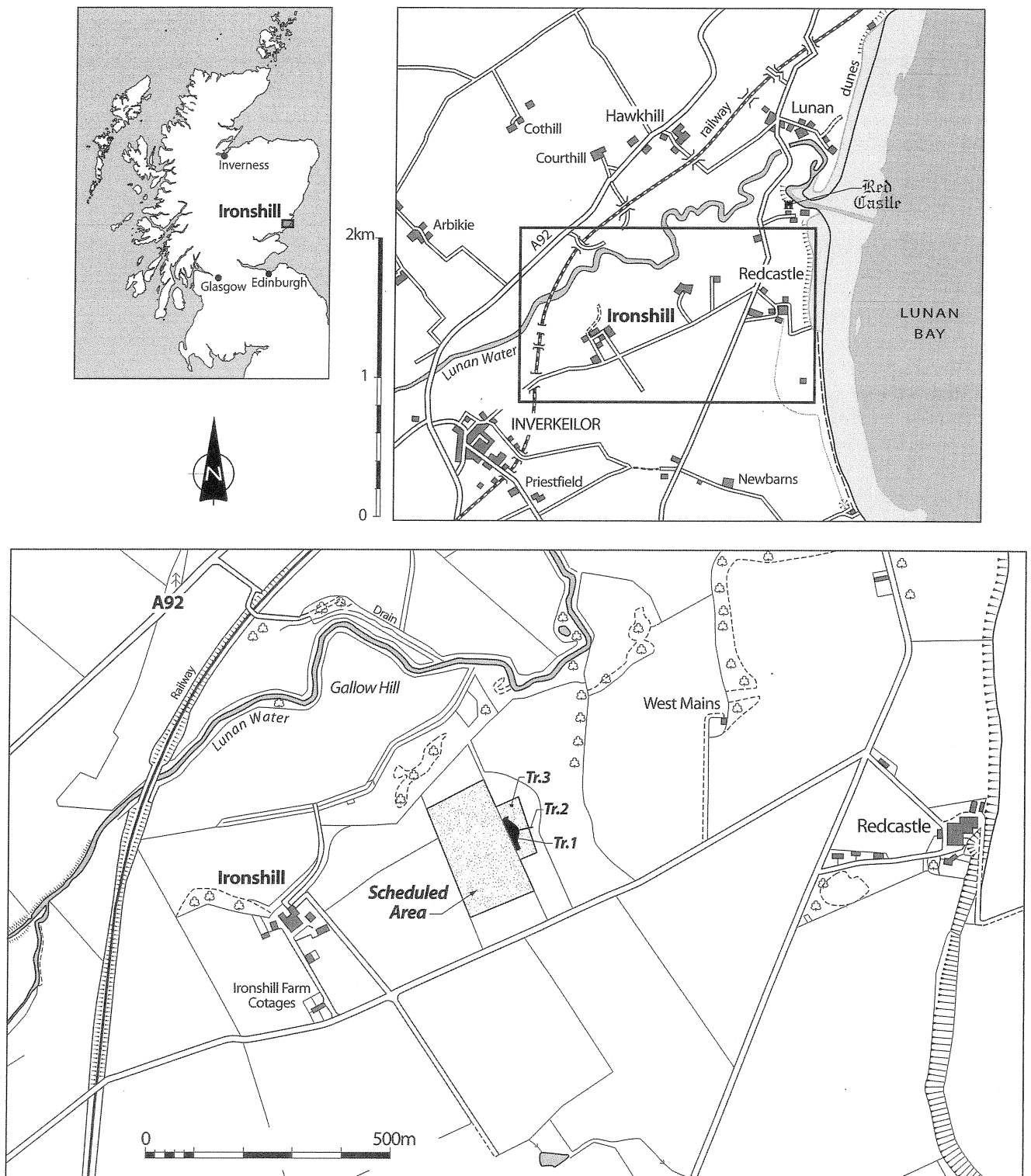




Illus 1 Location maps.

The excavation of a palisaded enclosure and associated structures at Ironshill East, near Inverkeilor, Angus

Catherine McGill

with contributions by Fraser Hunter, Mike Church and Mike Cressey

Introduction

During September 1998 an excavation was carried out by the Centre for Field Archaeology (CFA) and the Department of Archaeology, University of Edinburgh, at Ironshill East, near Inverkeilor (NGR NO 6878 5085; Illus 1). The site targeted for excavation comprised a cropmark palisaded enclosure with a large central timber roundhouse (Illus 2–3), and is protected as a Scheduled Ancient Monument. The excavation formed part of the Department's Angus and South Aberdeenshire Field School (see Finlayson et al 1999 for the wider objectives of this project). The project was funded jointly by Historic Scotland and the University of Edinburgh.

A range of cropmark features are present in the vicinity of the excavated site, and form part of an extensive cropmark landscape around Ironshill, Newbarns and Redcastle (see Alexander 2000 and forth, McGill forthcoming and Pollock 1997 for other excavation work in the vicinity). The enclosure (NMRS ref NO65SE 21) is located prominently at the extreme eastern side of a terrace above the Lunan Water lying at approximately 20m OD. It is bisected by a modern field boundary which runs NW–SE. To the SW of the boundary approximately two-thirds of the enclosure has been recorded as a clear cropmark on a series of photographs taken in 1978 (Ref RCAHMSAP AN 2898–2900 and 3531–2; eg Illus 2). On the photographs the post-holes of a large double-ring roundhouse can be detected within the centre of the enclosure (plotted on Illus 3). A rough line of pit features runs from the structure NW to the enclosure boundary. A small ring-groove feature is visible in the NW part of the enclosure.

The cropmark evidence is less clear on the NE side of the field boundary, which was not under cultivation at the time the aerial photographs (eg Illus 2) were taken, although the boundary of the palisaded enclosure is detectable there. Immediately to the E, and from approximately 20m N of the enclosure, the land slopes steeply down from the terrace. The free-draining sand subsoil is overlain by a thick ploughsoil layer. The site is regularly ploughed and recent rabbit activity had been recorded by Historic Scotland.

The principal objectives of the excavation at this site were to investigate the character and quality of preservation of that section of the site not clearly represented in the cropmark record; to establish by the insertion of

a trial trench whether any activity had occurred on the projecting spur forming the extreme NE corner of the terrace, outwith the main enclosure; and to record the effects of agricultural attrition, modern fencing and rabbit erosion on the site. Excavation was not possible in the western field due to the presence of crops. The management aspects of this investigation will be dealt with separately.

Three trenches were excavated (Illus 3). The main trench (Trench 1), which measured 75m by a maximum of 25m, targeted the enclosure. A slot trench (Trench 2) was excavated from the E side of Trench 1 almost to the base of the slope at the edge of the terrace. This trench was principally intended to identify any material associated with Trench 1 features which might have been dragged downhill by plough action. The trench proved devoid of features other than rabbit burrows, and a bone pin was recovered from the ploughsoil. Trench 3, measuring 5m by 4m, was excavated to the N of Trench 1, at the extreme corner of the terrace, to evaluate the character and extent of any archaeological remains present.

All features encountered were negative and had been horizontally truncated as a direct result of ploughing. There was no evidence for the preservation of buried soils or occupation layers. All archaeological features were assigned unique identifiers (Trench 1: F1 to F76; Trench 3: F3/1 to F3/8).

Trench 1 (Illus 4)

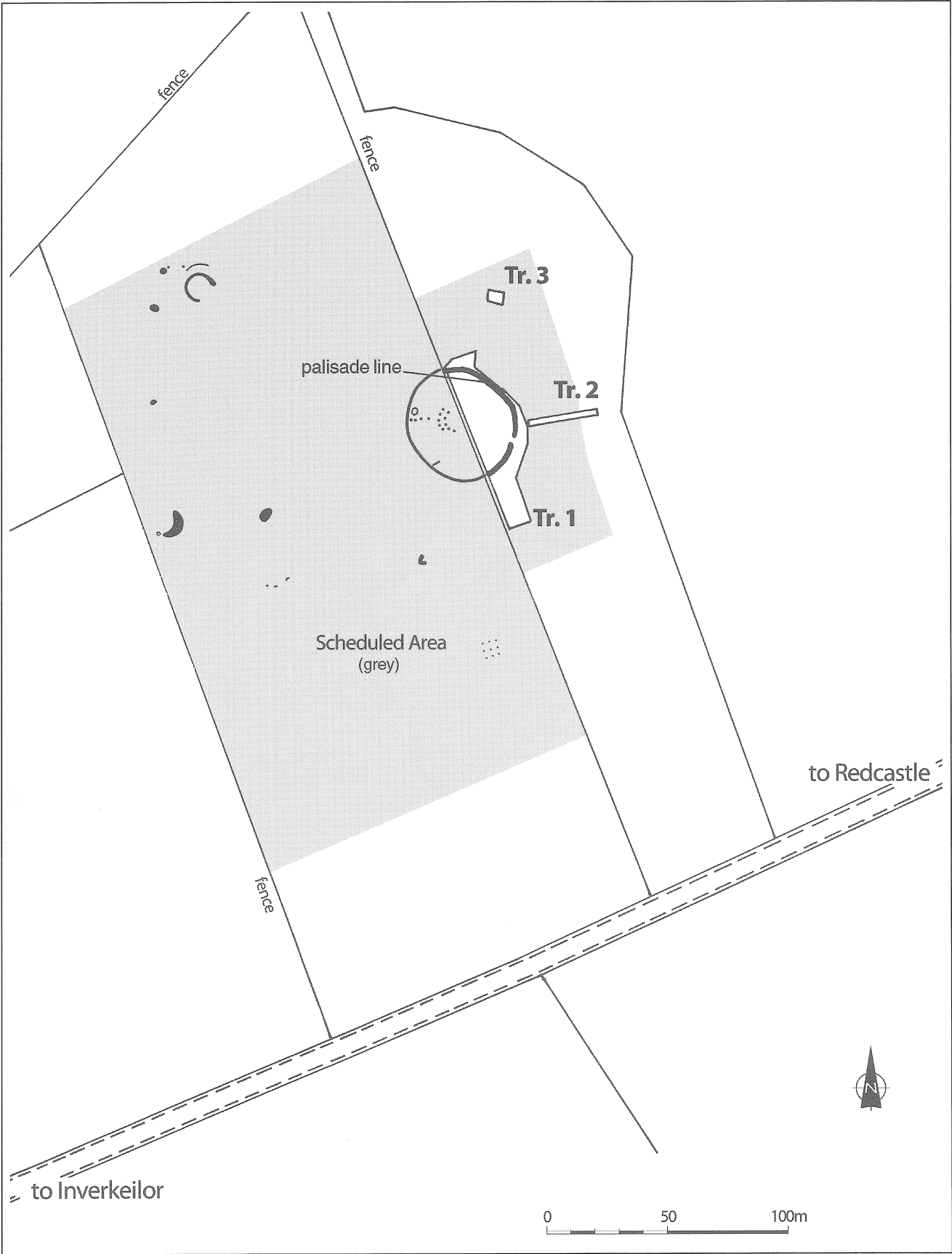
The palisaded enclosure

Based on a combination of the excavation and aerial photographs, the enclosure can be recognised as sub-circular with a maximum diameter of approximately 50m. The boundary of this feature was represented within the trench by two lengths of palisade slot (F1 and F3) separated by a 2m wide entrance to the SE. This slot varied in both width and depth from 0.7m to 1m and was U-shaped in section (Illus 5).

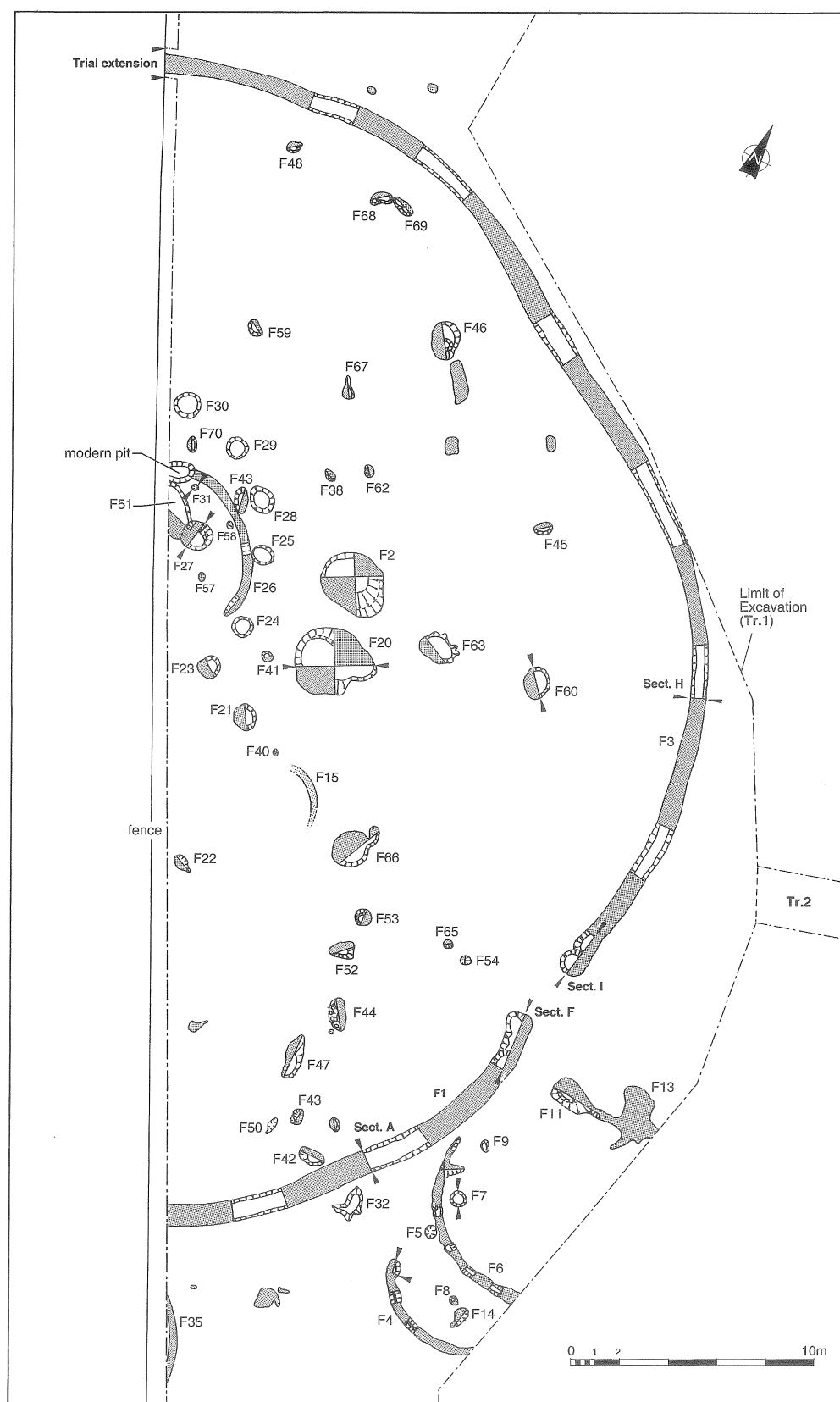
It is not possible to identify the nature of the timberwork held in the palisade trench in any detail. Sporadic occurrences of post-packing, post-pipes and slots were recorded in some of the lower fills. The lack of surviving stone packing and the minimal number of



Illus 2 Aerial photograph of the site. Crown copyright: RCAHMS (AN/3540).



Illus 3 Plan of site showing scheduled area, principal cropmark features and trench positions.

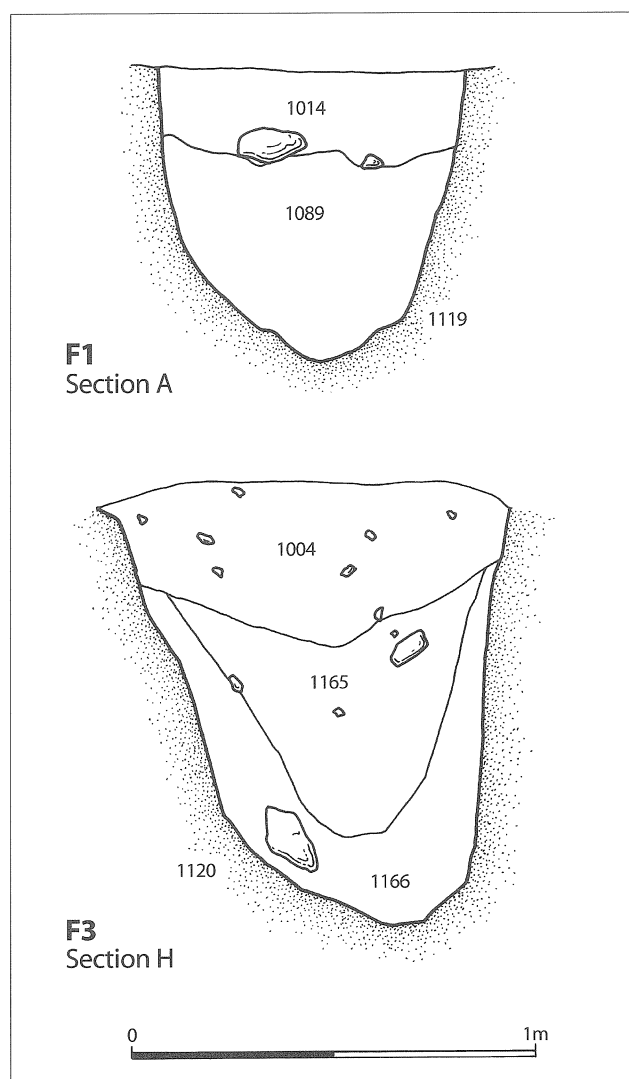


Illus 4 Trench 1 plan.

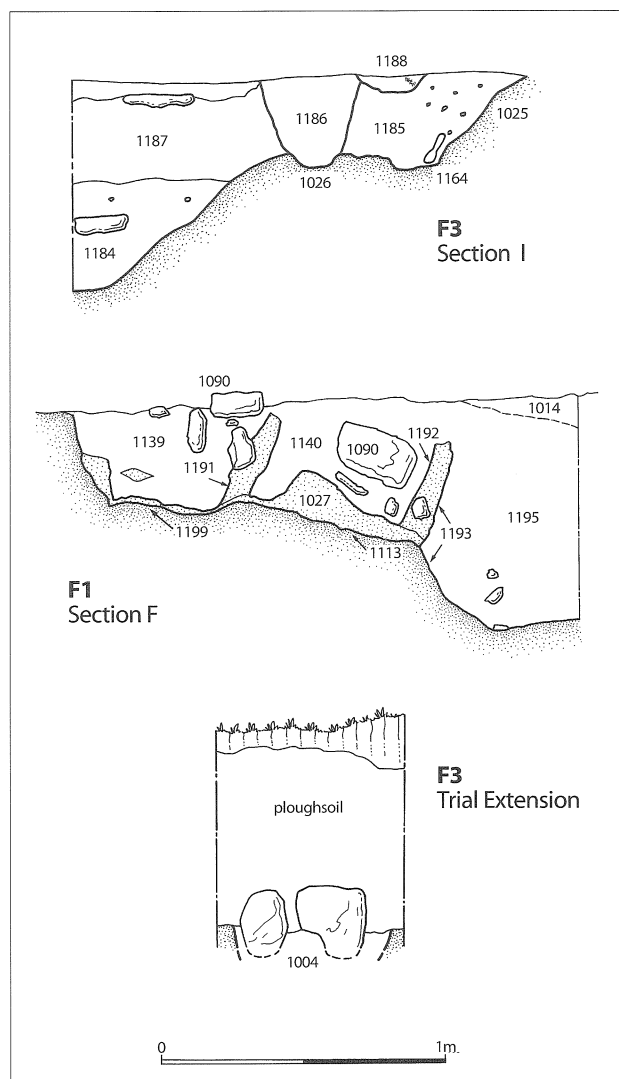
post-pipes identified in the excavated sections suggest that the greater part of the palisade slot has been robbed of stone, and perhaps of timber, at an early stage following the abandonment of the site.

Post-pipes were visible in the terminals to either side of the entrance (Illus 6). These indicated that there had

been a large post with a diameter of 0.4m at each terminus. Here, the palisade slot became slightly broader and shallower, perhaps indicating that the large terminus posts were not as tall as those around the remainder of the circumference, and in-turned slightly (Illus 4, 6). A re-cut was identified in the terminus of F3 (1026,



Illus 5 Sections through the palisade.



Illus 6 Sections of palisaded enclosure entrance terminals and the trial extension beneath the field boundary

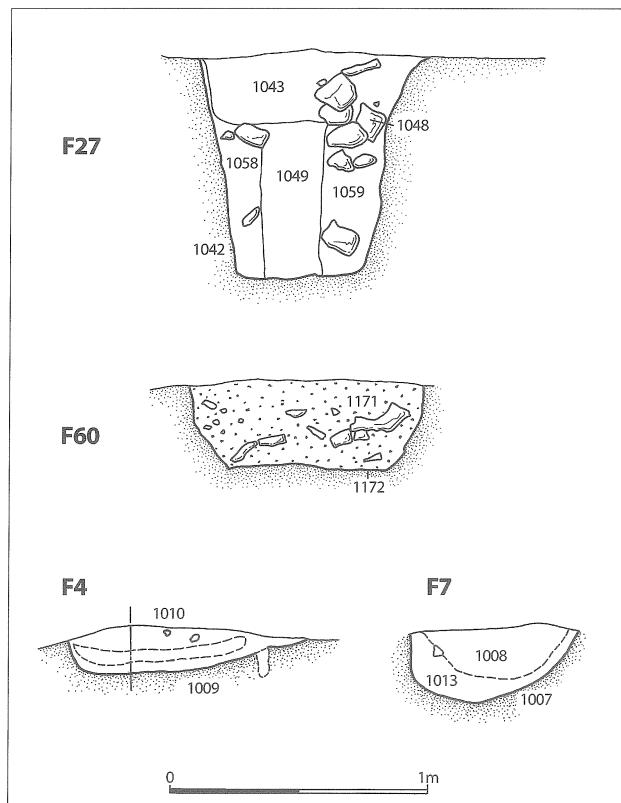
Illus 6), but elsewhere the palisade slot appeared to demonstrate only a single phase of construction.

The upper fill (1004 / 1014) of the slot for the most part consisted of a dark brown silty sand. It varied slightly to a mid-brown colour at the E limit of the trench, where the palisade extended just beyond the break of slope at the edge of the terrace. The location of this colour change is likely to reflect the increased mixing of the upper fill and the sand subsoil at this point due to the action of the plough, which will tend to level out the fairly sharp break of slope. The mixing of the upper fill in this area was further evidenced by the presence of modern pottery sherds in the palisade slot. All other finds from the palisade also came from this upper, mixed fill. These comprised six fragments of worked flint and three of quartz, two worn sherds of pottery (SF34 and SF62), burnt bone and herbivore teeth. This upper fill overlay a poorly-sorted mid-brown silty sand (eg 1089, 1165, Illus 5). In most sections, an initial silting episode was apparent (eg 1166, Illus 5). Neither of these earlier fills produced finds.

The trench was extended at the point where the N side of the palisade continued beyond the trench edge under the modern field boundary. This extension demonstrated that the palisade slot had been protected to an extent by the presence of the field boundary (Illus 6). Packing stones survived in a vertical position, projecting above the palisade slot, in contrast to elsewhere on the site where the few stones present were invariably lying horizontally on the surface of features, presumably having been uprooted by plough action.

The central structure

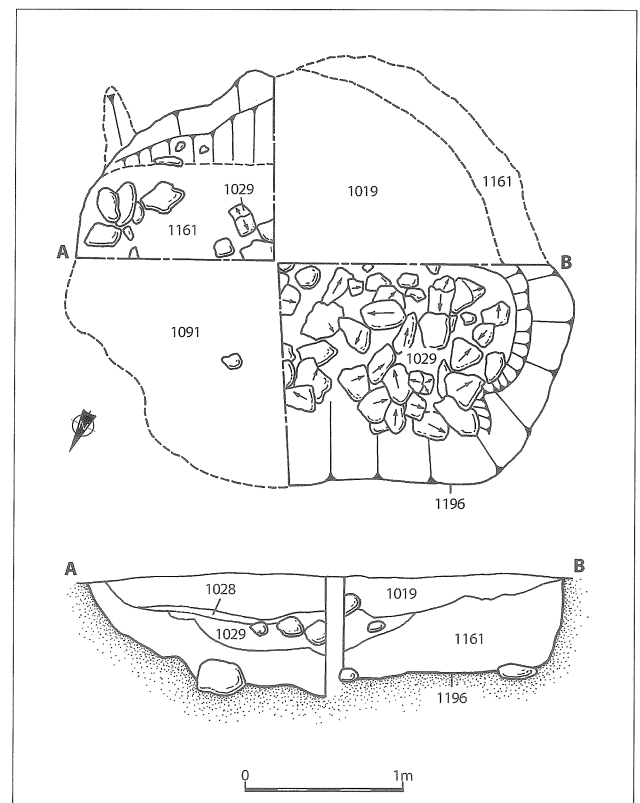
Aerial coverage of the western portion of the site (Illus 2; transcribed on Illus 3) shows this structure to comprise a double ring of posts. Less than a quarter of the structure extended into the excavated area (Illus 4). The outer ring was represented by six post-holes (F23, F24, F25, F28, F29 and F30). These lay 1.5–2m apart and were approximately 0.7m deep and 0.6m in diameter. All contained a substantial amount of packing material.



Illus 7 Sections of features F27, F60, F4 and F7.

The inner post ring, visible on aerial coverage, barely extended into the trench, with only one post-hole (F27) present (Illus 7). This was 0.7m in diameter and 0.8m in depth, slightly larger than the outer post-holes. The stone packing in F27 survived *in situ* to the extent that a post-pipe was clearly visible, the post itself being 0.25m in diameter. The maximum dimension across the outer post-ring exposed within the trench was 13m but, based on the aerial photographs of the remainder of this structure, the full diameter of the structure is likely to be nearer 17–18m and the diameter of the inner post-ring appears to be around 11–12m. Between the two rings, traces of a U-shaped curvilinear groove (F26) 0.25m across and 0.1m deep, were visible running not quite concentrically to the post-rings. The diameter of this feature appears to have been approximately 8m, smaller than that of the post-rings. This, combined with the difference between its mid-brown silty sand fill and the darker fills of the post-holes, suggest this feature represents a chronologically distinct structure. Alternatively, it is possible (but less likely) that the feature is asymmetrical in layout and does continue between the two post-rings, forming the foundation for a wall or screen within the post-built structure. The aerial coverage of the remainder of the site does not clarify this.

Several additional features were present within the area defined by the outer post-ring. These comprised three shallow stake-holes (F31, F57, F58), a number of pits (F43, F51, F70) and a modern feature truncating F26 and F51, the cut of which was visible in the ploughsoil. All of the pre-modern features respected



Illus 8 Plan and section of pit F20.

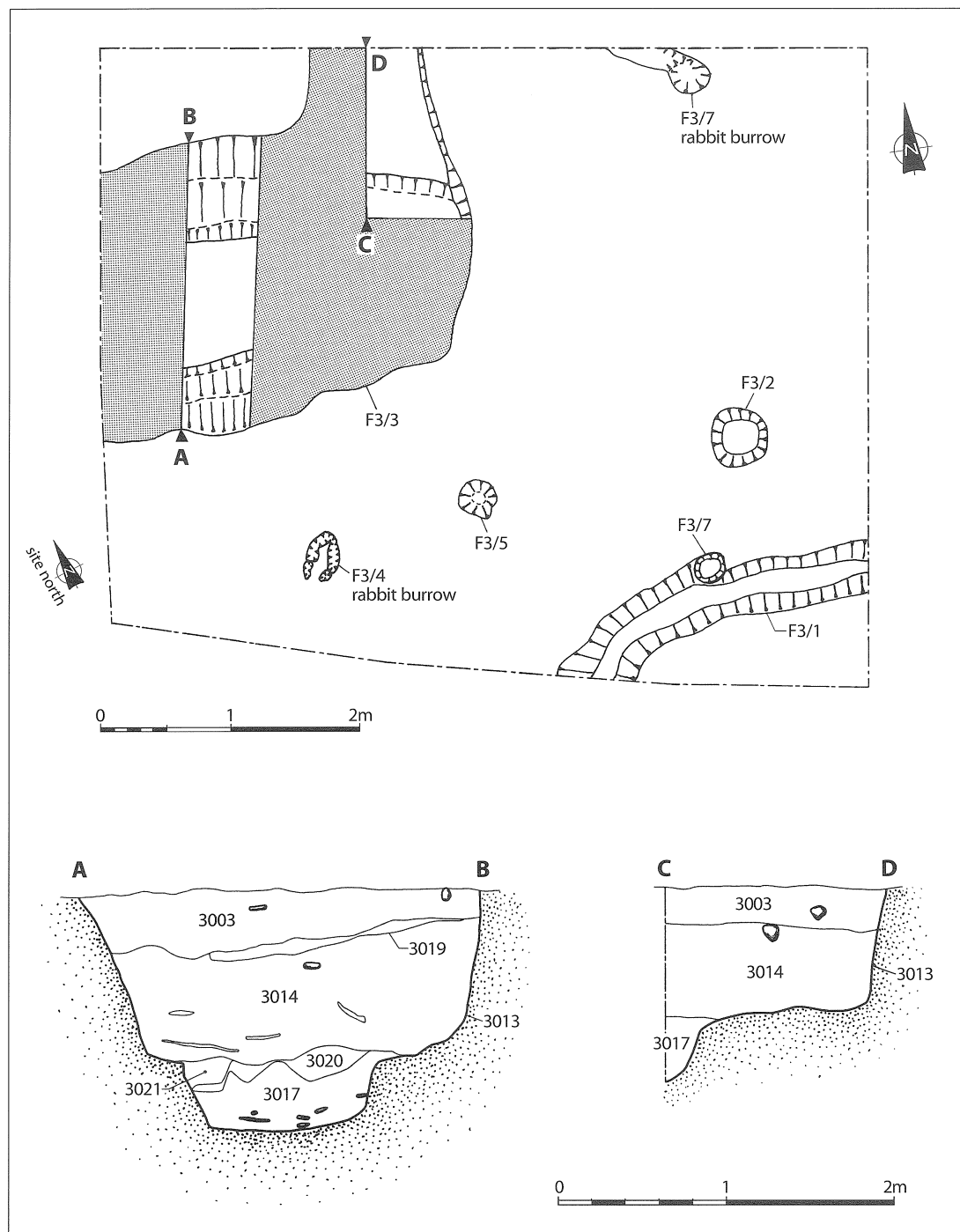
each other with the exception of central post-hole F27, which cut pit F51. Pit 51 contained burnt bone, heat-cracked stone and sherds constituting approximately one third of a prehistoric pot (SF80). The burnt organic residue, identified as a wax or grease by lipid analysis, from the interior of this vessel produced 2s radiocarbon dates of 390–110 cal BC (GU-9672) and 400–110 cal BC (GU-9673). The detailed report on the lipid analysis forms part of the site archive (Taylor unpubl).

The presence of an entrance in the structure, directly facing the palisade entrance to the east, is implied by the presence of a c 2m wide corridor clear of archaeological features running from the structure to the palisade entrance, suggesting the presence of an established path (Illus 4). Pits F23, F21, F40, F66, F65 and F54 appear to define the S side of this access route. There is no clear evidence of any features relating to a projecting porch for the structure, with the fortuitously placed F21 and F41 both being very shallow.

The deep, well-packed post-holes of the post-built structure are quite substantial and could certainly have been weight-bearing, suggesting that this structure at least was roofed.

Additional features within the enclosure

Two large pits (F2 and F20) lay outside and 2m to the E of the central structure. These were irregular in plan, 1.7–3m in width (Illus 8). Their sides were irregular but fairly steep, leading to relatively flat bases at a depth of approximately 0.8m. Each had two fills separated by a



Illus 9 Plan of Trench 3 and sections through souterrain.

layer of stones (eg 1029), some of which were heat-cracked. The lower fill consisted of re-deposited subsoil and proved in each case sterile (eg 1161). The upper fills were compact dark brown to black silty sands, containing many fragments of burnt bone and charcoal (eg 1019). There was a suggestion in the west-facing section of F2 that the cobbles lay in a re-cut of the pit. The stones themselves were laid with sufficient regularity to suggest they represent a roughly cobbled surface, perhaps forming a working hollow for domestic activities.

The remainder of the features identified within the enclosure, with the exception of the ring groove F15, which is discussed below, were shallow pits. One pit

(F60; Illus 7) contained carbonised worked wood, including branchwood with chopmarks, longitudinally split branchwood and squared-off roundwood. Radio-carbon samples of this material provided dates spanning the first three centuries cal AD (see below). The pits themselves did not fall into any clear patterns with the exception of those defining the S side of the proposed passage linking the entrances of the palisaded enclosure and the central structure (see above). A similar line of features could be seen as cropmarks on the unexcavated side of the site (Illus 2), possibly indicating some sort of division of space within the enclosure. F53, F52, F44, F47, F43, F42 also form a somewhat

rough alignment which might define a further sub-division within the enclosure.

Ring-groove structures

Excluding F26 (see above), four lengths of curving slot were identified. Three of these were identified immediately S of the enclosure (F4, F6, F35), and extended beyond the trench, whereas the fourth lay within the enclosure (F15). Two (F4 and F6) were partially concentric with each other, possibly representing two phases of activity or a 'ring-groove and tail'. The latter feature type, as seen at sites such as Port Seton East and West (Haselgrove and McCullagh 2000), forms when a second groove extends a small way from the main ring-groove, then runs concentrically to it, presumably creating a sheltered space on the exterior of the main structure. F11–13 may represent the vestiges of the E side of F6, damaged and extended by rabbits, but could alternatively have formed part of some sort of entrance structure relating to the palisaded enclosure.

All sections excavated through these features (eg Illus 7) suggested that they had either been very shallow, or that they were heavily plough-truncated, surviving to a maximum of only 0.15m deep. No features were identified within the largely homogenous mid-brown sand fills of the grooves (eg 1010). Inwashed layers and small lenses of sand occurred intermittently. Pit/post-holes F5, F7 (Illus 7), F8, F9 and F14 are spatially associated with F4 and F6 (Illus 4). F5 contained a flint flake and F7 six worn pot sherds (SF16).

The ring-groove remains are not substantial enough to have undisputedly represented roofed structures. They may none the less represent the severely truncated remains of roundhouses. If the ring-grooves were taken to represent the outer wall lines, the external diameters would be around 8 to 10m, considerably smaller than the post-built structure within the palisaded enclosure, but well within the recorded range of ring-groove houses. Alternatively, these features could be interpreted as windbreaks or shelters as has been suggested for the U-shaped gullies found with no associated structural remains at Port Seton (Haselgrove and McCullagh 2000).

Trench 3 (Illus 9)

The souterrain

A short length of souterrain passage (F3/3) was uncovered in Trench 3. This appeared to consist of part of an entrance corridor lying obliquely to the start of a main passage. The main passage was 2.4m wide at the subsoil surface. Two trial sections were excavated across this souterrain, one in the main body and the other along the possible entrance corridor. The base of the entrance passage, which was exposed for a length of 0.75m in the trench, lay 0.5m above the floor of the main passage, with an abrupt change of level between the two (Illus 9, C–D).

The entrance corridor, which was 0.9m wide and 0.9m deep, was fairly rectangular in profile. In contrast, the main passage had a stepped profile, levelling out on either side at a depth of one metre creating a step 0.2 to 0.5m wide before dropping again by 0.5m. The base of the main passage, which was 1.4m deep, was flat and measured 0.9m in width. No additional structural details were detected and there was no evidence of a lining.

There were five principal fills in the souterrain. The uppermost fill (3003) consisted of poorly-sorted dark brown compact silty sand similar to the ploughsoil. This was separated from the very similar 3014 by the discontinuous charcoal-stained silty sand of 3019, which did not appear in the entrance passage. Below the level of the step, three further fills were identified. 3021 and 3017 were similar to the uppermost fill but with a greater proportion of sand and several charcoal-stained lenses. Lying between these was a dark brown organic fill (3020) similar to 3003 and 3014.

The only datable evidence was produced from the middle fill 3014 and cannot be associated with the building or use of the souterrain itself. This was a 1st to 2nd century AD copper alloy Roman trumpet brooch (SF5). Other finds were a flint flake from fill 3003 and a sherd of pottery (SF65) from fill 3017.

Ring-groove feature

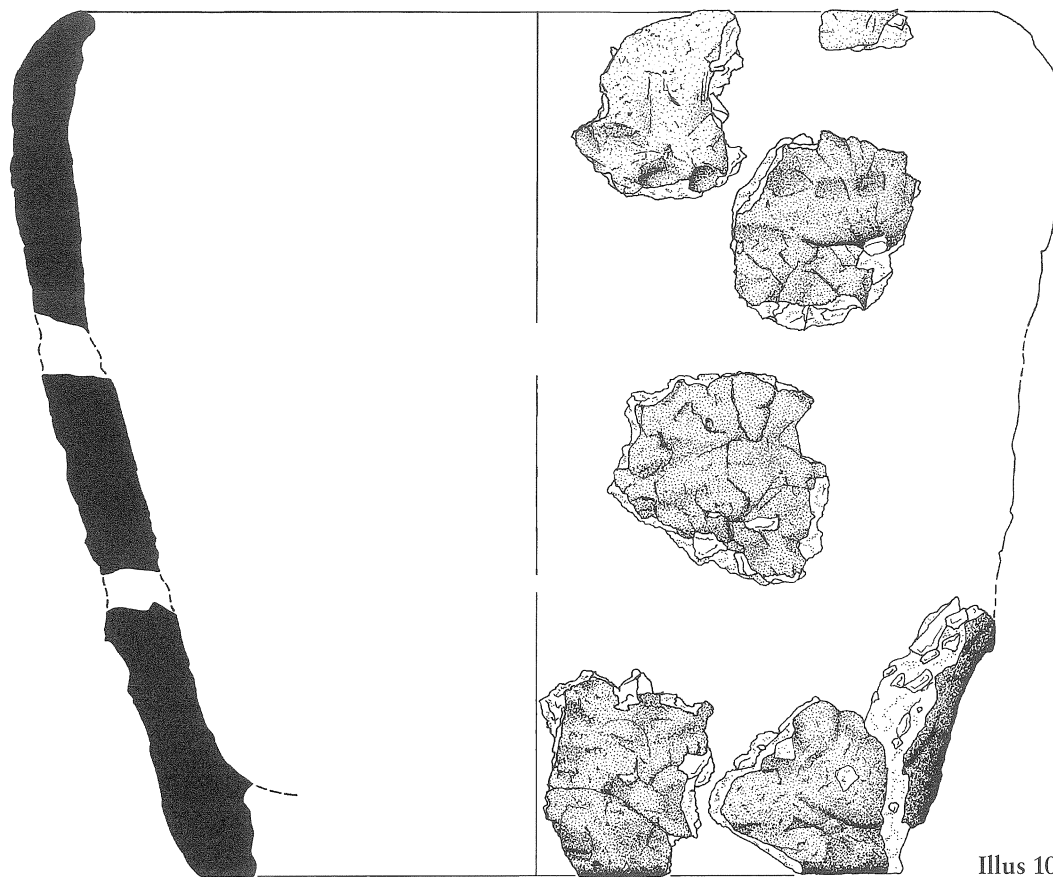
A length of a curvilinear slot and adjacent post-holes, possibly forming part of another ring-groove house, were located in the SE corner of the trench. This slot (F3/1) was more substantial than those identified in Trench 1, measuring a maximum of 0.5m across and 0.5m deep. The feature was cut by a single post-hole (F3/7) and was loosely associated in plan with two further post-holes (F3/2, 3/5), approximately 0.45m in depth.

The finds

Pottery (Illus 10)

The prehistoric pottery assemblage from Ironshill East comprised of 147 sherds with a total weight of 5375g. Of these, 139 sherds came from F51 (1077), a pit cut by a post of the central roundhouse, 6 from post-hole F7 (1007), 2 from the final fill of the palisade (1004) in section C and a single, very degraded, one from souterrain fill 3017. The sherds from F51 appear to derive from a single vessel. The different fabric types imply a minimum number of four individual vessels.

This collection was analysed using the pottery recording system recommended by the Prehistoric Ceramics Research Group (PCRG 1997). The analysis included a measurement of wear, as employed by Lelong (1993) and Swift (1996), which is measured on a scale of 1 (not worn) to 5 (very worn). This can aid in isolating residual elements in an assemblage, although



Illus 10 Pottery vessel SF80.

0 10 20 100mm

the relative softness of different fabrics must be taken into account as must any applied finishes such as slips or burnishes.

Fabrics

Four fabrics were identified in the assemblage.

Fabric 1 This fairly hard, smooth fabric is pale orange on the exterior (7.5YR 6/6), grey (7.5YR 5/1) in the core and pale grey on the interior (7.5YR 6/2). This firing pattern indicates that the vessel was probably oxidised with organics originally present. The diffuse core margins suggest the vessel cooled slowly in an atmosphere with limited oxygen (Orton et al 1993). The unusually low number of poorly sorted basic igneous inclusions vary in size from 5mm to 20mm. These almost certainly represent added temper. Although the inclusions are large, they are infrequent, giving the fabric a relatively smooth feel unusual in pots from later prehistoric contexts.

Fabric 2 This fairly hard sandy fabric, which has an irregular fracture, is pale orange throughout (7.5YR 6/6). Sparse, poorly sorted, angular igneous inclusions occur up to 10mm in maximum extent.

Fabric 3 This soft, sandy fabric has a red (10YR 5/8)

exterior and a grey (10YR 4/1) core and interior. This combination of colours suggests the vessel was fired upside down in an atmosphere with limited oxygen. Sparse, poorly sorted, angular basic igneous inclusions occur up to 10mm in maximum extent.

Fabric 4 This fairly hard, sandy fabric is very dark grey (7.5YR 3/1) throughout. There are moderate quantities of poorly sorted angular quartzite up to 5mm in maximum extent, and frequent, poorly sorted, angular mica schist inclusions up to 3mm in maximum extent.

Form and construction

Only the sherds from F51 (SF80) represented enough of a single vessel to allow the original form to be approximated (Illus 10). These sherds derive from a vessel with a basal diameter of 250mm. Although very fragmentary, the vessel's height can be estimated as greater than 300mm. Only two small rim fragments were identified. The overall vessel form is fairly upright, with the walls expanding slightly from the base to the gently inward curving shoulder and slightly inward-turning rounded rim. The thickness of the vessel walls decreases from 20mm by the base to 15mm below the rim, then to 7.5mm at the rim itself. The base itself is 25mm thick. The pot appears to have been coil-constructed, with the

coils having been evened out on the surfaces by hand as indicated by the fingerprint impressions showing over much of the surface. Both inner and outer surfaces are uneven and knobbly, with no indication of having been wiped or smoothed prior to firing.

Apparently overlying the finger impressions are the imprints of grass, seeds and some larger stalks, which imply the wet clay was wrapped in grass for firing, a feature frequently recognised in crude prehistoric pottery.

Surface treatment

The fingerprints that cover the exterior of the SF80 vessel may simply be the result of a hasty evening of the vessel surface in order to blend the coils together. Alternatively, this can be seen as an example of 'fingerprint rustication', supposedly a deliberate attempt to roughen the vessel surface in order to facilitate handling (Gibson and Woods 1997). Several sherds have been wet-smoothed on both the interior and exterior.

Decoration

Two forms of apparently deliberate decoration were present in the assemblage. The first was the simple form of crude decoration 60mm below the rim of vessel SF80 in the form of a rough linear band of finger impressions (Illus 10), distinct from the all-over finger-prints referred to above. The fingerprints, which are angled at approximately 20 degrees from the vertical, are closely but unevenly spaced. These appear on four body sherds and one rim sherd.

The very small sherd SF34 is possibly decorated with two incised parallel lines 5mm apart, less than 1mm deep and 1mm across. It is not apparent what part of the vessel these derive from nor whether they occurred on the interior or exterior of the vessel. It is possible that they are fortuitous and do not form part of a deliberate motif.

Function

Vessel SF80's function appears to have been associated with cooking, as is indicated by the presence of carbonised encrustations on the lower interior of the pot. Samples of the residue were submitted to Marcia Taylor for lipid analysis (Taylor, unpubl) and to SURRC for radiocarbon dating.

Wear

The breaks at the edge of each SF80 sherd were still relatively unabraded, despite the very fragmentary state of the vessel as a whole. This suggests that the vessel was deposited immediately or soon after breakage.

Sherd SF34 is the only one on the site which exhibits a high degree of wear. This is perhaps surprising as the fabric concerned is among the harder ones from the site. This may be an indication that the sherd is a residual element within the deposit from which it was recovered.

Discussion

Pottery similar to SF80 both in terms of form and coarseness has been found at St Germain's, East Lothian (Phase 3, antennae ditch, Alexander and Watkins 1998, 230, illus 13, nos 8–9), Craig's Quarry, East Lothian (Piggott 1960, vessels 9 and 10), and Bannockburn fort and homestead, Stirling (Rideout 1996, Iron Age pot 94/126,155). On the basis of these parallels, a later Iron Age date is most likely and this is supported by the radiocarbon dates from the pot residue of SF80.

The linear arrangement of fingerprints decorating the SF80 vessel is not unknown in later prehistoric pottery. It occurs on a raised cordon at Easterton of Argaty palisaded enclosure, Stirlingshire (Lorna Main, pers comm) and in a band a few centimetres below the rim on several vessels from Green Castle, Portknockie (although in the latter case the vessel form is everted with external lip, Ralston 1980). The dates ascribed to both of these sites are fairly early—the Late Bronze Age and Early Iron Age respectively. Purely on the basis of this evidence it is possible to suggest a typological progression from cordoned pot, to decorated cordons to decoration in the position of cordons. However, this is a very simple, reproducible form of decoration which is just as likely to have no chronological significance whatsoever.

All other sherds found on the site were small and fairly worn. These are likely to have been residual when deposited and should not be used as a basis for function identification or dating even if forms had been identifiable. F65, the single sherd from the souterrain, was constructed from fabric 2. This type of sandy fabric is a frequent occurrence on souterrain sites (see McGill 2002).

Catalogue of sherds by context/fabric

- 1004/1** (SF62), Fabric 3, 1 body sherd (MNI 1). Total weight 38.31g, maximum extent 62mm, thickness 15mm. Both interior and exterior wet-smoothed. No decoration is apparent. There are slight traces of an organic residue in the interior of the vessel. Wear 3.
- 1004/2** (SF34), Fabric 4, 1 body sherd (MNI 1). Total weight 8g, maximum extent 25mm, thickness 10mm, although full thickness does not survive (MNI 1). A mica-rich slip is present on the surviving side of the sherd, which also appears to have been wet-smoothed. There are also indications of two parallel incised lines. No residues are apparent. Wear 4–5.
- 1007/1** (SF16), Fabric 2, 6 body sherds (MNI 1). Total weight 120g, maximum extent 60mm, thickness 15mm. Both interior and exterior wet-smoothed. No decoration or residues apparent. Wear 3–4.
- 1077/1** (SF80), Fabric 1, 2 rim sherds, 7 base sherds (including 2 angled sherds which join to base), 130 body sherds, 4 of them decorated (MNI 1). Total weight 5202g, maximum sherds extent 100mm, thickness 25mm at base, average 20mm at wall, 15mm at rim. No surface treatment apparent. Finger impressions all over vessel-smoothing rather than

'finger rustication', appear to group into a linear arrangement 50mm below the rim. Also impressions of grass, seeds and stalks all over exterior-wrapped prior to firing. Encrusted residues on lower third of interior of vessel. Wear 2–3.

3017/1 (SF65), Fabric 2, 1 body sherd, weight 7g, max extent 35mm, >7mm thick. No visible surface treatment, decoration or residue. Wear 3–4.

Romano-British Trumpet Brooch (Illus 11) Fraser Hunter

Description

Plain trumpet brooch of Collingwood and Richmond (1969, 296–7) type R(ii), an elegant and slender example of the type. Largely intact, with a good patina: only around a third of the pin survives, the return of the catchplate is damaged, the foot bent and the headloop lost. The acanthus knob on the bow is flanked by single milled mouldings. The head is noticeably oval, stepping down to a flat edge. A solid rod axis of copper alloy holds the hinged pin, which is sub-rectangular in section. The bow is slender and triangular in section, with a marginal groove on one side and part of one on the other. The cylindrical footknob, cast with the bow, is decorated with a central depression with raised border; its edge bears two incised circumferential lines, one only partly encircling it. Surface X-ray fluorescence by Dr Katherine Eremin indicated that all three components were of leaded bronze with minor zinc and trace silver and antimony.

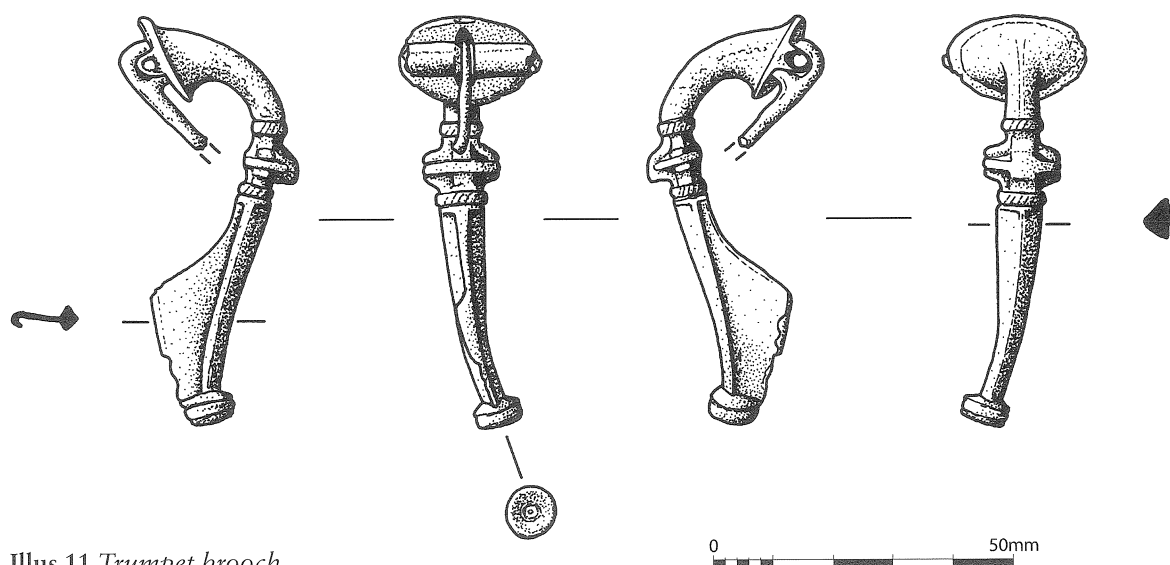
SF5, context 3014; upper fill of souterrain, Trench 3
L 67 mm, W 22 mm, H 27 mm

Discussion

Trumpet brooches are common in the Roman north and were preferred in Iron Age society to other brooch

types, perhaps because their style echoes native decorative habits (Hunter 1996). A convincing internal chronology has yet to be developed, and the date can only be given as broadly late 1st – late 2nd century AD. Although this is an elegant brooch, it is not one of the more elaborate varieties with enamelled decoration or silver inlay. The quantity of Roman brooches now being found by metal-detectorists indicates they were relatively widely available (eg see Hunter 1996): from Angus there is a similar brooch from West Mains of Ethie promontory fort (Wilson 1980, fig 3.1), a headstud brooch from house 1 at a site to the west of Ironhill (Pollock 1997, 347) and an enamelled plate brooch from Carlungie II souterrain (Wainwright 1953).

Roman finds, primarily late 1st–2nd century, are quite commonplace in Angus. Many excavated Iron Age sites have produced them: Robertson (1970, table IV) lists Carlungie I and II, Farnell, Pitcur I and II, Tealing III and West Grange of Conon. To this can be added Ardestie, Hurly Hawkin, Ironhill West, Auchlishie, Dundee Law, West Mains of Ethie and Redcastle (Wainwright 1963, 132; Taylor 1982; Pollock 1997; Dick 1997, 14; Driscoll 1995, 1100–1; Wilson 1980; Alexander forthcoming; this listing excludes stray finds and non-settlement sites, such as the Airlie burial). Wainwright's (1963, 153–219) survey shows that the vast majority of examined souterrains where the finds now survive have produced Roman artefacts. From this it seems that Roman goods were circulating regularly in the late first and second centuries in local society. However most sites had access to them only in small quantities: only Hurly Hawkin could be described as rich in Roman finds, with a patera handle, strainer rim, bracelet, cavalry harness mount, a coin, glass, Samian (seven sherds from at least five or six vessels) and coarse ware (Taylor 1982). This supports a model of Roman goods as valued items, with a pattern of controlled access to them: a small number of sites had privileged access to Roman finds, which were then redistributed within the parameters of local Iron Age social relationships.



Illus 11 Trumpet brooch

The relatively intact nature of the brooch invites speculation as to its ultimate fate. It was not deposited in a wearable condition, but the damage is unusual and seems more likely to be deliberate than accidental. While pins are often broken, it is much less normal for the whole foot to be bent. The foot and the surviving end of the pin are bent in opposite directions, implying the ends of the brooch were held while force was applied to the centre of the pin. This suggests the brooch was bent as a deliberate act prior to deposition. Although there has been no detailed study, there are other examples of intact or largely intact brooches incorporated in deposits linked to buildings (eg in the upper fill of a ditch surrounding building 6 at Carronbridge, Dumfriesshire; in a palisade trench at Seafeld, Inverness; Johnston 1994, 250; M Cressey, pers comm). Perhaps most relevant is the discovery of an elaborate late 2nd–3rd century enamelled brooch in the fill of Carlungie II souterrain, Angus (Wainwright 1953). This makes it likely that the Ironhill brooch was a valued item deliberately destroyed and deposited in the abandoned souterrain.

Other finds

Details of the chipped stone artefacts examined by Dr Graeme Warren and an unstratified fragment of socketed stone catalogued by Adam Jackson are included within the project archive.

Palaeobotanical studies

Carbonised plant macrofossils

Mike Church

Introduction

This report analyses the carbonised plant macrofossils recovered from bulk samples taken from the excavations at Ironhill East (see Finayson et al 1999 for a consideration of palaeoenvironmental sampling within the context of the Angus and South Aberdeenshire Field School). Eighteen samples were submitted for analysis, of which eight produced carbonised remains.

Methods

A ‘total’ sampling strategy was adopted on site (Jones 1991), meaning a sample was taken from every archaeological context, apart from deposits with clear bioturbation, modern contamination or those deposits that consisted of sterile redeposited sands and gravel. A 10% random sample of this population sampled in the field was then taken for wet-sieving to assess the potential for further work. This meant a statistically representative sample of all the archaeobotanical remains from the site was retrieved (van der Veen and Fieller 1982). The samples from two sets of deposits were also

sorted in their entirety. Firstly, all of the samples taken from the souterrain were sorted. Of these four samples only two contained plant remains (Samples 16 and 79). Secondly, samples from four of the six post holes from the central post-ring were also sorted, none of which contained carbonised plant macrofossils. No further samples were processed due to the low numbers of plant remains within the assemblage.

The bulk samples were processed using a flotation tank (Kenward et al 1980) with the residue held by a 1.0 mm net and the flot caught by 1.0 and 0.3 mm sieves respectively. All the flots and residues were dried and sorted using low-powered stereo/binocular microscope at x15–x80 magnification. All macrofossil identifications were checked against botanical literature and modern reference material from collections in the Department of Archaeology, University of Edinburgh. Nomenclature follows Stace (1991) with ecological information taken from Clapham et al (1989) and *Flora Europaea* (Royal Botanic Garden Edinburgh 1998).

Results

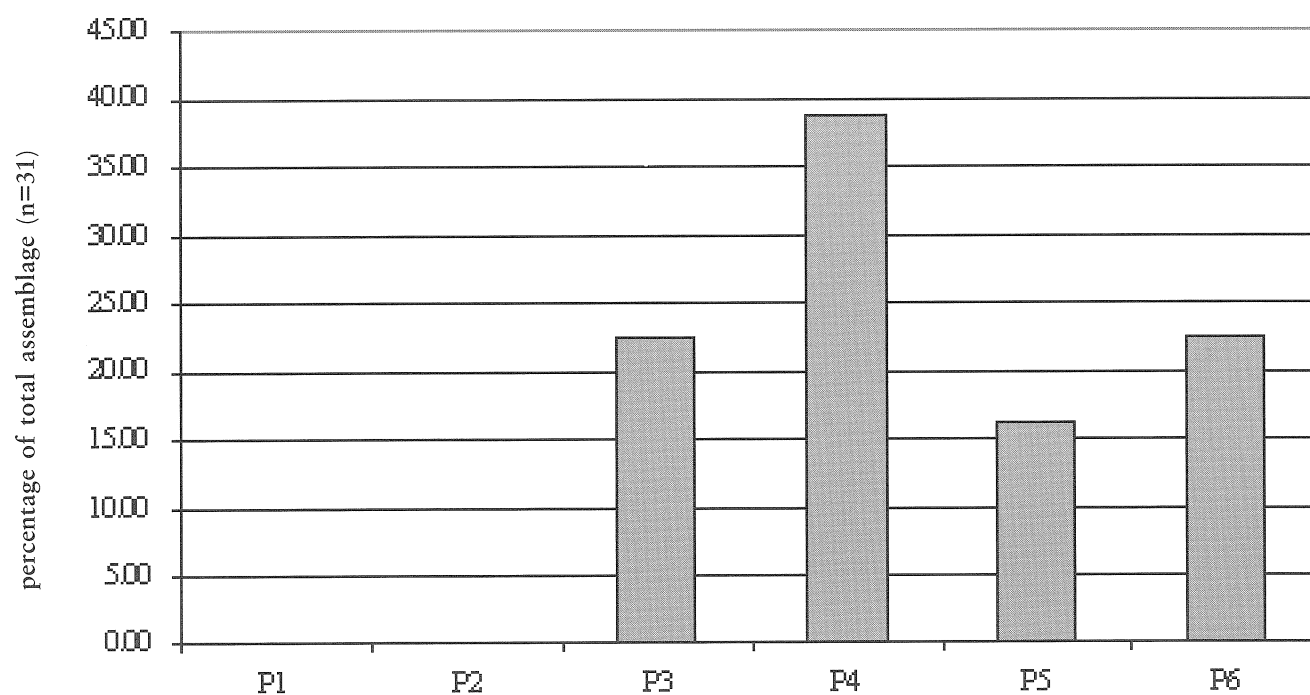
Table 1 presents the carbonised plant macrofossils recovered from the bulk samples. In general very few remains were recovered, limiting interpretation. The samples comprised two groups, the two samples from the souterrain fills and various negative feature fills from the enclosed settlement. Only four quantifiable components were recovered from the souterrain, all of which came from wild species. The other group of samples largely contained low concentrations of grain. Grain accounts for approximately 80% of the total assemblage. The remains are analysed as a single assemblage due to the low numbers of remains and probable approximate contemporaneity of the various deposits.

Taphonomy

The carbonised plant material is likely to have been dumped into the various negative features incorporated with ash from household fires, a taphonomic model acknowledged as being the principal charring mechanism in British archaeology (cf Hillman 1981; G Jones 1984; M Jones 1996; van der Veen 1992). However, it is probable that a lot of mixing of the material occurred within the soil body as none of the samples contain significant quantities of macrofossils. Only Sample 14 had a coherent assemblage of grain, possibly representing the accidental charring of a cleaned grain product. Illus 12 presents the preservation of the 31 cereal grains recovered from across the site, following the preservation indices outlined by Hubbard and al Azm (1990). Class P1 represents perfectly preserved grain through to class P6 representing severely degraded grain precluding even genus identification. In general, the plant remains were quite badly preserved, reflecting the charring conditions (cf Boardman and Jones 1990) and possible movement of material within the soil body.

Table 1 *Carbonised plant material from bulk samples.*

context information	palf	palisade fill	pf	pit fill	phf	post-hole fill	rgf	ring-groove fill, souterrain fill	
plant part	c	caryopsi	cb	culm base	n	nutlet			
sample	7	12	14	16	50	64	79	107	
context	1008	1004	1010	3014	1098	1128	3017	1028	
generic context type	phf	palf	rgf	sf	phf	phf	sf	pf	
feature	F7	F3	F4	F3/3	F43	F44	F3/3	F20	
volume (litres)	9	7	7	4	3	2	2	2	
grain	common name								
<i>Hordeum</i>									
<i>H. sp. (c)</i>	barley grain					3			1
<i>H. hulled (c)</i>	hulled barley grain					3			2
<i>H. hulled symmetric (c)</i>	hulled barley straight grain				1			1	
<i>H. hulled asymmetric (c)</i>	hulled barley twisted grain				1				
<i>Triticum</i>									
<i>T. sp. (c)</i>	wheat grain			2				1	
<i>T. dicoccum L. Schubl. (c)</i>	emmer wheat grain			1					
<i>T. spelta L. (c)</i>	spelt wheat grain			2		3		1	
cereal indeterminate	indeterminate cereal grain			1	1	7			
total grain				6	3	16	0	2	3
wild species									
<i>Polygonum spp. (n)</i>	knotgrass			1					
<i>Polygonum aviculare L. (n)</i>	knotgrass							1	
<i>Rumex spp. (n)</i>	dock							1	
<i>Carex spp. (trigonous) (n)</i>	sedge					1			
cereal/monocotyledon (<2 mm) (cb)						1	1	2	
total wild species				1	0	1	2	2	0
total quantifiable component				7	3	17	2	4	3
quantifiable component / litre				0.8	0.4	2.4	0.5	1.3	1.5
grain proportion (%)				85.7	100.0	94.1	0.0	50.0	100.0
wild species proportion (%)				14.3	0.0	5.9	100.0	50.0	0.0

Illus 12 *Grain preservation.*

grain preservation (after Hubbard and al Azm, 1990)

Cultivated species

Only 31 grains were recovered from the site so only limited inference can be made about the cereals present. Hulled barley (*Hordeum* sp. hulled) was present in four of the samples and the identification of a single twisted grain in Sample 12 means the six-row species was also present (*H. vulgare* var. *vulgare* L.). Wheat grains were recovered from three of the samples with both emmer (*Triticum dicoccum* L. Schubl.) and spelt (*Triticum spelta* L.) recovered. All three cereals are known from a number of later prehistoric sites from across Scotland (Boyd 1988; Dickson and Dickson 2000).

Wild species

Only eight quantifiable components from wild species were recovered, again negating detailed interpretation. They consist of seeds of knotgrass (*Polygonum aviculare* L.), dock (*Rumex* spp.), sedge (*Carex* spp.) and small culm bases. The knotgrass, dock and culm bases could derive from weeds of the cereal crop. The presence of sedge points to damp ground being exploited and this plant and the culm bases may have derived from the burning of turf (Dickson 1998). However, the small numbers of remains means positive identification of weed seeds or turf is impossible.

Discussion

In general, the concentrations of all carbonised plant materials are low with the composition weighted towards grain in most samples. The radiocarbon dates from F51 and F60 indicate infilling of the various negative features probably occurred during the late first millennium BC or early first millennium AD. There are only a couple of sites with contemporary plant assemblages in the North East. These include Wardend of Durris, Aberdeenshire (Boardman 1995) and Culhawk Hill in Angus (Rankin 1998). Both sites contained greater concentrations of plant remains and the cultivated plants included grains of hulled and naked six-row barley and oat, with some flax and emmer wheat also identified from the Wardend of Durris. Any similarities or differences in cultivation are impossible to assess because of the very low frequency of plant remains at Ironshill East.

The low concentration of carbonised remains from the souterrain is different to other assemblages sampled from souterrains during the Field School, such as Redcastle. This difference stems from the lack of carbonised material within the immediate post-abandonment fill of the souterrain, compared to the assemblages rich in grain processing debris from other sites in the vicinity, notably Dubton (Cameron 2002), Redcastle (Alexander forthcoming) and Hawkhill (Rees in prep). This suggests that the abandonment of souterrains did not follow an identical pattern, which may imply a lack of uniformity in their use during occupation. However, more detailed sampling of the structure at Ironshill would be needed confidently to compare the remains from the total excavations at the other sites.

Wood charcoal

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Wood charcoal was analysed from a range of features across the site. Seven species of wood are present within the charcoal assemblage and include *Quercus* (oak), *Betula* (birch), *Alnus* (alder), *Corylus avellana* (hazel wood and shell), Rosaceae (wild cherry or black-thorn), *Salix* sp (willow) and *Ulmus* (elm). There is insufficient material to investigate aspects of species exploitation, selection and local woodland composition other than to mention that the wood types recorded within the assemblage are typical of Scottish mixed woodland types with alder and willow being exploited from wet areas such as floodplains and stream banks.

A great deal of the charcoal is very poor in terms of defining whether it is branchwood; abrasion which leads to sub-rounding of the charcoal has occurred in some cases. This is mainly as a result of weathering within the soil as a result of translocation and movement within the soil profile. As with abrasion, soil staining was apparent on some of the charcoal.

Large diameter branchwood from samples within F60 has a range of 45–50mm and represents the remains of a stake and other carbonised roundwood. Certain fragments exhibited tooling and compression possibly caused by hammering. Samples of this material were selected for radiocarbon dating.

A fuller report and catalogue on the wood charcoal forms part of the site archive.

Radiocarbon dating

The taphonomy of the deposits at Ironshill East created difficulties in selecting samples suitable for radiocarbon dating. Few of the feature fills were securely sealed and most could have been disturbed in prehistory and/or in modern times. The chronological gap between the construction/occupation of the site and the formation of the fills as they were found during the excavation is impossible to quantify. Indeed, the relative chronology of the features and any charcoal they contained could not be certain, as the abraded, soil-stained wood charcoal assemblage could easily be residual.

Only two samples were considered acceptable for dating. The burnt stakes from pit F60, context 1171, were considered a suitable assemblage for radiocarbon dating owing to their good preservation. The concentration and condition of this material indicated that it was in its primary context of deposition. Although the pit cannot be tied stratigraphically to any significant features on the site, it is representative of the type of feature common within the bounds of the enclosure.

The second sample was from the pot residue on SF80, context 1077. The concentration and fairly good condition of the sherds suggest the vessel was deposited soon after breakage or broken *in situ*, and that the pit was probably backfilled shortly afterwards, with no significant post-depositional disturbance occurring.

Table 2 *Radiocarbon dates.*

lab no	sample context	material	lab age	lab error $\pm$	2s range, cal BC	$\delta^{13}C$ ‰
GU-9760AA-46477	F60	Betula sp	1865	60	0–330AD	-25.3
GU-9671AA-46478	F60	Corylus Avellana	1835	50	70–340AD	-28.0
GU-9762AA-47768	F51, SF80	Pot residue	2195	45	390–110BC	-24.0
GU-9763AA-47769	F51, SF80	Pot residue	2220	60	400–110BC	-24.2

The samples were submitted to the Scottish Universities Research and Reactor Centre (SURRC) and measured at the University of Arizona AMS Facility. Calibrated date ranges were calculated by SURRC using the University of Oxford Radiocarbon Accelerator Unit calibration programme (OxCal3).

It is legitimate to combine the two dates from SF80, on the understanding that they derive from the same entity. Combination of AA-47768 and AA-47769 produces a slightly tighter 2s calibrated range of 390–170 cal BC. Since it is reasonably certain that the burnt stakes from pit F60 relate to a single event, AA-46477 and AA-46478 can be reasonably combined to produce combined 2s calibrated ranges of cal AD 70–260 (93.7% probability) and cal AD 300–320 (1.7% probability).

Discussion

Building sequence

The almost complete lack of inter-cutting features surviving on the main site (Trench 1) renders the identification of a useful relative chronology essentially impossible. It is possible that most features represent a fairly short-lived settlement episode, with the majority of features in use simultaneously and two architecturally different styles of house co-existing. This can be supported by the general lack of archaeologically visible re-builds and re-cuts in individual features and structures. As such, the form of the occupation would have been a large post-built structure within a palisaded enclosure, with smaller ring-groove structures, or perhaps partial ring-grooves functioning as wind-breaks or shelters, co-existing both within the enclosure and immediately outside. The features within the post-built structure, with the exception of F51, which is cut by post-hole F27, could be contemporary with the construction and/or use of the principal structure. The features in Trench 3 could equally have co-existed with that building.

It seems however more likely that activity on site was more complicated in nature and form than this, and this is supported by the radiocarbon dating evidence. It is possible, though unprovable, that groove F26 and pit F51 could relate to a precursor structure built before the large post-built roundhouse, since F51 is cut by the inner post-ring and F26 is non-concentric to the post-rings. It is equally possible that the ring-groove structures, possibly including F26, represent a chronologically distinct phase. The extreme shallowness of the

ring-grooves may be an indication that they pre-date the post-built structure and have been partially eroded by trampling.

The fact that all ring-groove features respect the palisade line implies that if they are not contemporary, they were at least still visible on the ground when the palisade was constructed, or vice versa.

Putative unenclosed ring-groove settlement

The vestiges of the four ring-groove structures in Trenches 1 and 3, not including F26, which might form part of the post-ring house, are considered likely to have constituted part of an unenclosed settlement. The extent of this putative settlement is difficult to identify, as the heavily truncated features do not appear to show well as cropmarks. An unenclosed settlement such as this would fit comfortably with the undefended houses and clusters of houses common among the cropmarks on the terrace situated above Lunan Bay, as at Ironhill (Pollock 1997). Ring-groove houses are not uncommon in Scotland and this type of structure appears to have had a long currency. Recently excavated examples are from places as far apart as Gallow Hill, Girvan (Donnelly 1999) and Ednie, Peterhead (Strachan and Dunwell forthcoming).

The occurrence of ‘tails’, as is implied by the positioning of F4 and F6 at Ironhill East, is less frequent but not unknown. Similar features appear for example at both Fishers Road East and West, Port Seton (Haselgrove and McCullagh 2000).

No artefacts or charcoal suitable for dating were recovered from the ring-groove features. It is however possible that F51, the only feature stratigraphically demonstrated to pre-date the post-ring structure, relates to this putative phase of occupation. The pot residue from this feature was dated to the late first millennium cal BC, a date which might therefore be indicative of the original settlement here.

The palisaded homestead

This combination of a palisaded enclosure with a main central structure is widely recognised in the cropmark record and several such sites have been partially excavated. Homestead 1 at Bannockburn (Rideout 1996), of which only the west side was excavated, is strikingly similar in both form and scale to the principal components of the site at Ironhill East. The 18.6m wide central structure at Bannockburn, as at Ironhill East, takes the form of a double post-ring with a wall-groove

feature appearing between the two rings. The Bannockburn structure differs in having clear evidence of re-builds and a more regular wall groove which, unlike at Ironshill, is certainly a structural component of the post-built structure. Possible reconstructions for the Bannockburn structures, and therefore potentially that at Ironshill East, have been thoroughly discussed in Rideout's publication (*ibid*, 260–263).

Ironshill East also has close similarities to Myrehead (Barclay 1983). The morphology of the Ironshill palisade is comparable in terms of the form and location of the entrance. In addition, the Myrehead enclosure contained a variety of pits and a ring-groove fragment and had external, although in this case post-built, settlement traces clustered to the SW of the palisade entrance. There are indications of a central structure on aerial coverage of Myrehead, but the excavations were not able to cover that part of the site. The Myrehead site was interpreted as representing multiple phases, with most of the structures pre-dating the palisade in the form of an open settlement, dated in this case to the late 2nd to early 1st millennium BC.

An interesting feature that both of these sites share with Ironshill East is their lack of intercutting features, although the site at Bannockburn had some evidence for re-builds of the central structure on the same stance. This is not purely related to their reduction to truncated cropmark sites, as the complex palimpsests at sites like Newmill (Watkins 1980) demonstrate, but might indicate that they have been inhabited for a relatively short length of time, as only minimal evidence survives for even secondary cuts and re-builds.

The apparent alignment of the entrances of the central structure and the palisaded enclosure, and the apparent passage linking them can be paralleled, for example, between House 1 and the NE outer palisade entrance at Dryburn Bridge (Triscott 1982). This, from a practical point of view, may have allowed the occupants of the site to keep watch on their gate, but seems likely to have been intended to complement the imposing nature of the substantial central structure, in the way that formal avenues, gardens and gates complement 17th and 18th century country manor houses. It is also notable that the entrances are aligned approximately to the SE. Although this is the norm for prehistoric houses in Angus, in this case the location is interesting in relation to the topography of the site as the palisade entrance occurs at the top of a steep slope. In practical terms, this could have served to increase its defensibility, but approaching the structure from downslope must also have added to its imposing nature. The combination of the uphill approach and the aligned entrances is perhaps suggestive of a formal design concept, specifically intended to impress. Mercer (1985) suggests that 'substantial houses' of this type formed a widespread tradition in Scotland during the later Bronze Age and early Iron Age, although structures on a similar scale occur into the first few centuries AD, for example in association with the souterrain at Newmill (Watkins 1980).

Although no charcoal was recovered from a suitable secure context to date the palisaded enclosure or the post-built structure, the dates from F51 provide at the very least a *terminus post quem* for the construction of the central structure of the late first millennium cal BC. The dates from pit F60 are slightly later than those attributed to features on morphologically similar sites such as Myrehead and Bannockburn. As F60 is not stratigraphically linked to the palisaded homestead, this date does not necessarily apply to it, but there is no logical reason that this type of settlement might not have continued into the first few centuries AD.

The large pits F2 and F20 are worthy of independent consideration. Features almost identical to these were identified at Wardend of Durris (Russell-White 1995). Here, several pits of similar dimensions and morphology, containing significant quantities of cereal grain, were located in an Iron Age settlement complex. At least one of the Wardend of Durris features (F6) had a comparable fill sequence, with the more sterile layers underlying the stone lining, which was overlain by a charcoal-rich loam. In this case too, the stone layer appears to have been partially cut into the earlier fills. Two radiocarbon dates are available from one of the Wardend of Durris pits—200BC–AD75 (GU-2441; 2s) and 400–130BC (GU-2959; 2s) from the above and below the stone floor respectively. These features were interpreted as stone-floored scoops for domestic activities such as cereal processing, and such an interpretation does not seem inappropriate for the Ironshill East examples.

The souterrain

Little can be said of the souterrain with only a fragment having been excavated and the form of the structure in plan being unknown. Although no evidence for a lining was identified, presumably a timber one originally existed, as at nearby Redcastle (Alexander forthcoming): traces of its foundation may have been missed by the two narrow sections excavated. A souterrain with a similar stepped profile in the main passage was excavated at Cowie, near Stirling (Strachan 1999, 88).

Discussions over the functions of these structures have been entered into elsewhere (eg Barclay 1980; Armit 1999), and the limited excavations at Ironshill East can contribute little to this. However, the discovery of this souterrain was interesting in that it is located close to several others. Two recently excavated examples, at Redcastle (Alexander forthcoming) and Hawkhill (Rees in prep), lie within a mile of Ironshill East and of each other. Such a concentration of souterrains is not uncommon. If their primary function was as an underground storage chamber for agricultural produce of some sort, these concentrations could reflect very productive local economies, unsurprising in the present case considering the fertility of the land in the area, or a large population, again unsurprising with the number of cropmarks of later-prehistoric type houses. Alternatively, the numbers could be related to the relative ease with which

these features can be constructed in the deep sand subsoil. It is possible that the construction of such features did not require a substantial commitment of time or particularly hard physical labour. Most field archaeologists will attest to the relative ease of excavating a site on a sand subsoil! In these circumstances, they could be as much a fashion as a necessity, and their size and layout could reflect the whims of the individual rather than the required storage size. This could explain the bizarrely small 'micro-souterrains' at Dubton, Brechin (Cameron 2002). An interesting study would be to look at the relationships between subsoils and souterrain concentrations, dimensions and degree of elaboration.

The only detailed information revealed about the Ironshill East souterrain by these excavations was the sequence of fills it contained. These appear to support Armit's (1999) hypothetical souterrain abandonment horizon, which he dated to the 2nd century AD. Souterrain fills 3003 and 3014 at least appear to have been deliberately back-filled into the feature, as is implied by their poorly sorted nature. The charcoal-staining in 3019, separating these two fills, demonstrates the occurrence of burning in the vicinity at some point during the back-filling process. Armit's date for this theoretical horizon is not contradicted by the 1st–late 2nd century Roman trumpet brooch recovered from 3014.

Economy

The minimal evidence for the type of economic activities in which the builders and inhabitants of Ironshill East were involved points unsurprisingly to a mixed agricultural economy. Charred cereal grain from spelt, barley and emmer were recovered from various pit features across the site. Limited evidence for cereal processing comes in the form of rachis from various contexts, and possibly from the presence of pits F2 and F20, as stated above. The presence of domestic animals is indicated by the remains of herbivore teeth, too fragmentary to identify further, which were found in a number of contexts including the palisade fills.

Evidence of the use of worked timber other than for posts comes from the contents of pit F60, which was partially filled with the remains of worked and squared-off branchwood and roundwood.

The only tenuous evidence for any ritual activity on the site comes in the form of pit F51, which is cut by post-hole F27 of the central structure. This, with its fill of smashed pottery, could be interpreted as a foundation deposit. It is, however, equally likely that it is a rubbish pit, perhaps associated with activity preceding the construction of the post-ring structure.

The site in its wider social context

If the ring-groove features do represent an unenclosed settlement which was replaced after abandonment by a palisaded homestead, it seems likely that such a move reflects a social adjustment of some sort, rather than purely practical considerations. This would conform to

the broadly accepted general trend towards enclosure which occurs during the 1st millennium BC in Scotland, as described by Macinnes (1982). If the structural sequence were to have been the other way around, with a move away from enclosure, parallels again exist, as at St Germain's (Alexander and Watkins 1998) and Dryburn Bridge (Triscott 1982).

Irrespective of which structures co-existed, the scale of the enclosed central post-built structure and the design of its orientation in relation to the enclosure and the local topography, must have made it an impressive building, located in a prominent position in the local landscape. Although comparable cropmark sites are known in Angus, for example at Newton of Glamis (NMRS ref NO34NE 32), Dun (NO65NE 32), Templeton (NO64NW 86), Priestfield (NO64NE 12), no other sites of this type have been identified amongst the palimpsest of possible settlement sites in the immediate vicinity. Even without knowing which settlements were contemporary with the Ironshill East homestead, this suggests that it is likely to have been of some significance in the Lunan valley.

As with all substantial enclosed structures, the primary motivations behind the construction of the enclosing work could have been the desire for a status symbol by an individual or group, representing control of resources, or a communal achievement by the local population providing a gathering place. It could have been the equivalent of the rich man's villa. None of these possibilities, or combinations of them, are refuted by the archaeological evidence.

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Abstract

Trial excavations centred on a palisaded homestead at Ironshill, Angus were carried out in 1998 as part of the University of Edinburgh's Angus and South Aberdeenshire Field School. A section of the palisaded enclosure including a single entrance, part of the central post-built structure, several ring-groove structures and numerous pits were investigated. The lack of stratigraphy across the site meant it was not possible to demonstrate the chronological relationships between these features. It is most likely that at least two principal phases of activity are represented—an unenclosed settlement of ring-groove houses and a subsequent palisaded homestead—spanning the later first millennium cal BC and early first millennium cal AD. Trial sections were excavated through a timber-lined souterrain and adjacent ring-groove houses located outside the enclosure. A Roman trumpet brooch was recovered from one of the upper souterrain fills.

Keywords

Ironshill
palisaded enclosure
ring-groove houses
souterrain

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