2	11	3	1		
Chenopodium album L. (fat hen)	-	-	3	-	-	-	-	-	-	2	-	-	1	-		
Chenopodium sp. (goosefoot)	-	3	-	-	-	-	-	2	3	-	1	-	-	-		
Atriplex spp. (orache)	-	-	-	-	-	-	-	1	-	2	1	-	2	-		
Chenopodiaceae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Vicia/Lathyrus (vetch/pea)	-	-	-	-	-	-	-	-	1	-	-	-	-	-		
Leguminosae indet. (small) (small-seeded legumes)	1	2	-	-	-	-	1	-	3	-	1	1	-	-		
Aphanes arvensis L. (parsley piert)	-	-	1	-	-	-	-	-	2	1	-	-	-	-		
Potentilla cf. erecta (L.) Rausch. (common tormentil)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Polygonum aviculare agg. (knotgrass)	9	34	49	6	12	3	7	9	24	36	1	35	5	3		
Polygonum convolvulus L. (black bindweed)	1	3	1	-	-	-	1	-	1	2	-	-	1	-		
Polygonum lapathifolium L. (pale persicaria)	-	-	-	-	-	-	-	-	-	1	-	-	-	-		
Polygonum persicaria L. (red shank, persicaria)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Polygonum lap/pers (persicaria)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Polygonum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Rumex acetosella agg. (sheep's sorrel)	-	1	-	-	-	1	-	1	1	-	-	-	-	-		
Rumex spp. (dock)	-	6	2	-	-	-	-	-	-	1	-	6	1	-		
Polygonaceae indet.	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Urtica urens L. (stinging nettle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Odontites verna (Bell.) Dum. (red bartsia)	-	-	-	-	-	-	-	-	-	-	-	1	-	-		
Veronica arvensis L. (wall speedwell)	-	-	-	1	-	-	-	-	-	-	-	-	-	-		
Rhinanthus sp. (yellow-rattle)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Galeopsis sp. (hemp-nettle)	-	-	1	-	-	-	-	-	-	-	-	-	-	-		
Ajuga reptans L. (bugle)	-	-	-	-	-	-	-	1	-	-	-	-	-	-		
Prunella vulgaris L. (self heal)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Plantago lanceolata L. (ribwort plantain)	1	-	1	-	1	-	-	1	-	-	-	-	-	-		
Galium aparine L. (goosegrass)	6	3	80	2	21	12	1	3	3	21	12	106	8	8		
Galium cf. palustre L. (marsh bedstraw)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sherardia arvensis L. (field madder)	-	-	11	4	5	1	-	-	-	3	-	10	-	-		
Tripleurospermum inodorum (L.) Schultz Bip. (scentless mayweed)	3	-	-	-	-	-	-	-	-	16	1	1	-	-		
Lapsana communis L. (nipplewort)	-	-	1	-	-	-	-	-	-	2	-	-	-	-		
Avena sp. (oat)	-	-	-	-	-	-	-	1	-	-	-	-	-	-		
Bromus mollis/secalinus (bromegrass)	8	14	31	1	8	4	1	4	3	27	3	21	5	3		
Sieglingia decumbens (L.) Bernh. (heath grass)	29	2	1	-	7	2	-	14	4	4	2	4	4	3		
small grasses (including Poa annua)	18	54	116	28	36	4	15	47	20	100	9	84	27	7		
Gramineae indet. (medium size grasses)	-	2	6	1	1	-	-	3	4	8	-	7	5	1		
Arrhenatherum elatius, ssp. bulbosum (Willd.) Spenn. (onion couch)	-	-	-	-	-	1	-	-	-	-	-	1	-	-		
Carex pilulifera L. (pill-headed sedge)	2	-	-	-	-	-	-	-	-	-	-	-	-	-		
Carex spp. (sedge)	11	1	1	-	3	2	-	8	-	1	-	1	1	-		
<b>Other</b>																
Corylus avellana L. (hazelnut)	-	-	1	-	-	-	-	-	-	-	-	-	-	-		
Prunus spinosa L. (sloe)	1	-	-	-	-	-	-	-	-	-	-	-	-	-		
Rosa sp. (rose)	-	-	-	-	1	-	-	-	-	-	-	-	-	-		
Rubus fruticosus agg. (blackberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Pteridium aquilinum (L.) Kuhn, fronds (bracken)	-	3	2	-	-	-	-	-	1	-	-	-	1	-		
Calluna vulgaris (L.) Hull, flowers (heather)	-	1	1	-	-	-	-	-	-	-	-	-	-	-		
Calluna vulgaris (L.) Hull, flowers (leafshoots)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>Indet.</b>																
Indeterminate rhizomes/tubers	2	-	-	-	1	1	-	1	2	-	-	-	-	-		
Indeterminate seeds	3	5	21	7	10	6	-	9	12	10	3	10	5	9		
<b>TOTAL</b>	149	196	448	50	141	61	437	261	126	365	40	341	84	59		
Density of seeds per litre	5.0	6.5	19.9	1.7	6.3	4.1	19.4	8.7	5.6	13.9	5.3	11.4	2.8	2.0		

TABLE 10: Carbonised seeds from context 9730

	Context: 9730														TOTAL
Sample No.:	55	56	58	59	60	61	62	63	64	69	70	71	9730	9730	
Volume in litres:	22.5	30	22.5	30	15	7.5	30	30	18.75	30	30	15	9730	1138	
<b>Cereals</b>															
Triticum spelta L. (spelt wheat)	9	69	2	1	9	6	-	5	4	6	12	-	-	395	
Triticum sp. (hexaploid wheat)	32	155	-	1	7	4	1	14	24	7	12	3	-	533	
Triticum sp. (compact grains)	-	-	-	1	-	-	-	-	-	-	-	-	-	8	
Hordeum vulgare L. (six-row hulled barley)	1	-	-	-	-	-	-	1	-	2	1	-	-	31	
Cerealia indet.	103	232	2	5	8	4	4	20	56	10	12	12	-	933	
<b>Chaff</b>															
glume bases Triticum spelta	9	7	-	-	26	8	8	12	53	33	37	45	-	423	
glume bases Triticum sp.	5	-	-	13	12	1	5	6	99	8	19	46	-	369	
rachis segments Triticum spelta	1	-	-	-	3	2	-	1	3	5	4	4	-	34	
rachis segments Triticum sp. (brittle rachis wheat)	-	-	-	-	5	-	-	-	5	-	-	3	-	18	
rachis segments Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
basal rachis Hordeum sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
rachis nodes Triticum cf. aestivum L.	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
awn fragm. Avena sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
culm nodes Cerealia/large grasses	-	1	-	-	3	2	-	-	2	8	3	1	-	104	
culm bases Cerealia/large grasses	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
<b>Weeds</b>															
Ranunculus Subgenus Ranunculus	-	-	-	2	-	-	-	-	-	1	-	-	-	12	
Fumaria sp. (fumitory)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Cruciferae indet.	-	-	-	2	-	-	-	-	-	-	-	-	-	7	
Viola Subgenus Melanium (pansy)	-	-	-	-	-	-	-	-	-	-	1	-	-	1	
Montia fontana, ssp. chondrosperma (Fenzl) Walters (blinks)	-	-	-	-	2	-	1	-	1	2	2	1	-	26	
Stellaria media (L.) Vill. (chickweed)	-	-	10	18	5	21	-	1	2	-	5	3	-	423	
Chenopodium album L. (fat hen)	-	-	2	4	2	-	1	2	-	3	7	-	-	44	
Chenopodium sp. (goosefoot)	-	-	-	-	1	-	-	-	-	-	-	-	-	36	
Atriplex spp. (orache)	-	-	14	5	1	-	1	1	-	-	1	-	-	31	
Chenopodiaceae indet.	-	-	-	33	-	-	-	-	-	-	2	-	-	36	
Vicia/Lathyrus (vetch/pea)	-	-	-	-	-	-	-	-	-	2	1	-	-	6	
Leguminosae indet. (small) (small-seeded legumes)	-	-	3	-	1	-	-	2	-	2	2	1	-	39	
Aphanes arvensis L. (parsley piert)	-	-	-	-	-	-	-	-	-	-	-	-	-	7	
Potentilla cf. erecta (L.) Räusch. (common tormentil)	-	-	-	-	-	-	-	-	-	-	-	1	-	6	
Polygonum aviculare agg. (knotgrass)	-	5	12	28	15	2	7	1	3	9	8	9	-	767	
Polygonum convolvulus L. (black bindweed)	-	-	1	4	-	-	-	-	-	1	-	-	-	21	
Polygonum lapathifolium L. (pale persicaria)	-	-	4	-	-	-	-	-	-	-	-	-	-	9	
Polygonum persicaria L. (red shank, persicaria)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Polygonum lap/pers (persicaria)	-	-	-	2	-	-	-	-	-	-	-	-	-	4	
Polygonum sp.	-	-	-	16	-	-	-	-	-	-	-	-	-	16	
Rumex acetosella agg. (sheep's sorrel)	-	-	-	-	-	-	-	-	-	-	-	-	-	16	
Rumex spp. (dock)	-	-	2	-	2	-	-	1	-	3	1	-	-	55	
Polygonaceae indet.	-	-	-	-	-	-	-	-	1	-	-	-	-	24	
Urtica urens L. (stinging nettle)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Odonites verna (Bell.) Dum. (red bartsia)	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Veronica arvensis L. (wall speedwell)	-	-	-	-	-	-	-	-	-	-	-	-	-	7	
Rhinanthus sp. (yellow-rattle)	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Galeopsis sp. (hemp-nettle)	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Ajuga reptans L. (bugle)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Prunella vulgaris L. (self heal)	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Plantago lanceolata L. (ribwort plantain)	-	-	-	-	1	1	-	-	1	-	1	1	-	16	
Galium aparine L. (goosegrass)	-	1	9	23	46	14	5	6	6	93	50	9	-	903	
Galium cf. palustre L. (marsh bedstraw)	-	-	-	-	3	6	5	-	-	3	1	25	3	0	
Sherardia arvensis L. (field madder)	1	-	1	2	2	2	1	-	2	9	14	-	-	120	
Tripleurospermum inodorum (L.) Schultz Bip. (scentless mayweed)	-	-	-	-	-	-	-	-	-	-	-	-	-	55	
Lapsana communis L. (nipplewort)	-	-	-	1	-	-	-	-	1	1	3	-	-	12	
Avena sp. (oat)	-	-	-	-	-	-	1	-	-	1	-	-	-	3	
Bromus mollis/secalinus (bromegrass)	1	4	-	5	40	11	3	4	6	14	41	4	-	481	
Siegingia decumbens (L.) Bernh. (heath grass)	-	-	-	3	6	5	-	-	-	3	1	25	3	386	
small grasses (including Poa annua)	10	5	12	63	45	40	5	8	37	20	18	33	-	1691	
Gramineae indet. (medium size grasses)	-	1	-	3	1	-	2	-	2	2	1	2	-	109	
Arrhenatherum elatius, ssp. bulbosum (Willd.) Spenn. (onion couch)	-	1	-	-	-	-	-	2	1	-	-	-	-	9	
Carex pilulifera L. (pill-headed sedge)	-	-	-	-	1	-	1	-	-	-	-	-	-	11	
Carex spp. (sedge)	-	-	-	-	3	1	-	1	-	-	2	-	-	117	
<b>Other</b>															
Corylus avellana L. (hazelnut)	-	-	-	-	-	-	-	-	-	1	2	-	-	8	
Prunus spinosa L. (sloe)	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Rosa sp. (rose)	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Rubus fruticosus agg. (blackberry)	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Pteridium aquilinum (L.) Kuhn. fronds (bracken)	-	-	-	-	-	-	-	-	-	-	-	-	-	34	
Calluna vulgaris (L.) Hull. flowers (heather)	-	-	-	1	-	-	-	-	-	-	-	1	-	17	
Calluna vulgaris (L.) Hull. flowers (leafshoots)	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
<b>Indet.</b>															
Indeterminate rhizomes/tubers	-	-	-	2	2	-	1	-	6	-	8	3	-	98	
Indeterminate seeds	1	4	9	8	7	8	3	4	7	5	4	3	-	414	
<b>TOTAL</b>	173	485	83	246	256	132	50	92	325	249	299	188	-	8945	
Density of seeds per litre	7.7	16.2	3.7	8.2	17.1	17.6	1.7	3.1	17.3	8.3	10.0	12.5	-	7.9	

TABLE 11: Name changes in some plant species recovered at South Shields

Old name (Clapham, Tutin and Warburg 1962)	New name (Stace 1991)
Cruciferae	Brassicaceae
Leguminosae	Fabaceae
<i>Polygonum convolvulus</i> L. (black bindweed)	<i>Fallopia convolvulus</i> (L.) A. Love
<i>Polygonum lapathifolium</i> L. (pale persicaria)	<i>Persicaria lapathifolium</i> (L.) Gray
<i>Polygonum persicaria</i> L. (red shank, persicaria)	<i>Persicaria maculosa</i> (L.) Gray
<i>Polygonum lap/pers</i> (persicaria)	<i>Persicaria lap/map</i>
<i>Sieglingia decumbens</i> (L.) Bernh. (heath grass)	<i>Danthonia decumbens</i> (L.) DC.
Gramineae	Poaceae

(*Pteridium aquilinum*). All of these species occur in low numbers in the deposits, though this may reflect their lesser likelihood of getting charred and thus becoming preserved, rather than their original degree of abundance.

#### FORMATION PROCESSES

It has long been recognised that carbonised seed assemblages are made up primarily of the remains of harvested grain crops and their associated impurities (M. Jones 1988, Knörzer 1971). Furthermore, we know that the processing of these crops after the harvest and before storage or consumption alters the original composition of the assemblage. Variations in sample composition can thus often be explained by showing that these samples represent different stages of the crop processing sequence (see Hillman 1981, G. Jones 1984). In this section these variations between samples are explored, in order to understand the origin of the material in each context.

Five aspects are considered: the relative amounts of the four main constituents as described above (grain, chaff, weeds, other), the density of seeds per litre of sieved sediment and three ratios connected with the crop processing sequence (Van der Veen 1992). The first aspect provides a 'rough and ready' guide to broad differences between samples, and can be used here as only one crop species (spelt wheat) is represented in the samples. The seed density gives an indication of the rate of deposition and the likelihood of the material representing primary deposition (in this calculation of density the indeterminate seeds and rhizomes are excluded). Ratio 1 calculates the number of glume bases of spelt wheat to grains of spelt wheat. High values for this ratio represent a fine-sieving residue, values of around 1 represent complete spikelets, and values close to 0 represent cleaned grain. To calculate this value all *Triticum* sp. grains (except the compact grains) have been combined with those of *Triticum spelta*. Furthermore, the unidentified cereal grains have been proportionally divided between wheat and barley, according to the relative proportions of wheat and barley in each sample. Ratio 2 calculates the number of rachis segments of barley to grains of barley. As we are dealing with six-row barley a ratio of c. 0.3 would reflect complete ears of barley, higher values represent cleaning residues of the early stages of barley processing (i.e. winnowing or coarse-sieving residues), while lower values represent either a fine-sieving residue or cleaned grain. Ratio 3 calculates the number of weed seeds to cereal grains (in this case wheat and barley grains combined). A high value represents a

sieving residue, a low value (considerably less than 1) represents cleaned grain. The values for each ratio are given in Table 12.

#### CONTEXT 9740

There are 16 samples from this context. They are all very consistent in composition, comprising small amounts of cereal grain, a lot of chaff, intermediate amounts of weed seeds, as well as traces of other plants (Illus. 31). Cereal remains (both grains and chaff) always represent 50 per cent or more of the total. The density of seeds per litre is high: most samples have more than 10 seeds per litre (in many cases much more than that: Table 8 and Illus. 32). The exceptions are samples A and B, which lie at the very edge of the deposit. The values for Ratio 1 (Illus. 32) indicate that the samples all contain 10x or more spelt glume bases than spelt grains, and thus represent a fine-sieving residue. Ratio 2 could be calculated for six samples only. All of them contain high numbers of barley rachis segments relative to barley grains and represent residues of winnowing or coarse-sieving. Ratio 3 indicates that there are between 4 and 13 times more weed seeds than grains, pointing to a sieving residue.

Thus, context 9740 represents a fine-sieving residue of the spelt wheat crop, with minor admixtures of an early processing residue of barley. The results indicate that the deposit is consistent in composition and has a high density of seeds per litre. This suggests that the deposit was formed within a relatively short amount of time and that we are dealing with material in a primary context. Fine-sieving residues may be stored and used for fodder, but there is no evidence of a structure here (no post-holes or other structural evidence was found). However, the deposit is quite substantial (6x7 m), and may represent a processing by-product left near a threshing floor. Alternatively, it represents temporary storage in sacks.

#### THE PITS AND 'HOLLOWS'

Inside the house a number of pits and 'hollows' were identified. Fill 9759 of pit 9758 contained the iron adze; context 9757 probably represents the fill of the central hearth (9756). Context 9752/3/4 (fills of 9750) represents a concentration of burnt grain, possibly in a basket. This feature, like the other 'hollows', was not cut into the floor of the house, but consists of a shallow depression, probably produced by repeated wear. The content of these 'hollows' is likely to be similar to that of context 9730. The overall composition (Illus. 33) indicates that four samples (contexts 9752, 9753, 9754, 9754A) contain 80+ per cent grain, three samples — 9759 (fill of 9758), 21205 (fill of 21202) and 21257 (fill of 21258) — resemble the pattern from context 9740, while the remaining three samples are characterised by large numbers of weed seeds. The density of seeds per litre also identifies a diverse origin of the material (Table 9 and Illus. 32). Six samples have high seed densities (> 10 per litre), one sample has an intermediate seed density and three samples have low seed densities (< 2.5 per litre). The values for Ratio 1 indicate that four samples represent clean grain, one a fine-sieving residue (21257: fill of 21258), while two samples (21205: fill of 21202; 21233: fill of pit 21234) appear to represent mixtures. Ratio 2 could not be calculated as the amount of barley in these samples was negligible. Ratio 3 confirms that contexts (9752/3/4/4A)

TABLE 12: RATIOS OF THE MAJOR CROP CONSTITUENTS

Context	Sample No.	Wheat glume bases	Wheat grain	Ratio 1	Barley rachis	Barley grain	Ratio 2	Total weed seeds	Total cereal grain	Ratio 3
9740	A	26	8	3.3	.	.	.	11	8	1.4
9740	B	16	2	8.0	.	.	.	7	2	—
9740	C	130	17	7.6	6	8	0.8	69	25	2.8
9740	D	711	14	50.8	11	16	0.7	351	30	11.7
9740	E	682	52	13.1	33	27	1.2	645	83	7.8
9740	F	132	18	7.3	.	.	.	118	24	4.9
9740	H	99	42	2.4	.	.	.	109	44	2.5
9740	I	129	18	7.2	.	.	.	86	18	4.8
9740	J	225	13	17.3	9	6	1.5	257	20	12.9
9740	K	510	49	10.4	7	18	0.4	541	69	7.8
9740	L	192	19	10.1	28	42	0.7	355	61	5.8
9740	N	81	5	16.2	.	.	.	72	8	9.0
9740	O	161	23	7.0	.	.	.	121	23	5.3
9740	P	84	12	7.0	.	.	.	85	12	7.1
9740	Q	111	26	4.3	.	.	.	139	29	4.8
9740	R	224	11	20.4	.	.	.	77	11	7.0
9752	.	36	347	0.1	.	.	.	13	348	0.04
9753	.	25	493	0.1	.	.	.	13	499	0.03
9754	.	34	208	0.2	.	.	.	7	208	0.03
9754A	.	35	103	0.3	.	.	.	1	103	0.01
9757	.	3	4	—	.	.	.	38	4	9.5
9759	.	3	7	0.4	.	.	.	5	7	0.7
21,205	.	149	66	2.3	.	.	.	186	74	2.5
21,207	.	2	1	—	.	.	.	20	1	20.0
21,233	.	49	13	3.8	.	.	.	226	14	16.1
21,257	.	161	15	10.7	.	.	.	133	15	8.9
9730	5	0	0	—	.	.	.	2	0	—
9730	8	0	0	—	.	.	.	0	0	—
9730	10	6	2	—	.	.	.	21	2	10.5
9730	11	0	2	—	.	.	.	1	2	—
9730	12	14	9	1.6	.	.	.	79	9	8.8
9730	13	6	6	1.0	.	.	.	53	6	8.8
9730	15*	0	0	—	.	.	.	5	0	—
9730	17	0	1	—	.	.	.	11	1	11.0
9730	18	3	5	—	.	.	.	110	5	22.0
9730	19	47	32	1.5	.	.	.	390	32	12.2
9730	20	5	5	1.0	.	.	.	27	5	5.4
9730	21	17	17	1.0	.	.	.	98	17	5.8
9730	22	2	3	—	.	.	.	7	3	2.3
9730	25	5	2	—	.	.	.	75	2	37.5
9730	26	10	4	2.5	.	.	.	91	4	22.8
9730	27	12	6	2.0	0	12	0.0	157	18	8.7
9730	28	22	8	2.8	.	.	.	253	10	25.3
9730	29	1	2	—	.	.	.	8	2	4.0
9730	30	0	1	—	.	.	.	2	1	—
9730	31	29	14	2.1	.	.	.	106	14	7.6
9730	32*	18	16	1.1	.	.	.	98	16	6.1
9730	33	3	9	0.3	.	.	.	40	10	4.0

## SOUTH SHIELDS ROMAN FORT

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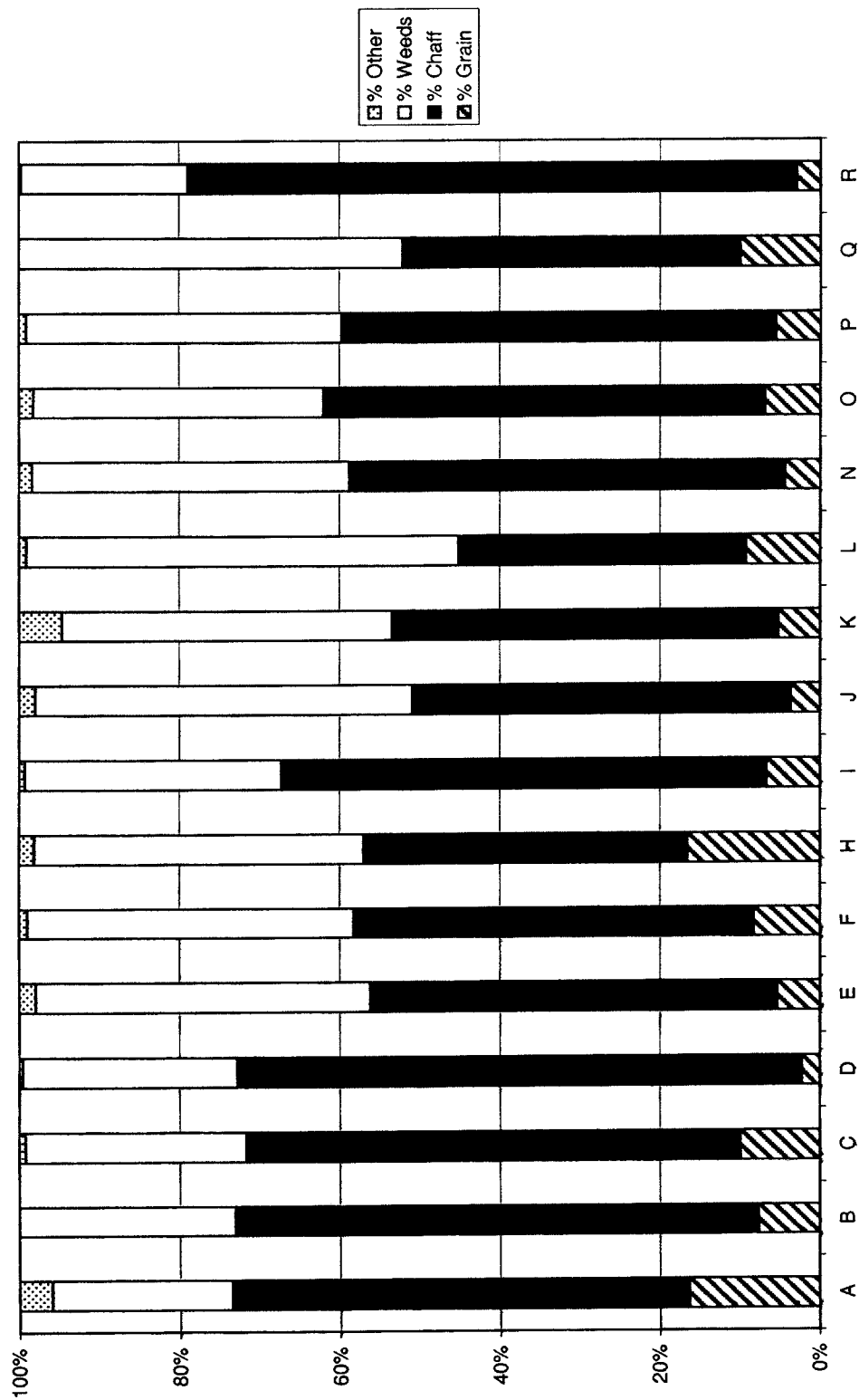
9730	34	16	42	0.4	.	.	.	211	44	4.8
9730	35	2	6	—	.	.	.	214	6	35.7
9730	36	7	23	0.3	.	.	.	502	27	18.6
9730	37	3	0	—	.	.	.	20	0	20.0
9730	38	10	1	10.0	.	.	.	24	1	24.0
9730	39	15	15	1.0	.	.	.	83	15	5.5
9730	40	26	28	0.9	.	.	.	89	28	3.2
9730	41	1	29	0.0	.	.	.	140	32	4.4
9730	42	6	55	0.1	.	.	.	349	55	6.3
9730	44	0	0	—	.	.	.	43	0	43.0
9730	45	2	12	0.2	.	.	.	109	14	7.8
9730	46	0	14	0.0	.	.	.	34	14	2.4
9730	47	2	398	0.0	.	.	.	26	409	0.1
9730	48	10	141	0.1	.	.	.	98	141	0.7
9730	49	0	5	—	.	.	.	105	5	21.0
9730	50	1	48	0.0	.	.	.	301	51	5.9
9730	51	0	3	—	.	.	.	33	3	11.0
9730	52	14	25	0.6	.	.	.	289	27	10.7
9730	53	12	2	6.0	.	.	.	63	2	31.5
9730	54	13	10	1.3	.	.	.	27	10	2.7
9730	55	14	142	0.1	.	.	.	12	145	0.1
9730	56	7	456	0.0	.	.	.	17	456	0.0
9730	58	0	4	—	.	.	.	70	4	17.5
9730	59	13	8	1.6	.	.	.	214	8	26.8
9730	60	38	24	1.6	.	.	.	174	24	7.3
9730	61	9	14	0.6	.	.	.	97	14	6.9
9730	62	13	5	2.6	.	.	.	28	5	5.6
9730	63	18	38	0.5	.	.	.	29	40	0.7
9730	64	152	84	1.8	.	.	.	66	84	0.8
9730	69	41	23	1.8	.	.	.	164	25	6.6
9730	70	56	36	1.6	.	.	.	185	37	5.0
9730	71	91	15	6.1	.	.	.	67	15	4.5

represent clean grain. Contexts 21205, 21233 and 21257 contain sieving residues, while the remaining samples contain a mixture of material.

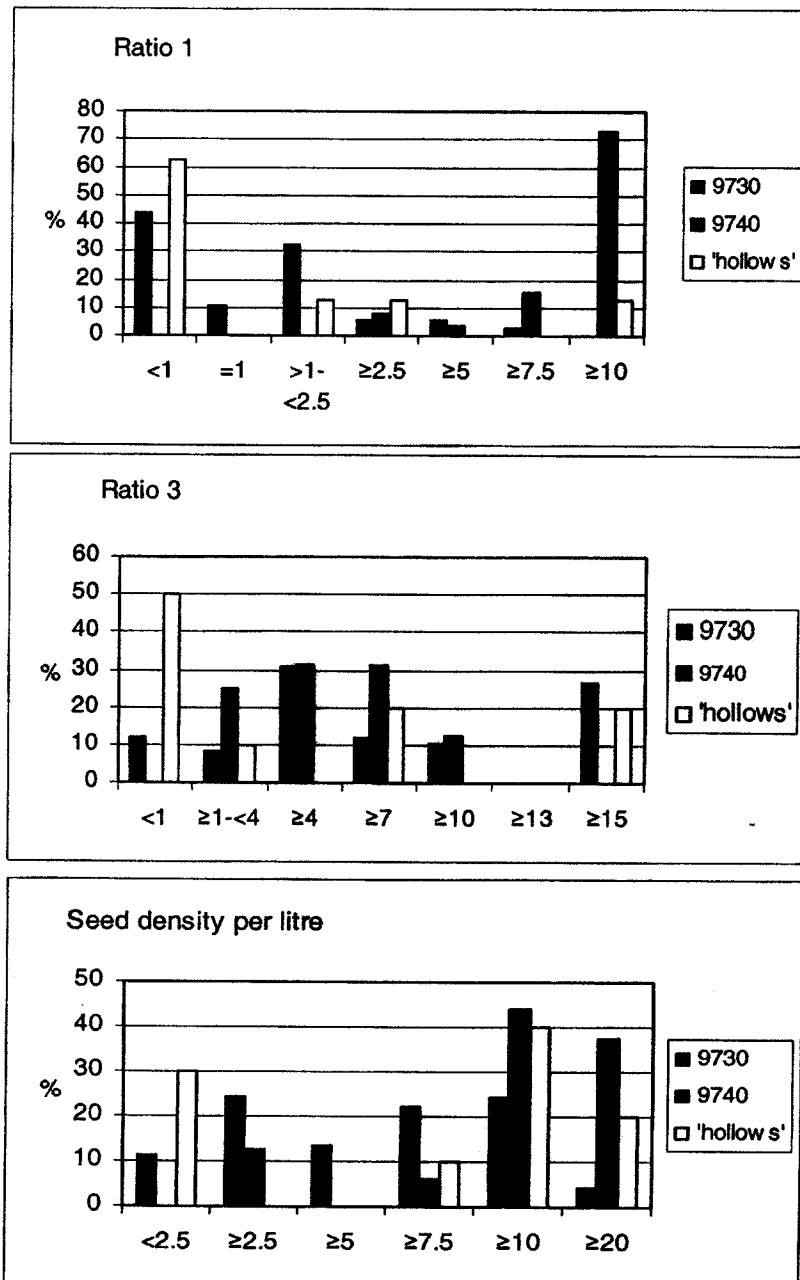
We can conclude that contexts 9752, 9753, 9754 and 9754A represent clean spelt grain. They all originate from the same feature (9750), already identified during excavation as a concentration of grain in a possible basket; they clearly represent a primary deposit. Three samples (21205, 21233 and 21257) contain some evidence of fine-sieving residues of spelt wheat, though the number of weed seeds is unusually high. Context 9757, from the hearth, contains a large amount of weed seeds and little else (similar to many samples in context 9730, below). The content (9759) of pit 9758 could not be allocated to a crop processing stage (it contained culm nodes and weed seeds), nor could that of 21207 (fill of hollow 21208).

## CONTEXT 9730

In total 54 samples from this context were analysed (14, 23 and 24 contained no plant remains and 43, 67 and 68 have been lost). Of these 41 contained 50 or more seeds. The majority of the samples is characterised by large amounts of weed-seeds (Illus. 34; samples with less than 50 seeds have not been plotted). The exceptions are samples 47,

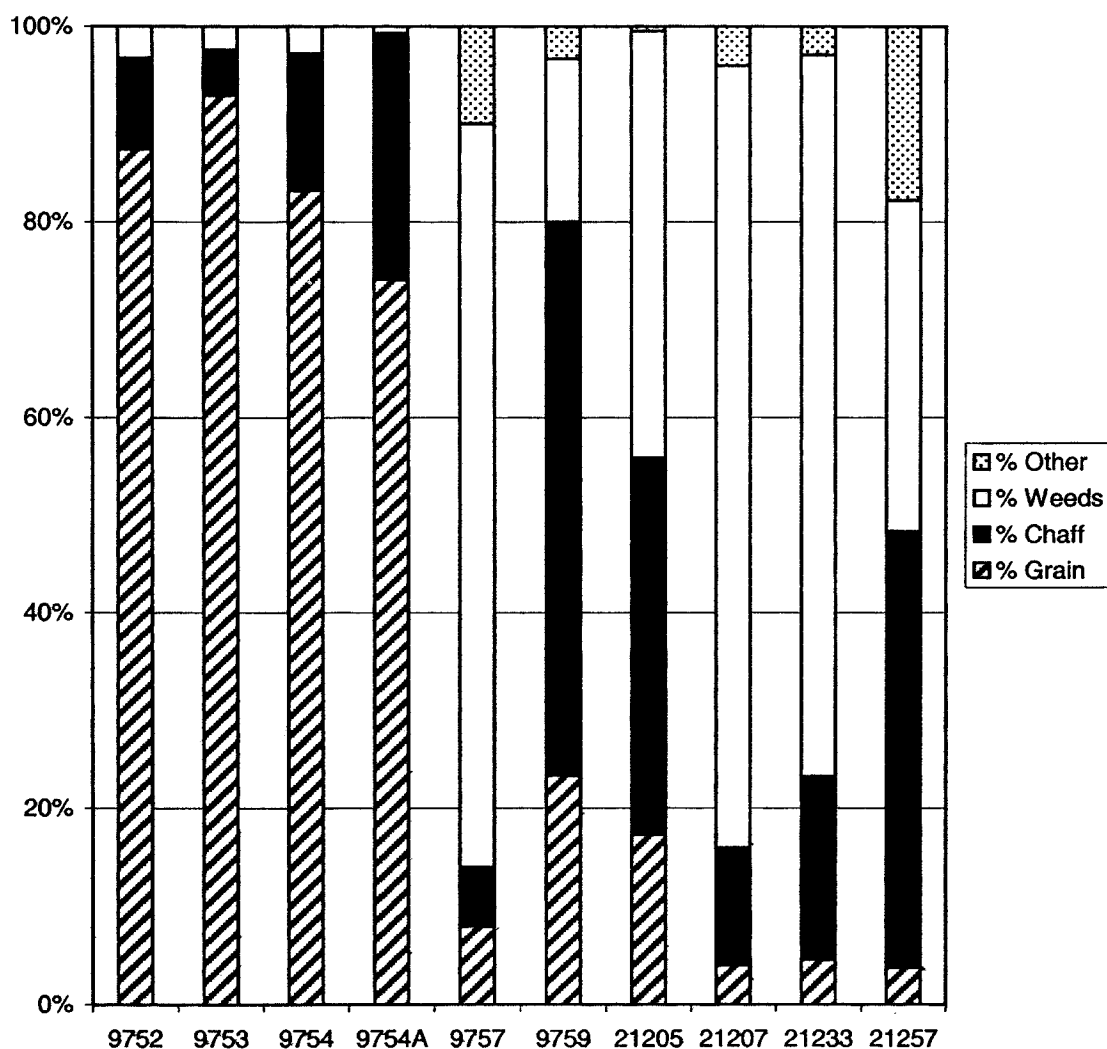


Illus. 31. Relative proportions of the major sample constituents, context 9740



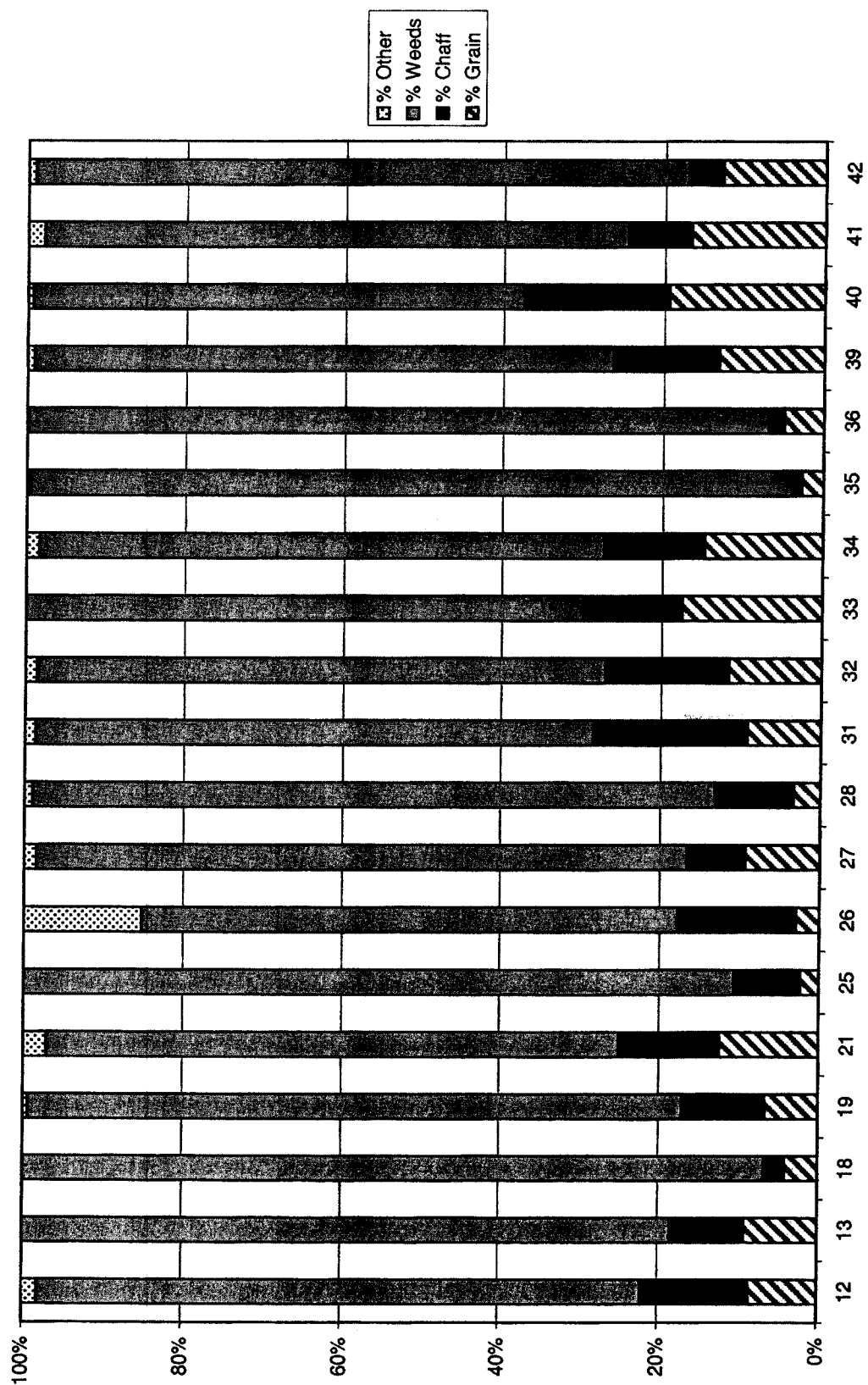
Illus. 32 Relative proportions of ratio values and seed densities



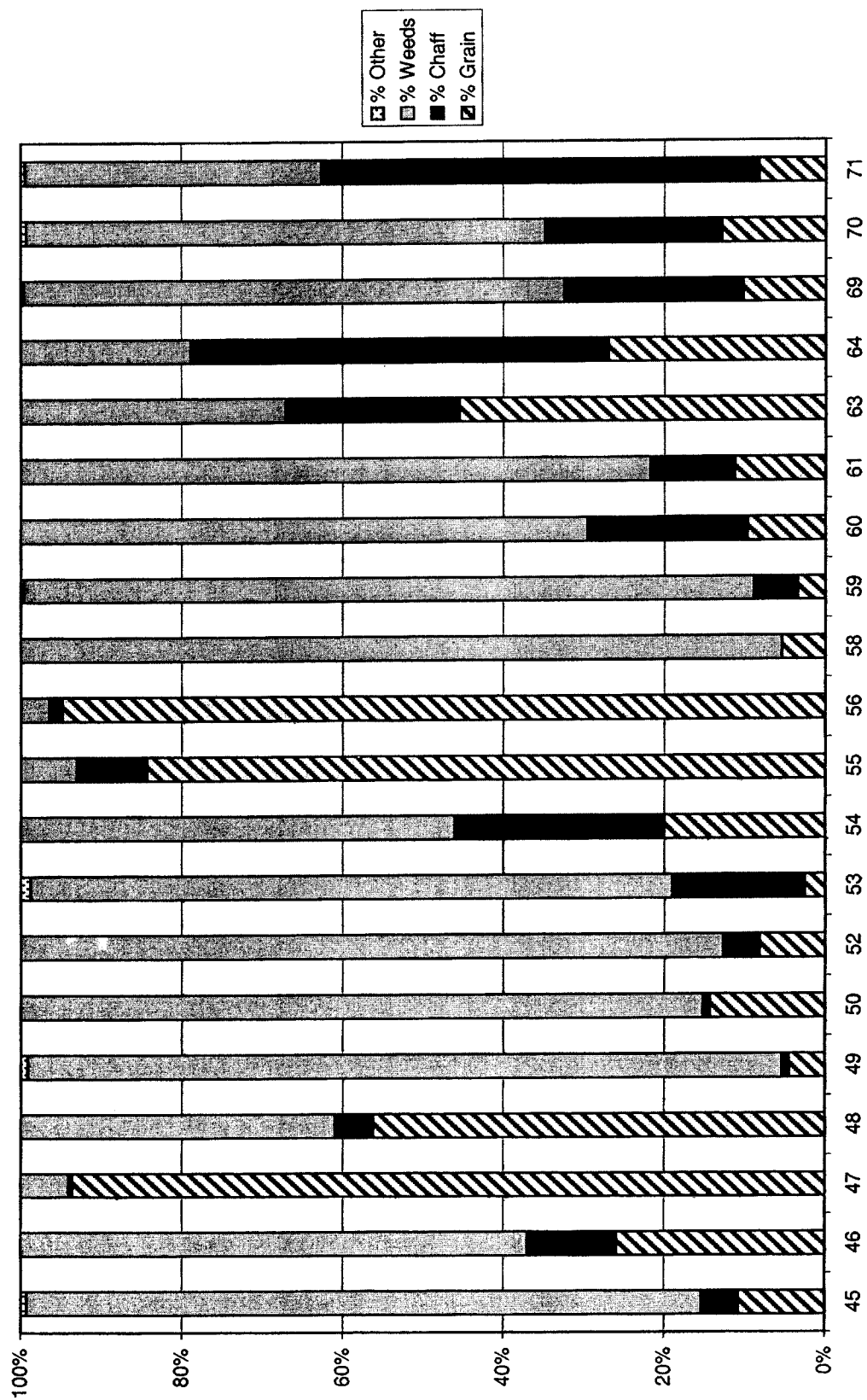


Illus. 33 Relative proportions of the major sample constituents, pits and 'hollows'

48, 55 and 56, which contain large numbers of cereal grains (c. 80 per cent). The density of seeds in this context is variable: many samples have low densities, but some, especially samples 47, 48, 55 and 56, have high ones. The values of Ratio 1 identify eight samples as containing clean grain, four samples as containing spikelets of spelt wheat, and 16 as possible fine-sieving residues, though in most cases the numbers on which this ratio is calculated are extremely low (Table 12; another nine samples had indeterminate values). There is only one value for Ratio 2 as the samples contain virtually no remains of barley. Sample 27 has some barley grain, but no rachis, and represents either the fine-sieving residue or product. The values for Ratio 3 are very variable: several samples have values considerably below 1 and these represent clean



Illus. 34A. Relative proportions of the major sample constituents, context 9730



Illus. 34B Relative proportions of the major sample constituents, context 9730

grain. However, the majority of the samples contain more weed seeds than grains, in some cases considerably so.

To conclude, the samples from this context divide into several groups: firstly, there are four samples (47, 48, 55 and 56) which clearly represent clean grain, and their seed densities suggest primary deposition. Other samples are suggestive of fine-sieving residues, though compared with the samples from context 9740 they appear to contain very low amounts of cereal grains and chaff. Other samples consist almost entirely of weed seeds. These are difficult to interpret which probably means that they contain material of mixed origin. This, together with the low seed densities, suggests that most of the material was not deliberately deposited in this context, but is the result of casual refuse and 'background noise'.

#### CONTEXT 9782

The wall-slot was divided into segments for sampling purposes and 19 samples were collected. Lack of time meant that these samples could not be fully analysed, though most were sorted. The samples from the northern and western part of the wall-slot (samples 1-13) all contain very small amounts of seeds, mostly well below 50 seeds per sample. In terms of the sampling squares, this part of the slot runs through 58, 49, 41, 33, 25, 17, 18, 10, 11, 4, 5, 6, 7, 15 and 16. Samples 20-25 (with the exception of 22) are much richer in seeds, with the seed densities in samples 23, 24 and 25 reaching above 10 per litre. In terms of the sampling squares, this is the part of the slot running through or near squares 66, 67, 68, 69, 70, 71, 72 and 64, with the highest concentration at 70, 71, 72 and 64. The density was therefore greatest at the front of the southern part of the house, to the left of the door upon entry. The composition of the samples is similar to those from context 9730, i.e. small amounts of cereal grain and chaff and large numbers of weed seeds. *Galium aparine* and *Polygonum aviculare* are particularly common, as in context 9730. It seems likely that the seeds in the wall-slot are derived from what was originally lying on the floor of the house.

#### REMAINING CONTEXTS

A large number of samples was collected from the drainage gully of the house (contexts 9747, 9749, 21259, 21235 and 21260). All were very poor in seeds, mostly no more than 5-10 seeds: this situation presumably represents seeds blowing around the settlement, or so-called 'background noise'. Samples from the boundary gully (context 21288) have not been analysed due to lack of time, but a cursory inspection of the samples indicated that most were very poor in plant remains.

#### CONTEXTUAL VARIATION

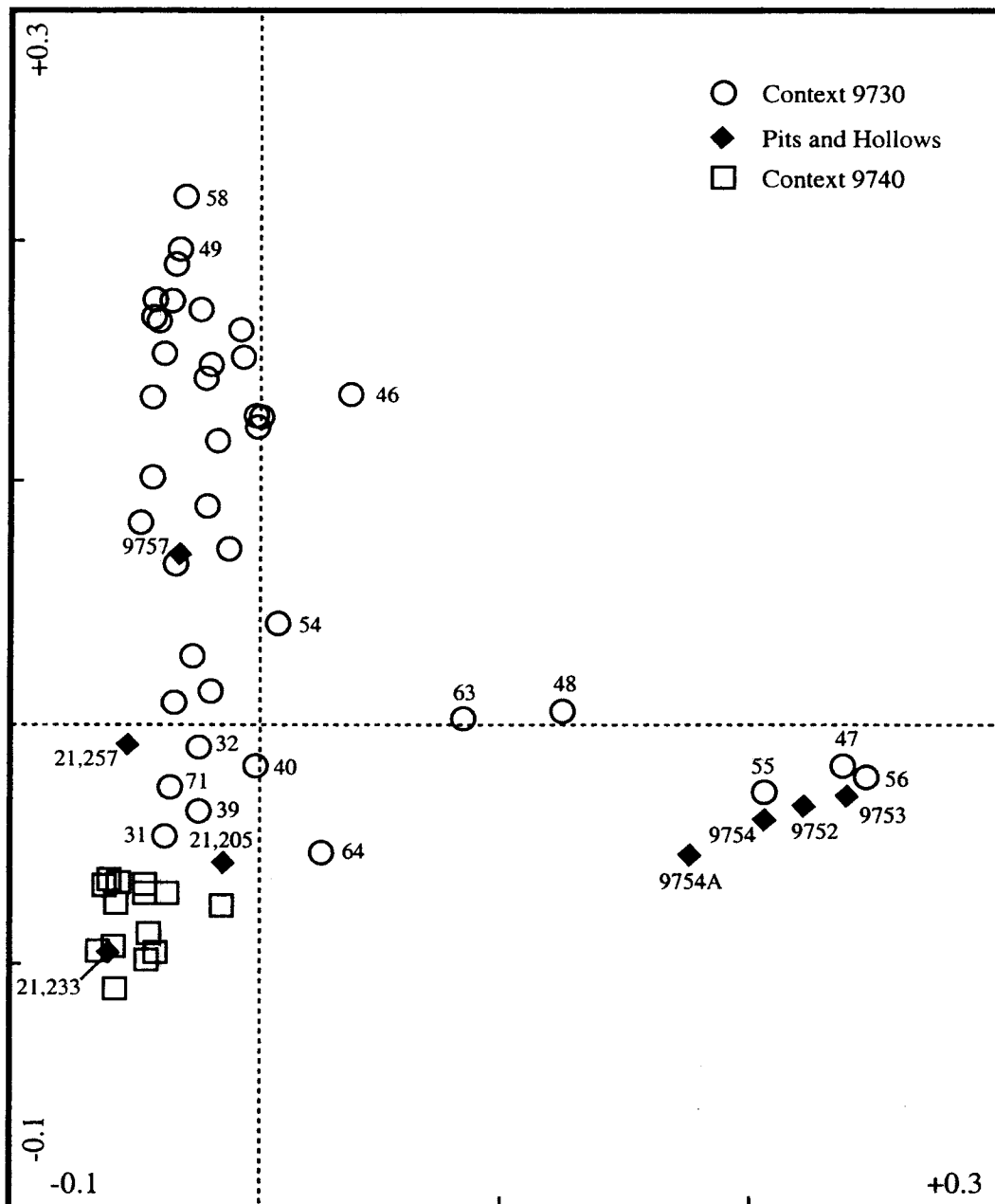
So far, we have considered the variation within each context by looking at the main categories of material, their relative proportions and ratios. In this section we will explore differences between samples and contexts by reviewing the individual species that characterise the different contexts. For this purpose the grains of *Triticum spelta* and *Triticum* sp. were combined (but excluding the compact grains) and the unidentified cereal grains were allocated to wheat or barley according to their relative proportions in each sample. The glume bases of *Triticum spelta* and *Triticum* sp. were

also combined, as were *Chenopodium album* and *Chenopodium* sp. Moreover, samples with less than 50 identifications were excluded from the analysis, as were species that occurred in less than 10 per cent of the samples (for reasons see Van der Veen 1992, 25). The resultant data set consists of 61 samples and 34 species. The data were analysed using an ordination technique called Correspondence Analysis, using Canoco 4 and CanoDraw 3.1 (Ter Braak and Šmilauer 1998). This technique identifies differences between samples on the basis of their species composition. The first, horizontal axis identifies the main variation within the samples, and plots samples that are dissimilar to one another at opposite ends of the first axis. The second, vertical axis explains further differences between the samples, again plotting samples according to their (dis)similarity. The species are plotted in similar fashion, i.e. those that frequently co-occur are plotted close together, those that do not are plotted at opposite ends of the axes. For reasons of clarity the samples and species plots are here given as separate figures (Illus. 35 and 36).

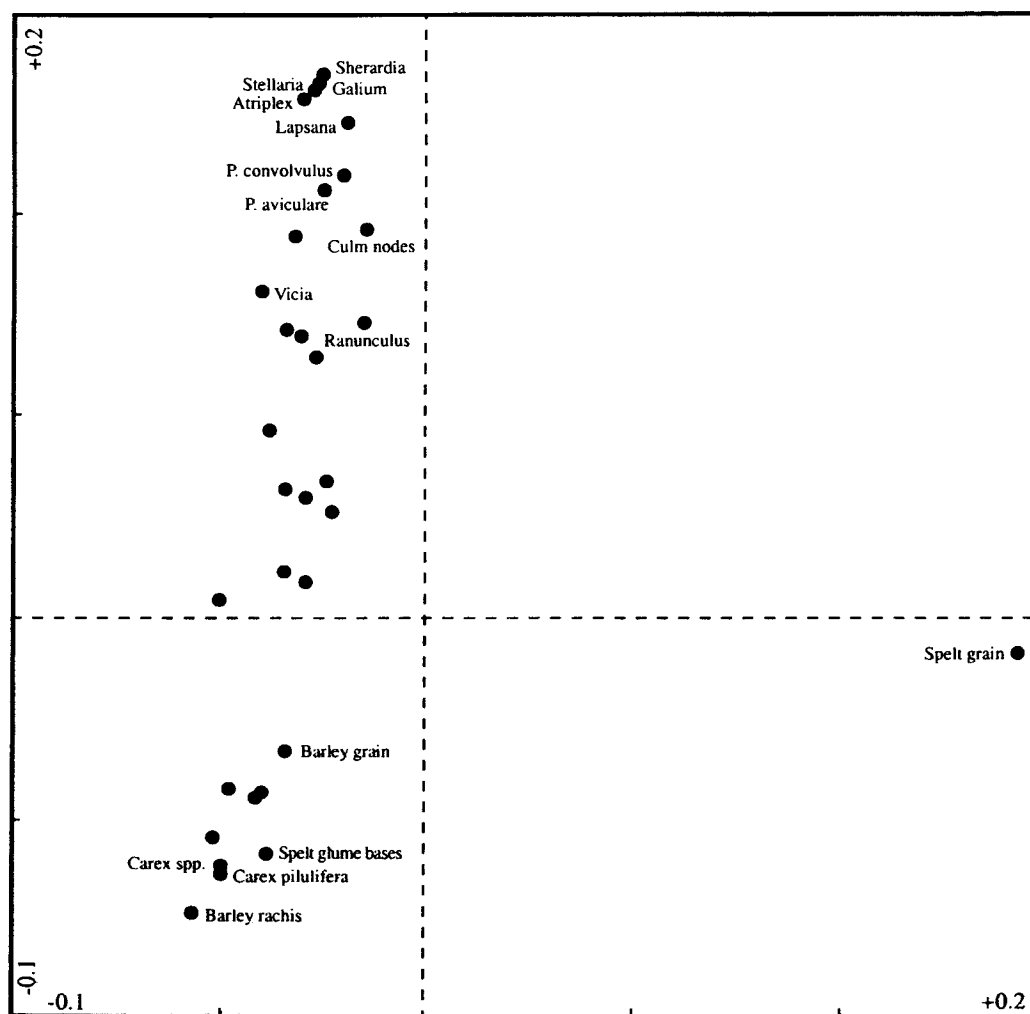
Three groups of samples can be clearly identified: the first group is characterised by high amounts of spelt grain and little else (context 9730: samples 47, 48, 55 and 56, as well as samples 9752/3/4/4A). The second group represents all the samples from context 9740, and is characterised by high proportions of glume bases of spelt wheat, seeds of *Sieglingia* and *Carex*, as well as rachis segments and grains of barley. Added to this group are samples 21233, 21205 and, to a lesser extent, 21257, as well as a few samples from context 9730 (31, 39, 71, 32 and 40). The third group comprises most of the samples from context 9730 and is characterised by a range of weed seeds (see below). They do not belong to any specific crop-processing residue or product.

The samples in group 3 need some further discussion. Amongst the many weed seeds in these samples are most of the so-called 'large' weed seeds, that is weed seeds that are similar in size to the diameter of cereal grains. These cannot be removed during sieving and are normally removed by hand, immediately before food preparation. Examples are *Galium aparine*, *Polygonum convolvulus*, *Vicia/Lathyrus*, *Ranunculus* Subgenus *Ranunculus* and *Bromus mollis/secalinus*. These species are very common in context 9730, but rare in context 9740, suggesting that the samples from 9730 contain hand-cleaning residues. These same samples also contain large numbers of *Polygonum aviculare*, again unlike 9740, but the seeds of this species tend to be smaller than those mentioned above. Culm nodes are also more common in these samples and may also represent some hand-cleaning. Moreover, the evidence for some complete spikelets in these samples may also be interpreted as hand-cleaning (most of the spikelets will have been broken up during the earlier stages of processing, but some may have remained intact and may have been removed by hand just prior to food preparation).

While the composition of the samples in group 3 can be partly explained by the presence of hand-cleaning residues, the number of small weed seeds present suggests a further possibility. Other potential sources of weed seeds in the house are thatch and bedding (Letts 1999). Both commonly contain many wild plants which can trickle down onto the floor of the house and become burnt in the hearth or, alternatively, were burnt during the catastrophic fire of the house. Thus, as suggested above, many of the samples from context 9730 appear to contain material of mixed origin.



Illus. 35 Correspondence analysis of the samples, axes 1 and 2

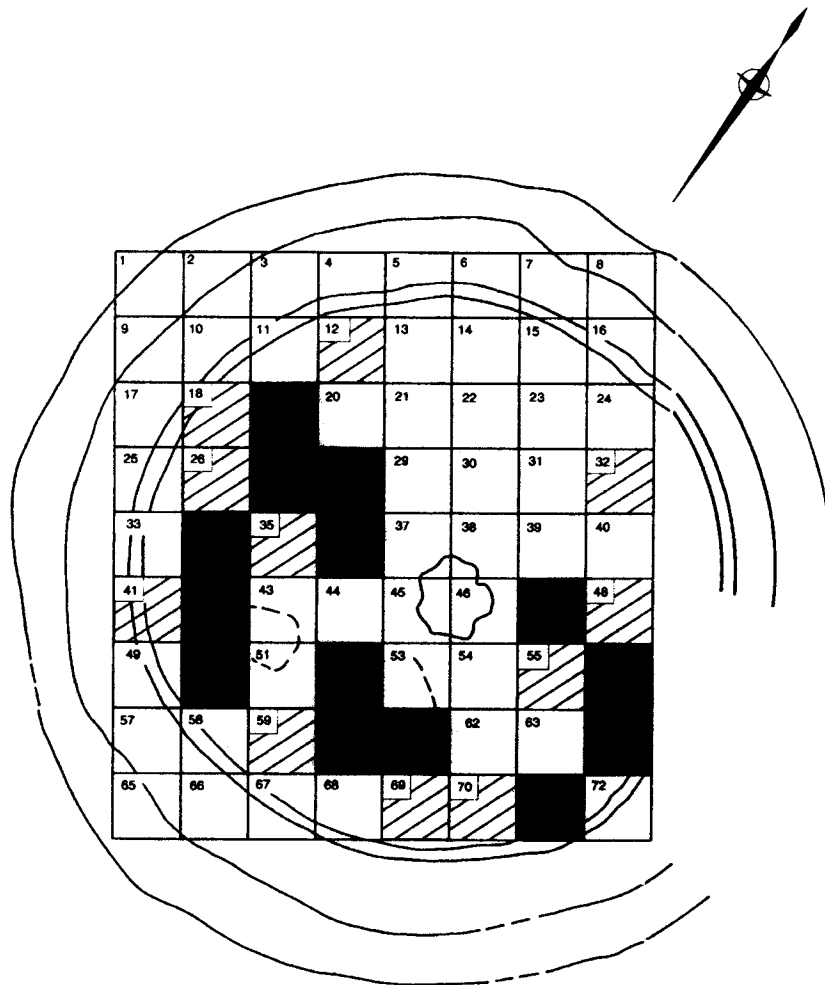


Illus. 36 Correspondence analysis of the species, axes 1 and 2

### SPATIAL VARIATION IN THE HOUSE

In order to assess the evidence for spatial patterning in the use of plants in and outside the house, contexts 9730 and 9740 were sampled extensively and on a grid basis. It is clear from the analyses discussed above that context 9740 represents homogenous material deposited over a short period of time, i.e. fine-sieving residue of the spelt wheat crop. Context 9730 is different: it contains material of mixed origin and some spatial patterning exists.

The seed densities for each sample in context 9730 have been plotted on Illus. 37. Both the north-eastern area of the house and the area around the hearth (9756) have lower than average densities. The area inside and left of the entrance, as well as the



## Distribution of seed densities

- ☐ Seed density below average
- ☒ Seed density approximately average
- ☒ Seed density above average

Illus. 37 Distribution of seed densities across context 9730

back of the house have higher densities. The area inside the entrance represents the concentration of grain mentioned above. This general pattern is corroborated by the results from context 9782, the wall-slot. The higher densities in this context are also located in the south-eastern corner of the house.



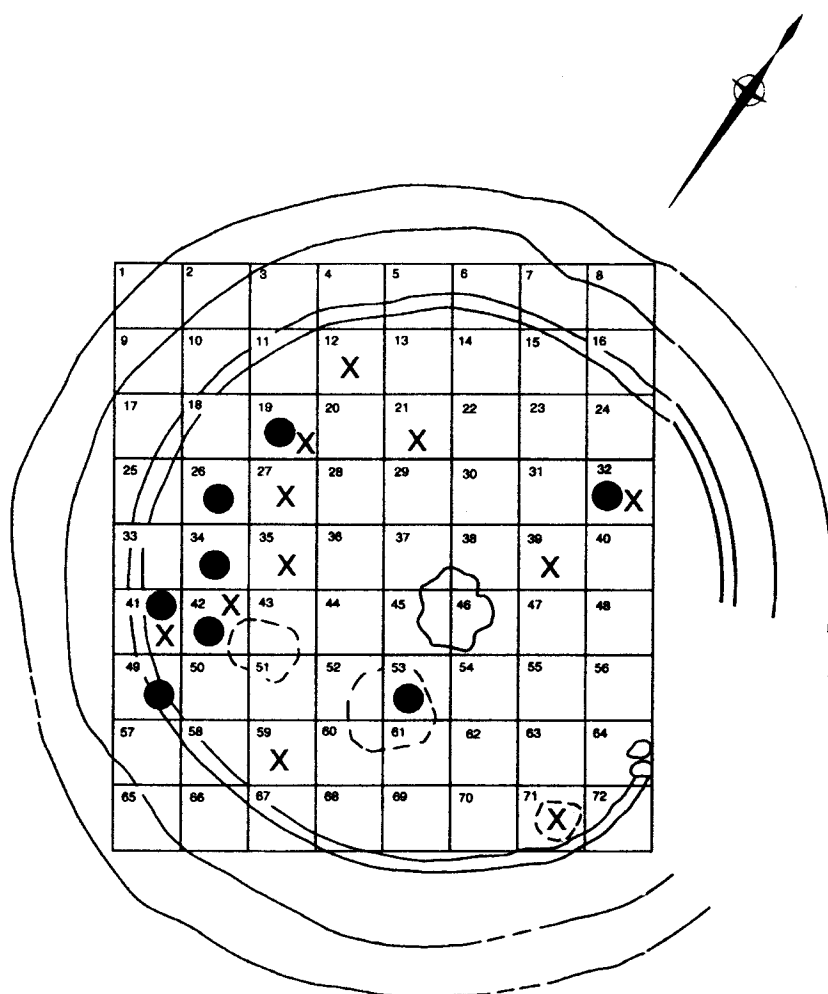
The occurrence of heather, bracken and culm nodes may be used to identify the presence of areas of bedding and/or of collapsed roofing; all three materials have been used for these purposes in the past (Letts 1999). An even coverage across the house might be indicative of roofing material, a clear spatial pattern may be evidence for bedding. A complicating factor here is that collapse of part of the external wall onto the floor may have sealed the floor deposits and prevented them from burning. This was possibly the case where an area of unburnt daub was found in the north-eastern part of the house (approximately over squares 14, 15, 23 and 24).

The distribution of heather, bracken and culm nodes is given in Illus. 38 and 39. All three are more common in the southern and western (back) part of the house; the northern and eastern parts of the floor are 'cleaner'. This suggests that the material does not represent roofing material (presumably this was burnt to ash and thus not recognisable). The culm nodes in the south-eastern part of the house may represent hand-cleaning of the grain. The combination of heather, bracken and culm nodes in the area diametrically opposite the doorway may possibly represent evidence of a sleeping area.

The food plants are plotted on Illus. 40. As discussed above, the spelt grain is clearly concentrated in one area, above context 9750. Samples 47, 48, 55 and 56 are identical in composition to those from that feature and we conclude that the grain in these samples derives from that feature. The material does not represent grain stored in the roof and fallen onto the floor during the fire, but represents part of the grain kept or abandoned in context 9750. The significance of the location of a large batch of clean spelt grain immediately inside the entrance is not clear, other than that such a position would offer enough light to carry out hand-cleaning, but see further discussion below.

The other food plants (hazelnuts, sloe and rosehip) are found in only small numbers. Their distribution does not indicate any clear patterning, though there is some suggestion that they lie around, but at some distance from the hearth. They may represent the inedible remnants of 'snack' foods which were thrown away into the hearth, became charred and were later swept onto the floor during cleaning of the hearth. Alternatively, they were thrown onto the floor by people sitting around the hearth and were later burnt during the fire.

To conclude, the distribution pattern of the plant remains across the floor of the house suggests that at the time of the fire a quantity of spelt wheat was kept in the house, probably in preparation for cooking and eating. The location of this batch of grain is just inside the entrance of the house. Scattered across the floor were small amounts of large weed seeds, some spikelets and culm nodes removed during hand-cleaning of this and previous batches of grain. The area near and around the hearth (9756), as well as the northern part of the house, are relatively free of seeds, suggesting that activities took place here that prevented the accumulation of plant remains. The areas near the grain and at the back of the house contain the most plant remains, suggesting that these parts of the house saw activities compatible with plant deposition. The area around the grain may be interpreted as the place where hand-cleaning of grain just before food preparation took place (it has the best light), with the contaminants removed from the grain scattered around. The back of the house sees



Bracken and heather distribution

X Bracken

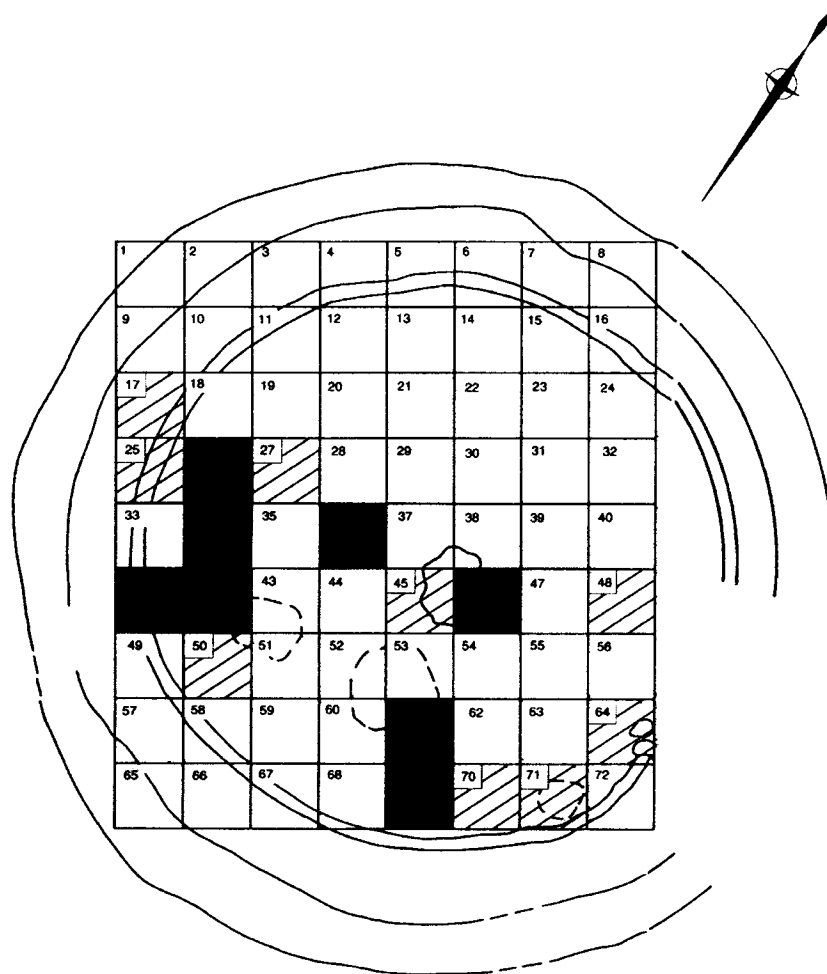
● Heather

Illus. 38. Distribution of heather and bracken across context 9730

most of the potential bedding material (heather, bracken and culm nodes) and may be the area where the inhabitant(s) slept (see also p. 147 ff.).

#### WEED ECOLOGY

Weed species have varying preferences for soil conditions such as moisture, pH and available nitrogen. By tabulating these preferences for the weed species associated with the cereal crops we can assess the soil conditions of the arable fields in which these

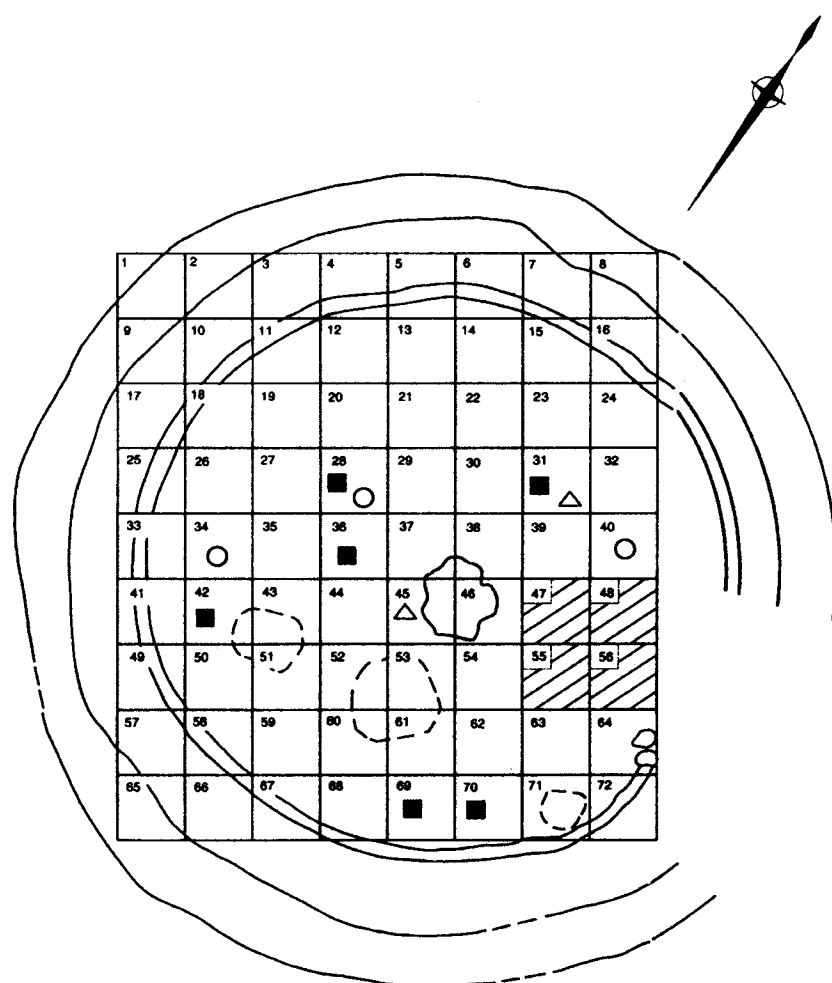


Distribution of culm nodes

- density below average
- density average
- density above average

Illus. 39 Distribution of culm nodes across context 9730

crops were grown and from that we infer how these crops were cultivated. Not all the weed species could be used in this analysis, i.e. only those identified to species level. The soil preferences have been taken from Clapham *et al.* (1962), Ellenberg (1979), and Fitter (1978). The figures for each edaphic factor have been calculated using the number of seeds expressed as a percentage of the total number of weed seeds. In each



## Distribution of food plants

- Hazelnut
- Sloe
- △ Rosehip
- ▨ Spelt grain concentration

Illus. 40 Distribution of food plants across context 9730

case broad categories were used (see Table 13), and the figures are presented for context 9730 and 9740 separately (the grain-rich samples in context 9730 contain virtually no weed seeds and are consequently of little value in this calculation).

In terms of soil moisture the figures in Table 13 clearly indicate that many species are indifferent to soil moisture (especially *Polygonum aviculare*, *Galium aparine*, *Bromus*

TABLE 13: Weed ecology

Soil moisture	9740	9730	Soil PH	9740	9730
Dry	1.6	9.2	Acid	26.0	8.0
Well-drained	3.0	5.1	Weakly acid	0.9	17.5
Damp	0.1	0.7	Neutral	1.1	10.8
Wet	0.0	0.0	Alkaline	0.0	0.0
Indifferent	37.3	47.8	Indifferent	14.0	26.5
Indeterminate	58.0	37.2	Indeterminate	58.0	37.2
Nitrogen	9740	9730	Life form	9740	9730
Poor	42.2	9.5	Annuals	13.3	46.6
Intermediate	3.2	5.0	Annuals that		
Rich in nitrogen	2.0	26.9	can overwinter	0.9	8.2
Indifferent	11.8	23.6	Perennials	45.0	11.0
Indeterminate	40.8	35.0	Indeterminate	40.8	34.2

*mollis/secalinus*, and *Sieglingia decumbens* — the most numerous species in the assemblage). The remaining species suggest relatively well-drained soils; there is no evidence for wet or waterlogged soils. In terms of soil pH, the figures suggest that the soils varied from acid (e.g. *Sieglingia decumbens*) to weakly acid/neutral (e.g. *Galium aparine*, *Tripleurospermum inodorum*). A clear difference is visible between the two contexts, due to the high numbers of *Galium aparine* in context 9730 and *Sieglingia decumbens* in context 9740. The figures for availability of nitrogen also identify a major difference between these two contexts. Context 9740 is characterised by a high proportion of poor soil indicators (esp. *Sieglingia decumbens*, *Carex* spp.), while context 9730 (with high numbers of *Galium aparine*) scores high for soils rich in nitrogen (and species indifferent to soil nitrogen, such as *Polygonum aviculare*, *Bromus mollis/secalinus*, and *Plantago lanceolata*).

A further aspect to consider is that of lifeform. Annual species are those which can tolerate a considerable degree of soil disturbance in the form of digging, ploughing, hoeing and weeding. Perennial weed species are more sensitive to soil disturbance as this may damage their root systems or may bury the plant. Perennial species recover much less well from such damage than annuals do. In the calculation of the relative proportions of annuals and perennials, *Arrhenatherum bulbosum* has been treated as an annual (see Van der Veen 1992, 137). Two species, *Stellaria media* and *Montia fontana* are annuals which can overwinter; they have been listed separately. Again, we see a dramatic contrast between the two contexts: context 9730 is characterised by annuals, context 9740 by perennials. For context 9740, this pattern suggests but little soil disturbance in the field where the spelt crop had been growing, thus encouraging the growth of these perennial species. The information from context 9730 is more difficult to interpret as the seeds in the samples are of mixed origin.

Thus, the ecology of the weed species suggests that the soil fertility in the fields was rather low, i.e. the replacement of nutrients after each harvest, through manuring or fallow, was not sufficient, and that the amount of soil disturbance (ploughing, digging,

weeding) was also rather low. Nevertheless, the evidence for better soil conditions such as *Galium aparine*, *Tripleurospermum inodorum*, *Stellaria media*, and *Chenopodium album*, esp. in context 9730, does suggest that the conditions in the fields were far from disastrous. This type of assemblage has been interpreted as characteristic of an expansion of arable production or an extensive cultivation regime (Van der Veen 1992). It is worth noting here the contrast between the two contexts in the ecological information they contain. This fact, of course, highlights the importance of first screening samples for crop-processing stage and other formation processes, before using them in comparison either within the site itself or with other sites (see also G. Jones 1987). This issue will be explored further at a future date.

Most of the samples clearly represent the remains of a spelt wheat crop, but the samples from context 9740 also contain some remains of six-row, hulled barley. The barley remains represent an early processing residue (winnowing or coarse-sieving), while the spelt represents a late one (fine-sieving). Because the two crops are derived from two different crop processing stages, we cannot compare the weed assemblages associated with these two crops, as we would not be comparing 'like with like' (G. Jones 1987). What we can say is that the two crops were treated separately.

In the area immediately to the west of the house a cultivation plot was uncovered with clear evidence of spade-dug furrows, but no ard marks. It is possible that the spelt or barley crops were grown here, though other interpretations are possible, such as a horticultural plot next to the house. Such plots are often associated with intensive cultivation regimes. The evidence from the weed ecology, however, suggests that the spelt crop was grown under a more extensive regime or, at least, in fields that received relatively little soil disturbance and only moderate amounts of nitrogen. If this interpretation is correct and if the plot next to the house was used for growing spelt wheat, then we must assume that the plot, after the initial digging of the furrows, was neither regularly treated with manure, nor repeatedly dug.

Alternatively, the plot was used for growing vegetables (greens, peas or beans). These species are notoriously underrepresented in charred seed assemblages and their absence here does not preclude their presence on the site. No pollen is preserved in the soil here, so we cannot establish what exactly the plot was used for.

## REGIONAL CONTEXT

In a recent synthesis of the development of arable farming in north-east England (Van der Veen 1992) it was demonstrated that during the Iron Age considerable differences existed between sites in the way people cultivated their crops. A detailed analysis of the charred seed assemblages from six late iron-age settlements indicated that in the northern part of the region a system of small-scale, subsistence agriculture was in operation (Group A sites), while in the southern part of the region larger-scale cultivation, reflecting an expansion of arable farming was prevalent (Group B sites). It is thought that differences in the socio-economic structure of society rather than environmental differences are underlying this divergence (Van der Veen 1992).

Group A sites (Murton, Dod Law and Chester House in Northumberland) are characterised by the presence of emmer wheat and barley, with only small amounts of spelt wheat, and by a weed assemblage dominated by annual species indicative of good

soil conditions. Group B sites (Thorpe Thewles in Cleveland, plus Stanwick and Rock Castle in North Yorkshire) are characterised by spelt and barley, an absence of emmer wheat, as well as a weed assemblage dominated by perennial species indicative of poorer soil conditions. Since then data from four more sites have become available: Scotch Corner (Huntley 1995), Melsonby (Van der Veen 1999), both in North Yorkshire; Port Seton, East Lothian (Huntley 2000), and now South Shields. Scotch Corner and Melsonby are clearly Group B sites, while Port Seton is more similar to the Group A sites.

The results from South Shields indicate that spelt wheat was the dominant wheat species; there is no evidence for the cultivation of emmer wheat. Barley is less numerous than on the other Group B sites, but this is, almost certainly, due to the fact that the samples originate from one catastrophic event, rather than from a large number of different events. The weed assemblage (at least that of context 9740) contains a large number of perennial species, and is dominated by species that are either indifferent to soil conditions (e.g. *Bromus mollis/secalinus*, *Polygonum aviculare*) or indicative of rather poor soil conditions (*Sieglingia decumbens*, *Carex* spp., *Montia fontana* etc.). Thus, both the type of cereals grown and the weed assemblage are typical of Group B sites. With its location at the mouth of the river Tyne, South Shields now represents the most northerly site of this group recorded to date. Furthermore, the location of Group B sites is now no longer restricted to the Tees lowlands, as it had been before the discovery of the site at South Shields.

The radiocarbon dates for the seed assemblages in the above-mentioned study demonstrate that these two cultivation regimes were contemporary and that this divergence in agricultural regimes was in existence in the region by c. 300 B.C. (Van der Veen 1992). The four radiocarbon dates for the spelt grain (context 9730) and spelt glume bases (context 9740) from South Shields, when combined, give a date of  $2207 \pm 43$  B.P., which gives a calibrated date range of 390–170 cal. B.C. This makes South Shields one of the earliest Group B site, possibly slightly earlier than Phase I at Thorpe Thewles, Cleveland (Heslop 1987, Van der Veen 1992), where the earliest occupation is thought to start no earlier than c. 300 cal. B.C.

## SUMMARY AND CONCLUSIONS

The archaeobotanical analysis of 80 samples has produced a remarkably rich assemblage of charred plant remains (19,787 seeds in total). The results demonstrate that two cereal crops were grown at this site: spelt wheat and six-row, hulled barley. Of the two, spelt is numerically more important in this particular assemblage. They were grown as separate crops. There is a possible trace of bread wheat within the samples, but the role of this crop in the arable economy of the site could not be ascertained. The crops were cultivated under an extensive regime, with relatively small amounts of soil disturbance and manuring, resulting in the growth of many perennial arable weeds tolerant of lower levels of nitrogen. This type of assemblage is often associated with an arable system that is expanding. The diet was supplemented with nuts and fruits collected in the wild, such as hazelnuts, sloes, rosehips and blackberries.

The spatial patterning of the plant remains across the site indicates that the processing of the spelt crop might have taken place in the vicinity of the house: the

fine-sieving residues were deposited just six metres north of the house. Inside the house a quantity of clean spelt grain was found just inside the entrance; scattered across the floor were small amounts of plant remains, mostly of large weeds, culm nodes and spikelets which probably represent the hand-cleaning of this and previous batches of grain immediately prior to food preparation. The area immediately around the hearth and the northern part of the floor area appear to have been kept slightly cleaner, in that fewer plant remains were found here. The area to the back of the house has higher seed densities including some heather, bracken and culm nodes; this may be where people slept (see also p. 147 ff.).

We now have carbonised seed assemblages from nine iron-age sites in this region. These divide into two groups, Groups A and B (as described above and defined in Van der Veen 1992). South Shields clearly belongs to Group B, signified by a predominance of spelt wheat and barley and an extensive cultivation regime. The location of South Shields makes it the most northerly site within this group recorded so far. While the earlier results had pointed to the Tees lowlands as the focus for this group, it is now clear that this cultivation regime was far more widespread, and may have been in operation across most of the lowlands south of the Tyne. It remains to be seen whether it was also current in the upland areas of the counties of Durham and North Yorkshire and/or the coastal plain of Northumberland. Only future excavations in these areas can help answer this question.

The radiocarbon dates demonstrate that South Shields is one of the earliest Group B sites recorded so far (possibly slightly earlier than Phase I at Thorpe Thewles, Cleveland). To conclude, South Shields represents one of the earliest sites in northern England (and Scotland) where spelt wheat is the principal wheat crop and is cultivated under an extensive farming system.

#### THE IRON-AGE FINDS *by* A. T. Croom

Iron-age objects found (exact find-spots unknown) at South Shields before the excavations reported here include a fragment of a Meare spiral bead and three small and opaque yellow annular beads (Allason-Jones and Miket 1984, 4.48–50, 4.52). Both of these types of bead are generally dated 250 B.C. to A.D. 50, although the northern production centre seems to date from the first century B.C. to A.D. 50 (Guido 1978, 75–76, 79–81).

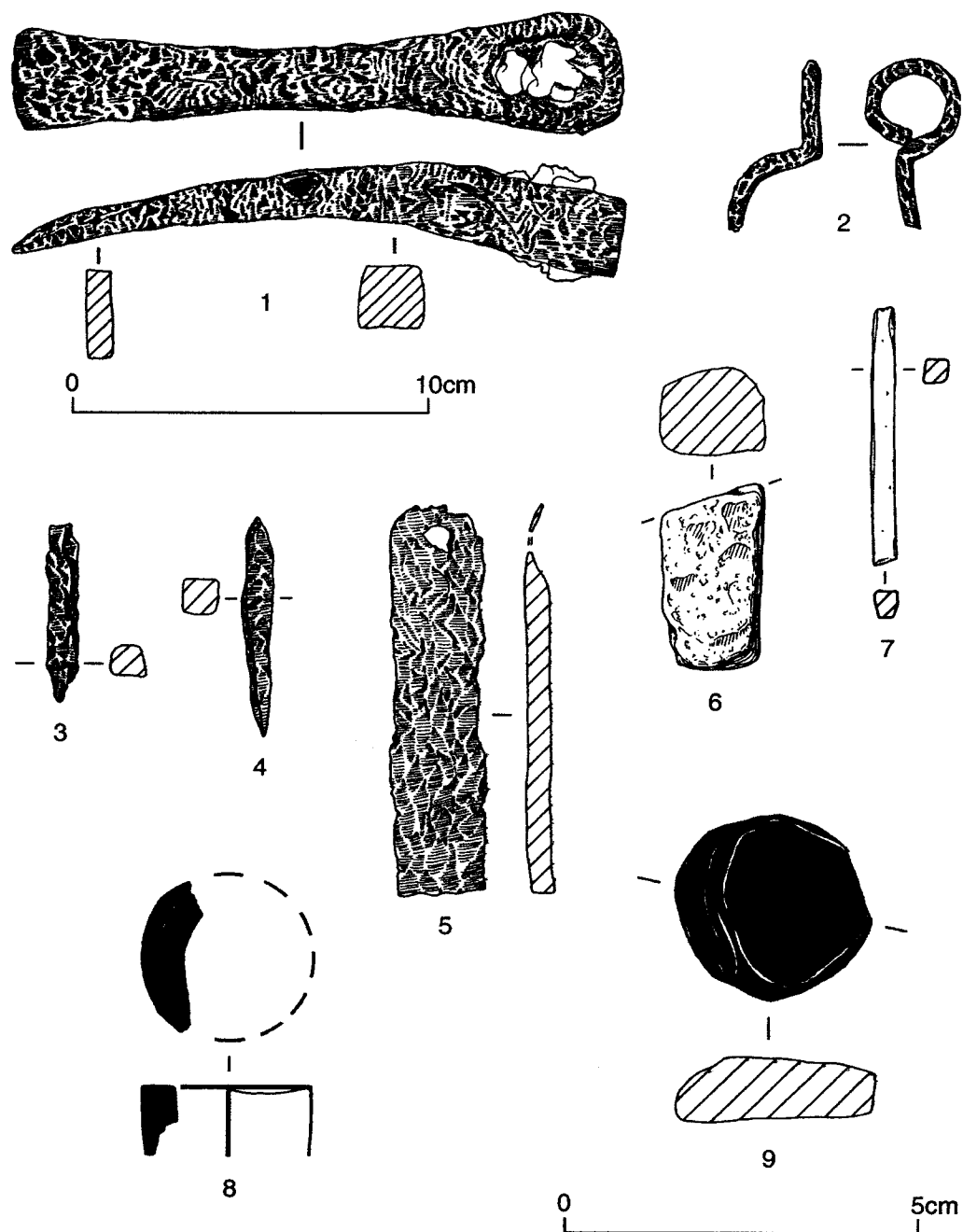
#### CATALOGUE

##### FINDS FROM THE PREHISTORIC LEVELS IN THE EAST QUADRANT AREA

##### Iron

1. Adze (L:177 mm, W:34 mm, B:23mm). Pit inside roundhouse, 9759, I522. (Illus. 41.1). Slightly splayed blade, curving out from the socket with an oval-shaped eye. The remains of a wooden haft exist in the eye. Manning points out the difficulty of distinguishing between an adze and a hoe, but suggests that a narrow blade, near-straight edge and strong neck are more probably characteristic of an adze (Manning 1985, 16). Parallel: Hod Hill: Manning 1985, B8, first century A.D.? (with wider blade).
2. Ring-headed pin (L:26 mm, D:12 mm, B:2 mm). Floor of roundhouse, 9730, I519. (Illus. 41.2). A small, incomplete ring-headed pin, made from circular cross-section wire. The ring-headed pin





Illus. 41 Finds nos 1-9

made from iron or copper-alloy wire was first produced in the early Iron Age but was, with various developments, a long-lived type, particularly in the north. The ring is usually in the same plane as the pin, with a kink in the shank just below the head (Dunning 1934), but in this example the head is set at an angle to the shank. This is a sub-type found in southern England and Wales (Savory 1964, 131; Dunning 1934, fig. 5 no. 1) and Scotland (Stevenson 1955, 288).

Parallels: Traprain Law: Stevenson 1955, fig. B no. 2, copper alloy, second or third century A.D. Corbridge: Haverfield 1911, fig. 34 right, copper alloy, no context details. Dinorben: Savory 1964, fig. 19 no. 1, iron, 'Iron Age A'. Anglesey?: Smith 1925, fig. 109.

3. Rod (L:25 mm, W:3 mm, B:3 mm). Fill of roundhouse wall trench, 9782 (exact location unrecorded), 1529. (Illus. 41.3). Short rod with square cross-section, tapering to one end.

4. Rod (L:31 mm, W:3 mm, B:3 mm). Fill of roundhouse wall trench, 9782, 1530. (Illus. 41.4). Short rod of square cross-section, tapering in one plane to one end.

Parallel: Thorpe Thewles: Allason-Jones 1987, fig. 53 no. 16, late Iron Age

5. Strip (L:57 mm, W:12 mm, B:3 mm, hole W:4 mm). Fill of roundhouse wall trench, 9782, 1531. (Illus. 41.5). Incomplete strip of rectangular cross-section, punched with a sub-square hole at one end. Possibly from a binding with a nail at either end, as examples from Danebury (Cunliffe and Poole 1991, fig. 7.24 nos 2.345-6, 270-50 B.C.).

### Lead

6. Lump (L:27 mm, W:13 mm, B:12 mm). Burnt area north-west of house, 9740, L75. (Illus. 41.6). Roughly rectangular lump of lead, fragmented.

### Bone

7. Rough-out (L:37 mm, W:4 mm, B:4 mm). Ground surface outside house, 21270, B386. (Illus. 41.7). Short length of bone, cut at both ends, with a roughly square cross-section. Probably an unfinished needle or pin.

### Jet and Shale

8. Cylinder (external D:24 mm, B:3-6 mm, L:10 mm). Ground surface outside house, 21270, J26. (Illus. 41.8). Incomplete collar or ring made of jet or shale. The large interior diameter suggests it is not a necklace bead or spindlewhorl (e.g. Danebury: Laws 1991, fig. 7.40 no. 4.13) and it is not large enough for a 'hair ring' (e.g. Thorpe Thewles: Swain and Heslop 1987, fig. 58, no. J1; Silchester: Lawson 1975, fig. 7 no. 59).

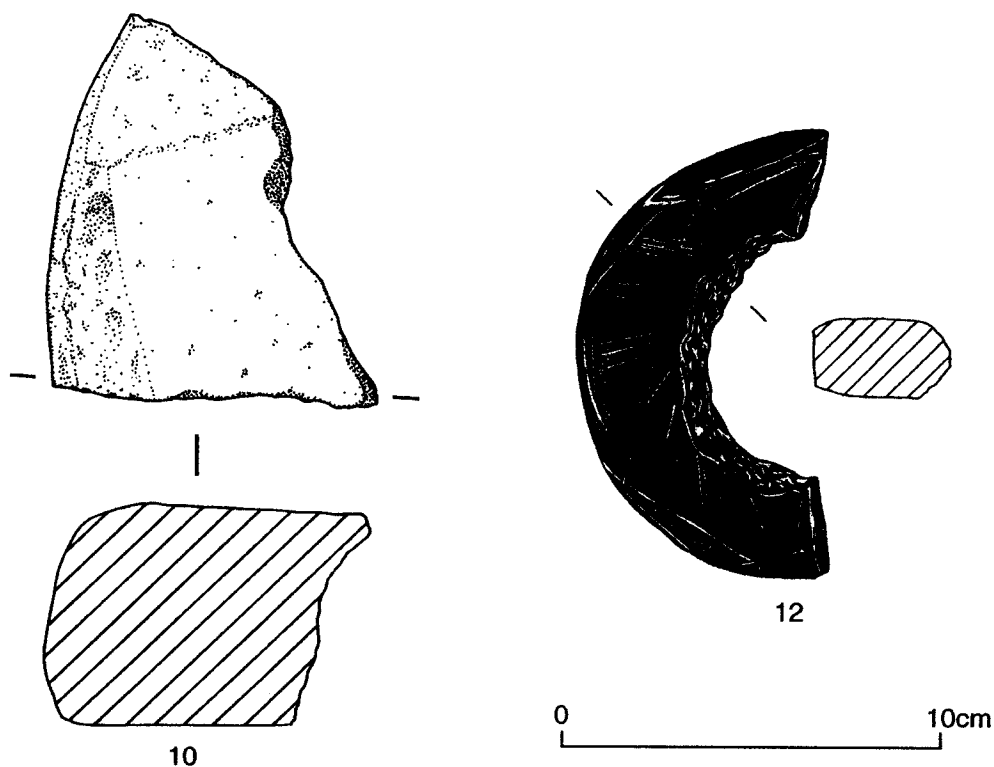
Parallels: York?: Allason-Jones 1996, no. 313, unprovenanced.

9. Disc (D:25 mm, B:9 mm). Fill of roundhouse wall trench, 9782, J38. (Illus. 41.9). Rough disc, flattened on lower surface, made from cannel coal, shale or similar. Unpierced discs do not appear to be common on iron-age sites.

### Quern

10. Quern (D:360 mm, B:60 mm). Fill of probable hearth, inside roundhouse, 9757, S441. (Illus. 42.10). Fragment of sandstone quern. Although the rounded edge might suggest a flat rotary quern, the fragment is too small for certain identification. Rotary querns were in use alongside saddle querns from the early Iron Age (Buckley 1979, 89), but were generally of the beehive type, which was perhaps introduced in the North c. 200 B.C. (Heslop 1987, 111). At Thorpe Thewles, for example, the middle Iron-Age to first-century A.D. settlement produced 15 beehive querns, four saddle and no flat querns (*ibid.*, 84, 88). Both upper and lower stones on beehive querns were generally made from very thick stones, although some thin lower stones are known from southern England at Danebury (Laws *et al.* 1991, fig. 7.58 nos. 8.117-8, 8.120, context dates of 310-270 B.C. and 270-50 B.C.) and Gussage All Saints (Buckley 1979, fig. 68 no. 2153, before the third century B.C.).

11. Quern. Pit, possible hearth, inside roundhouse, 9757, S440 (not illustrated). Fragment of sandstone quern, possibly burnt, with only one certain original face remaining. This face is uneven but very smooth in patches and so this fragment is unlikely to have come from quern no.10 above, as this had no worn areas on either face.

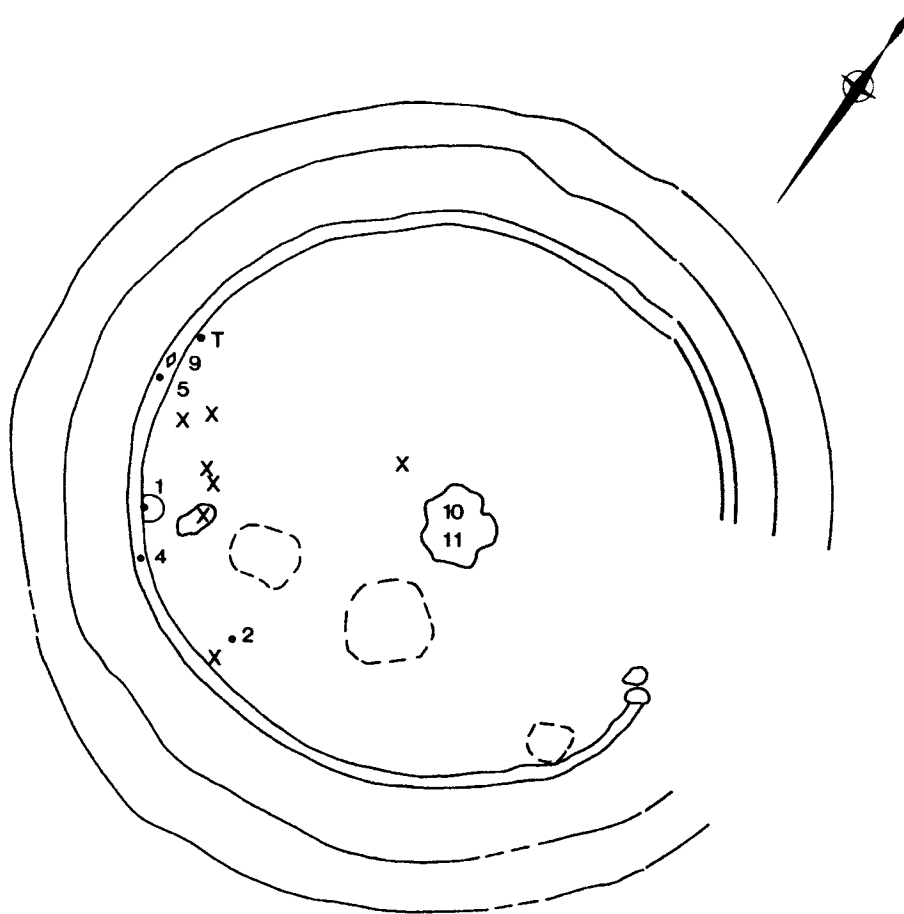


Illus. 42. Finds nos 10, 12

## DISCUSSION

Perhaps the most important item in this collection of finds is the adze, found in a pit near the wall within the roundhouse. The burying of objects within pits is a recognised feature of iron-age sites: a study of such depositions on sites in Wessex has shown that there are three groups of finds that are particularly commonly so treated: iron objects, worked bone and querns. Overall, objects used in 'routine, mundane, agricultural, craft production, and food production' are more commonly put in pits, rather than 'fine' items such as weapons and brooches (Hill 1995, 67). The iron tool, whether adze or hoe, would be covered by these criteria. At Danebury three hoards of iron objects were recovered from specially dug pits within houses, with no similar groups found outside. It was suggested that the pits were dug during construction or soon afterwards and that they could be 'propitiatory deposits associated with the construction of houses or well-being of the occupants' (Cunliffe 1995, 86). The quern fragments were recovered from a central feature identified as a probable hearth, which contained a large number of unworked sandstone fragments, some of which showed signs of burning.

The iron items other than the adze came from the fill of the wall trench, as did the coal disc. These items are more likely to result from the decay of the wall after the fire



## Key

X = Copper alloy

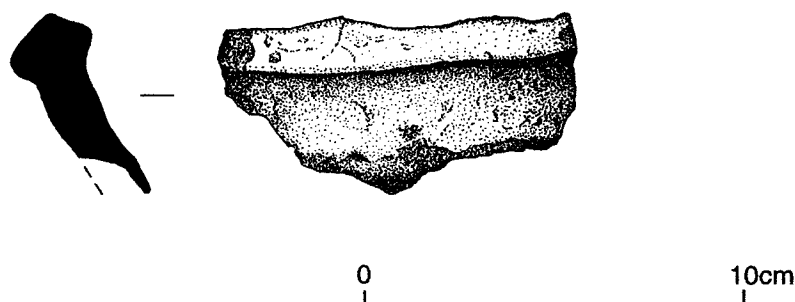
○ = Pit

◇ = Approximate position

T = Tooth

Illus. 43 Distribution of finds in roundhouse

rather than objects entering the trench during construction. The ring-headed pin came from the floor surface of the roundhouse, as did a number of copper-alloy flecks too small and too decayed for identification. Other than the querns, all the finds within the roundhouse with identified finds-spots, including the seven copper-alloy flecks, come from one distinct quarter of the building (see Illus. 43).



Illus. 44 Rim sherd of prehistoric pottery

#### PREHISTORIC FINDS FROM NORTH-WEST OF THE MAIN AREA

12. Shale armlet (external D:120 mm, W:32 mm, B:23 mm). Metalled surface leading off parade-ground in east quadrant, Period 3 (early second century A.D.), 26741, J40. (Illus. 42.12). Incomplete shale armlet of roughly oval cross-section, although the cross-section has an irregular profile. On one side the outer edge is bevelled all along the fragment, while on the other, lower side it is only bevelled in places. The outer edge and both faces are smoothly worked but have fine file marks on the surfaces, particularly on the lower side where they run in all directions. The inner face, although showing some signs of smoothing (or wear), is only very roughly worked without any attempt at achieving the finish of the other faces. Armlets seem to have been traded as rough-outs for finishing away from the source of production (Laws 1991, 368).

Parallels: Kimmeridge: Davies 1936, pl. 3, early Iron Age. Danebury: Laws 1991, 368, fig. 7.40 no. 4.15, at least 3 rough-outs, dating to 360–310 B.C., 310–270 B.C. and 270–50 B.C.

York: Allason-Jones 1996, no. 321, no context details.

The tradition of making armlets in this way may have continued into the Roman period, but the presence of the South Shields example in an early Roman context immediately above the iron-age horizon suggests that it probably derived from the prehistoric site.

It but remains to note three copper-alloy beads from a beaded torc found in early Roman contexts (late Hadrianic or early Antonine) in the central part of the Roman fort: these could conceivably derive from the pre-Roman site. They have already been published (Croom 2001).

#### Pottery by Clive Waddington

1. Ground north-west of roundhouse, 9773. Not illustrated. Two sherds from the same vessel. Heavily abraded body sherds whose inner surface has been eroded, therefore it is not possible to measure the thickness of the vessel walls. The thickness was over 15 mm in places. No decoration is evident on the outer surface which has been smoothed by hand. The vessel was hand-made from a coarse fabric with coarse grits (opening agents). Much of the fabric has been oxidised during the firing process, so suggesting a simple firing technology. This pottery, although not diagnostic, is typical of northern, later prehistoric pottery fabrics and forms.

2. Ground north-west of roundhouse, 9785 (equivalent to 9773). (Illus. 44). Rim sherd of an open vessel, probably a shallow bowl, relatively well-made and probably used for tableware rather than storage. The wall of the sherd has a maximum thickness of 14 mm below the thickened rim which forms a trapezoidal section. The vessel is hand-made in a coarse fabric with coarse grits including sandstone. It has been covered with a fine orange-coloured slip. No decoration is evident on the sherd. The vessel appears to be evenly fired with little evidence of oxidation and this may account for its relatively good state of preservation compared to the other sherds.

#### ANIMAL BONE

A few fragments of animal bone were recovered from contexts associated with the roundhouse. The occupation deposits produced one fragment of a poorly-preserved cattle incisor (21230) and an

unidentifiable burnt fragment (21233). The demolition contexts produced one horse tooth in extremely poor condition (9730) and a fragment of burnt long bone shaft (9760). The authors are grateful to L. Gidney for examining and identifying these fragments.

## THE IRON-AGE SITE: DISCUSSION

### SPATIAL PATTERNING INSIDE THE ROUNDHOUSE

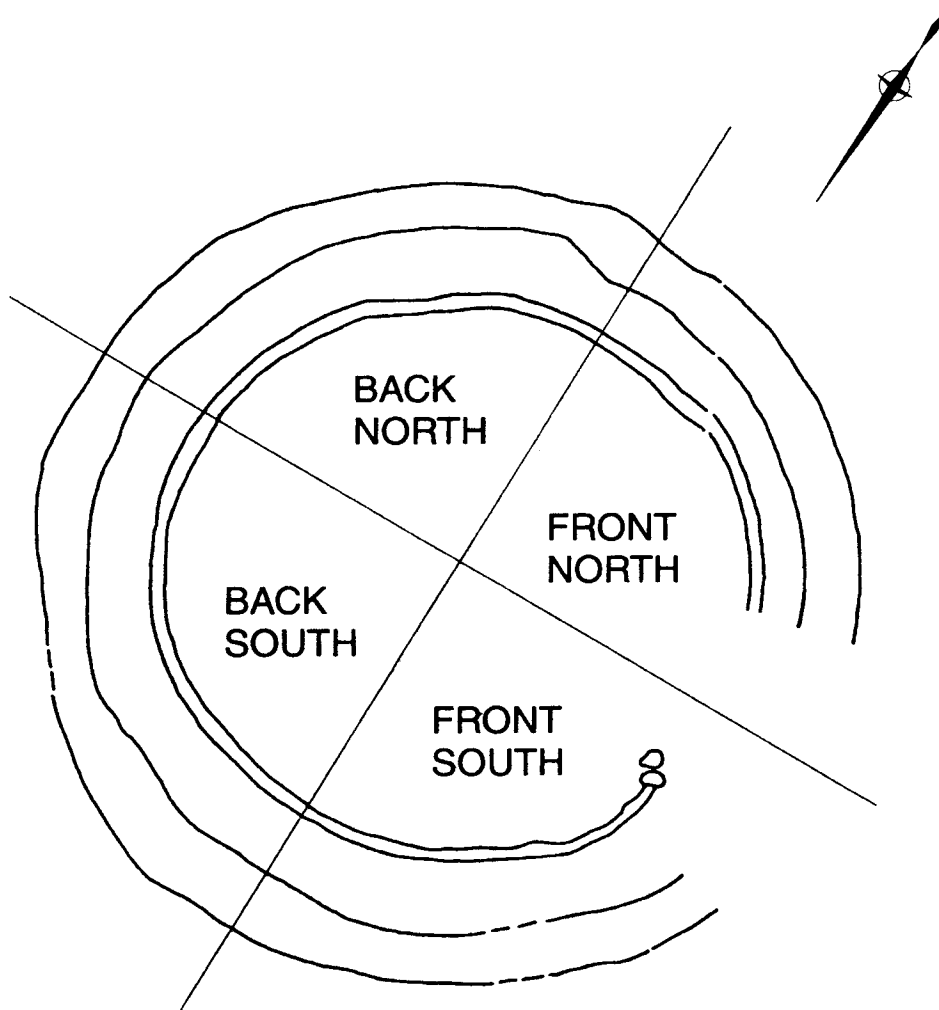
In the following discussion, the house is described in relation to the doorway at the east, and so the direction upon which the doorway is orientated. The 'back' of the house refers to the interior furthest away from, and opposite the door. A line drawn from the doorway through the centre to the back of the house is on an east-west alignment and divides the house into north and south halves; each of these is further divided for the purposes of discussion into a back (west) and front (east) quadrant (see Illus. 45).

The following elements of spatial patterning are evident within the South Shields roundhouse:

1. A central hearth, surrounded by space clear of features except on north-east (front north) side.
2. Many hollows, all artefacts and special deposits, in back south quadrant.
3. Several hollows and possible structures (posts, stone pad) in front north quadrant, i.e. to right upon entry. These are the features that encroach upon the area of the hearth.
4. Bedding material (bracken and heather) concentrated in back/west part of house, most densely in back south quadrant.
5. Average and above average density of weed seed, mostly confined to south half of house, but with quite a lot in the back north quadrant. Although the sample from the north side of the house is not quite complete for reasons given in the specialist report, the 'lost' area is not large enough to cast doubt on the overall pattern which shows a greater density of seeds on the south side of the house. The reliability of the distribution recovered from the floor is supported by the plant remains recovered from the wall-slot, which also showed a much higher concentration on the south and south-east side of the house.
6. Culm nodes, indicative of earlier hand-cleaning of grain or the presence of bedding material, are densest in the south half of house, concentrated in front south quadrant (to left upon entry) and back south quadrant. Chaff, grain and weed-seeds from the wall-slot were also most concentrated in the front south quadrant.
7. Basket of grain processed, placed or abandoned in hollow inside doorway.

Certain of these patterns occur often enough in other well-preserved roundhouse interiors to suggest that they are of general significance in understanding the way in which house interiors were divided spatially for either functional, ideological or cosmological reasons, as shown in Table 14.

There is thus an obvious distinction in use between the north and south sides of those iron-age roundhouses which have produced internal floor plans. This pattern



Illus. 45 Diagram of terms used in discussion of roundhouse interior

has sometimes been explained in purely functional terms: at Longbridge Deverill Cow Down, for example, it was suggested that the south side was used for major domestic tasks, and the north side given over to other activities, such as sleeping (Hawkes 1994, 67). But the line of distinction is apparently defined by the east-west axis of the buildings, passing through the doorway and the centre of the house. It has been argued that this axis is most frequently related to significant solar directions, preferring the equinoctal sunrise (E) and the midwinter solstice (ESE) (Oswald 1997). The South Shields house faces the equinoctal sunrise. The possible solar connection and various ethnographic parallels have led to suggestions in recent years that movement within a roundhouse to carry out different activities might in some way refer to the cosmological beliefs of the inhabitants (Parker Pearson 1996). Fitzpatrick (1994; 1997),

TABLE 14 Evidence from other well-preserved roundhouse interiors

This list does not claim to be an exhaustive one. All of the examples face east, east-south-east or south-east, and are thus analysed in terms of an east-west axis through the doorway and centre of each house.

Site	Date	Interior patterning	References
Springfield Lyons, Essex	Late Bronze Age	Faced east; group of pits in west. (back) half produced primary discard deposits of broken fine wares, suggesting this was where food was consumed	Buckley and Hedges 1988
Dunston Park, Thatcham, Berks	C7–C6 B.C.	Finds restricted to porch and south half of house	Fitzpatrick 1994; Fitzpatrick <i>et al.</i> 1995
Longbridge Deverill Cow Down, Wilts.	Late C6 B.C.	Bulk of pottery confined to porch and south half of house; possible table or dresser in this area; spindle whorls, bone tools and 'loom weights' (more probably 'firebricks') concentrated in back south quadrant	Hawkes 1994; Giles and Parker Pearson 1999
Bryn Eryr, Anglesey	Romano- British	Plot of finds of pottery showed a clear concentration in the area diametrically opposite the door	Longley 1998, 246 and fig. 13
Bancroft, Milton Keynes	Late Bronze Age/early Iron Age	Concentration of pottery, fired clay objects and slag in south-west quadrant, but said to occur in post-hole construction contexts.	Williams and Zeepvat 1994, 29–33
<i>Scottish 'Wheelhouses' (four published reports of complete structures)</i>			
Kilpheder, S. Uist	C4 B.C. to C2 A.D.	South side of house characterised by earth floors and artefacts relating to corn grinding, weaving, ceramic storage, food preparation. North side has flagged floors and fewer finds. Horseshoe shaped central hearth faces the door. Special deposits of animal bones or pottery in area at back of house opposite door. After entry through door, stone kerbs guide access to the left.	Lethbridge 1952
A'Cheardach Mhor, S. Uist	C4 B.C. to C2 A.D.		Young and Richardson 1960
A'Cheardach Bheag, S. Uist	C4 B.C. to C2 A.D.		Fairhurst 1971
Sollas, N. Uist	C4 B.C. to C2 A.D.		Campbell 1991
		See generally Giles and Parker Pearson 1999; and Parker Pearson and Sharples 1999	

analysing the house at Dunston Park, and invoking the evidence from Cow Down, suggested that there was a clockwise, or 'sunwise' progression of activities around the house, with domestic activities and eating taking place during the day in the southern half, with progression to the northern half for sleeping in the hours of darkness, until the cycle began again with the sunrise on which the house was orientated.

Similar cosmologies have been hypothesised for the wheelhouses and brochs of western Scotland such as Dun Vulcan, South Uist (Parker Pearson and Sharples 1999, 16–21) and it has been speculated that movement around such houses referred to the cycle of human life (the doorway being 'the point at which life symbolically began



and ended') as well as the diurnal cycle. The varied tasks along the route around the internal space of the house have also been seen as embodying the annual cycle of agricultural life, from the spring activities of food processing and craftwork on the sunlit (south) side, to winter storage and overwintering of animals in the sunless (north) side (Giles and Parker Pearson 1999, 225–28).

In the analysis of the wheelhouses, however, an additional and parallel hypothesis has been proposed, namely that the seating positions of individuals within the house were arranged according to a social hierarchy which existed both within the household and among outsiders (Parker Pearson and Sharples 1999, 17; Giles and Parker Pearson 1999, 224). Although seniority and gender could theoretically have been 'arranged sunwise from the doorway', a symmetrical hierarchy running from the west has been considered more likely. This is based partly on the horseshoe-shaped hearths which faced the door, suggesting the possibility of a senior figure or figures sitting at the 'head' of the horseshoe, with subordinates arranged along the rest of the west and along the north and south sides (Parker Pearson and Sharples 1999, fig. 1.10), and partly on the evident importance of the east-west axis and the special deposits found in the west ends of wheelhouses.

Some of the characteristics that have given rise to the cosmological explanations currently in vogue may be discerned at South Shields. The near restriction of pottery and finds to the southern half the houses at Dunston Park, Longbridge Deverill Cow Down and in the wheelhouses is broadly followed by the seed density plot (Illus. 37), and exactly matched by the distribution of culm nodes (Illus. 39) and the finds plot (Illus. 43) at South Shields. The culm node plot and the grain in the doorway hint at food preparation in the front part of the southern half as well as at the back of the house, and cleaning or processing of grain in the front southern quadrant is particularly suggested by the chaff, grain and weeds recovered from the wall-slot. The blankness of the north side as far as finds are concerned seems to occur at South Shields as in the other examples, although the distribution of bracken and heather, which is unlikely to be associated with roof thatch (because of its clear concentrations), suggests the presence of some bedding material on the north side, and a group of hollows and a pad of stone slabs is evident in the front part of the north side (baking has been suggested as the function of a patch of slabs in a similar position at A'Cheardach Mhor: Parker Pearson and Sharples 1999, 17).

But although some north/south distinctions are discernible at South Shields, the most obvious concentration of activity occurred at the back of the house and appears to be related to the east-west axis drawn thence, through the central hearth, to the doorway. The special deposits occur with the greatest concentration of hollow features and all of the finds (except the quern fragment in the hearth and one unlocated artefact) diametrically opposite the door, in a way reminiscent of Deverill Cow Down and the wheelhouses, and with a particular emphasis at South Shields on the back south quadrant which can also be recognised at Cow Down. The most conspicuous concentration of bedding-type material again occurs right at the back of the back south quadrant, congruent with nearly all of the finds and greatest seed/culm node density. The seed density plot hints at an open area for sitting or moving around the

hearth (as in the wheelhouses) where food processing did not take place; a horseshoe-shaped seating area facing east (the standard wheelhouse pattern) would be allowed at South Shields by the distribution of hollows.

In short, at South Shields the strong pattern of an area of special status opposite the door overshadows the distinctions visible between north and south sides. This must cast doubt on the simplicity and exclusivity of the theory of the north-south distinction as a sunwise regulator of human activity as expressed so straightforwardly at Dunston Park. A sleeping area for at least some is surely indicated at the back, opposite the door, rather than exclusively in the northern side of the house. Without embarking on the question of the validity of the ethnographic parallels which have been used to attempt reconstructions of roundhouse cosmology, other explanations than the 'sunwise' theory for the differing patterns of north and south seem just as plausible: a division in activities based on gender or a human-animal or even a free-servile segregation. The possibility that animals occupied areas in roundhouses has been little mentioned of late, though alluded to in Giles and Parker Pearson's analysis of the wheelhouses, which posits overwintering of animals in the front northern part of the house (but as part of their hypothetical annual cycle). Phosphate analysis has the potential to shed light on this question, and it is to be regretted that this was not undertaken at South Shields in 1992. It is also possible that the apparent north-south division conceals a more complicated system of segmental or cellular division by which the residential area/area of special status at the back of the house was complemented to its left and right by a number of areas devoted to particular activities: food cleaning and preparation (front south); some undefined activity involving the patch of flat slabs (front north); lower status bedding/storage/animal holding (north). Temporary partitions separating such discrete areas of activity, such as skins hung from the roof, need not have survived in the archaeological record, and of course such an approach to the use of the interior is given concrete architectural form in the Scottish wheelhouses.

There are also several ways of explaining the area of special status related to the doorway axis. While this could be taken as an indicator of social hierarchy, it would be hard to disprove that this was not simply the living and sleeping area used by the whole family inhabiting the roundhouse, with the areas nearer the front of the roundhouse taken up by specialist activities. But the least that can be said is that the combined evidence of artefacts, plant remains and hollows affirms that either more use was made of the area opposite the door as a living/sleeping space (an interpretation based on functional difference) or that leading individuals and honoured guests richer in bedding and artefacts used that area (an interpretation based on social or intra-familial hierarchy).

#### THE DEPOSITION OF FINDS

In the South Shields roundhouse the sheer number of finds and traces of copper alloy requires comment, as does the possibility that, rather than casual losses, they represent deliberate ritual placements in the sort of structured pattern that is now increasingly recognised in iron-age contexts (Hill 1995). This is particularly likely to be the case

with the buried adze, but the distribution of the other objects at the back of the house recalls that of the deposits interpreted as 'special' in the wheelhouses (Parker Pearson and Sharples 1999, 17–18). The possibility that the destruction of the house was itself of a ritual nature is considered in the next section.

Pottery had been used at South Shields by the middle Iron Age, as the two sherds from the burnt area outside the house testify, but they could pre-date the occupation of the house. The complete absence of pottery from the house itself calls for comment as an example of a generally aceramic occupation in a roundhouse of the middle Iron Age of north-east England. It has recently been suggested that the middle Iron Age may have been a period of sporadic use of ceramics in this region (Willis 1999, 89).

#### THE DESTRUCTION AND ABANDONMENT OF THE MIDDLE IRON-AGE SETTLEMENT

It is impossible to say for certain whether the fire which brought the occupation of the middle iron-age settlement to an end was an act of deliberate destruction or an accident. There were two separate areas of conflagration, the house and the crop-processing residue. These were separated by only 6 m, so a spark from an accidental blaze could conceivably have carried from one to the other. Less indicative of an accident is the remarkable fact that after the fire the whole investigated area, including the cultivation plot and boundaries, was abandoned, and then covered by wind-blown sand. A considerable accumulation of sand and vegetation had formed above the level of the middle iron-age farm before any attempt was made to reclaim the area. This could be taken to suggest that the fire had been a hostile or at least a deliberate act, with accompanying social dislocation evidenced by the abandonment of the entire cultivation plot adjacent to the house. On the other hand, the boundary gully was dug or cleaned out when filled with wind-blown sand, suggesting that there was no great interval between the fire and the sand accumulation, and raising the possibility that the fire may have taken place during a catastrophic storm which introduced the sand in a single or rapid series of events. Crop processing and food preparation were taking place right up to the time of the fire, which could be taken as evidence that the abandonment of the site was neither deliberate nor orderly.

However, a final possibility remains to be considered: that the destruction of the house was a deliberate act of a ritual nature, possibly in a funereal context (see Hawkes 1994 for a suggestion that the Longbridge Deverill Cow Down House was burnt as part of a funerary ritual for its owner, whose body need not have been present). To explain the evidence in this way we would have to accept that the community was willing to countenance the abandonment of the surrounding cultivated area as well as the house itself, leaving the survivors to start afresh and develop their means of livelihood on a new site. On the other hand, the wind-blown sand which sealed the house and its adjoining fields may have been allowed to accumulate in a localised zone of abandonment: it does not necessarily signify the abandonment of the whole of the Lawe. A ritual of termination would have the virtue of giving possible explanations for certain puzzling aspects of the features in the house. The hearth, full of stone fragments, could have been emptied of its ash so that the latter could be carried to a

new house elsewhere; the absence of ash, possibly to be explained in this way, was a feature of hearths in the wheelhouses (Parker Pearson and Sharples 1999, 18), and the presence of one, possibly two quern fragments in the hearth at South Shields is suggestive of a deliberate infill with special materials. Another explanation for the basket of grain in the doorway hollow might be that it was deliberately placed on the central axis of the house which would be faced from the dwelling area. Even the seed plot need not be immune from such an explanation, if the floor of the house had been kept clean until a special episode of food preparation — a last meal for the deceased — on the eve of the fire, and the concentration of bedding material, and objects could conceivably have been specially arranged for a funeral ceremony. Even the hollows are open to reinterpretation, for although definitely not cut features in which objects could have been buried, they could theoretically have been created immediately before the fire to accommodate items of an organic nature, no traces of which would have survived. Does this possibility invalidate our attempts to explain the patterning of remains inside the house, namely to identify different areas of activity and their significance? It needs at least to be borne in mind that a closing ritual might have emphasised the back-of-house/hearth/doorway axis at the expense of other patterns of use; but it seems equally likely that a final ritual arrangement of the house — if that is what it is — would reflect the pattern of use of the interior during the life of the owner.

#### THE GENERAL CHARACTER OF THE SITE

Although the excavations inside the Roman fort have only revealed a fraction of the iron-age landscape on the Lawe, certain aspects of the character of middle iron-age settlement are now sharply defined. The main cereals exploited were spelt wheat and hulled barley, with no evidence for the cultivation of emmer. The productive economy matches that of several other sites in the north-east, to date all in the Tees Lowlands some 50 km to the south, which have yielded crop remains (see above).

The cultivation furrows actually recorded on the site have clear affinities with so-called 'cord-rig' (Topping 1989). The earlier phase of furrows were very narrowly spaced for cord rig (only 0.70 m apart): this finds a parallel at Snear Hill, Northumberland, possibly of early iron-age or bronze-age date (Topping 1989, 171). The later system accompanying the roundhouse at South Shields (and still therefore no later than the early second century cal. B.C.) had more widely spaced (2 m) furrows. Neither system had underlying ard marks, which would certainly have been detected had they existed.

Only following reclamation after the abandonment of the middle iron-age settlement before c. 170 cal. B.C., ard marks appear for the first time in the sequence on this part of the site, scoring the sand below the cultivated soil. As the ard marks occur in six successive series of parallel alignments, presumably several separate episodes of ploughing are represented, rather than a single 'sod-busting' episode. The narrowly spaced 'cord-rig' furrows which ensued did not coincide with any of the ard mark arrangements, something also observed at Rudchester (Gillam *et al.* 1973) and taken to mean that 'the rigg-and-furrow need not be associated with the ard marks' (Fowler

1983, 154). The evidence from Denton, 20 km to the west (Bidwell and Watson 1996, 15), where spade-dug furrows appeared to coincide with underlying ard marks, suggests that ploughing with an ard could have taken place as part of the formation of ridges which may have been finished with a spade. At South Shields and Rudchester there may have been a reversion to purely spade-prepared furrows (cf. Fowler 1983, 154), but these were presumably the latest in a series of furrow arrangements (each perhaps alternating with a period of reversion to pasture or other non-arable use), the earliest of which had been formed with the use of an ard.

The excavated area at South Shields therefore presents evidence of several different forms of cultivation at different periods: in the middle Iron Age, very narrow rig, followed by furrows of a wider spacing. The lack of evidence for ard marks below either set of furrows suggests that they were hand-dug, and it is uncertain whether they were used for the cultivation of the spelt and barley which we know were being processed close by at the end of this period, or whether they were used for, say, vegetable growing. The absence of plant remains indicative of vegetable growing near the house does not mean that the furrows are more likely to have been used for cereal crops, because cereal assemblages tend to survive better than those representing vegetables. If however, as is possible, the extent of the earliest rig approaches 0.10 ha, this system may be thought very extensive for vegetable growing. Caution is required: the furrows were not traced continuously across the site: the portion to the north-west could conceivably be part of a separate plot, perhaps even a vegetable plot attached to another house.

When reclaimed in the later Iron Age, the area saw repeated episodes of ploughing with an ard. It would be dangerous to see a chronological progression here, from spade-digging to ard-ploughing, especially as the final phase of extant furrows had no accompanying ard marks and appeared to be hand made. Also, in terms of the middle iron-age settlement, the rig-and-furrow was close to the house, indeed at one point enclosed by a boundary to form a plot by the house. In the later Iron Age, the area in question could have been in the middle of an extensive field system and we have no knowledge of where the settlement lay at this time. It is impossible to be certain that the practices we see here were not used in the earlier period, further away from the house. Nor can we be sure that the latest surviving form of cultivation (furrows over unrelated ard marks) was actually the last, for this was abandoned to inundations of sand, and there could conceivably have been further iron-age horizons on top of this, away from this area or truncated by the earliest Roman activity.

The roundhouse of middle iron-age date was apparently the earliest structure on the investigated part of the site. The house was essentially a single-period structure, but the accompanying cultivation was of at least two phases. The house constituted, or formed part of, an unenclosed settlement. We can be confident about this; besides the presence of the boundary bank and gully, indicative of an open landscape of fields or land-allotments, work to the north-west of the east quadrant has shown that no enclosure ditch occurs between the roundhouse and the central area of the Roman fort where, apart from occasional ard marks, the iron-age activity fades out. It is unfortunately unknown whether the roundhouse was on the outer fringe of a settlement with a nucleus lying to the east, or whether it had any neighbours at all.

Although a continuous enclosure ditch is ruled out, another house or houses could theoretically lie beneath unexcavated Roman structures, some distance to the north-west.

Other dated examples of unenclosed settlement have recently been reported in north-east England at Stanwick, N. Yorks (late second or first century cal. B.C., discussed in Fitts *et al.* 1999) and Melsonby, N. Yorks (beginning third or fourth century cal. B.C.: Fitts *et al.* 1999). Taken together with these, the South Shields evidence tells against the widely accepted view (e.g. Darvill 1987, 150) that enclosed settlement predominated in the Tyne-Tees Lowlands for most of the first millennium B.C. Enclosed settlements could still be constructed in lowland areas in the last two centuries B.C., as, for example, the site at Thorpe Thewles, Co. Durham (formerly Cleveland) shows (Heslop 1987). Arguments have been made (e.g. Haselgrove 1984) for a dynamic shift from enclosed to open settlement, connected with a sudden intensification of clearance and increase in evidence for arable farming from the first century B.C. This model was epitomised by Thorpe Thewles, where the enclosed site was superseded by an open nucleated settlement. It is now apparent that open settlement occurred widely in the middle to later iron-age settlement pattern in this region, and that the supposed predominance of enclosures has been due to their potential for discovery by air photography.

Because the area excavated at South Shields only contained a building at some time during the period 390–170 cal. B.C., it is naturally much less clear what form settlement on the Lawe took in the earlier or later Iron Age. It is probable, as we have seen, that the nucleus of earlier prehistoric settlement lay on the higher ground to the south-east, and it is theoretically possible that there was an early iron-age enclosed settlement there, superseded by the unenclosed settlement we see. The existence of a hillfort cannot be ruled out. There is no hint as to the location of the settlement accompanying the cultivation regime which was practised after the destruction of the middle iron-age site, and it is impossible to say for certain whether the Lawe was occupied, and if so what form the settlement took, at the time of the arrival of the Roman army in the later first or early second century A.D.

### EPILOGUE

Despite its discovery within an unlikely urban environment and during the course of research on a Roman military site, the excavated part of the prehistoric sequence at South Shields has contributed greatly to our knowledge in a number of areas, ranging from patterns of mesolithic and neolithic activity to the settlement forms and arable economies of the Iron Age. In particular, the roundhouse, with its surviving spatial patterning of internal features, plant remains and artefacts, must stand out as an exceptional example of preservation. The immediate reason for this high quality of evidence is the protection afforded to the prehistoric deposits by the overlying Roman stratigraphy, and the site demonstrates the potential for discovery in similar circumstances of well-preserved prehistoric structures which have been protected from ploughing in later centuries. Finally, this exercise has emphasised the potential of total area excavation to recover material that would not have been detected by, for example,

trenching to evaluate the site. Earlier excavators of the Roman levels in the east quadrant had mistaken the wind-blown sand overlying the prehistoric levels for natural. Examination of sections offered by Roman and modern intrusions cut through the prehistoric stratigraphy yielded hardly any indication of the complex and well-preserved sequence which area excavation went on to reveal. In a situation where Roman stratification in an urban setting would not have allowed geophysical survey to hint at what lay beneath, it was left to a policy of total excavation to ensure that the prehistoric sequence would take its place in the history of South Shields.

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