

Excavation of a timber round-house and broch at the Fairy Knowe, Buchlyvie, Stirlingshire, 1975–8

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with contributions by J Barber, W E Boyd, D Caldwell, A Clarke, the late G Collins, P Davidson, D Dungworth, F Hunter, D Ingemark, G McDonnell, the late A S Robertson, L Slater, C Smith, M Spearman, S Willis & the late A Young

ABSTRACT

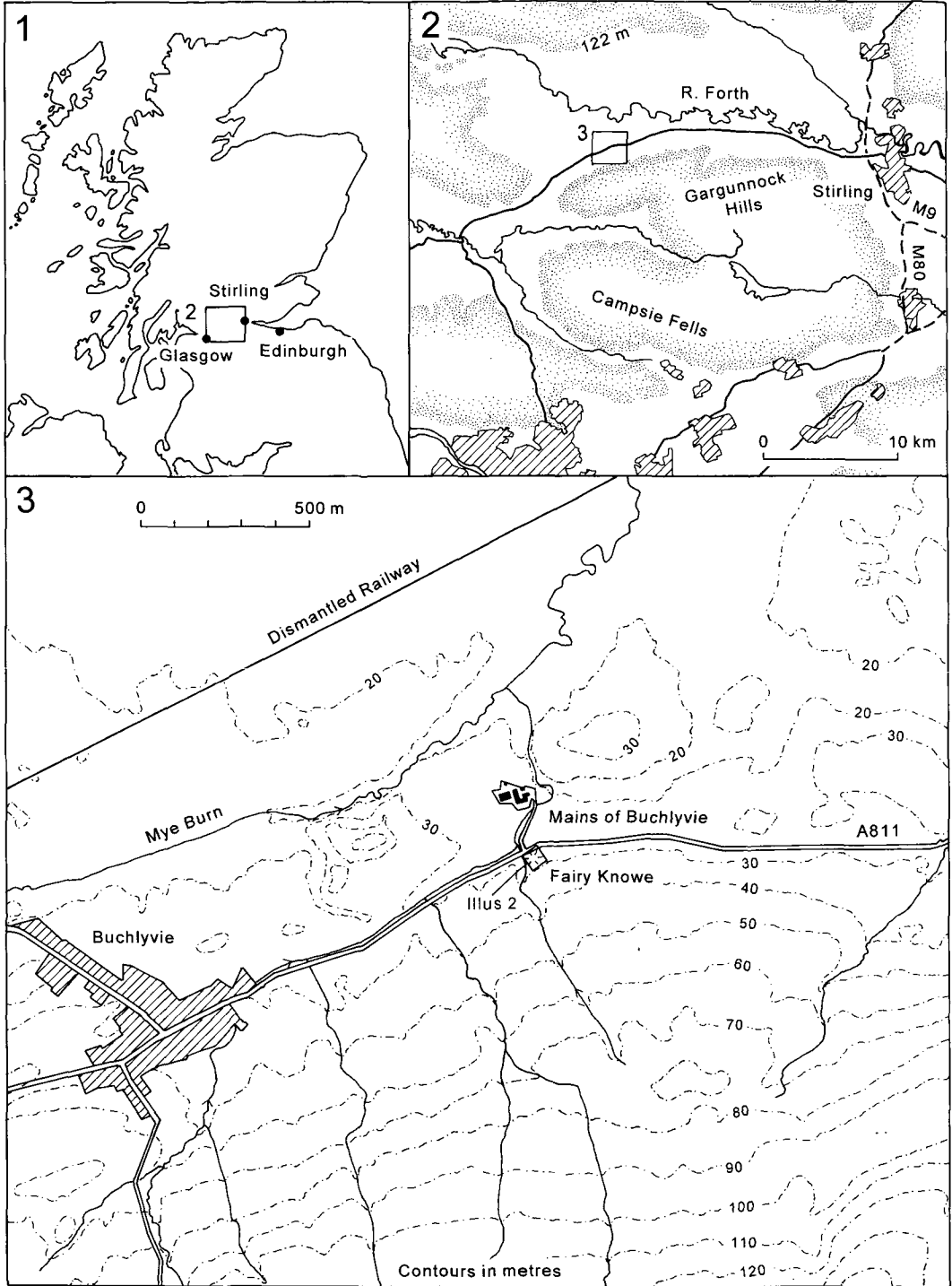
Excavations undertaken on the Fairy Knowe at Buchlyvie between 1975–8 revealed evidence of a timber round-house of Iron Age date. The stumps of some of the oak posts of the building still survived in situ. The remains of the round-house were overlain by a solid-based broch with an inner courtyard some 8.2 m across within walls up to 5.5 m thick. The floor of the broch was partly paved and had a number of post-holes inserted into it. The occupation of the broch with its central hearth was associated with Roman artefacts, including bronze coins, pottery and glass. Radiocarbon dates suggest that the round-house was built sometime between 400 cal BC and cal AD 250 and the artefactual evidence indicates that the broch was probably occupied and destroyed in the pre-Antonine period. The project was jointly sponsored by Historic Scotland and (former) Central Regional Council.

INTRODUCTION

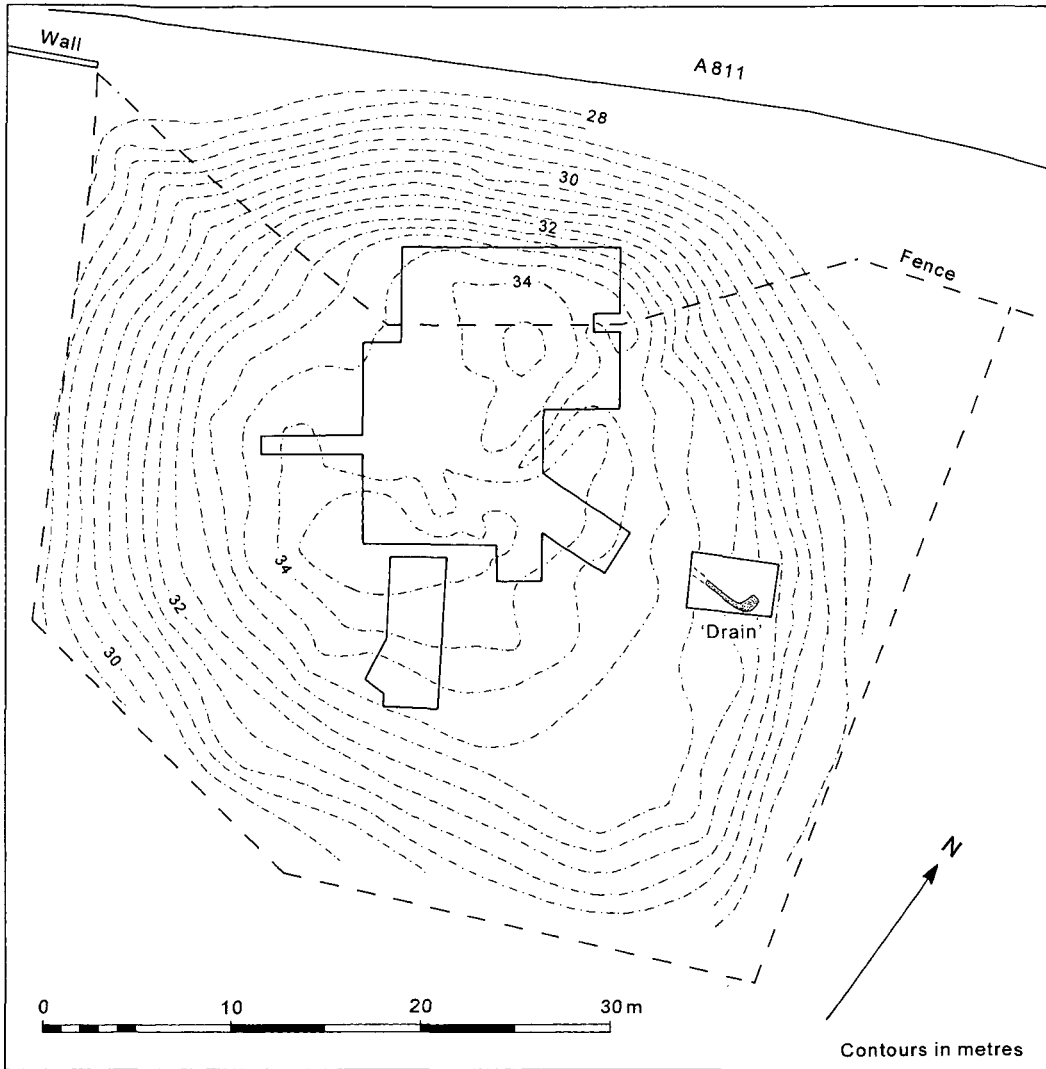
The Fairy Knowe is a small green mound which, with others in its immediate vicinity, forms part of the terminal moraine of the Loch Lomond late-glacial re-advance. It is located 1 km east of the village of Buchlyvie, Stirlingshire, and 21 km west of Stirling at NGR: NS 5856 9426 (illus 1.1). Its summit stands at a height of 34.5 m OD and it lies 2 km south of the River Forth, on the southern fringes of the flat carselands of the Forth Valley, across which it commands extensive views. To the south the land rises steadily towards the Gargunnoch Hills (illus 1.2). An unnamed burn runs along its western side (illus 1.3). In 1974 planning permission was granted for the realignment of the A811 Stirling to Balloch road and the upgrading of the junction of the minor road from Mains of Buchlyvie farm. The scheme proposed the removal of two-thirds of the Fairy Knowe which adjoins the road on its south side, immediately opposite the junction.

Before the excavations the base of the mound measured c 42 m north/south and 50 m east/west and it stood about 7 m high. The shape of the mound had been altered by past activities such as road widening and the excavation of at least one Home Guard trench (information from Mr

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ILLUS 1 Fairy Knowe location plans. (Based on the Ordnance Survey map © Crown copyright)



ILLUS 2 Site contour plan showing trench locations

Middlemass, owner of the site at the time of the excavations). After vegetation clearance a roughly circular depression was visible on the north of the summit of the mound and a number of stones protruded through the turf.

Current Ordnance Survey maps and the Stirlingshire Inventory (RCAHMS 1963, 65) indicated that a cist had been found here. This identification appears to have been based on a number of historical sources. The Statistical Account (1796, 329) records that 'A small green mound on the eastern confines of the lands of Buchlyvie, appears to have been a tumulus. Some human bones, inclosed in flags of stone, were lately found in it; but there is no tradition which gives any account of its origin.' This may also be the site described by Maclagen (1884, 20) as 'A Tumulus called the "Fairy Knowe" near the line of railway [at Kippen] was lately opened. Inside were found "an auld can" and some coins', although in an earlier article Maclagen (1872, 36)

does not name the site of these finds and the Inventory (RCAHMS 1963, 65) suggests that it may be a separate site from the cist discovery. Chrystal (1903, 74) indicates that the site was said to have been used as a Druidical temple.

In order to establish whether any archaeological remains were present on that part of the mound due to be removed by the roadworks a trial excavation was carried out over weekends during May and June 1975 with the assistance of a number of volunteers including members of the Stirling Field and Archaeological Society. This was followed by nine weeks' excavation undertaken over three seasons from 1976 to 1978 (illus 2). An interim report was published (Main 1978). This concluded that the main structure found on the site was a broch. The results of the archaeological excavations led to the alteration of the road line to avoid damage to most of the remains. The site was backfilled at the end of the excavations and the Fairy Knowe was scheduled as an ancient monument in 1986. The finds are in the Smith Art Gallery & Museum, Stirling. The archive is in the National Monuments Record of Scotland.

PHASE 1: TIMBER ROUND-HOUSE

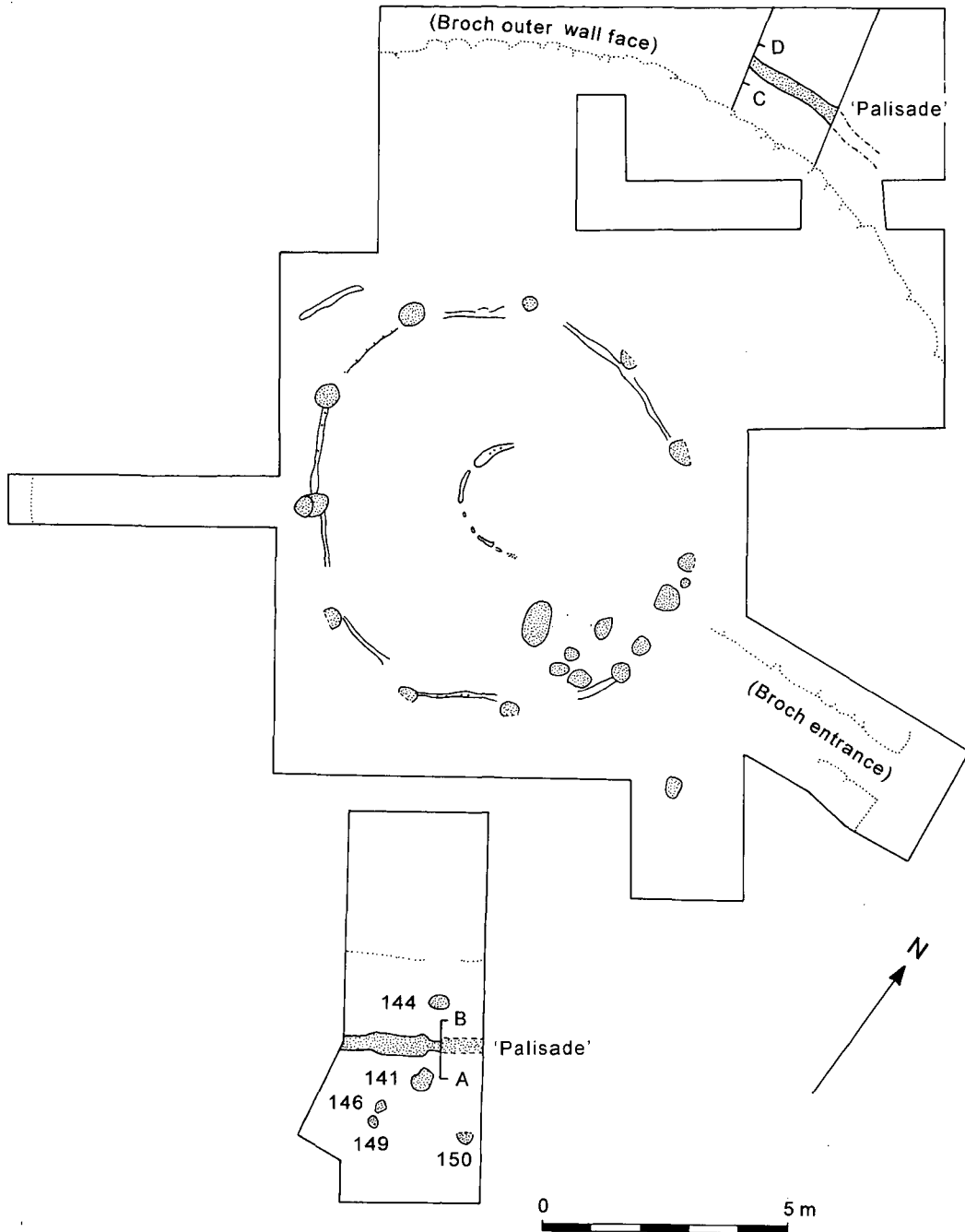
POST-RING (ILLUS 3 & 7)

An almost circular ring of 11 post-holes c 8 m in diameter was excavated. (It should be noted that illus 3 is a composite plan created from a number of different sources and represents a best fit of the available information.) Six post-holes were fully excavated; three were half-sectioned; and two were examined only briefly. Most showed stone packing *in situ* or stone packing which had collapsed as a result of post decay. Five post-holes (F53, F93, F99, F67 & F70) had evidence of timber posts still surviving *in situ* (illus 4). The last two were badly decayed and only slivers of wood survived. The posts had survived because of the anaerobic conditions produced in the post-holes by their being cut into clay and sealed under later stone structures. Additionally, the upper levels of some of the post-holes were filled with stones and some were sealed by clay.

The excavated post-holes averaged 0.5 m deep and 0.45 m in diameter at ground level. The posts were spaced between 2.1 m and 2.6 m (centres) apart. Two (F3 & F53) would have lain entirely beneath the inner wall face of the broch (though this had already been removed at the time of excavation); one (F67) was completely under a stone from the later foundation course which was removed during the archaeological excavations; two (F83/94 & F93) lay wholly under later paving and the remainder (F99, F63, F68, F73, F70 & F69) were part under the later wall and part under paving.

The only small finds from any of these post-holes were fragments of burnt bone, probably animal, which were recovered inside the post from F53 (illus 4) during post-excavation analysis. This bone need not necessarily have been contemporary with the post-ring since heart rot would allow material from that or a succeeding phase to enter the post-hole; but it cannot post-date the construction phase of the later stone structures which effectively sealed the post-hole (Reynolds & Barber 1984, 99). The only other find from a pre-broch context was a fragment of lead, SF446, from below paving in the broch entrance. While its location pre-dates the occupation of the broch it is not definitely associated with the round-house occupation and could relate to the broch construction phase. The timber posts were not burnt but had decayed *in situ*. The surviving timber posts from F53, F93 and F99 measured 200 mm, 140 mm, and 150 mm in diameter by 300 mm, 310 mm and 250 mm long respectively (illus 5). The bases of F53 and F99 had preserved areas of the original surface on which axe or adze marks are clearly visible.

In the east, between posts F93 and F73, there are two additional features, F29 and F26, set on the same circle as the post-ring. They are set at a closer spacing than the 11 posts but each lies

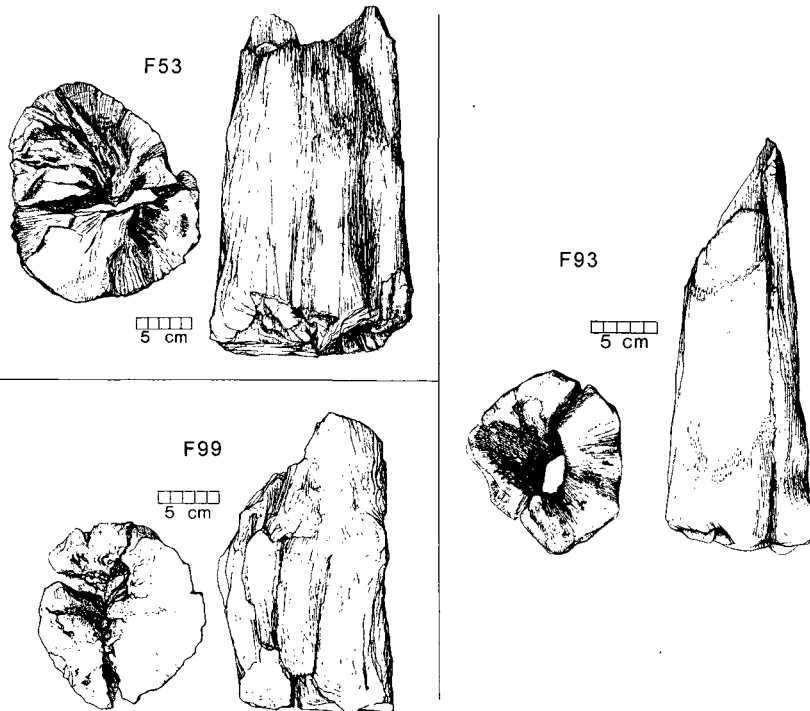


ILLUS 3 Round-house general plan

at a similar spacing from the main posts on either side of it. It is thought that these may relate to the location of the entrance into the round-house. As in the great majority of British prehistoric houses, the entrance appears to have lain in the east (see Oswald 1997). Post F53 lies on the direct



ILLUS 4 Post F53 *in situ* (scale 0.3 m)



ILLUS 5 Posts F53, F93 and F99 after excavation



ILLUS 6 Round-house ring-groove between post-holes F67, F69 and F70

axis from this entrance alignment. It is possible that the passageway was deliberately aligned on the sun for symbolic reasons.

RING-GROOVE (ILLUS 3, 6 & 7)

A narrow and irregular penannular depression or groove which linked 10 of the posts of the post-ring, generally running on the inner side of the post-holes, was traced over c 65% of the circumference of the post-ring. It spanned an area 7.4–8 m across (centre to centre). It appeared to be missing in the east, between the three posts F70/F73/F93 (illus 7) where the entrance was probably located. It was from 40 mm to 140 mm wide and its average depth was 40 mm. The feature had been disturbed by later walling and paving which resulted in variation in both its width and depth. In three areas (F3–F53; F53–F83/94; & F63–F68) regularly spaced and uniformly sized stake-holes 40 mm deep, 40 mm in diameter and between 150–200 mm apart, were cut into the base of the feature (illus 7). It is likely that the feature represents a ring-groove which would have supported a wattle and daub wall set on a framework of stakes.

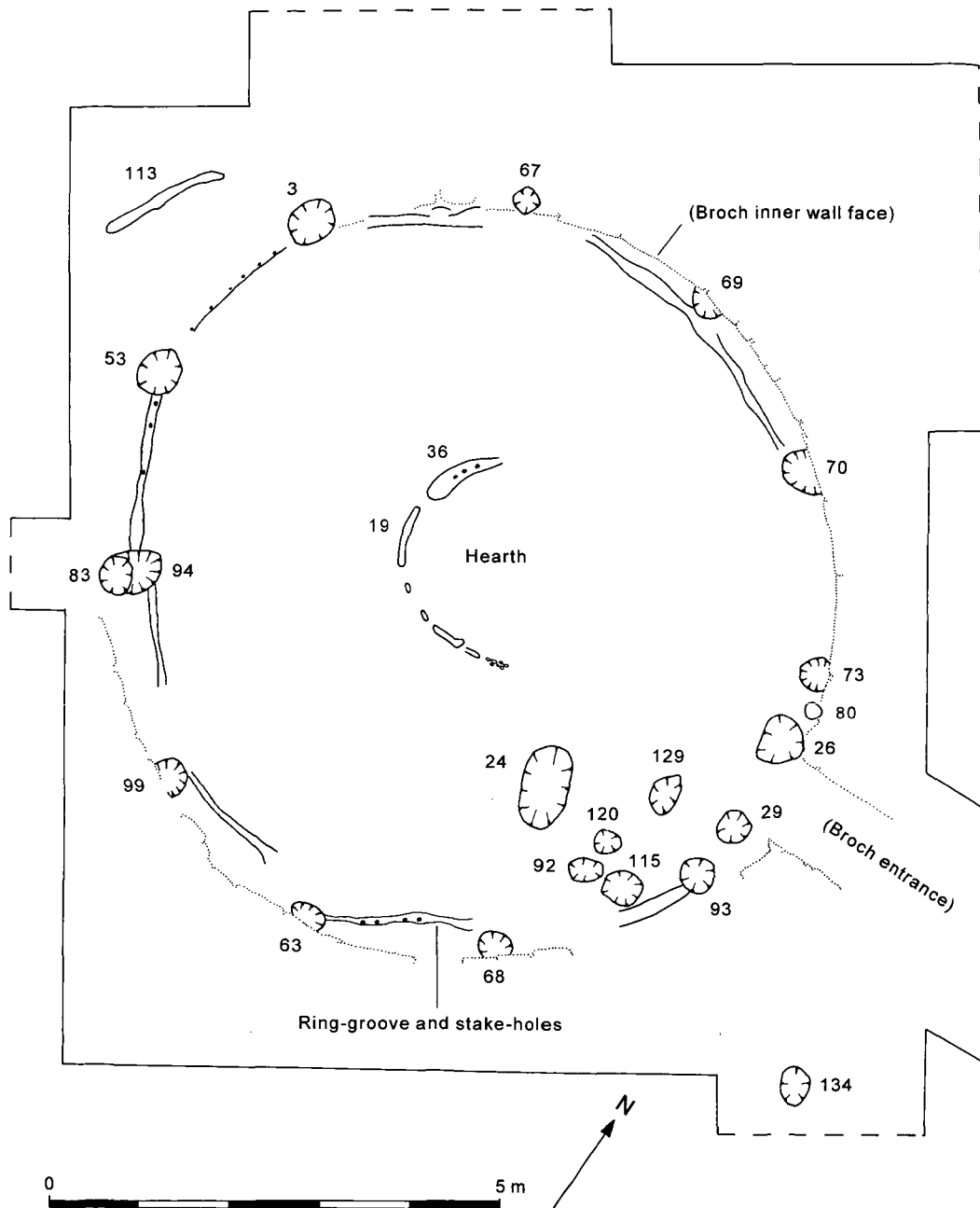
‘PALISADE’ (ILLUS 3 & 8)

A curving linear feature, in two separate stretches with an overall length of 5 m, was found to the north and south of the post-ring. It was 0.3 m wide and up to 0.8 m deep. From the limited length exposed its overall diameter is estimated at around 21 m. In the northern length there was evidence for four post-pipes probably representing the remains of a series of upright posts set approximately 0.3 m apart. The feature was packed with rounded boulders of varying size (illus 8) and covered by later paving.

MISCELLANEOUS

Between the post-ring and the ‘palisade’ a shallow feature, F113, 1.5 m long, was recorded in the north-west quadrant (illus 3 & 7). It lay at a distance of 1.1–1.5 m from the ring-groove. On excavation it was interpreted as a possible ‘drip trench’ associated with the former roof-line of the round-house but it could represent a former building line.

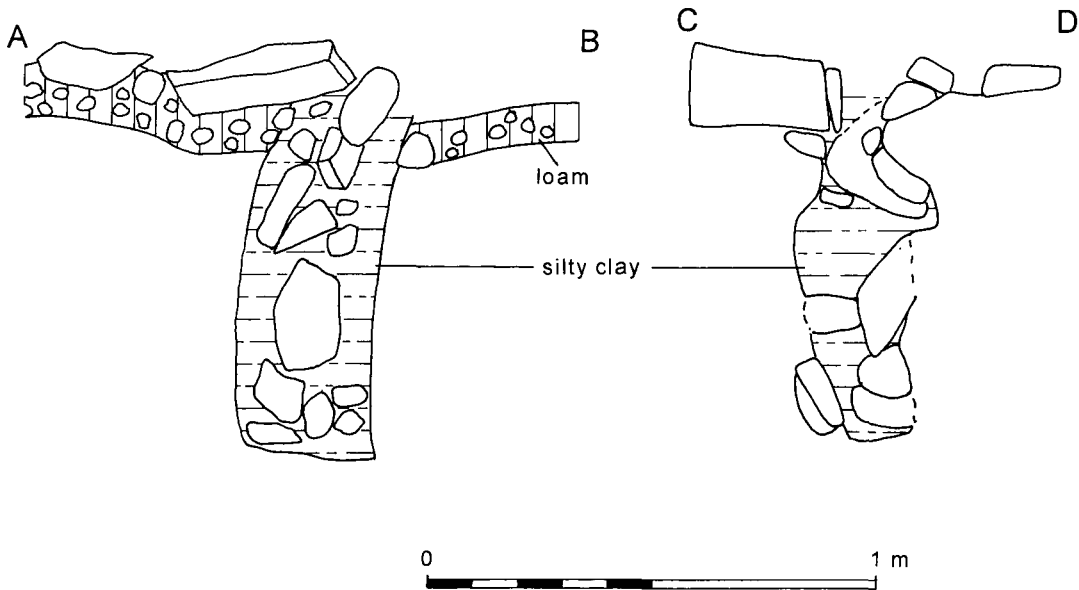
In the south-east a post-hole, F134, was excavated. It lay under later paving at a distance of 2.5 m from F93 of the post-ring (centre to centre). This feature may represent the remains of an additional post-ring.



ILLUS 7 Round-house: interior details

INTERIOR (ILLUS 7)

Inside the post-ring a number of post-holes, stake-holes and other features had been cut into the natural pinkish-grey clay of the mound (illus 7). Contemporaneity between the main post-ring and any of the internal features could not be proven. Recognition of the Phase 1 round-house at



ILLUS 8 Sections of the 'palisade'

the very end of the 1976 season rendered questionable some of the original assumptions about the primary broch floor and the allocation of the internal features to a particular phase. It seems likely that at least some of the features had a function within Phase 1 although the majority are identified on the Phase 2 plans. Only those which lay beneath clearly later structures have been included as part of the round-house plan. It has been assumed that the round-house would have had a central hearth (though the earliest phases of the hearth could not be directly linked to the known Phase 1 features). There was a discontinuous curving groove, comprising F19 and F36, on the west and south sides of the hearth. F36 included three evenly spaced and sized stake-holes cut into its base. This feature appeared to continue round the south side of the hearth where it was represented by a series of individual stake-holes (overlain by later hearths). It is suggested that this is the remains of a screen which partly enclosed the hearth.

Wooden posts

John Barber

This material consists of five post stumps, all oak (*Quercus* sp). These form part of the circular setting of 11 post-holes, c 8 m in diameter, described above. They have all undergone considerable decay and the nature of this decay is of some interest. The samples identified as F67 and F70 have decayed almost completely — mere slivers of wood remaining in the latter case. The other three, F53, F93 & F99 (illus 5) survive as hollow, truncated cones of wood, the outer and upper surfaces being heavily weathered and the heartwood rotten from top to bottom. In the fine clay-silt which filled the decayed core of F53 (illus 4) approximately 9 g of burnt bone was found. None of this bone was recognizably human and the only recognizable fragment, of skull, was clearly not human. The bases of F53 and F99 have preserved areas of the original surface on which axe or perhaps adze marks are clearly visible. The preservation of these areas is clearly due to some specific and localized factor. Both examples have soil and small stones ingrained into the bottoms of their sockets so that at these points were created, locally, the anaerobic conditions necessary for preservation.

However, the bond between the wood and the soil/stone coating is so firm as to suggest that some chemical reaction is involved.

Microscopic examination, under polarized light, of thin sections prepared from the decayed wood revealed the presence of hyphae, fine filaments which collectively form the mycelium, or 'body', of a fungus. Wood from the decayed interiors and from decaying exteriors of these posts was subjected to Erdtman's acetolysis and the spores of the fungi were recovered. The presence of this fungal matter indicated that the posts were decaying under fungal and presumably also insect and bacterial attack. This would have preferentially taken place where the wood was wet, close to ground level, but where an adequate supply of oxygen was also available. The subsequent onset of anaerobic conditions was due presumably to the superimposition of a layer or deposit of sealing material which halted decay and ensured preservation of the posts. It is clear that the interval between the initiation of decay and its prevention cannot have been of any considerable length. Whilst it is impossible to be specific about the time period involved it can confidently be suggested that it is extremely unlikely to have been of the order even of a single century.

The lifespan of the building of which these posts were elements is also a matter of speculation. The preservation of wooden buildings of considerable antiquity such as the Anglo-Saxon church at Greensted, Essex (Hewitt 1980), and the stave-built churches which once existed in Norway (Lindholm 1969) has led to a belief in the enduring nature of wood as a building medium. It must be remembered, however, that of the hundreds of stave-built churches which once existed in Norway, only 27 now survive (*ibid*) and Greensted is the only surviving example of a wooden church tradition that may once have encompassed all of Britain and Ireland (Edwards 1990, 122). Greensted has only survived into this century because of extensive remedial work in the Victorian period which involved the removal of the rotten bases of the upright posts, at their junction with the ground, and it is clear from recent experimental work that it is at this interface that wooden posts are most vulnerable.

At Butser Experimental Farm, Hampshire, a round-house based on the excavated ground plan of an Iron Age site at Pimperne, Dorset, was erected and left in place for 14 years (Harding *et al* 1993). Within eight years unseasoned oak posts, slightly over 350 mm in diameter, which formed the outermost posts of the porch, had virtually rotted away at their junction with the ground surface (*ibid* 101). These posts were continuously exposed to the elements, hence their rapid demise. However, during the dismantling of the Pimperne house it became apparent that this process was also well advanced in the posts of the internal post-ring, though these had been better protected from the elements. After 14 years of life '... all the pith wood had rotted away, leaving just a stump of heartwood reaching to the base of the posthole' (*ibid* 110). Although the building was still structurally sound, with that rate of rot replacement of posts and/or total reconstruction would have become inevitable within the next decade (ie 20–25 years after construction).

These observations are supported by the results of experiments carried out by the Forestry Commission (Clarke & Boswell 1976) which indicate that 75% of hardwood posts 75–100 mm in diameter will have decayed within five years of erection. Allowing for the greater diameter of the Fairy Knowe posts it is difficult to see how a post structure of this type could have survived more than 15–20 years in waterlogged soils such as these clays must have been.

The conserved stumps of F53 and F99, curated at the Smith Art Gallery & Museum, Stirling, were assessed for dendrochronological potential. The largest fragment of F99 had a surviving radial span of 55 mm while that of F53, which was more complete, was 115 mm. Sapwood had not survived on either stump; but the curvature of the outer surfaces indicates that it had not been trimmed off but had simply decayed away, leaving the heartwood. The ring-patterns of both stumps were fast grown, with a maximum of only c 40 rings visible on F53, making them unsuitable for dendrochronological analysis. Clearly, young, fast-grown trees, left untrimmed except for the axe-shaped bases, had been used for these posts.

PHASE 2: BROCH

BROCH WALL (ILLUS 9)

The width of the broch wall was fairly consistent in each of the excavated areas, varying between 5.4 m and 5.5 m in thickness and enclosing an inner courtyard 8.2 m in diameter, giving a

maximum overall diameter of 19.2 m. The walls survived to a maximum height of 1 m with collapsed rubble to a similar depth inside the walls. The broch was set on a slightly different centre from the earlier timber round-house.

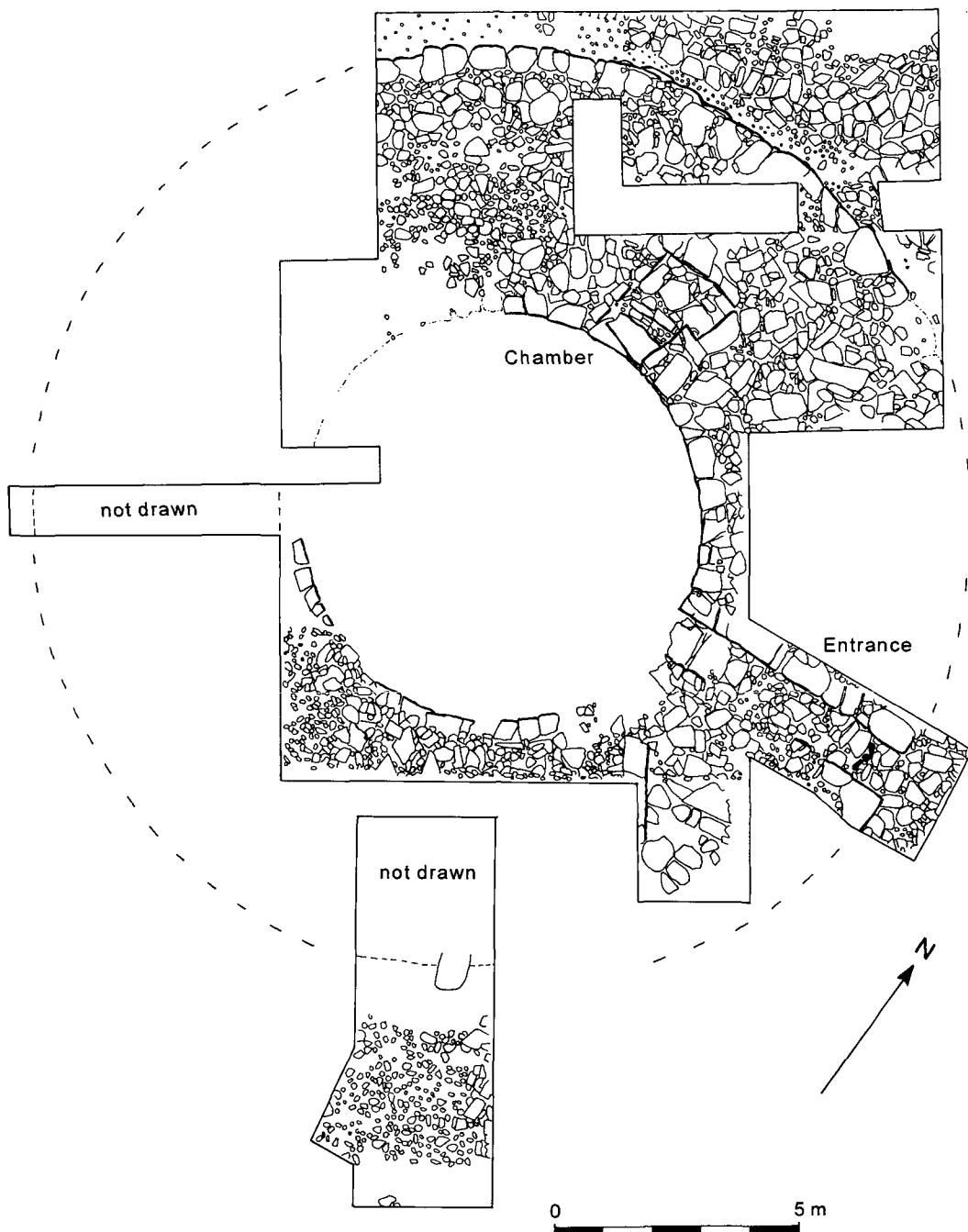
The outer and inner wall faces were of different construction. The outer face comprised very large rounded boulders and varied from one to three courses high. The spaces between the boulders were infilled with smaller packing stones. In the north the foundation course was almost fully embedded in the natural clay of the mound (illus 10). It was of very similar construction to the external wall face of the broch at Hurly Hawkin (Taylor 1983, pl 15A), although at the latter site the foundation course lay on top of the clay. At the outer end of the entrance at Fairy Knowe the two boulders from the outer wall face which flanked either side of the passage lay on top of the paving which extended outside the broch from the floor of the passage. The outer wall face was not excavated over the entire circumference, with only some 25% being exposed in the north and at the entrance. It is not possible therefore to confirm what proportion of the foundation course was embedded in the clay and whether the setting of the entrance blocks on paving was unusual within the overall construction of the outer face.

The surviving inner wall face consisted of between one and seven courses of small sandstone blocks of differing sizes, being best preserved in the north-east. At nearby Coldoch broch (illus 45) both outer and inner faces were constructed in this way. The inner face at Fairy Knowe was built of the local red sandstone which outcrops in the nearby stream bed. The inner wall did not survive over its entire length. Approximately 29% was missing on the west side; in the north-west quadrant the line of the wall was traced from the survival of the shallow impressions left by some stones of the foundation course in the clay, and in the south-west the line of the inner face was identified along the outer edge of the peripheral paving which covered this part of the interior. This evidence allowed the inner circumference to be reconstructed even although parts of it had been completely removed. The inner wall face of the broch overlay some of the post-ring and ring-groove of the earlier timber round-house.

The wall core stood to its greatest height of 1.5 m in the north and south of the broch and comprised loose angular rubble and earth held in place by the outer and inner walls. In the north-west quadrant the remains of the core were represented by only a scatter of stones. Although the wall core was not exposed over all of the broch (illus 9) there was no evidence of double wall construction in the excavated areas.

ENTRANCE (ILLUS 9 & 11)

The long narrow entrance passage faced east. It was 0.9 m wide along its full length which measured 5.48 m on the north side and 5.44 m on the south, where the inner corner was missing. The floor of the passage was paved. On both sides this paving extended under the side walls which had been built on top of it. This well-laid paving extended from the interior through and under the entrance passage to the outside of the broch, and clearly preceded construction of the passage walls. The passage floor was overlain by a thin deposit of black soil (Layer 4) from which a number of artefacts was recovered including a sherd of Samian, SF443, which adjoins a second sherd, SF9, found in the interior. The side walls were built of a mix of large boulders and smaller sandstone blocks. Only a single course of the side walls survived over much of the passage length, except on the inner end of the north side where the wall stood to 0.8 m and five courses high. No lintels survived either *in situ* or in the rubble which filled the passage. There were no door checks in the passageway and no other definite features such as bar holes or socket holes were found in the side walls. This may have been due to the fragmentary condition of these walls especially on



ILLUS 9 Broch general plan: the details of the internal courtyard are on illus 13; edged stones are shown solid black

the south side, or simply to their absence in the original design. There was, however, a narrow upright stone on the north side with an adjoining narrow gap rising from the level of the passage floor level, some 2.3 m from its inner end (illus 9). It is not known whether this is a deliberate

structural feature. Immediately next to this gap was a large block showing drill holes on two sides, and the remains of drill holes on its upper surface, where a slab had already been removed before the block was used in the building of the broch. Three stones set on edge across the width of the passage — some 0.65 m from the outer end of the passageway and rising above the floor level — may represent the former location of a door (illus 9). At Hurlly Hawkin (Taylor 1983, 218), a slab interpreted as serving this function was set on edge 1.26 m into the passage from the outside of the entrance.

INTRA-MURAL FEATURES (ILLUS 9 & 12)

Set within the thickness of the wall in the north was a rectangular area of large flat slabs measuring 1.65 m east/west and 1 m north/south. On the north side of the slabs walling, up to four courses high, survived to form the back wall of a small cell or chamber. This chamber was connected by a short, narrow passage to the central courtyard from which it was accessed by means of two angular 'steps'. These 'steps' showed no evidence of wear. The paved floor of the chamber lay 0.6 m above the level of the courtyard paving. Between the paving on the floor of the chamber and the broch wall core was a layer of sand and gravel. This served to even out the irregularities of the rubble of the wall core and provided a level foundation for the stone slabs. The east side of the chamber was formed by a single course represented by a large flat block which showed no sign of wear. The west side of the chamber was up to three courses high. A narrow, partly stone-lined, channel filled with pea gravel, separated the chamber from the passage. The function of this channel is not known. A number of small finds were recovered from the floor of the chamber including SF77 (illus 15) which is part of the handle of a Roman blue-green glass bottle, probably of the cylindrical type. Samian, SF247 (illus 15), and amphora, SF67, were found in the rubble which filled the chamber. There was no black soil (Layer 4) in this chamber and its function is not known. It could have been either a small room in its own right or may have provided a means of access to a stair leading to upper floor(s) for which no other evidence survives.

The only other feature identified within the thickness of the broch wall was found in the south-east quadrant where an area of paving continuous with that in the entrance passage extended under the south wall of the passage. A stretch of walling 1.5 m long and up to four courses high lay within the width of the wall on the west side of this paving (illus 9). The surviving length of walling was not connected to the inner wall face. This area would have been immediately on the left on emerging into the courtyard from the entrance passage. Access could have been either from the ground floor of the interior to the north or the entrance passage to the east. There are two possible interpretations for this feature; it could have been a ground-floor cell accessed from the interior, which may in turn have led to a stair to the upper levels of the broch. In the absence of any surviving steps this part of the interpretation must remain unproved. Alternatively, it could have been a guard cell accessed directly from the entrance passage. The interior of the cell, above the paving, was filled with loose rubble. There was no black soil (Layer 4) in this area but finds included part of a cannel coal armlet (SF409 & illus 36) from the floor and a bronze staple (SF412 & illus 18) from the rubble fill.

EXTRA-MURAL PAVING (ILLUS 9 & 10)

To the north and east of the broch, areas of well-laid sandstone paving slabs were recorded outside the broch wall (illus 10). On the south side of the broch the paving consisted of flattish



ILLUS 10 Broch outer wall face and extra-mural paving to the north (looking east)



Illus 11 Broch entrance passage, looking east from the internal courtyard



Illus 12 Broch intra-mural chamber to the north of the courtyard (looking north)

rounded cobbles rather than slabs. In the northern area a strip of clay, 200–300 mm wide and 120 mm deep, and containing small rounded cobbles, separated the outer broch wall face from the paving. Where it was investigated, in the north and south, this paving was found to overlie the ‘palisade’ trench of the earlier timber round-house. The paving was level with the top of the foundation course of the outer wall face in the north, and with the base of the foundation course at the entrance, where it was continuous with the paving in the floor of the entrance passage itself. No finds were recorded from the paving in the north but finds from the south included two amphora sherds, SF285 and SF286, which were recovered from the rubble which overlay the cobbles.

BROCH INTERIOR (ILLUS 13 & 14)

The internal diameter of the broch averaged 8.2 m. All of the interior of the broch was excavated (illus 14). A black layer (Layer 4), was recorded over much, although not all of the interior. Most of the small finds from the site were from this level, including burnt animal bone and carbonized grain. Layer 4 lay both directly on the clay floor and on the paving, including the paving in the entrance passage. It was thickest to the south of the central hearth and thinned out towards the walls, being almost absent in the north-west and missing in both of the chambers. A complex series of post-holes, stake-holes, pits and channels cut into clay confirmed that the courtyard had formerly contained a number of timber structures ranged round a central hearth. There were areas of peripheral paving in the north and south-west extending round 30% of the circumference and a more extensive paved area in the east, between the entrance passage and the hearth, extending into the passageway itself. The paving overlay some of the post-ring and ring-groove of the earlier timber round-house. The paving to the east of the hearth incorporated a rotary quern (SF234 & illus 13). Hingley (1993, 32) refers to the deposition of quernstones in a number of Iron Age contexts, including a quern which is built into the inner end of the entrance at Castlehill Wood dun, some 17 km to the east of the Fairy Knowe (Feachem 1959, 36). A quern was also inserted into paving in one of the intra-mural chambers at Hurly Hawkin (Taylor 1983, pl 15c). It should be noted that these last two examples are saddle querns. Hingley (*ibid*) suggests that such stones were deliberately placed in an act of ritual deposition. (The Fairy Knowe example, being made from garnetiferous schist, would have made very gritty meal.)

There was some evidence of radial subdivision in the south-east quadrant of the interior, including two slabs set on edge (F18) and two narrow slots (F17 & F16/20) cut into the clay floor. The broch at Hurly Hawkin (Taylor 1983) also shows evidence of the division of the internal space. Willow, aspen and alder charcoal was recovered from the interior and it is possible that these were used to build light items such as screens or partitions.

The stone-built hearth was centrally located and was surrounded by a quantity of ash. In its final phase it was well built, rectangular in plan, measuring approximately 1 m by 1.2 m. A kerb of slabs set on edge defined the north and west sides but collapse on the other two sides had removed any evidence for a kerb here. It was overlain by the black soil layer (Layer 4) and the rubble which filled the broch interior. It was paved with small sandstone slabs, burnt, reddened and cracked through heat. The hearth clearly overlay earlier features.

The removal of the upper fills of the negative features cut into the clay floor before any sections were drawn makes interpretation and allocation to a particular phase, (ie timber round-house or broch) difficult. The interpretation of a number of features has therefore been made using section drawings, photographs and plans and, to a lesser extent, the written site record. There does appear to be some suggestion of an inner ring of post-holes at a distance of between



ILLUS 13 Broch interior plan — the hearth is stippled; edged stones are shown solid black

1.4 and 1.7 m from the inner wall face which could presumably have supported any upper floors as well as the roof. Similar post-rings are known from other brochs including Leckie (MacKie 1982, 62), where an eight-post ring has been recorded some 1.8–2.3 m inside the broch wall.



ILLUS 14 Broch interior from west

MISCELLANEOUS

In 1975 a trench opened on the east side of the mound revealed the remains of a curving stone-built structure up to four courses high and 4 m long (illus 2). Some cover slabs were still *in situ* at each end. It was 0.5 m wide at the lower, eastern end, narrowing to 0.1 m on the west. Since it extended to the edge of the mound its eastern end is probably incomplete, as this area was used in the 1920s to provide material for road-works in the area (information from Mr Middlemass). The feature had a compacted rubble base which sloped downhill to the east.

Finds from the rubble infill included a sherd of Roman pottery, SF273, and from the rubble layer immediately above the feature included iron slag, SF262, an iron furnace bottom, SF263 (illus 28), and Roman pottery, SF274 and SF278. The furnace bottom, along with the small bloomery sample, is suggestive of an industrial function for the feature, but there was no evidence of blackening or heat which might have been expected had it served as some kind of flue.

The alignment of the feature suggests that it runs back uphill towards the entrance passage at a level which would place it beneath the extra-mural paving in front of the entrance. It may have been a drain from the interior. Given the close relationship between the ground plans of the round-house and the broch, it could equally have fulfilled a function in either building, although structurally an association with the broch is considered more likely.

There were no excavations outwith the mound itself and therefore the possibility of the former presence of extra-mural settlement or defences was not investigated.

PHASE 3: EVIDENCE FOR DESTRUCTION

There is considerable evidence of burning within the broch with charred grain, wood charcoal, vitrified stone and burnt bone found over much of the interior in both the lower levels of the rubble fill and the black soil (Layer 4) which covered much of this area. Artefacts were scattered across the courtyard. Some of these artefacts show evidence of heating, including bottle glass, SF38 (illus 17), and Samian, SF87 (illus 15), although in the latter case it should be noted that a joining sherd is unburnt. There was also a quantity of molten lead described as 'nodular waste', which could have been the result of fire damage. A quantity of fired clay fragments from the interior could also be interpreted as highly fired daub from a conflagration (M Spearman, pers comm). The black soil (Layer 4) and the collapsed walling and rubble above this which incorporated black soil in its lower levels marks the end of the occupation of the broch. There is nothing in the archaeological record from the excavation to confirm whether the fire inside the broch was accidental or deliberate, and if deliberate who was responsible.

There is a question as to how the artefacts, in particular the ornaments within the interior, came to be in their discovered positions. They may have fallen from above as upper floors collapsed in the fire or have been the contents of wooden containers for which no direct evidence has survived. There is also a possibility that some of the objects were deliberately placed before the fire occurred. (See Discussion of the Artefact Assemblage below.)

The destruction of the interior by fire was followed by the complete dismantling of the inner wall, including the foundation course, and the removal of the wall core in the north-west quadrant of the broch (as evidenced by the ghost marks of the former line of the inner face and the almost complete absence of wall core in this area). Of the outer wall face only the base course embedded in the clay remained on the north side. The lack of disturbance in the trench sections suggests that the broch had been dismantled as a deliberate act of demolition at some time in antiquity. Although the exact date of this is not known, it may not have been long after the fire brought the occupation of the broch to a sudden end. There was no evidence for the re-occupation of the site after its destruction.

PALAEOBOTANICAL REMAINS

W E Boyd

Samples provided from a variety of excavated features at Fairy Knowe consisted of sediment, charcoal fragments and one flotation sample. In general, 100 ml of sediment was examined, but where a smaller volume was available, the total sample was used. The sediment was separated in water and sieved through coarse (1.5 mm) and fine (150 µm) sieves. Examination was done under a low-power binocular microscope (to $\times 25$ magnification) and identification by reference to a collection of plant remains held in the Department of Botany, University of Glasgow. The charcoal was identified under a high-power ($\times 250$) binocular microscope, following the key for wood anatomy in Godwin (1956) and by reference to Greguss (1959) and a collection of reference material held in the Department of Botany, University of Glasgow.

In general, the 25 samples examined, along with four examined by C A Dickson in 1978, contain few botanical remains, the only sample containing abundant material being sample 6, a grain-rich sample from Layer 4, the destruction layer (Table 1).

The results are presented in Table 1 and detailed discussion regarding certain items is given below.

Cereals

Hordeum (barley) *Hordeum* remains constitute the majority of plant remains found at this site, and most are caryopses ('grains'). Most of the grain is hulled and, since none has been positively identified as naked, it is probable that those labelled as undifferentiated are poorly preserved hulled grains. About half the grains (49%) are noticeably asymmetrical. Van Zeist (1970, 50) points out that in two-row barley (*H. distichum*) all the grains have a straight or symmetrical shape, whereas in six-row barley (*H. vulgare*) only the median grains are symmetrical, with the lateral grains growing in a twisted or asymmetrical shape. Consequently, two-thirds of the grains from six-row barley should, in theory, be twisted. However, in practice, this value is rarely observed, and at several sites Van Zeist records that between 40% and 60% of the grains are twisted; where there are only a few grains, the presence of twisted grains is used to diagnose all the grain as *H. vulgare* (Van Zeist, 1970). All the grain recorded in the samples from Fairy Knowe is probably six-row barley. This is supported by the presence of one v-shaped collar from the junction of the culm and the base of the ear; according to Renfrew (1973, 77), v-shaped collars occur only in six-row barley.

The barley grain recorded here resembles bere barley, a lax-eared, six-row barley. Most of the remains are from broch occupation samples (Phase 2), but several fragments came from a sample of the fill of F53 of the round-house post-ring (Phase 1), and could represent the earlier presence of bere barley (although note the comments above in relation to burnt bone from this feature). From the amount of barley recorded here, and the relative scarcity of other cereals, barley may have been the principal crop grown by the occupants of the broch at Fairy Knowe. However, there is only one grain-rich sample which probably represents an isolated event, such as the accidental burning of well-sorted barley grain, at some stage during cereal grain processing (cf Hillman 1981, 139–41). Comparison of the range of plant remains for Sample 6 (mainly mature barley grain with a small proportion of wild oat grain of similar size, and very small amount of weeds) with the assemblages recorded from various stages during the processing of free-threshing cereals such as barley (Hillman 1981, fig 6), suggests that the sample represents a stage after threshing and winnowing. This is done immediately prior to kiln-drying, when the grain is dried to avoid spoilage during bulk storage. The presence of an assemblage representing this stage in the processing suggests that the grain was locally produced, and not imported to the site.

Barley is the most commonly occurring cereal in Scottish Iron Age contexts and six-row barley is recorded at Iron Age sites throughout Scotland (Boyd 1988, 104) including the nearby Leckie broch and dun, Camelon native fort in Falkirk, Balloch hillfort, Argyll, and Dun Mor Vaul, Tiree.

Triticum (wheat) Only six grains are definitely identified as *Triticum*, and their specific identification is slightly uncertain. Three of the *T. dicoccum* (emmer) grains are underdeveloped, the ratios of their dimensions corresponding well with those presented by Van Zeist (1970) for underdeveloped grains. The fourth grain is probably a mature *T. dicoccum* grain although it is poorly preserved. Although both Van Zeist (1970, 53) and Renfrew (1973, 62) suggest that in the absence of rachis fragments, it is difficult to differentiate *T. compactum* (club wheat) from *T. aestivum* (bread wheat), on the basis of the overall dimensions and shape (cf Van Zeist 1970, 57) it is probable that both wheats are represented here by one grain each.

Given the long history and widespread past presence of wheat in Scotland, it is probable that wheat was grown in Scotland during the Iron Age, albeit as a minor crop (Boyd 1988, 104).

Avena (oat) Although grains may shrink slightly on burning, the size distribution of *Avena* grains indicates that *A. saliva* (cultivated oat; grain length 12–16 mm) is not represented here, and the distribution suits the other species found in Britain, *A. fatua* (common wild oat) and *A. strigosa* (bristle or black oat) (Renfrew 1973, 92 ff). The differentiation between the latter two species, in this case, is on the basis of caryopsis morphology (Jessen & Helbaek 1944, 52–3). Where fragments of the lemmas or entire lemmas are present, the very pubescent nature of *A. fatua* and less pubescent *A. strigosa* lemmas also serve to distinguish these two species. Several of the florets are identified on this basis, although in one case, the lemmas are too poorly preserved for identification to species level. On three florets the distinctive 'suckermouth' base, typical of *A.*

fatua (Renfrew 1973, 94), is also present. Examination of the lower part of awns on modern samples indicates that each species appears to have a characteristic spiral form; this is the basis of the identification of awn fragments as *A fatua*. The remains identified as *Avena* sp probably represent poorly preserved *A strigosa* or *fatua*, there being no indication that *A saliva* is present.

The remains from Fairy Knowe may represent *A strigosa* being present as a weed contaminant in the barley crop, especially given its close association with barley remains. However, given the former widespread cultivation of *A strigosa* in Scotland, it is more probable that the grain represents the cultivation of *A strigosa* at Fairy Knowe, as a cereal in its own right.

Avena fatua (common wild oat) is a common weed of cereal crops, being one of the most troublesome weeds of arable land in Britain (Bland 1971, 125). Since most of the wild oat remains are from Sample 6, their presence represents wild oat contamination as a weed in the barley crop. In California, where *A fatua* has successfully naturalized during the last few centuries, the Indians collected the grain to use as bread corn (Sturtevant 1919, 77). *A fatua* may therefore have been regarded as an acceptable weed contaminant in Iron Age Britain.

Weeds

Weeds of cultivated or waste ground The majority of the remains of herbs represent species of common, and often troublesome, weeds of cultivated or waste ground, and where they are found in archaeological contexts, are generally regarded as weed contaminants of cereal crops (eg Helbaek 1964). The seeds of *Raphanus raphanistrum* (wild radish) are enclosed in pod segments which, being similar in size to cereal grains, are frequently not removed by sieving or winnowing (Findlay 1956). The others tend to be very small seeds, and although hand-sorting of grain can be efficient (Hillman 1981) they may easily have been missed. Many of these herbs, (*Chenopodium album* (fat hen), the *Rumex* species, *Raphanus raphanistrum*, *Stellaria media* (chickweed) and *Urtica dioica* (stinging nettle) have, in the past, been cultivated or collected from the wild throughout the world and used as pot-herbs, salad or green vegetables or as food flavouring (Sturtevant 1919). Furthermore, the seeds and fruits of these plants, plus various *Polygonum* species and *Fallopia convolvulus* (black bindweed), have been found in the stomachs of Iron Age bodies preserved in peat (Brandt 1950; Helbaek 1958; 1960), and were thus probably either eaten deliberately or as an acceptable contaminant with cereals.

The seeds and fruits recorded at Fairy Knowe are mostly present in the barley-rich sample (Sample 6), in moderately low proportions, and therefore probably only represent weeds inadvertently collected and brought to this site with the barley. Most of the species represented here have been recorded at other Scottish Iron Age sites (Dickson 1979; Robinson 1983).

The one seed each of *Anagallis arvensis* (scarlet pimpernel) and *Polygonum lapathifolium* (pale persicaria), found under a paving stone, probably represent plants growing on the disturbed ground around the pre-broch building.

***Allium ursinum* (ramsons/wild garlic)** Several carbonized bulbous roots of this edible plant were found together in the destruction layer. Ramsons has an historical record from Europe and northern Asia of use as a food, both as a green and salad vegetable and as a food flavouring, and its relative *A sativum* (garlic) has a long folk history of use in medicine and religion, as well as a food (Sturtevant 1919). The ramsons bulbs at Fairy Knowe may therefore have represented food collected in the wild, either being waste from the use of its leaves, or more probably, the accidental loss of bulbs prior to use. It might be speculated that these local plants may have been used as a substitute for garlic (which does not grow naturally in the wild in this area) in some medicinal or religious activity.

Herbs of damp places and of hedges and woods The herbs of damp places occur almost exclusively in the samples from three pits/post-holes, and probably represent local damp conditions in which little patches of

sedges, willow-herbs, rushes and probably other plants grew. Such conditions also allowed the preservation of small quantities of unburnt wood and an unburnt alder cone scale.

One interesting occurrence is that of a burnt caryopsis of *Glyceria maxima* (reed sweet-grass), found in the hearth. This is an aquatic herb which grows in reedswamp or along river banks, and its presence in a hearth seems unusual. It is interesting to note that the seeds of a related species, *G fluitans* (flote sweet-grass) have been collected in Europe for making pudding and gruel (Sturtevant 1919, 291), and it is possible that *G maxima* may have been used at Fairy Knowe for a similar purpose.

The seeds of *Primula* and *Vicia* are both very poorly preserved, with little surface pattern being retained. The *Primula* seed shows the distinctive squarish shape of seeds of this genus, and is similar in size (0.75 mm diameter) to those of *P vulgaris* (primrose). The *Vicia* (bush vetch) seed is also very small (1 mm diameter), with the hilum extending around about three-quarters of the circumference, and again any surface pattern has been lost on burning. Both seeds have probably been accidentally brought into the occupation area, possibly from a nearby hedgerow.

Trees and shrubs

***Corylus avellana* (hazel)** The distinctive nut fragments are, with the exception of barley and oat remains, the most abundant plant remains found at Fairy Knowe. They are found in all the broch occupation contexts. *Corylus* may therefore have been an important food source throughout this period of occupation at the site.

The kernels provide a convenient food, which can either be eaten raw or ground into a flour for baking (Fraser 1981, 75), and have also been used to provide edible oil (Sturtevant 1919, 194). Although hazel nuts are commonly found at archaeological sites throughout Britain (Godwin 1975, 267), and have probably constituted an important source of food from the Mesolithic through to the medieval period, there are surprisingly few other records of hazel nuts at Scottish native Iron Age sites (Dickson 1983, 208; Robinson 1983).

***Prunus spinosa* (sloe) and *Rubus idaeus* (raspberry)** The fruit of *P spinosa* recorded here resembles modern examples. However, it is smaller than the reference material (5 mm diameter against c 9 mm), being closer in size to other fossils (Baas 1971, 64). Although sloe berries have an astringent taste, they have been eaten as a raw fruit in parts of northern Europe, and throughout Europe are used in preserves and fermented preparations (Sturtevant 1919, 465). Raspberry is, of course, a commonly eaten fruit throughout Europe. The seeds of both plants are conspicuous here as being two of the few uncarbonized plant remains in the samples. Although it is probable that the fruits of both plants were used as food during the Iron Age, in this case, they may represent ancient or modern contaminants (bird droppings, etc; Hillman 1978).

Wood charcoal Charcoal fragments are present in most of the samples, generally as very fine material. The hearth samples consisted mostly of burnt stone and the wood charcoal present is mostly too fine for identification. Larger fragments were identified and these indicate that a wide variety of wood was used at Fairy Knowe. The fragments of *Alnus* (alder), *Betula* (birch), *Corylus* (hazel), *Populus* (aspen), *Quercus* (oak) and *Salix* (willow) found among the destruction layers and (to a lesser extent) the hearth layers probably represent fire waste, whereas the *Salix*, *Populus* and *Alnus* present in the rubble tumble probably represent wood used for construction. All the charcoal is from species which probably grew in the surrounding area. It should be noted that although in many samples (especially the 'charcoal' ones) several fragments are identified as one species, these may be merely fragments from one original piece in each sample, and the small amounts analysed, therefore, are not significant.

The remains of *Alnus* probably represent *A glutinosa* (alder), the only native species of alder now growing in Britain. Likewise, the *Populus* sp charcoal probably came from *P tremula* (aspen), since the other two native *Populus* species occur in lowland England. The specific identification of both *Betula* and *Quercus* wood is difficult, if not impossible (Jane 1970, 315 & 392), and each may equally represent one of

TABLE 1 (contd)

Results of macroscopic plant analysis.

	Feature or layer	Round-house post-hole	Pre-broch below clay floor/below paving	Broch Occupation				
Trees								
<i>Alnus</i> sp (alder)	cone scale			1 unc				
	charcoal							2f
<i>Betula</i> spp (birch)	charcoal							2f
<i>Corylus avellana</i> (hazel)	charcoal							
<i>Populus</i> sp (probably aspen)	charcoal	4f		14f				
<i>Quercus</i> sp (oak)	charcoal							
<i>Salix</i> spp (willow)	charcoal							2f
Miscellaneous plant remains								
wood charcoal		100%		ab	ab	v com	v com	v com
unburnt wood			com	com	occ	occ	f pres	occ
<i>Cerococcum geophilum</i> (a fungal fruiting body)				1				
Unidentified fungal fruiting bodies		2	1	23	4	1		
Miscellaneous non-plant remains								
?animal hair						c30f		
bone fragments, burnt & unburnt		occ	occ	occ		occ	com	
shell fragments								
insect fragments				occ			occ	
metal fragments				occ				
pottery fragments				occ	occ			

two native (and common) species. The *Salix* charcoal may represent any of a wide range of willow or sallow species. *Salix* and *Populus* wood are often difficult to differentiate, and cannot be distinguished in the solid with certainty (Jane 1970, 323).

Salix, *Populus* and *Alnus* make poor building timber. However, both *Populus* and *Alnus* have a documented history of use, especially for the provision of small timber and items of temporary carpentry, both having had special value as commonly available non-coniferous softwoods during medieval times, and *Salix* species and are still used to provide wood for the construction of woven hurdles and fences and in basketry (Rackham 1980). It is possible, therefore, that willow, aspen and alder were used at Fairy Knowe to build light items such as fences or screens, perhaps being incorporated into daub and wattle walls or wall coverings.

ANIMAL BONE

Catherine Smith & the late Archie Young

Originally, the animal bones were sorted and assigned primary identifications by Archibald Young at the Hunterian Museum, Glasgow, in 1989; after his death, the bones were reassessed by Catherine Smith in 1997. A full record of the identifications is deposited in the archive of the project records.

Condition of the bones

Most of the assemblage consisted of small, calcined fragments, greatly distorted by heat. It was possible, therefore, to identify only a small proportion to species. In some deposits, every fragment of bone had been

Abbreviations used: occ = occasional; com = common; v com = very common; ab = abundant; f = fragment; f pres = fragments present; unc = uncarbonized; 100% signifies that the entire sample consists of this item; CAD indicates that the sample was analysed by C A Dickson in 1978.

Destruction layers				Hearth layers								Rubble tumble							
f pres	1f	f pres	7f										f pres						
f pres	4f	1f					1f						3f		5f				
com	100%	100%	100%	13	1	com	occ	com	com	v com	occ	com	occ	v com	100%	100%	100%	100%	100%
								1		7									
occ		occ	occ	ab		occ	occ	occ	com	com		occ	ab	com					
occ			occ	occ	occ			occ	com	occ	com								

burnt or calcined. Of the small quantity of unburnt fragments, most were in a rather poor, friable condition. The identification rate for all phases of the site is therefore low.

Of the identifiable fragments, the majority were of disintegrated herbivore teeth, which had dissociated into the enamels surrounding the infundibula (or internal pillars) and the outer enamel 'skin' of the teeth. Because teeth are relatively dense structures, they tend to survive more frequently than long bones under adverse conditions of preservation. Thus, despite the degree of disintegration, it was possible in most cases to identify the tooth fragments to species. Similar deposits of disintegrated teeth have been noted at Roman sites in central and western Scotland, as at Camelon Roman fort, near Falkirk (Smith 1987), Bothwellhaugh Roman bath house (Hodgson & Smith 1981) and Elginhaugh (Smith forthcoming). At all these sites, the bones had, as at Fairy Knowe, been rendered almost unidentifiable by the effects of burning.

Results: species present

The species identified at Fairy Knowe are shown in Table 2, arranged by site phase. It is also noted whether the fragments were of tooth, bone or antler. The terms large ungulate and small ungulate have been used to describe fragments of ribs or vertebrae, according to their size. Thus large ungulate fragments are most likely to have come from cattle, although it is possible that they represent horse or red deer. Similarly, fragments described as small ungulate are most likely to represent sheep, although they could have originated from goat, roe deer or pig. All other unidentifiable fragments have been described as indeterminate mammal.

It can be seen that the majority of the fragments in Table 2 came from Phase 3, representing the end of the broch's occupation and its destruction. Most of the mammalian fragments were of domestic livestock, particularly cattle, although bones of sheep/goat, pig and horse were also present. The dominance of cattle

may partly be explained by the conditions of preservation at the site, since large, heavy bones from robust beasts survive better than smaller, more delicate ones from sheep or even pigs. There may in addition have been a definite preference for the keeping of cattle over sheep, although since the bones from Fairy Knowe were in such poor condition it is unwise to read too much into these results.

In order to further compare the relative frequencies of the animals, it is usual to calculate the MNI, or minimum number of individuals. These figures are usually calculated using the frequency of the most commonly occurring bones for each species. In this case, since there was such a high degree of fragmentation, it was not possible to estimate the minimum numbers of individuals. An attempt has been made to solve this problem by assessing the minimum numbers of herbivore cheek teeth present. Since cattle, sheep, horses and deer each have the same number of cheek teeth (three molars and three premolars in each half of the upper and lower jaws), the frequency of occurrence of the cheek teeth is directly comparable for these species and should provide a rough guide to the frequency of the animals themselves.

In the case of pigs, both the upper and lower jaws contain an extra premolar (the first premolar, PM1), but this is a very slight tooth which occurs only occasionally in this species. Probably because of its small size and variable occurrence, no pig first premolars were retrieved at this site and have, therefore, been omitted from the estimates. A further source of error is in estimating how many teeth were present. Thus, minimum numbers of teeth have either been based on complete teeth, where these were present, or on the numbers of the dental infrastructures known as infundibula. Each molar tooth of cattle, sheep and red deer contains two major infundibula, while only one is present in each premolar. Thus by dividing the numbers of infundibula by two we can arrive at an estimate of minimum number of teeth present. In Table 3, these data are presented for each species and site phase and show that cattle teeth accounted for 81.1% of the total teeth present across the whole site, sheep (or goats) for 7.5%, pig 9.7%, horse 0.9% and red deer 0.9%. As noted previously, there is probably a bias in preservation which favoured cattle teeth rather than those from sheep. However, these figures are useful in that they probably present a truer picture of the numbers of red deer which were present. The antler fragments from Phase 3, as well as three artefacts made from antler (SF195, SF325 & SF520; illus 40) probably do not represent animals which were used as food at the site, since at least one fragment was shed or cast and thus came from a live animal. A tooth, skull and humerus fragments on the other hand, must represent animals which died or were killed.

Other teeth which have been omitted from the estimates of minimum numbers were a pig canine tooth, of such large size that it must have come from a wild boar (*Sus scrofa*), and a human molar, both from Phase 3.

Mammalian species which were also represented in the surviving material were dog and dog/fox. Only one bone could definitely be attributed to dog (a large metatarsal, from the hind foot); on the basis of size, the other fragments could have come from either species, and in fact it is not unlikely that they were indeed from fox. At the broch site of Howe, Stromness (Smith & Hodgson 1994), a large collection of fox bones, some bearing knife cuts, was recovered, indicating a small-scale cottage industry in pelt production, and it is possible that foxes were also hunted at Fairy Knowe for their fur.

Bones of small mammals, two from the bank vole (*Clethrionomys glareolus*) and one possibly from rabbit (*Oryctolagus cuniculus*) or hare (*Lepus capensis*) were also noted in Phase 2. The possible rabbit/hare bone was a metapodial, much shrunken and distorted by heat, and the identification is therefore in doubt. However, if it is rabbit, this presents a problem, since this species is not thought to have been successfully introduced into Britain until the Norman period. Although rabbits may have burrowed into the site in the recent period, this bone had been affected by fire, in the same way as the bones from other species which were securely dated. This would not be problematic if the animal represented is hare.

Of the non-mammalian bone, only two fragments came from birds; these were not identifiable to species. However, unburnt amphibian bones, probably from the common frog (*Rana temporaria*) were fairly numerous in Phases 2 and 3. A likely explanation for the presence of so many frog bones is that they were contained in owl pellets, which were regurgitated by birds roosting in the abandoned building. At the broch site of Howe, Stromness, owls were also thought to be responsible for the presence of numerous bones of Orkney vole and frogs, deposited during the period of the broch's collapse (Smith & Hodgson 1994, 151).

Evidence of age of animals at death

Unfortunately only one partial mandible survived with teeth still *in situ*. This came from a very young calf (Phase 3). Many tooth fragments were of course present. Amongst these teeth were deciduous molars of cattle and sheep/goat, as well as unerupted tooth buds from pig, indicating that young animals had died or been killed. Adult teeth were, however, in the majority. The long bones were, as noted, very fragmentary, and provided little evidence of age, although one metatarsal apparently came from a very young (neonatal) calf (Phase 3).

Evidence of butchery and bone working

Knife cuts were observed on three bones from Phase 3: the styloid process of a pig skull, a cattle metatarsal shaft and the ventral edge of a cattle mandible all showed thin cut marks which appeared to have been made by a metal blade. There was some evidence that long bones of cattle and red deer had been chopped (Phase 3). A piece of red deer antler, probably a waste fragment, had been cut across but because of its poor condition it was not possible to say whether it had been chopped with an axe, or had been sawn. Antler was also modified to produce artefacts (SF195, SF325, & SF520; illus 41). Other evidence of bone modification came from several bone points which may have been produced from pig fibulae (SF39A, SF39B & SF83, illus 41). In pigs the fibula is a long, thin bone which is easily modified by paring down the proximal end of the bone, and if required, piercing the shaft near the distal end to form a 'needle'.

Bone pathology

One abnormality was noted in a fragment of cattle pelvis (Phase 3; SF12). In this specimen a small patch of eburnation (polishing) had formed on the acetabulum, or socket for the hip joint, adjacent to the pubic bone. While not sufficient in itself to diagnose osteoarthritis, the eburnation indicates there was some degree of joint abnormality.

DISCUSSION

Although the bones were in very poor condition, they have provided evidence of various facets of life at the site. The meat of domestic livestock, including cattle, sheep/goats and pigs, as well as wild game, red deer and wild boar was eaten. Cattle teeth and bones were certainly more common than those from any of the other species, but this may be because conditions of preservation favoured larger animals over smaller ones. There are few comparable sites from a similar geographical location and date range which also produced animal bone assemblages. At the promontory fort, broch and souterrain complex of Hurly Hawkin, near Liff in Angus, bones were found but the report states only that they were 'animal bones, predominantly sheep and cattle' (Taylor 1983, 250). It is in the far north of Scotland and Orkney that well-preserved animal bones have been found; for example at the brochs of Howe, Stromness (Smith & Hodgson 1994), and Crosskirk, Caithness (McCartney 1984), domestic livestock were also dominant over wild game animals, indicating a well-organized pastoral economy.

However, at Fairy Knowe, as at Howe and Crosskirk, red deer were exploited for their antlers as well as their meat. The relatively high frequency of antler fragments compared with that of deer bones indicates that antlers were deliberately brought to the site. Naturally shed antlers were probably collected, as shown by the presence of a specimen which had been cast. At other Iron Age sites in Scotland it has also been noted that although deer bones were present, the proportion of antlers was also higher than could be obtained from animals which were killed locally (Smith & Hodgson 1994, 143).

TABLE 2

Total numbers of bone and tooth fragments

	Phase 1		Phase 2		Phase 3		Antler	Phase 4		Total
	Teeth	Bone	Teeth	Bone	Teeth	Bone		Teeth	Bone	
Cattle	6	1	118	10	582	142		10		869
Sheep/goat			25	5	21	21				72
Pig			9	2	27	21				59
Horse					2					2
Red deer					2	3	29			34
Dog						1				1
Dog/Fox						3				3
Bank Vole				2						2
Small Mammal				1						1
Human					1					1
Bird species					2					2
Amphibian				15		89				104
Large Ungulate				11		49				60
Small Ungulate				5		4			3	12
Indeterminate Mammal		65		963		1733			25	2786
Total	6	66	152	1014	637	2066	29	10	28	4008

TABLE 3

Minimum numbers of cheek teeth present in each phase

	Phase 1	Phase 2	Phase 3	Phase 4	Total	%
Cattle	1	23	159	1	184	81.1
Sheep/goat		5	12		17	7.5
Pig		4	18		22	9.7
Horse			2		2	0.9
Red Deer			2		2	0.9

ARTEFACTS

Fairy Knowe was prolific in terms of the number of artefacts recovered, especially from the broch destruction layers, producing over 500 small finds in addition to quantities of bone, vitrified stone and carbonized grain. This destruction horizon produced a useful and fairly comprehensive collection of bronze, iron, and stone artefacts. The bulk of the material is typical of the native Roman Iron Age in Scotland.

The majority of the artefacts came from the black soil (Layer 4) which lay on the interior of the broch and the entrance passage. Some finds came from the intra-mural chambers; some were recovered from the extra-mural paving on the south of the broch; others were found above the 'drain' on the east side of the site. Artefacts were also recovered from the lower layers of rubble collapse inside the broch and above the extra-mural paving on the south.

In the artefact reports which follow the dimensions given are all in millimetres, and masses are in grams. The following abbreviations are used: L length, W width, T thickness, H height, D diameter, m mass. The context information is in the following format: Layer or feature, area; phase. All dimensions are in millimetres (mm) unless otherwise stated. The individual specialist reports on the finds are followed by a full discussion of the artefact assemblage.

IRON AGE AND ROMAN POTTERY

Steven Willis

A total of 171 Iron Age and Roman pottery sherds, weighing 1815 g, was recovered in the course of the excavations at Fairy Knowe. Only two sherds (31 g) are from vessels of Iron Age tradition, while the Roman component of the group is dominated by Samian (31 sherds; 235 g) and amphora (125 sherds; 1244 g). The sherds were recovered from a wide range of contexts, all post-dating Phase 1. In general the assemblage comprises sherds which, independent of their fabric and form, are comparatively small. Nonetheless these items are in a normal state of preservation (ie they are not soft and have not suffered excessive weathering).

The Iron Age tradition sherds, of course, provide only the broadest indication of date. The Samian, however, is all of late first-century AD date, with the dating of the remainder of the Roman pottery indicating that it is contemporary. There is nothing present which is necessarily of second-century AD date. Nor is there any reason to believe that this material arrived at the site after the Flavian period. There is no doubt that this is a significant group of material for investigating the interaction of the indigenous population with the Roman world at the time of the initial Roman invasion of Scotland, and this is considered further, below.

In addition to this pottery, a range of other contemporary ceramic objects was recovered, including fragments from casting moulds, and these are described separately below.

The Iron Age and Roman pottery has been classified into exact fabrics following established principles (cf Peacock 1977A; PCRG 1995) with macroscopic identification supplemented by examination using a $\times 20$ binocular microscope. The sherds have been weighed and counted, and where possible rim and base diameters have also been measured.

CATALOGUE (ILLUS 15 & 16)

Fabric 1

- 401 Body sherd from a large vessel of Iron Age tradition. Only the exterior surface is extant, to which a wide cordon had been applied. The sherd probably derives from a jar or possibly a bowl or a cauldron. The exterior surface is burnished with traces of soot or carbonized residue present (illus 15). m 17 g. F 78; Phase 2.

Fabric 2

- 433 Base sherd from a vessel of Iron Age tradition. Possibly from a jar. The diameter of the base cannot be estimated as insufficient of the circumference is represented. m 14 g. 3C, B3; Phase 3.

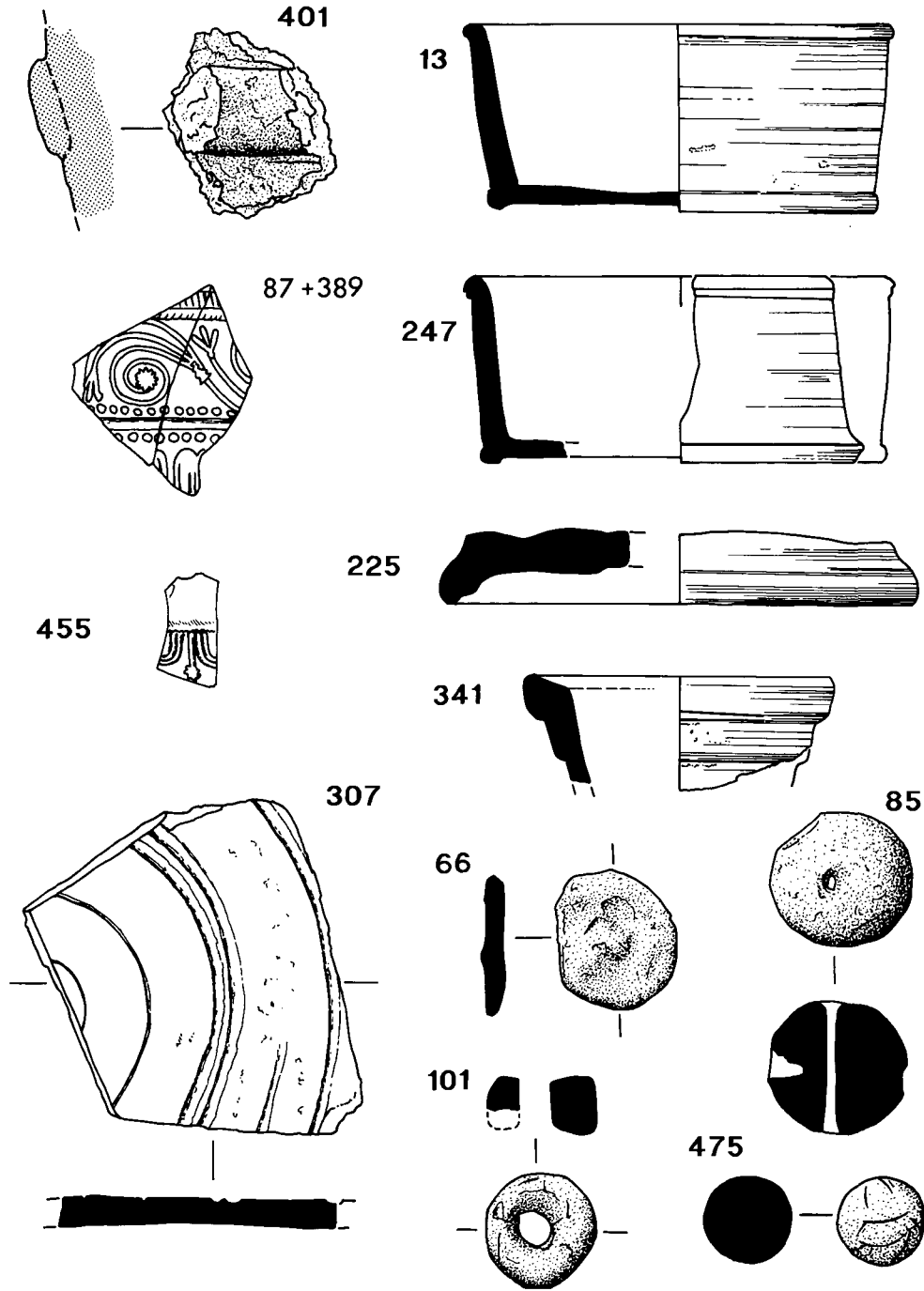
Fabric 3A: South Gaulish Samian

- 2 Base sherd including footring, Drag. 18; burnt. Adjoins 44 (below) which is also a base sherd with footring. Together they represent 34% of the circumference of the footring, the diameter of which is 100 mm. La Graufesenque, Flavian. m 20 g. 4, 55; Phase 3.
- 9 Sherd from a platter footring. Adjoins 443; see 443 for discussion. m 2 g. 3B, 55/65; Phase 3.
- 13 Complete profile of a Drag. 22/23. 32% of the rim circumference is represented; 35% of the base. The rim diameter is 85 mm, the base diameter 75 mm. La Graufesenque, Neronian-Flavian (illus 15). m 35 g. 3B/c, 55/65; Phase 3.
- 27 Body sherd, Drag. 27. La Graufesenque, Neronian-Flavian. m 6 g. 4, 54; Phase 3.

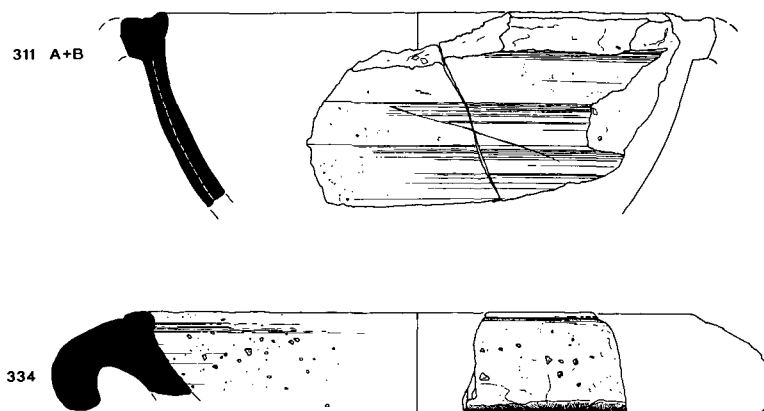
- 43 Base sherd with footring, Drag. 15/17 or 18. Around 22% of the footring circumference is represented and the diameter is 90 mm. La Graufesenque, Flavian. Trimmed approximately at junction of wall and floor with fractures worn smooth. m 33 g. 4, 55; Phase 3.
- 44 Base sherd including footring, Drag. 18. Adjoins 2, see above. m 25 g. 4, 55; Phase 3.
- 45 Two adjoining sherds of platter floor (45 A/B); different vessel to 2/44. La Graufesenque, Flavian. 45A is burnt. m 6 g. 4, 55; Phase 3.
- 87 Decorated body sherd, Drag. 29. La Graufesenque, Flavian. Slightly burnt. Adjoins 389 (cf below) and taken together it can be seen that the upper zone of decoration contains a simple scroll characteristic of La Graufesenque products. This design is closely paralleled on a Drag. 29 of the Pompeii hoard, dated to AD 79 (Atkinson 1914, 34, pl VII, no. 37). The top of the lower zone is represented with straight godroons visible (illus 15). m 3 g. 4iii, 55; Phase 3.
- 94 Platter body sherd. La Graufesenque. m 1 g. 4i/iii, 55; Phase 3.
- 107 Plain body sherd from a bowl. La Graufesenque, Flavian. m 4 g. 4, 54/55; Phase 3.
- 159 Plain body sherd from a bowl. La Graufesenque, Flavian. m 5 g. 3B/C, 64/65; Phase 3.
- 247 Complete profile of a Drag. 22/23. 11% of the rim circumference is represented; 16% of the base. Rim and base diameters both 95 mm. La Graufesenque, Flavian (illus 15). m 14 g. 3C/chamber rubble, 64; Phase 3.
- 337 Footring sherd from a cup. 7% of the footring circumference is represented; diameter 60 mm. La Graufesenque, Flavian. m 1 g. 4iii, A3; Phase 3.
- 358 Base and footring of Drag. 37. 27% of the footring circumference is represented; diameter 80 mm. La Graufesenque, Flavian. Slightly burnt. One fracture has been worn smooth (cf 311A & B). m 24 g. 4i/iii, A3; Phase 3.
- 361 Decorated body sherd, Drag. 29 or 37. La Graufesenque, Flavian. Only a minute fringe of decoration is represented, being a section of the lower moulding. This comprises the edge of what is probably a scroll, plus a part of a leaf terminal. m 6 g. 4iii, A3; Phase 3.
- 389 Decorated body sherd, Drag. 29. Adjoins 87; see 87 for discussion. La Graufesenque, Flavian. Unlike 87 this sherd is not burnt (illus 15). m 4 g. 3D, A2/A3; Phase 3.
- 418 Five sherds, including a rim, from a bowl, probably Drag. 37. This rim adjoins another rim sherd, 419. Together they represent around 4% of the rim circumference, the diameter of which is uncertain. La Graufesenque, Flavian. m 3 g. Black deposit under wall rubble, A1; Phase 3.
- 419 Three sherds, including a rim, from a bowl, probably Drag. 37. Original interior surface missing. This rim adjoins another rim, 418; see 418 for discussion. m 2 g. Black deposit from wall core, A1; Phase 3.
- 443 Sherd from a platter footring. Adjoins 9 (cf above) which is also from the footring. Together they represent c 9% of the circumference of the footring, the diameter of which is 100 mm. La Graufesenque, Flavian. These sherds have been trimmed and are worn as finds 7/37. m 4 g. 4, entrance passage; Phase 3.
- 455 Decorated body sherd, Drag. 30 or 37, with ovolo represented. La Graufesenque, Flavian. This ovolo type emerged AD 70s and appears on the work of a number of south Gaulish manufacturers. It occurs with some frequency amongst the Pompeii hoard (Atkinson 1914), and is present at Red House, Corbridge (Hanson *et al* 1979, fig 13 no 5 & fig 14 nos 7–9), and Inchtuthil (Hartley 1985, fig 98 nos D17–19) (illus 15). m 2 g. 4, B3; Phase 3.
- 457 Decorated body sherd from a bowl; a tiny fragment displaying a bead border. La Graufesenque, Flavian. m 1 g. 4, B3; Phase 3.
- 458 Rim sherd, Drag. 29. Around 1% of the rim circumference is represented; hence the diameter is uncertain. La Graufesenque, Flavian. m 1 g. 4, B3; Phase 3.

Fabric 3B: Micaceous Central Gaulish Samian

- 7 Base sherd, including footring, from Drag. 15/17 or 18. Adjoins 37. m 16 g. 4iv, 55; Phase 3.
- 37 Base sherd, including footring, from Drag. 15/17 or 18. Adjoins 7. Together they represent around 32% of the circumference of the footring, the diameter of which is 95 mm. Flavian. These sherds have



ILLUS 15 Iron Age and Roman ceramics (scale 2:3)

ILLUS 16 Roman *mortaria* (scale 1:3)

heavily pitted surfaces and appear slightly burnt. This base has been trimmed at the junction of the footing and the base, as flagon base 225. m 17 g. 4i, 55; Phase 3.

Fabric 4: Amphora

(A full sherd catalogue is presented in the archive of the project records)

- 67 Body sherd. m 10 g. Rubble in southern half of intra-mural chamber, 64; Phase 3.
- 69 Body sherd. m 12 g. Rubble in northern half of intra-mural chamber, 64; Phase 3.
- 144 Body sherd. m 80 g. T 21 mm. F34, area 54; Phase 2.
- 171 Body sherd. m 7 g. Intra-mural chamber floor, area 64; Phase 2.
- 251 Six sherds. m 4 g. Intra-mural chamber floor, area 64; Phase 2.
- 278 Body sherd. m 199 g. T 16 mm. 2/3 & extra-mural 'drain', trench A; Phase 3.
- 285 Body sherd. m 85 g. T 3i, trench B; Phase 3.
- 286 Body sherd. m 26 g. 3, trench B; Phase 3.
- 360 & 493 Four adjoining body sherds. 360 (3 sherds, m 277 g); 493 (1 sherd, m 4 g). Broken in the course of excavation. m 281 g. T 21 mm. Unstratified.
- 415 105 body sherds. m 466 g. T 15 mm. 3c/4, B1; Phase 3.
- 417 Body sherd. m 3 g. 3c/4, B1; Phase 3.
- 431 Body sherd. m 4 g. 3c, B1; Phase 3.
- 432 Body sherd. m 67 g. 3c/4; Phase 3.

Fabric 5

- 307 From a Roman dish imitating forms associated with 'Pompeian Red Ware'. One vessel-floor sherd. This vessel was not less than 160 mm in diameter. The upper surface is pitted through weathering and no slip is visible. The lower surface is not burnt as is often the case with forms of this type (illus 15). m 37 g. 4, A1; Phase 3.

Fabric 6

All three sherds are probably from the same vessel which is likely to have been a flagon.

- 226 Roman body sherd. m 1 g. 4, 55; Phase 3.

- 242 Roman body sherd. m 2 g. 4 & 'F2', 55; Phase 3.
 293 Roman body sherd. m 3 g. F25, 55; Phase 2.

Fabric 7

- 225 The footring and base of a Roman flagon. Around 18% of the circumference of the footring is represented; diameter c 100 mm. As with several of the Samian items this base has been trimmed and smoothed around the junction of the base and the vessel wall suggesting a secondary use, possibly as a lid, or perhaps inverted as a small shallow 'dish' (illus 15). m 19 g. 3B, 54; Phase 3.
 273 Body sherd from a Roman flagon. Possibly from the same vessel as 225. m 2 g. 3 & extra-mural "drain" infill, trench A; Phase 3.

Fabric 8

- 274 Body sherd, Roman, possibly from a flagon. m 5 g. 3 & extra-mural 'drain', trench A; Phase 3.

Fabric 9

- 30 Roman body sherd, possibly from a flagon. m 2 g. 2/3 & wall core, 64; Phase 4.

Fabric 10

- 341 Roman flagon rim, of ring-necked form (illus 15). m 11 g. 4iii, A3; Phase 3.

Fabric 11

- 311 Roman mortarium, Verulamium region white ware. Two adjoining sherds (311A/B): 311A has an extant rim but the flange is missing; 311B is a body sherd. The interior of the vessel is worn and virtually no trituration grit survives. One of the fractures of 311A and two of 311B are worn smooth indicating that they have been used for rubbing or polishing, though not comprehensively (illus 16). m 148 g. 4, A3; Phase 3.
 450 Roman mortarium. One body sherd, burnt. From same vessel as 311A/B. m 9 g. 4, B3; Phase 3.

Fabric 12

- 334 Mortarium rim. This is a north Gaulish mortarium of Hartley's (1977) Group II/Gillam (1968, 64) type 238. Around 6% of the rim circumference is represented, the diameter of which is c 220 mm. Flint and quartz trituration grits are present; grits extend over the flange. The grits have been applied whilst the vessel was being turned (in a clockwise direction) for associated scoring marks show that they have been dragged along the surface (illus 16). m 66 g. 3e, A3; Phase 3.

FABRICS

Iron Age tradition fabrics

Fabric 1 This is an unoxidized fabric, represented by one sherd (401), which is dark grey throughout. The sherd is hard and its fractures are extremely hackly. Its one surviving original surface, presumably the exterior, has been burnished. The fabric is dense and contains angular fragments of a hard, dark, fine-grained rock, evidently of the dolerite-basalt range. These occur in common frequency and range up to

TABLE 4

Iron Age and Roman pottery (summary)

Fabric	Cultural Association	Number of sherds	Weight g	Forms	Source
Fabric 1	Iron Age	1	17	Jar or bowl	Presumably local
Fabric 2	Iron Age	1	14	? Jar	Presumably local
Fabric 3a (Samian)	Roman	29	202	Various	La Graufesenque, southern Gaul
Fabric 3b (Samian)	Roman	2	33	Platter	Lezoux, central Gaul
Fabric 4	Roman	125	1244	Amphorae	Baetica
Fabric 5	Roman	1	37	Large dish	? Colchester
Fabric 6	Roman	3	6	Flagon	? Southern Britain
Fabric 7	Roman	2	21	Flagon	Not known
Fabric 8	Roman	1	5	? Flagon	Not known
Fabric 9	Roman	1	2	? Flagon	Not known
Fabric 10	Roman	1	11	Flagon	Not known
Fabric 11	Roman	3	157	Mortarium	Verulamium region
Fabric 12	Roman	1	66	Mortarium	Pas-de-Calais

3 mm in longest dimension. Angular fragments of micaceous rock (probably schist) of similar size also occur, with rare frequency.

Fabric 2 This is an unoxidized fabric, again represented by one small sherd (433, from a base), dark grey throughout. It is hard with irregular hackly fractures. The exterior surfaces have been smoothed. Ill-sorted coarse granules and fragments of quartz and granite or dolerite are common.

Roman fabrics

Fabric 3 nominally denotes Samian. Two Samian fabric types are represented. All of the vessels bar one occur in the south Gaulish La Graufesenque fabric (Webster 1996, 13). The vessel represented by 7 and 37 occurs in the distinctive micaceous Lezoux (Central Gaulish) fabric that is diagnostic of a first-century AD date (cf Boon 1967; Dannell 1971, 266–7).

Fabric 4 This is the familiar fabric associated with the Dressel 20 amphora. The sherds from Fairy Knowe occur in the standard fabric range which is well characterized (Peacock & Williams 1986, 136–40; Tyers 1996, 87). The source of the fabric is the Guadalquivir Valley in southern Spain.

Fabric 5 This is a fine fabric, light red throughout. It is a fairly soft fabric with regular fractures and a smooth feel. Very fine quartz grains are moderate. Fine powdery red pellets, presumably ferrous, are rare and well sorted. The fabric is represented by one sherd (307) from the base of a Pompeian Red Ware type dish (illus 15). This fabric closely accords with the description of Peacock's (1977b) Pompeian Red Ware Fabric 5. Peacock suggested that his Fabric 5 was a Colchester product; this probability has been supported by subsequent study (R Symonds, pers comm).

Fabric 6 This is a fine fabric, creamy white throughout. It is represented by three body sherds (226, 293 & 242). This fabric is soft, has regular and slightly laminated fractures and a smooth powdery feel. The clay matrix is very fine and virtually free of inclusions. Coarse angular quartz grains (c 0.8 mm) and fine red pellets occur but are very rare. Fabrics of the type are common during the Claudian to Trajanic period and are particularly associated with flagons. These sherds seem very likely to come from the same vessel; there is no indication that they come from anything other than a flagon. A source in south-east England, northern France or the Rhineland is possible though flagons in characteristically similar fabrics to this one were produced quite widely in Britain during the decades following the Claudian invasion.

Fabric 7 A fine oxidized fabric with a white slip, represented by two sherds. The fabric ranges from yellowish-buff to pale red. This is a soft fabric with regular fractures and a smooth powdery feel. The clay matrix is very fine and contains very fine to fairly coarse red pellets which are rare; very fine mica plates are frequent. A white slip, now rather worn, extends across the exterior surfaces of 225 but is absent from the abraded surfaces of the body sherd 273.

The two sherds in this fabric come from a flagon/s; 225 comes from the base of a flagon and has apparently been reused (illus 15). Flagons in non-white fabrics were often white slipped, especially in the early Roman period conforming with the general form-colour concordance discernible amongst the Roman ceramic repertoire. The source of this particular fabric is not certain.

Fabric 8 The fabric is represented by one sherd that is red to greyish-buff. Fractures are regular; the fabric is soft with a slightly rough feel. The clay matrix contains plentiful inclusions, all of which are fine. Very fine angular voids in moderate frequency probably indicate the former presence of calcareous inclusions. Very fine quartz/sand is also present in sparse frequency as are fine/very fine rounded pellets of clay or grog. The original surfaces of 274 are abraded; it may be from a flagon.

Fabric 9 This fabric is represented by one small body sherd, 30, which could be from a flagon. This is a very fine fabric, yellowish-brown throughout, which is soft with a very smooth feel and irregular fractures. It appears to be free of inclusions.

Fabric 10 There is only one example of this fabric amongst the assemblage, namely 341; it is light red throughout. It is fairly hard with crisp regular fractures and a slightly rough feel. The clay matrix contains fine and very fine quartz grains in moderate frequency. Sub-angular/sub-rounded voids are rare and may represent weathered-out calcareous inclusions. The source of this fabric is uncertain.

Fabric 11 Verulamium region white-ware mortarium fabric There are three sherds in this ware, 311A/B and 450, probably all from the same vessel. The appearance of the sherds from Fairy Knowe is identical to the descriptions given by Tyers (1996, 132) and Davies *et al* (1994, 41).

Fabric 12 North Gaulish (Pas-de-Calais) mortarium fabric. One sherd occurs in this fabric, a rim, 334 (illus 16). The fabric is fine textured and pale cream with a pink core. The character of the fabric represented at Fairy Knowe conforms with the descriptions given by Tyers (1996, 125) and Davies *et al* (1994, 67) of this fabric.

DISCUSSION

Although small, this assemblage is of considerable interest. The Roman pottery represented is closely datable and comprises a wide but selected range of types. The vessels represented are of types known to have been circulating in Scotland during the late first century AD, being present at Roman military sites in the region. The bulk of the Roman pottery comes from Phase 3, but the few sherds from Phase 2 are typologically (and chronologically) indistinguishable from those of Phase 3 and they all appear to comprise a consistent Flavian group. As a whole the group is comparable with several other collections from indigenous sites in Lowland Scotland. As well as the selective nature of this Roman material and the high proportion of Samian present, other aspects of note are its fragmented character, the fact that several items have clearly been 'reused' or deliberately trimmed down and that a number of sherds have worn edges indicating their use as abrasives or polishers.

The positions of the excavation trenches at this site, being concentrated on the brooch, may well have influenced the nature of the pottery sample recovered. Only two sherds of pottery of Iron Age tradition were recovered. The typology of these items is consistent with that of Iron Age tradition pottery from north-east England and southern Scotland (cf Evans 1995; Willis in press a). Such a meagre tally of sherds is not surprising. Some later prehistoric and Roman Iron Age sites in Scotland south of the Highland fault have yielded pottery groups representing modest numbers of vessels, as at Hownam Rings (Piggott 1950, fig 10). Generally, however, this pottery is an infrequent find in southern Scotland, independent of site type. It was a rare find, for instance, at Dalladies, Kincardineshire (Watkins 1981a, 155), Newmill, Perthshire (Watkins 1981b, 190), Boonies, Dumfriesshire (Jobey 1975, 135), Port Seton East, East Lothian (Haselgrove with Philip, forthcoming), Leckie brooch (MacKie 1982, 71) and apparently The Tappoch, Tor Wood (Hunter 1951; RCAHMS 1963, 85–7), both in Stirlingshire. However, it is noteworthy that the number of sites of the period which have produced at least a few sherds is probably greater than the number from which none has been recovered (cf Willis in press b). That the presence of at least small numbers of sherds per site is the norm in north-east England has been confirmed by a major review of regional collections undertaken in 1996 by this author as part of the English Heritage Survey of Later Prehistoric Pottery Collections. A review of this material in Scotland would be complementary.

The body sherd, 401 (illus 15), is evidently from a large vessel with a cordon, presumably a jar or bowl, or even a cauldron. Such cordons are not common features on pottery of this type in the region, though an illustrated sherd from Balloch Hill, Argyll (Peltenburg 1983, fig 13 no 123A), believed to be of Iron Age tradition, has what might be a similar cordon (though one side is damaged).

Turning again to the Roman pottery, the presence of a wide range of Samian is immediately striking. This is not without parallel as Leckie brooch (MacKie 1982) and Hyndford crannog, Lanarkshire (Curl 1932, 381–2; RCAHMS 1978, 108–9), have yielded comparable assemblages, similar in date and size, and in the presence of other Roman wares, though with a comparatively high proportion of Samian compared to the other Roman pottery. Roman pottery of Flavian date, including Samian, of course also known from other sites, such as the brochs at Hurlly Hawkin, Angus and Torwoodlee, Selkirkshire, though in lesser quantity (Robertson 1970).

The Samian amounts to 31 sherds (235 g; with an EVE by rim and base measurement of 1.15) from approximately 19 vessels. No stamps are present. All the sherds are of late first-century AD date. Two adjoining platter sherds are central Gaulish but occur in the distinctive highly micaceous fabric of the first-century Lezoux industry; all other sherds are south Gaulish. A wide range of forms is represented. Details are listed in the catalogue but the number of sherds per form type and the breakdown of the number of vessels represented can be summarized (Table 5) in tabular form.

At least five different form types are present. The Drag. forms 18, 27, 29 and 37 are the most common forms of the mid to late Flavian period (Willis 1997a), while 15/17 is the fifth most frequent type. Hence their presence amongst a site group of the period is not surprising. The presence of two examples of Drag. 22/23 (cf Webster 1996, 36 for typology) is, however, more remarkable (illus 15; these Fairy Knowe dishes approximate to Drag. 23). That examples of the Drag. 22/23 are rare is attested by the fact that only one example occurs amongst a total of 247 identified vessels from the first-century fortress deposits at Exeter (Holbrook & Bidwell 1991, Appendix II.1) and likewise only five are present in the sample of 544 vessels from Periods 1 and 2 at Fishbourne (c AD 43–100). Curiously, 18–20 examples are known from the extraordinary Samian assemblage from Inchtuthil (amongst a total of c 360 identified vessels; Hartley 1985),

TABLE 5

Composition of the Fairy Knowe Samian

Form Type	Number of sherds	Number of Vessels Represented
Drag. 15/17 or 18	8	5
Drag. 18	2	1
Drag. 22/23	2	2
Drag. 27	1	1
Drag. 29	3	2
Drag. 29 or 37	1	1
Drag. 30 or 37	1	1
Drag. 37	1	1
Probably Drag. 37	8	1
Indeterminate Bowls	2	2
Decorated Bowl	1	1
Cup	1	1

though examination of the Inchtuthil sherds shows that there are differences of typological detail between this fortress group and the examples from Fairy Knowe. No examples of Drag. 22/23 were recovered during the 1973–86 excavations at Strageath (Frere & Hartley 1989) and Robertson's (1970) inventories from non-military sites list no examples. The significance of these two examples of the form at Fairy Knowe may lie in the fact that they are small dishes, as several of the bases of other Roman vessels from the site had been altered by trimming and wearing to become, when inverted, similarly small, albeit shallower, dishes (ie flagon base 225 (illus 15) and the Samian bases 43, 9 & 443 and 7 & 37).

Study of contemporary Samian assemblages from sites in eastern England demonstrates that the number of different form types present at a site is a good index of site status (Willis 1997b). Fairy Knowe, with at least five different forms, has a comparatively high total. This is a greater range than amongst any other contemporary group from an indigenous site in Scotland with the exception of Hyndford crannog (around eight), and the possible exception of Leckie (for which no details are yet available) and Traprain. It may be of interest to note that amongst the survey of sites in eastern England a total of five or more different first-century Samian forms is registered for sites which subsequently develop into villas (ie Rudston and Norton Disney; Willis 1997b). A further index of potential significance is the ratio of decorated bowls to plain vessels (cf Willis 1997a; 1997b). At Fairy Knowe this is in the order of c 7:10, respectively. The inhabitants of the broch clearly had access to decorated bowls as well as plain ware. Considered at a Provincial level this is not an unprecedented phenomenon as a substantial proportion of sites of native origin across England and Wales acquired small numbers of decorated Samian bowls during the later first century. Nor from this perspective is the decorated to plain ware ratio unusual. Recent research by this author suggests that these decorated Samian bowls were valued by the indigenous communities more for their form than as a consequence of their being decorated. That Samian constitutes a comparatively high proportion of the Roman pottery from the site is a pattern seen elsewhere in the region and beyond. Its presence at Fairy Knowe bears witness to the fact that Samian was in the vanguard of Roman imports arriving at indigenous sites in northern Britain (and north Wales), albeit in modest quantities, in the later first century, and strongly suggests that it was regarded differently from other types of Roman pottery (Willis 1997b, 38–41). What is particularly significant though, is firstly that the Fairy Knowe assemblage demonstrates that these patterns of Samian distribution seen further south in the British Isles at this time were also manifest within a Scottish context, where they may indeed have resulted from similar cultural evaluations and practice. Secondly, the sheer density of Samian at this site is, by

any comparison, remarkable (c 19 vessels). Whilst other explanations are possible this Samian evidence seems to verify the status of this site. However, as noted elsewhere, the 'wealth' of the recovered artefact sample may relate to the circumstances of the ending of the broch occupation.

Finally, regarding Samian, first-century Lezoux ware from central Gaul (platter 7 & 37) appears to be a relatively uncommon find in Scotland. It is not present at Inchtuthil (Hartley 1985), though it is known at Strageath and Camelon (Hartley 1989, 218).

The only amphora type represented is the south Spanish Dressel 20 (Fabric 4) which normally contained olive oil. There are no base, handle or rim sherds amongst the assemblage, but the thickness of the body sherds (16–21 mm), as well as the curvature of the larger fragments, indicate that the vessels represented are fairly certainly of Dressel 20 form rather than the other, less frequent forms which occur in this fabric, the most common of which is the Haltern 70 (Sealey 1985, 59–66; Peacock & Williams 1986, 115–16). On the basis of variations in the detail of the fabric of the sherds and in their general character it would appear that four vessels of Dressel 20 form are represented. This form is fairly well documented from Roman military sites of Flavian date in Scotland (cf Fitzpatrick 1992), occurring for instance at Inchtuthil (Darling 1985), Strageath (Frere 1989, 261) and Dalswinton (Gillam 1957, 21). Its distribution at indigenous sites in Scotland is not yet clear. It cannot be assumed that four (or more) amphorae arrived at the site with their original contents intact or with other contents, or indeed as whole vessels; though of course they may have done. It is well known that these forms were reused in many ways. Sherds of the fabric, for example, are present at the farmstead enclosure site of Burradon in Tyne and Wear (Jobey 1970), where worn sherd edges testify to the fact that the sandy nature of this fabric makes it ideal as an abrasive tool. This is significant in the case of Fairy Knowe where the mortaria sherds 311A/B have worn fractures suggesting similar use.

That the sherds of Fabric 4 are so fragmentary is not surprising as it is a characteristic of this ware to laminate and fracture. Thus small sherd size and average weight cannot in this case be taken as an archaeologically meaningful index of taphonomic factors.

Parts of two mortaria were recovered. One is a product of the Verulamium region product (311A & B and 450, Fabric 11; illus 16). This mortarium lacks the external gritting associated with pre-Flavian vessels from this source and has a comparatively rounded body, which is more typical of Flavian examples and dates to c AD 70–100. The other vessel is of Gillam form 238, from the Pas-de-Calais, north Gaul (334, Fabric 12; see catalogue; illus 16) and it too is familiar from Flavian contexts. Amongst the sample of Flavian mortaria from Strageath these two sources are the most common (Frere & Wilkes 1989, Table vii) and they are also represented at Inchtuthil (Darling 1985, Table xxiii). Gillam type 238 from north Gaul is widespread in northern Britain at Roman military sites, being present, for instance at Dalswinton (Gillam 1957, 20–1, fig 6), Fendoch (Birley 1939, 144–5, fig 15, nos 1 & 3) and Oakwood (Gillam 1954, 102, fig 8, nos 1, 5 & 6); Verulamium region mortaria appear equally widespread.

Several further observations may be made. It has been noted above that a number of the sherds, including Samian, have worn edges and have evidently been used as rubbers or polishers. Similarly worn Roman sherds are recorded from elsewhere in Scotland, for instance at Hurlly Hawkin (Taylor 1983, 241). This practice, together with the apparent trimming of some of the pottery, the propensity of the Dressel 20 to fragment and the small size of the group generally, invalidates any serious consideration of the fragmentation of the material. It is clear though that the group is composed of comparatively small sherds, of low average weight. As regards the spatial distribution of the material it may be noticed that no sherds of Samian were present amongst the small amount of pottery recovered from the extra-mural area, which contrasts with its relative frequency from the broch itself.

The range, quantity and find-locations of the Roman pottery at Fairy Knowe broch indicate that its inhabitants did not find Roman material culture abhorrent and, indeed, they may well have embraced it. Clearly, the Roman pottery assemblage from the broch is composed of types (Samian, amphora, mortaria and flagons) which were present in Scotland at military sites during the Flavian period. How these Roman vessels came to the site is open to interpretation. Assuming most if not all arrived during the lifetime of the broch (as the stratification suggests) they may conceivably have been acquired via exchange with the Roman military or independent merchants or 'tinkers'; alternatively they could be 'diplomatic' gifts. Whatever the mechanisms by which this Roman material arrived at Fairy Knowe, and however it may have been initially perceived and used, it is evident that its final uses at least were, in many cases, 'adapted'. As we have seen several pieces had been used as rubbers or polishers. This use may relate to honing or shining metal artefacts, and, indeed, could have been connected with metal working activities. The trimming of a number of bases suggests their inversion and re-employment as small dishes, which like the two Drag. 22/23 forms would be suitable receptacles for fine/finite commodities; an alternative possibility is their potential use as oil lamps in an environment receiving limited natural light. Hence at the end of its life this pottery was being employed in ways different from those which we conventionally take to be the function of these 'familiar' Roman forms. In this way these items may have ceased to be, in any meaningful sense, Roman.

MEDIEVAL AND POST-MEDIEVAL POTTERY

David Caldwell

CATALOGUE (NOT ILLUS)

Medieval

- 375 Rim sherd of jug, soft red medieval earthenware; abraded; traces of external white slip? 1/2 topsoil, A3; Phase 4.
 469 Body sherd of light gritty medieval earthenware, lead glaze on exterior. 3B, entrance passage; Phase 3.

Post-medieval

- 233 Three small fragments of reduced grey post-medieval earthenware, with lead glaze. 2, 53; Phase 4.
 275 Part of strap handle with red unglazed surfaces, post-medieval earthenware. 2, trench A; Phase 4.
 276 Small fragment of reduced grey post-medieval earthenware with lead glaze. 2, trench A; Phase 4.
 512 Body sherd of post-medieval earthenware with red exterior surface with traces of lead glaze. 3B, 64; Phase 3.

Modern

- 172 Tiny sherd of bone china. 2B/3B, 54; Phase 3.

DISCUSSION

There are two small sherds of medieval pottery, six of post-medieval type, and a minuscule piece of bone china, all but the last probably of local manufacture. The medieval pieces include an abraded rim sherd of a jug in a soft, red fabric, and a body sherd of a hard, light gritty fabric, glazed externally. These pieces are likely to date to the 13th/14th century. All the post-medieval

pieces are similar to the earthenware from the kiln site at Throsk, near Stirling, dating to the 17th and early 18th century (Caldwell & Dean 1992).

All come from contexts which can be considered to post-date the occupation of the broch. Such a collection, in any case, is not likely to represent reuse of the broch in more recent times, but is indicative of agricultural activity, for example the spread of midden material on to farmed land along with animal dung.

OBJECTS OF FIRED CLAY

Steven Willis

CATALOGUE (ILLUS 15)

- 66 Crudely formed disc, flat on one side and somewhat uneven on the other. Its circumference is only approximately round and a section appears to have been broken off; this is an old break which is a little worn. Surfaces are smooth and seem partly worn. The fabric is characteristically similar to 475, being pink, hard and apparently inclusion free. Its function is unclear. It may be a gaming piece or may perhaps have been associated with metalworking (illus 15). L 30, W 24, T 4–5, m 5 g. Rubble in southern half of intra-mural chamber, 64, Phase 3.
- 85 ?Bead of fired ceramic with various vesicules or voids. There is an irregular, narrow perforation placed off-centre through the piece which is approximately 2 mm in diameter. See discussion under 475 (illus 15). 31 by 26 by 27, m 22 g. 4iii & 'F2', 55; Phase 3.
- 101 Clay whorl or bead. This is a roughly fashioned item perforated prior to firing. Some attention has been paid to smoothing the surfaces. The fabric is again characteristically similar to 475 and 66, pink in appearance with no visible inclusions (illus 15). L 24, W 24, T 13, m 8 g. 4iii, 55; Phase 3.
- 279 Wall daub. This sample comprises 35 associated fragments of daub weighing 188 g. Several of the pieces display the impressions of two or more adjacent wattles hence indicating that the sample represents structural wall daub (cf Poole 1991, 207–9). Some fragments show the impression of both upright and horizontal wattles. The longest fragment has a longest dimension of 66 mm, though the majority of pieces are under 35 mm. Extant original surfaces are uneven, with undulations and ridges.

All the fragments occur in a similar fabric which is generally oxidized yellow-brown. The fabric is soft and powdery with irregular fractures; many edges are abraded. Ill-sorted clay pellets are present in sparse frequency, while ill-sorted coarse angular quartz grains and rock fragments occur rarely. This may well be a raw clay.

There is some indication from the daub that several of the wattles were split. In six cases the diameters of the wattles can be established with some confidence: 22 mm (1 example), 20 mm (3), 13 mm (1), 11 mm (1). Poole's analysis (1991, 208), of the Maiden Castle sample established that the vertical sails have larger diameters (ranging between 14–35 mm) with horizontal rods rarely greater than 23 mm in diameter. 3, above extra-mural 'drain', trench A; Phase 3.

- 475 Clay ball. This is a small, well-formed, sphere with burnished surface. It is pink in colour and hard with no inclusions visible within the clay matrix. Several fine incised lines are visible on the surface and appear to be finger-nail marks; they form no clear pattern but may be significant. This item resembles a marble and may be a gaming/recreational piece. Clay balls are known from Traprain Law (Curle & Cree 1916, 68, 130, fig 40 no 7) and Clatchard Craig, Fife (Close-Brooks 1987a, 165, fig 27 no 105). Close-Brooks (1986, 165) notes the suggestion that these ceramic balls may be related to small balls in other materials found on sites of Iron Age date in southern and central Scotland. Both the Clatchard Craig ball and the illustrated example from Traprain have an irregular pattern of pricked holes on their surfaces and it is conceivable that the nail marks on the Fairy Knowe ball are analogous (illus 15). D 18, m 6 g. 4, B3; Phase 3.

MISCELLANEOUS FRAGMENTS OF FIRED CLAY

A total of 38 miscellaneous undiagnostic fragments of fired clay weighing 375 g was also recovered in the course of the excavations.

FABRIC

Fabric uniformity is not to be expected from this category as it probably includes much unintentionally fired clay associated with various activities over time. On the whole surfaces are typically oxidized red or reddish-brown, though 252, 294 and 496 are cream/beige throughout. Where unoxidized, fragments are mid to dark grey; original surfaces are slightly rough. Fragments are soft with irregular fractures. Very fine quartz grains typically occur in moderate frequency. Clay pellets of various sizes also occur in some fragments though they are rare. Some fragments also contain larger angular quartz inclusions c 1 mm which are rare; one fragment has larger sub-angular quartz inclusions c 3 mm. No 485 contains small rounded pebbles of a fine-grained hard (probably igneous) rock up to 9 mm. Some 'chaff' inclusions are evidenced.

DISCUSSION

The fragments of baked clay comprising this category seem likely to represent largely unintentionally fired clay, in many cases probably daub and other clay surfaces. They are certainly not from vessels (whether Iron Age tradition or Roman).

It is possible that some pieces such as 11A are from the outer faces of moulds or bellows guards. All one can say is that items included under this category are not diagnostic as mould or crucible fragments. None of the items under this category displays the hackly fractures and hardness of the fragments associated with vitrification (ie 193, etc). What processes led to their firing is obviously uncertain; they may be either a direct or indirect result of everyday domestic activities and/or small-scale metal-working, for which there is other evidence from Fairy Knowe. They generally display a number of common characteristics such as surface oxidization, smoothed surfaces and evidence of hand modelling. The character of the material in terms of appearance and fragment size is closely similar to baked clay and daub found on other Iron Age sites in northern Britain such as Burradon, Tyne and Wear (Jobey 1970).

CATALOGUE

Phase 2

- 488 One fragment, m 5 g; longest dimension 34 mm. Oxidized throughout. No extant original surfaces. Perhaps fired daub. F1, IV/V, Area 55.
- 294 One fragment, m 4 g; longest dimension 29 mm. One flat original surface is oxidized, otherwise unoxidized. Perhaps fired daub or other clay surface. F130, Area B3.
- 479 Two fragments, m 5 g; longest dimensions 19 & 29 mm. Adjoin. Partially oxidized. Abraded amorphous fragments with possible wattle impression.
- 483 One fragment, m 1 g; longest dimension 11 mm. Partially oxidized. Tiny fragment with one fairly flat original surface. Perhaps fired daub or other clay surface. F141.
- 482 One fragment, m 1 g; longest dimension 13 mm. A tiny fragment oxidized throughout. F 144.
- 481 One fragment, m 1 g; longest dimension 15 mm. A tiny fragment with oxidized surface. F146.
- 508 One fragment, m 1 g; longest dimension 8 mm. Thin fragment, 5 mm thick. Oxidized throughout with apparently two extant original surfaces on opposite sides. What it represents is uncertain. Area A2.

Phase 3

- 191 One fragment, m 26 g; longest dimension 66 mm. Displays one fairly flat and smooth original fashioned surface that is oxidized. Perhaps fired daub or other clay surface. 4 upper, Area 55/65.
- 252 One fragment, m 6 g; longest dimension 27 mm. Characteristically similar to 496. Oxidized buff throughout. Displays an original unevenly fashioned surface; generally of irregular appearance. 4, Area 54/55.
- 257 One fragment, m 12 g; longest dimension 42 mm. Displays one originally fashioned oxidized surface. This is uneven with finger pad impressions; otherwise unoxidized. Perhaps fired daub or other clay surface. 4, Area 55.
- 258 One fragment, m 9 g; longest dimension 26 mm. Displays one fairly flat and smooth originally fashioned surface. Partially oxidized. Perhaps fired daub or other clay surface. Characteristically similar to 191 & 255; possibly associated with 506. 4, Area 54/55.
- 496 One fragment, m 11 g; longest dimension 33 mm. Oxidized buff throughout. Crudely fashioned; displays a rounded edge and original surface, otherwise amorphous. Characteristically similar to 252. 4, Area 54/55.
- 503 One fragment, m 3 g; longest dimension 20 mm. Characteristically similar to 504. Displays a fairly flat smooth exterior surface which is oxidized and an uneven interior surface which is unoxidized. The clay appears clean and may therefore have been prepared. Perhaps fired daub or other clay surface. 4, Area 54/55.
- 504 One fragment, m 3 g; longest dimension 22 mm. Characteristically similar to 503. One flat smooth exterior surface which is oxidized. Perhaps fired daub or other clay surface. 4, Area 54/55.
- 505 One fragment, m 7 g; longest dimension 27 mm. Oxidized throughout. Displays one fairly flat smooth original surface. Perhaps fired daub or other clay surface. 4, Area 54/55.
- 506 One fragment, m 16 g; longest dimension 40 mm. Oxidized throughout. This fragment displays two original surfaces which are fairly flat and which adjoin at a right angled edge. Possibly from the same object as 258. 4, Area 54/55.
- 507 One fragment, m 6 g; longest dimension 25 mm. Partially oxidized. Fragment 16 mm thick. Displays 2 fairly smooth surfaces on opposite sides. One of these may be a wattle impression. The fractures and light density of this ceramic suggest it is not pottery; besides it has a twig impression along one of its fractures. 4, Area 54/55.
- 510A Four fragments, m 4 g; longest dimension 23 mm. All four pieces are apparently associated. Oxidized throughout. Amorphous form. 4, Area 54/55.
- 448A One fragment, m 5 g; longest dimension 41 mm. Oxidized pale red throughout. No extant original surfaces; powdery. Similar to fragments comprising 279. 4, Area B1.
- 448B One fragment, m 3 g; longest dimension 28 mm. Partially oxidized. One irregular original surface? 4, Area B1.
- 464 One fragment, m 2 g; longest dimension 24 mm. Partially oxidized. Only a tiny area of the original surface represented. 4, Area B3.
- 486 One fragment, m 1 g; longest dimension 20 mm. Oxidized red throughout. No extant original surfaces. Appears to be a prepared clay; possibly a fragment of Roman pottery or tile. 4, Area B3.
- 490 One fragment, m 1 g; longest dimension 26 mm. A thin fragment. Oxidized throughout. Has a possible finger/thumb pad impression on one face. 4, Area B3.
- 204 One fragment, m 134 g; longest dimension 83 mm. Partially oxidized. This substantial fragment displays a fairly smooth original exterior surface including a rounded edge. 3B, Area 54.
- 246A One fragment, m 38 g; longest dimension 54 mm. Partially oxidized. Characteristically similar to SF 11A and perhaps from the same object. Displays an original exterior surface which is uneven and convex. This fragment also has a somewhat rough interior face which may be the consequence of being applied to another surface, or could be the result of hand-fashioning. If this fragment is from an object originally round in cross-section this fragment represents c 25% of the outer circumference with an outer diameter of c 85 mm and an inner diameter of c 60 mm. It is possible therefore that this object is

related to metalworking, and may represent a bellows guard, though there is no indication of it having been exposed to a particularly high temperature. Layer 3B, Area 55.

- 11A Two fragments, m 29 g; longest dimensions 31 mm and 49 mm. Two adjoining fragments, partially oxidized. Characteristically similar to 246A. They display one original surface (the exterior) which is moderately convex and uneven. If the fragments are from an object round in cross-section they represent c 25% of the circumference, with a diameter of c 85 mm. There is no original inner face. See 246A. 3B, Area 55/65.
- 255 One fragment, m 9 g; longest dimension 40 mm. Characteristically similar to 191. Displays one fairly flat original surface that is oxidized. Perhaps fired daub or other clay surface. 3B, Area 64.
- 491 One fragment, m 3 g; longest dimension 17 mm. Partially oxidized. A small abraded lump of fired clay; one flat surface, possibly original. 3C, Entrance passage.
- 485 One fragment, m 6 g; longest dimension 25 mm. Oxidized buff throughout. No extant original surfaces. 3C, Area B3.
- 487 One fragment, m 2 g; longest dimension 19 mm. Oxidized throughout. No extant original surfaces. 3C/4, Area B1.
- 489 Two fragments, m 2 g; longest dimensions 17 mm and 19 mm. Both fragments are oxidized throughout and display a fairly flat original fashioned surface. Perhaps fired daub or other clay surface. Black deposit under wall rubble, Area A1/B2.

Phase 4

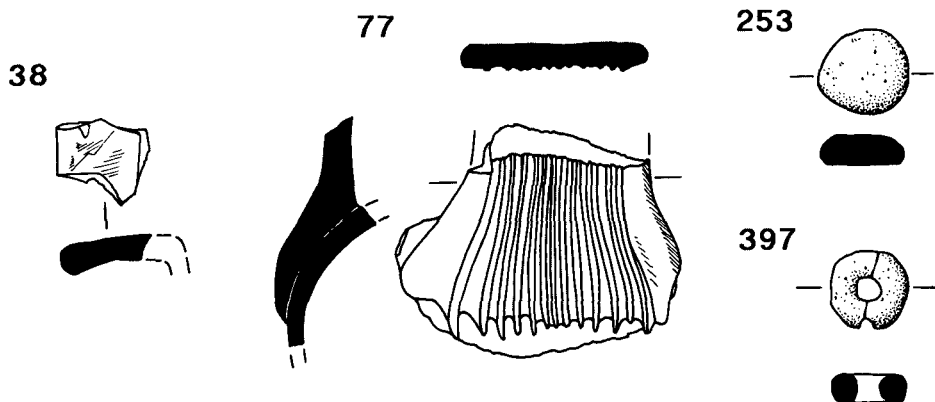
- 484 One fragment, m 19 g; longest dimension 47 mm. Oxidized red throughout. No extant original surfaces. 1, Area B1.

ROMAN GLASS

Dominic Ingemark

CATALOGUE (ILLUS 17)

- 8 Base fragment of a cylindrical bottle. Blue-green bottle glass, heavily worn. 4v, 55; Phase 3.
- 38 Rim fragment. Blue-green bottle glass, slightly melted (illus 17). 3B/c, 55; Phase 3.
- 76 Unidentified fragment of blue-green bottle glass. Channel in chamber, 64; Phase 2.
- 77 Fragment of the lower part of a reeded handle of a bottle. Blue-green, somewhat bubbly, bottle glass. Unidentified bottle glass (illus 17). 4/5, 54; Phase 2.
- 102 Base fragment of a cylindrical bottle? Blue-green bottle glass. 4iii, 55; Phase 3.
- 146 Fragment of the base of a cylindrical bottle, belonging to the same vessel as 321. Blue-green bottle glass, which was heavily worn before breaking. 3B/c, 64/65; Phase 3.
- 160 Unidentified fragment of blue-green bottle glass. 3B/c, 64/65; Phase 3.
- 224 Base fragment of a cylindrical bottle. Blue-green bottle glass. 4 & 'F2', 55; Phase 3.
- 321 Fragment of the base of a cylindrical bottle, belonging to the same vessel as 146. Blue-green bottle glass, which was heavily worn before breaking. F56, 65; Phase 2.
- 324 Unidentified blue-green bottle glass. Body fragment? Joins 384. 4iii, A3; Phase 3.
- 344 Base fragment of a cylindrical bottle. Blue-green bottle glass. The fragment was slightly distorted by heat. 3D, A3; Phase 3.
- 362 Body fragment of a cylindrical bottle. Blue-green bottle glass. Unstratified.
- 384 Unidentified blue-green bottle glass. Joins 324. 4iii, A3; Phase 3.
- 405 Blue-green bottle glass, distorted by heat, and therefore impossible to identify to type. F1 SE quad VI; Phase 2.
- 410 Blue-green bottle glass, distorted by heat. Neck? F1 NE quad VII; Phase 2.



ILLUS 17 Glass (scale 2:3)

DISCUSSION

A total of 15 fragments of Roman glass was found during the excavations of Fairy Knowe. All of these were of common blue-green bottle glass. Due to the considerable fragmentation, and the fact that some of it had come into contact with heat and therefore was somewhat distorted, not all fragments could be positively identified to type. However, all identifiable fragments (seven out of 15: 8, 146, 224, 321, 344, 362 & 384) belonged to one single type: Isings (1957) form 51, a thick-walled, robust cylindrical bottle. The rim, either horizontal or diagonal, is folded out, up and in. The neck is narrow or wide, in some cases almost as wide as the bottle itself. The shoulder is almost flat. The handle is of angular shape, often receded, and is attached just below the rim and at the shoulder. In order to protect it from breaking, it is somewhat drawn in. The rims, necks, shoulders and handles of cylindrical bottles are more or less identical with the ones of square and prismatic bottles (Price 1995, 185). Therefore it is impossible to determine to which type a fragment belongs. However, in the case of Fairy Knowe, it is likely that all fragments originally came from cylindrical bottles.

In Roman Britain the oldest finds of cylindrical bottles are from Colchester. These date to the Claudian-Neronian period (Harden 1947, 306). However, it is first in Flavian times that the cylindrical bottles became common (Charlesworth 1969). They were produced on a very large scale, and are exceedingly common on Roman sites from Flavian times until the early second century. Production of these bottles ceased totally around AD 110–20 (Price 1995, 185). Most of the cylindrical bottles are likely to originate from the north-western provinces, possibly from Britain itself.

The bottles were used for transport and storage of liquids and semi-liquids such as wine and *defrutum* within the Roman Empire. Since several fragments show signs of use/wear, it is probable that they retained the function as vessels for storing liquids among the natives. A secondary use as cinerary urns was not uncommon in a Roman context (Harden 1962, 136), although to my knowledge no finds of this kind have been made outside the Roman Empire. Blue-green bottle glass was probably reused as cullet in the production of beads and bangles in native Scotland (Henderson & Kemp 1992).

In non-Roman contexts in Scotland a total of eight sites have positively identified cylindrical bottles: Fairy Knowe; Castlehill Wood dun, Stirlingshire; Leckie Broch, Stirlingshire; Torwoodlee, Selkirkshire; Castlehill fort, Ayrshire; Castlelaw fort, Midlothian; Hyndford Crannog, Lanarkshire; and Traprain Law, East Lothian (Ingemark, in prep). These seem to have been

imported during a fairly short timespan, from the Agricolan invasion (or possibly somewhat earlier) until around AD 120 (ie a period of 40 years). There is also the possibility that some of the blue-green bottle glass found on other sites and not identified to type might once have belonged to cylindrical bottles. In my view, this shows the close trading contacts the Romans and natives had in Scotland.

In a Roman context in Scotland, cylindrical bottles are very common: in the case of Inchtuthil, for instance, the bulk of the vessel glass consisted of bottle glass, particularly cylindrical ones (Price 1985, 307). However, outside the Roman Empire, bottles of this kind are extremely rare, a phenomenon not uncommon for cheap, everyday products.

If one studies Roman glass in native contexts from Scotland (Ingemark, in prep), Fairy Knowe belongs to the largest group of sites: those with few different types of vessels, often of fairly low quality and/or value and a limited number of fragments. Probably this glass reached Fairy Knowe via Roman military sites, and is evidence for contact of some sort between natives and Romans.

OTHER GLASS FINDS

Fraser Hunter

CATALOGUE (ILLUS 17)

- 55 Two fragments from a small semi-opaque deep blue glass bead. Although only part of the section is preserved, if symmetrical the bead would have been globular or a squat barrel shape. Probably of Guido (1978) Group 7. D 4 (perforation D 2); H (surviving) 2. 4ii, 55; Phase 3.
- 253 Roman gaming counter in opaque white glass. Plano-convex in section, sub-circular in plan (illus 17). D 16 × 17.5; H 6. 5, 54/55; Phase 2.
- 397 Opaque yellow annular bead (Guido 1978, class 8), broken in two. Poor quality glass with abundant air bubbles — indeed the break has occurred where there are very large air bubbles in the D-shaped section (illus 17). D 8 (perforation D 2.5); H 3.5. 4vi, 55/65; Phase 3.

DISCUSSION

The yellow bead, 397, is a typical Iron Age form for which a first/second-century AD date is quite acceptable (Guido 1978, 73–6). Globular blue beads like 55 are a long-lived type which spans the later Iron Age and beyond (Guido 1978, 69–70).

More interesting is the gaming counter, a type well known on Roman sites in a range of colours (eg Crummy 1983, 92–3). The only other native sites in Scotland with such finds are Traprain Law (Curle & Cree 1916, 128, fig 38/12), Camelon native site (Proudfoot 1980, 125) and the rich burial at Waulkmill, Tarland, Aberdeenshire (Callander 1915). The implications are interesting but under-researched. First we must ask whether it was used on the site as a gaming counter. This is, of course, hard to establish, but given the range of likely gaming counters at Traprain (eg Cree 1923, fig 19/33–40), and the presence of gaming sets in late Iron Age contexts at Waulkmill and elsewhere in Britain (eg Welwyn Garden City; Stead 1967, 14–19), it seems plausible. The question then is of the context: was the game Roman or native in origin? This is far harder to answer. Certain pre-Roman board games are elusive: the above examples are all in a context of Roman contact. The possibility that board games are an innovation arising from such contact is worth raising, although it requires a more thorough appraisal of the evidence than is possible here.

What is more certain is its social implication. Iron Age gaming sets are rare finds in Britain (and indeed on the European mainland), generally restricted to the upper end of late Iron Age graves (eg Welwyn, Stanway, and Verulamium grave 9; Stead 1967; Crummy 1997; Stead & Rigby 1989, fig 90). More locally, the Waulkmill burial is a good example: with its miniature cauldron, silver brooch and recently identified high-quality Roman glass vessel (D Ingemark, pers comm) it must be considered a high status burial. This suggests board games may have been the prerogative of those of high rank, much as chess was in later periods.

COPPER ALLOY

Fraser Hunter

CATALOGUE (ILLUS 18, 19 & 20)

The alloy composition of the objects has been determined by energy-dispersive X-ray fluorescence (XRF) analysis. A sample was analysed quantitatively by David Dungworth (see below), the remainder qualitatively by Katherine Eremin (NMS Analytical Research). These latter results are from surface analysis only, and are affected by corrosion; while perfectly reliable and valuable for the rapid determination of general alloy types (bronze, brass, gunmetal, etc), this cannot provide the detailed distinctions of Dungworth's work, and these results are distinguished from fully quantitative analysis by *italics*.

Ornaments

- 20 Pin shank in two (non-joining) pieces, circular in section, both point and head lost. The upper end narrows slightly and is bent through c 60°. The original form cannot be reconstructed, although it would fit with the projecting ring-headed type (Stevenson 1955, 288–90). Corrosion products in one area preserve organic traces as a series of diagonal lines, shown on the illustration (illus 18). L 62; D 2.5. Alloy: gunmetal. 4, 54; Phase 3.
- 47 Penannular brooch of Fowler (1960) type A3 (i), with knob and single collar terminals. The pin, now broken, is of circular-sectioned wire, and is a replacement (cf Allason-Jones & Miket 1984, 3.119–3.123) (illus 18). Hoop D 31 by 30; T 3. Pin L 19; D 2. Alloy: copper. 4 & 'F2', 55; Phase 3.
- 49 Enamelled finger ring (illus 18 & 20). The loop is broken, but one of the broken ends is smoothed, implying continuing use. The loop expands to the circular bezel; at the junction are pairs of almond-shaped swellings, the style closely related to the domes of trumpet motifs. Perpendicular to this on the bezel's circumference are diametrically opposed lip mouldings (see MacGregor 1976, xvii–xix for terminology).

The bezel has a chequerboard enamel design in red and yellow set at 45° to the axis of the hoop. The blocks are c 2 mm square; one axis has eight blocks, the other seven. The yellow is better preserved than the red, and it was clearly added as solid blocks cut from a longer rod: surface striations are visible, oriented differently in different blocks and with no heat distortion. No such details are visible for the red: it fits into irregular gaps, implying it was inserted as a molten glass paste, or perhaps a powder. There are no cell divisions between the different colours, which is the norm in Iron Age *champlevé* enamelling; rather the different melting points of red and yellow glass would ensure the yellow remained solid when the red was added.

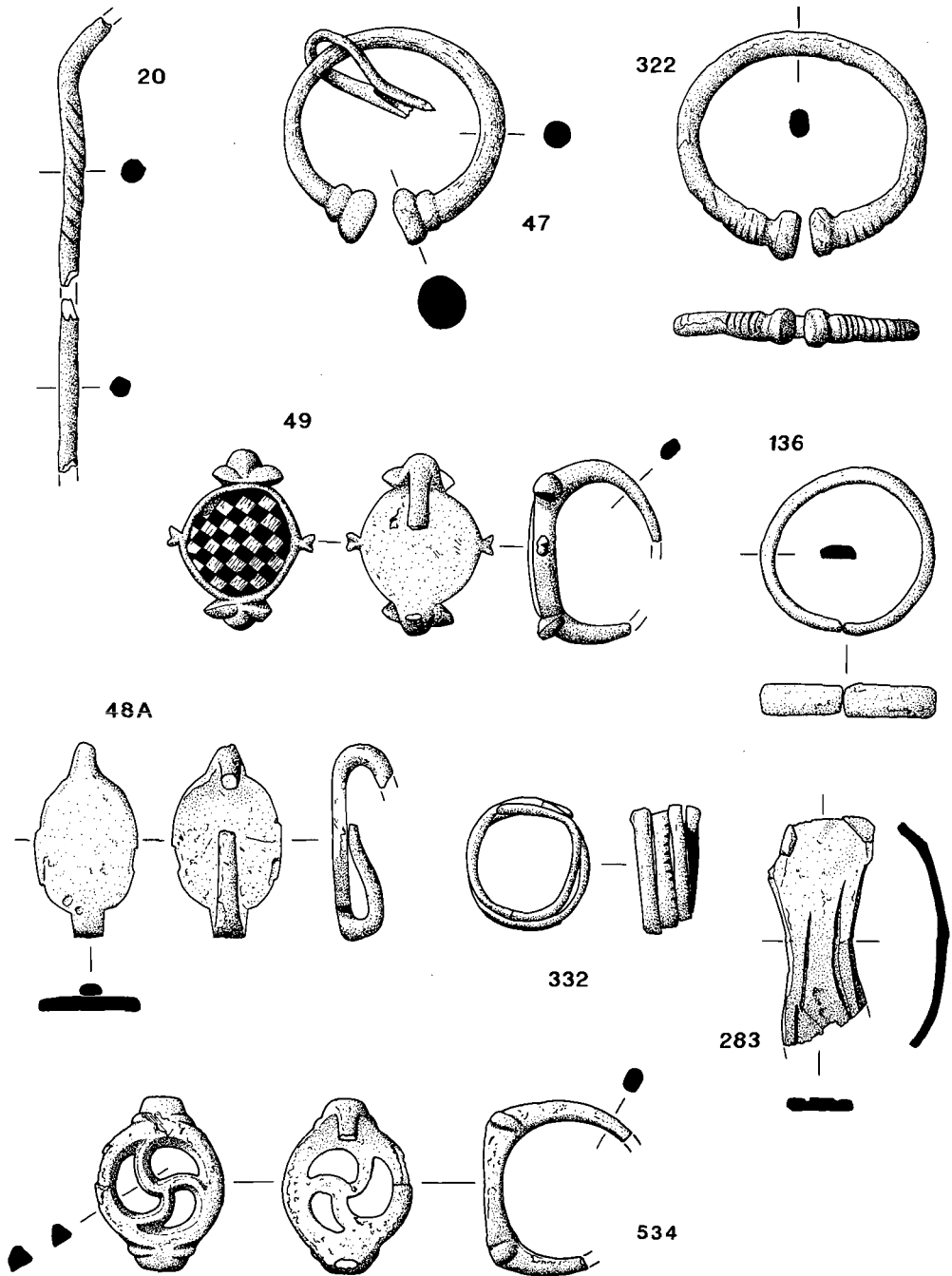
Hoop D 24 by 18.5 (on incomplete axis). Bezel D max 21.5; enamelled field D 15 mm; T 4.5. Alloy: *gunmetal*. 4 & 'F2', 55; Phase 3.

- 136 Penannular ring with butting square-cut terminals, in section internally flat, externally slightly rounded. Although plain, the section and dimensions are consistent with use as a finger ring, and

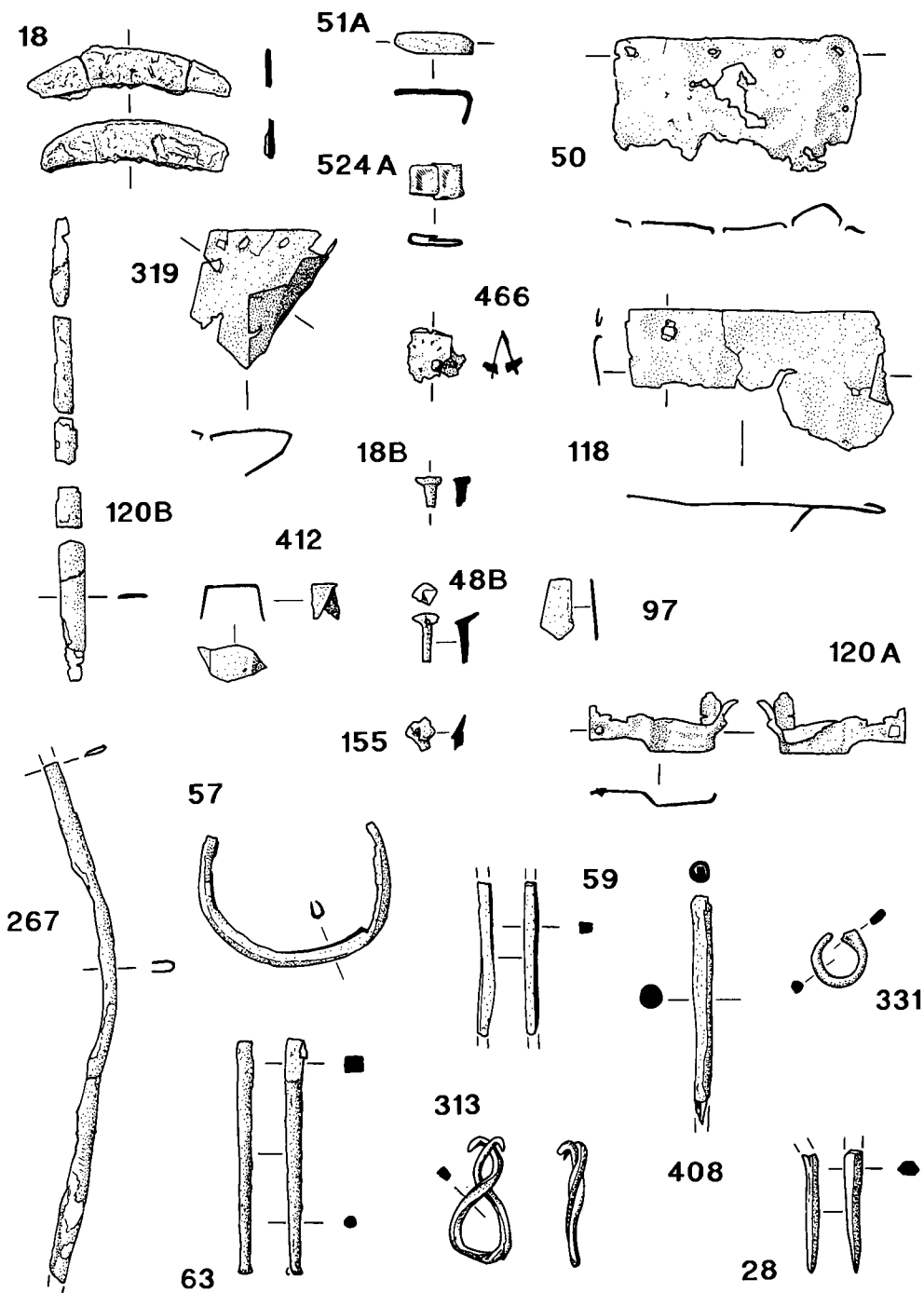
- accordingly it is classed here as an ornament, although other interpretations are possible (illus 18). D 25; H 5; W (hoop) 2. *Alloy: leaded gunmetal*. F30, 54; Phase 2.
- 322 Hoop of penannular brooch of Fowler (1960) type A3, with knob terminals and multiple encircling ridges on the neighbouring areas of the hoop. At least 13 ridges are visible on each side, although corrosion prevents certainty and much of the original surface is lost. Hoop oval rather than round in section. The multiple ridging is a version of Fowler (1960) type A3(ii) and can be paralleled in an example from Hod Hill (Brailsford 1962, fig 11, E3 (illus 18). D 35 by 31; T 3. *Alloy: brass*. 3D/4, A1; Phase 3.
- 332 Spiral finger ring of $3\frac{1}{4}$ turns, made from a rectangular-sectioned strip, thickest in the central turn and thinner to the sides. The central turn has decorative nicks on one edge around half of its circuit. For the type see Clarke (1971, illus 17) D 19 (internal D 14.5); T 9. Strip 2.5 (max) by 1–1.3. *Alloy: gunmetal*. 3D/4 or F58, A1; Phase 3.
- 534 Finger ring with bezel bearing openwork triskele decoration. The hoop is broken, but the ends are rather rounded and worn, indicating that it continued in use after breakage. The hoop expands towards the bezel, where the shoulders are ornamented with angled pairs of lentoid mouldings, less prominent than on 49. There is a crack in the bezel rim at one point. The ring has a close parallel from Forfar (Simpson 1970). Hoop D 24 mm by 19 mm (incomplete axis). Bezel max D 18.5 mm; T 2.5–3 mm. *Alloy: leaded gunmetal*. Found in April 1999 by a metal-detectorist immediately south of the broch mound and claimed as Treasure Trove (illus 18).

Strip and mounts

- 18 Four fragments forming two flat crescentic strips, with slightly rounded edges on their upper surfaces. All surfaces have grass impressions in their corrosion products. Probably a pair of curved mounts (illus 19). A (1 piece): L 40; W 8; T 1.3; B (3 pieces): L 44; W 8; T 2.0. *Alloy: leaded bronze*. 4, 54; Phase 3.
- 48A Plain oval plate with attachment tangs folded under it, one round-sectioned and broken, the other rectangular-sectioned and folded back against the rear of the plate. The flat nature of the plate and the variety of tangs imply it is not a broken finger ring, and it may best be interpreted as a decorative mount or clasp, the tangs to clamp it against something. Cf Traprain (Cree 1923, 194–5) (illus 18). L 26; W 15; T 9. *Alloy: gunmetal*. 4 & 'F2', 55; Phase 3.
- 51D Strip fragment, tapering to one end, the edges slightly rounded on the top surface. L 16; W 5.5; T 0.7. *Alloy: gunmetal*. 4 & 'F2', 55; Phase 3.
- 51E Two fragments of slightly tapering strip, the edges rounded on the top surface. L (total) 31; W 8; T 0.5. *Alloy: gunmetal*. 4 & 'F2', 55; Phase 3.
- 51F Strip fragment. L 18; W 8; T 0.3. *Alloy: bronze*. 4 & 'F2', 55; Phase 3.
- 60A Two joining strip fragments. L 23; W 6; T 1.4. *Alloy: gunmetal*. 4i, 55; Phase 3.
- 60B Strip fragment with both long edges intact; one edge is slightly curved up, the other slightly curved down. L 11; W 7; T 0.4. *Alloy: bronze*. 4i, 55; Phase 3.
- 88 Three fragments, originally joined, of a strip with the start of a curve at one end, in the same plane. L 8; W 3; T 1.5. *Alloy: bronze*. 4iii, 55; Phase 3.
- 97 Tapering strip fragment, broken at both ends (illus 19). L 12; W 6.5; T 0.4. *Alloy: bronze*. 4, 54/64; Phase 3.
- 120B Six fragments (three joining) from a flat strip, the edges of the upper surface slightly rounded. Tapers slightly towards the ends, which are damaged. Decorative mount? (illus 19). L (min) 87; W 5; T 0.5. *Alloy: bronze*. 4, 54/55; Phase 3.
- 167 Five fragments of strip, originally joined, the upper surface with rounded edges. Largest L 12; W 5.5; T 1.5. *Alloy: leaded gunmetal*. F13, 54; Phase 2.
- 524A Short strip, the ends folded over flat against the strip to touch one another (illus 19). L 11 (unfolded 23); W 7.5; T 2.5. *Alloy: leaded bronze*. F1 & layer 6, 55, Phase 2.



ILLUS 18 Copper-alloy ornaments, mounts (48A) & tankard handle (283) (scale 1:1)



ILLUS 19 Copper-alloy artefacts (scale 2:3)

Sheet

- 46 Sheet fragment with one original straight edge, the others damaged. Organic remains in the corrosion products on one side imply it was fastened to an organic object as a mount or patch. L 17; W 15.5; T 1.2. Alloy: bronze. 4 & F1, 55; Phase 3.
- 50 Rectangular sheet patch/mount, damaged but with enough of the original edges surviving to reconstruct the shape. Punched rivet holes D 1.5–2 mm are placed around the edges, with one at each corner, two additional ones on the long edge, and one on one of the short edges. Three rivets survive, all solid with square-sectioned shanks. Only one is intact: the bend in the shank implies it was fastened to an object c 5 mm thick; the thickness suggests it was organic (illus 19). L 52; W 28; T 0.2–0.3. Rivets L 6; head 2.8 by 3.2; shank 1.5 square. Alloy: bronze. 4 & 'F2', 55; Phase 3.
- 60C Small rectangular sheet fragment with three original edges. L 15; W 10.5; T 0.5. Alloy: leaded gunmetal. 4i, 55; Phase 3.
- 90 Sheet fragment, no surviving original edges. L 11; W 6.5; T 0.4. Alloy: bronze. 4iii, 55; Phase 3.
- 113 Sheet fragment with two original edges, one folded over by 1.5 mm to clamp it to another object. L 6; W 5; T 1.5. Alloy: bronze. 4, 54/55; Phase 3.
- 118 Two joining sheet fragments, with one original straight edge, the rest corroded and damaged. Large circular rivet hole 3 mm by 2 mm punched through near edge. Folds and creases imply the sheet was deliberately removed from an object. Probably a patch (illus 19). L 58; W 29; T 0.2–0.3. Alloy: bronze. 4 & F1, 55; Phase 3.
- 120A Distorted corner fragment from a sheet with a rivet hole c 2 mm D in the corner. The rivet is of rolled sheet type (illus 19). L 30; W 10; T 0.3. Alloy: bronze. 4, 54/55; Phase 3.
- 127 Three sheet fragments, non-joining but probably from the same object. Two square corners and part of one rivet hole survive, most likely representing the remains of a rectangular patch. L 14; W 8; T 0.2 (largest frag.). Alloy: bronze. 4, 64/65; Phase 3.
- 150 Sheet fragment, no surviving original edges. Thicker than most examples. L 8; W 7; T 0.6. Alloy: leaded gunmetal. 4, 64/65; Phase 3.
- 161 Folded sheet fragment in two joining parts, folded in half, each half then folded in on itself. Organic remains, most likely grass, are preserved in the corrosion products on the external surfaces. Largest frag. L 30; W 7; T 6 (sheet 0.7). Alloy: brass. F13, 64; Phase 2.
- 260 Sheet fragment with a punched rivet hole in one corner containing rolled-sheet rivet. The rivet shank length implies it was attached to a material c 3 mm thick; organic remains in the corrosion products suggest this was organic. Probably the corner of a patch or mount. Sheet L 28; W 13; T 0.4. Rivet head D 6 × 4; shank D 2.5. Alloy (sheet): gunmetal. Unstratified.
- 319 Folded trapezoidal sheet patch with peripheral square rivet holes, c 2–3 mm long. The patch was reused: it has three straight edges angled at c 120° to one another, with irregularly spaced rivet holes from its primary use; the fourth edge is an irregular series of straight-edged cuts which truncate one original rivet hole. In this reshaping and reuse the patch was folded over the edge of an object c 5 mm thick, as crease lines attest. It seems this was a body patch subsequently reused as an edge or rim patch for an organic object (given the width). The rivet holes concentrate in one corner, and some probably stem from this secondary use (illus 19). L 34; W (folded) 24; T <0.1. Alloy: bronze. 3D/4, A1; Phase 3.
- 385 Two curved sheet fragments, with one original straight edge. Largest L 8; W 3; T 2. Alloy: bronze. F1, 55; Phase 2.
- 466 Folded sheet fragment with no surviving original edges. Two solid square-sectioned rivets survive *in situ*, of L 4 mm (fastened through a material 3 mm thick) and shank section 1.5–2 mm (illus 19). L (folded) 11; W 9; T (sheet) 0.4. Alloy: bronze. 4, B3; Phase 3.
- 524B Sheet fragment, no surviving original edges. L 6.5, W 5.5, T 0.4. Alloy: gunmetal. F1 & layer vi, 55, Phase 2.
- 525 Four sheet fragments (two joining), probably from one object. No rivet holes are preserved. The original shape is uncertain, but may have been rectangular. All the fragments have one edge cut

straight; the others are damaged. Dimensions: 54 by 20 (joining); 23 by 11; 13 by 9.5; T 0.3. Alloy: bronze. 3B, 54; Phase 3.

526 Sheet fragment, one original straight edge. L 11.5; W 9.5; T 0.2. Alloy: brpmze. 4, 54/55; Phase 3.

527 Sheet fragment, no surviving original edges. L 10; W 9; T 0.4. Alloy: leaded gunmetal. Unstratified.

Rivets and fastenings

18B Rolled sheet rivet, tip broken (illus 19). L 55; head 6 × 4; shank D 2.5. Alloy: bronze. 4, 54; Phase 3.

48B Rolled sheet rivet, no sign of damage (illus 19). L 9.5; head 5 × 4; shank D 2.5. Alloy: bronze. 4 & 'F2', 55; Phase 3.

51A Angled staple comprising a strip, broken at one end, the other bent through 90° and tapered to a point for insertion in organic material (illus 19). L 17; W 4.5; T 8 (sheet 0.7). Alloy: gunmetal. 4 & 'F2', 55; Phase 3.

51B Angle portion from staple similar to 51A. L 8.5; W 4; T 4.5 (sheet 0.6). Alloy: leaded gunmetal. 4 & 'F2', 55; Phase 3.

51C Angle portion from staple similar to 51A & B, although analysis shows it is not from the same object. L 7.5; W 4.5; T 4.5 (sheet 0.5). Alloy: leaded brass. 4 & 'F2', 55; Phase 3.

120C Rolled sheet rivet found with 120A, and probably part of same object. Head flattened, tip broken. L 5; D (head) 4.5. 4, 54/55; Phase 3.

155 Rolled sheet rivet, shank broken (illus 19). L 3; head 6 × 5; shank D 3. Alloy: leaded gunmetal. 3B/c, 64/65; Phase 3.

412 Unused rivet of 'paper clip' type (Hunter 1994, 58–9), with hexagonal upper surface and two prongs at 90° (illus 19). L 13; W 7; T 7.5 (sheet 0.3). Alloy: bronze. Intra-mural chamber fill, B2; Phase 3.

Binding

57 Curved binding of folded sheet, penannular in section, the ends broken. No signs of stress, implying this was its intended shape. Probably a circular binding round the rim of an organic vessel (illus 19). D (external) 41; W 3; H 3. Alloy: bronze. 4i, 55; Phase 3.

267 U-sectioned folded sheet binding, now twisted but originally straight. Ends squeezed closed, probably from later damage. (illus 19). L 110; W 4; H 5. Alloy: bronze. 2, trench A; extra-mural Phase 4.

Rod

59 Square sectioned rod fragment (illus 19). L 33; W 2.5; T 2.5. Alloy: gunmetal. 4i, 55/65; Phase 3.

71 Fine square-sectioned rod fragment. Fine hammer marks 1.5 mm wide are visible at one end. L 30; W 2.5; T 1. Alloy: leaded gunmetal. 3B, 54; Phase 3.

408 Rolled sheet rod, finished at one end by hammering it flat, broken at other end. Function uncertain (illus 19). L 49; D 4. Alloy: gunmetal. F1 NE quad; Phase 2.

Miscellaneous

28 Round-sectioned point, expanded and hexagonally faceted at one end, which appears to be broken and has a slot cut into the top. Presumably another component, of which no trace remains, was clamped into this. This would be a curious way of hafting a point, and it may instead be a handle for a fine iron tool, the blade missing, with the handle doubling as a point (for the principle, cf the similar technique in Roman scalpels, eg from Cramond: Gilson 1983, 388) (illus 19). L 29; W 3.5; T 3. Alloy: leaded gunmetal. 3B, 54/64; Phase 3.

63 Rod with rectangular-sectioned head, the edges slightly bevelled, and circular shank, tapering slightly before expanding into a knobbed terminal. A small patch of solder survives on the rectangular end,

implying this was fixed into a socket on another copper-alloy object, perhaps as a fine handle or support leg. Parallels are elusive (illus 19). L 50; W 4; T 3. Alloy: bronze. S half of intra-mural chamber, 64; Phase 3.

- 283 Decorated handle, quite crudely worked. Concave-sided sheet, curved in longitudinal section. Single crude incised lines parallel the concave edges, starting c 10 mm from the end. The original ends are lost; there are no surviving signs of a means of attachment (illus 18).

Probably the central portion of a tankard handle: sheet versions are known as well as cast ones (Corcoran 1952, class V; MacGregor 1976, 147–9). Although there are no precise parallels known to the writer for the concave sides, the diversity of the tankard handle series means this is not a significant problem. The Newstead example is the only other sheet handle from Scotland (MacGregor 1976, no 290); compare also Corbridge (Allason-Jones & Bishop 1988, 83–4) and Stonea (Jackson & Potter 1996, 263). L 31; W 14; T 1.5. Alloy: leaded bronze. 3 & extra-mural ‘drain’ infill, trench A; Phase 3.

- 313 Hooked loop of fine rectangular-sectioned wire, twisted into a figure of eight and tapering to hooked terminals. At its lowest point the wire has split in two from working stress due to insufficient annealing. Some form of attachment device (illus 19). L 27; W 12; T (wire) 2 by 1.5. Alloy: leaded bronze. (3E/4, A3; Phase 3.
- 331 Small penannular ring of oval-sectioned wire, terminating in a rounded point at one end and slightly irregularly expanded at the other. Function uncertain. (illus 19). D 11.5; wire 2.5 by 2. Alloy: leaded gunmetal. 3D, A1; Phase 3.

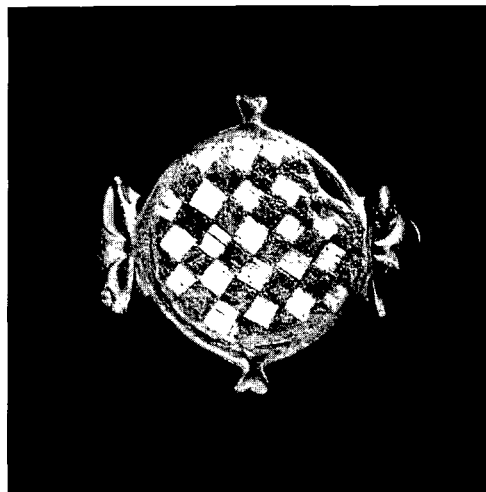
Unidentified fragments

- 54 Oval-sectioned curved fragment, probably from a ring c 7–10 mm D. L 13; W 3.5; T 1.5. Alloy: bronze. 4iii, 54; Phase 3.
- 100 Fragment, perhaps from a strip, no original edges. L 13; W 3.5; T 1.5. Alloy: brass. 4i/iii, 55/65; Phase 3.
- 380 Small curved fragment, slightly concave section externally. L 5; W 1.5; T 3. Alloy: gunmetal. F1 layer VIII, 55; Phase 2.
- 406 Three slightly curved fragments, not joining, no original edges. Largest L 9; W 6; T 1. Alloy: bronze. F1 SE quad layer VI; Phase 2.

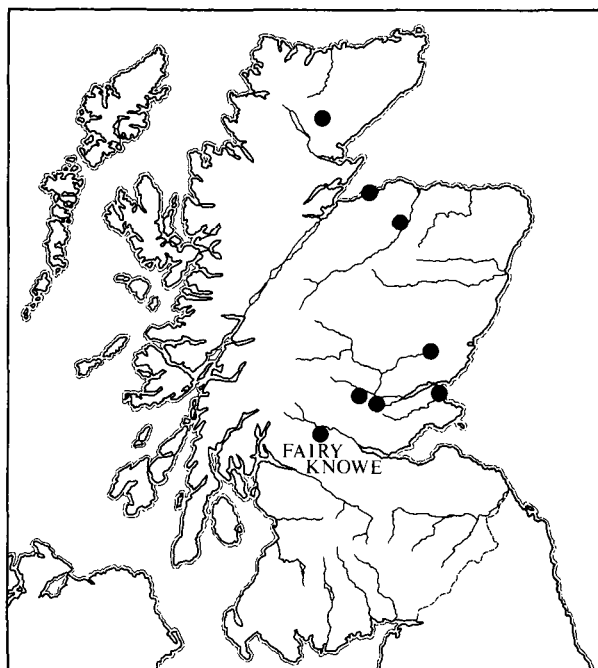
DISCUSSION

The most important items in the assemblage are the finger rings 49 & 534; 49 is the finest surviving example from Scotland. The type has been plausibly derived from Roman prototypes (Simpson 1970), as the idea of a bezel on a ring was alien to local ways. As the alloy of both rings is reused Roman metal, their dating is consistent with this. The adoption/transformation process must have been rapid, given that this example is late first/early second-century in date, and the Strageath example (below) is Flavian. Since previous discussions of the type (Simpson 1970; MacGregor 1976, 135–7) there have been four new discoveries: Fairy Knowe (two); Strageath, Perthshire (from a Flavian context in the Roman fort; Frere & Wilkes 1989, 157); and Middleton, Moray (a 1997 discovery which will be published fully elsewhere). The enamelled rings from Traprain Law (Burley 1956, no 159) and Newstead (Simpson 1970) are more classically Romano-British (Bateson 1981, 55–6).

The updated distribution (illus 21) reinforces the previous concentration northward from the Forth in east Scotland: indeed the type may be considered a product of the area. Several examples mirror local metalworking traditions in the use of prominent almond-swellings (cf the massive armet series, MacGregor 1976, nos 231–50) and lipped mouldings (cf massive terrets, eg MacGregor 1976, nos 113–14). The enamelling, too, parallels local styles: the yellow and red



ILLUS 20 Iron Age enamelled ring 49; the enamelled field is 15 mm in diameter



ILLUS 21 Distribution of Iron Age enamelled finger rings

chequerboard of the Fairy Knowe example is closely similar to the Castle Newe massive armlets (Brailsford 1975, 69–74), and the more elaborate, almost floriate design of the Strageath example is related to the enamelling on the Pitkelloney armlets (Brailsford 1975, 75–82). The type may therefore be seen as part of the massive tradition of metalworking (MacGregor 1976, 184–5).

The Fairy Knowe rings were clearly cherished possessions, as seen by their continuing use after the breakage; 49 has a magnificent patina compared to other items in the collection, perhaps built up through extensive handling before deposition.

The other ornaments, while less spectacular, nonetheless form an impressive range. The brooches, pin shank and spiral finger ring are all typical Iron Age forms. However, the penannular brooch 322 with multiple ridging is an unusual example for which no parallels have been found. It is surprising given the quantity of other Roman imports, that there are no Roman brooches, or indeed any Roman copper-alloys from the site, although the alloys used indicate the availability of Roman metal as a raw material.

A range of strips and mounts is present, from crescentic through tapering to straight. Apart from 48A (most probably a clasp-mount for some organic material), none shows any clear methods of attachment, suggesting they were glued or hammered to an organic substrate as decoration. The sheet fragments, numerically the largest group, also attest to the former existence of organic items. The presence of corners and rivets on the more sizeable fragments indicates they are patches rather than bronze vessel fragments, while the preservation of organic traces in corrosion (46) and the size of rivet shanks and folds (50, 260, 319) indicates most were for patching organic rather than metal vessels; the reuse of some patches (319) is an interesting point, indicating careful use of the resource. (For metal patches on wooden vessels, see an example from Ardgour, Inverness-shire, now radiocarbon dated to the Iron Age; Maxwell 1951, 164.) The bindings also reveal the former presence of organic items, especially 57 which appears to be the rim of a narrow-necked organic vessel. Further evidence comes from the associated groups of fragments (eg 57, 120), which suggest the metal was deposited together with its attached organics, although no reconstructions are possible.

The probable tankard handle 283 indicates the existence within the broch of wooden vessels of some pretension. Tankard fragments are rare in Scotland and this is a valuable addition to our knowledge, albeit rather cruder than most. For the other Scottish examples, see MacGregor (1976, 147–9); add a fragment from Ballinbrich, Fife (Hunter 1996, 113).

A wide range of rivets is present, representing a possible range of specialized functions. The rolled sheet rivets (eg 18, 48B) are one of the typical multi-purpose rivet types, as are the solid examples (446). The paper-clip rivets, in contrast, appear to have been solely for the repair of copper-alloy vessels, and the presence of an unused example (412) strongly points to repair of such vessels on site, even though no certain vessel fragments survive. The angled staples such as 51A-C are for fastening to organic material.

The miscellaneous section contains several other rare or unique objects of interest: the fine dual-function handle 28, the handle/leg 63 and the decorative hooked loop 313.

In summary the copper-alloy objects from Fairy Knowe form an important assemblage. While dominated by fittings relating to the decoration or repair of organic objects (probably vessels), the finer metalwork, notably the ornaments, points to inhabitants of some status.

ROMAN COINS

the late Anne S Robertson

CATALOGUE (NOT ILLUS)

- 145 *As* of Vespasian (AD 69–79)
 AE. Diam 25 mm. Mass 4.34 g. Axis ↓.
 Obverse: IMP CAES[AR] VESPASIAN AVG
 COS III, IIII or VIII P P
 Head of Vespasian, laureate, r, globe at point of neck.
 Reverse: S C (l and r in field)
 Eagle standing front on globe, wings spread, head r.

Compare RIC 497 (COS III, AD 71); 747 (COS III, AD 72–3); 764A (COS VIII PP, AD 77–8).
Corroded, not badly worn.
4/5, 55/65; Phase 2

- 335 *As* of Vespasian (AD 69–79)
AE. Diam 24 mm. Mass not recorded — coin now missing. Axis ↓.
Obverse: [IMP CAES] VESPASIAN AVG [COS III]
Head of Vespasian, laureate, right.
Reverse: Not identified.
Mint: Rome
Date of coin: AD 71
Too corroded to estimate wear.
4iii, A3; Phase 3

DISCUSSION

The importance of these coins for dating purposes is that they are of bronze. Bronze coins, being so hard worked in circulation, became excessively worn, and were withdrawn from circulation when they became too worn to recognize. Bronze coins of AD 69–79 are most unlikely to have survived in continuous circulation into, say, the Antonine period. It is therefore probable that they reached Fairy Knowe in the late first century AD. (For further comments on the coins, see the General Discussion, below.)

EDXRF ANALYSIS OF COPPER-ALLOY ARTEFACTS

David Dungworth

The chemical compositions of a selection of 32 copper-alloy artefacts from Fairy Knowe were determined using EDXRF. The results are compared with those from contemporary sites in northern Britain and indicate that Fairy Knowe may have had a substantially different supply of copper-alloys from other Roman period sites in northern Britain.

ANALYTICAL METHOD

All of the objects were analysed using Energy Dispersive X-ray Fluorescence (EDXRF) in the Department of Archaeology, University of Durham. The analysis was carried out using a Link Analytical XR200 EDXRF. This was operated at an accelerating voltage of 20 keV and a current of 250 μ A with a 'live time' of 100 seconds (some of the smaller samples were analysed at higher currents in order to ensure a reasonable total number of 'counts'). The concentrations of all the elements present in the samples were calculated by reference to data collected from 10 standards of known composition. Details of XRF can be found in many textbooks, eg Dziunikowski (1989).

SAMPLING OF OBJECTS

EDXRF is a non-destructive technique but it analyses the surface of an object (typically only the outer 0.1 mm). Thus, analysis of uncleaned objects gives an analysis of the corrosion products (Organ 1962). Quantitative analysis relies on analysing a sample of uncorroded metal which will be representative of the whole object in its uncorroded state. In order to obtain such a sample a

small area may be cleaned to remove the corrosion products. This cleaned surface can then be analysed. Larger objects may be drilled (1 mm diameter) in order to obtain a sample of metal, which can then be analysed. Samples 001, 002, 030, and 031 were drilled, while all of the others were obtained as small samples of metal which were cleaned using air abrasion and then mounted in epoxy resin and polished.

DISCUSSION

The copper-alloy analyses are presented in Table 6. This records the levels of a number of different elements in the metal (Cu, Zn, Pb, Sn, Fe, As, Sb, and Ni). Other elements were analysed for but not detected (Ag, Au, Co and Mn).

Most of the samples consist of fragments of sheet metal and so typological comparisons with other contemporary sites is difficult. The analysed assemblage did include two penannular brooches. One of the penannular brooches (SF47) is uniquely made of almost pure copper. Thirty-three penannular brooches from northern Britain have been analysed and none of these is made from a similar alloy (Dungworth 1997a). The second penannular brooch (SF322) is made from brass, as are many other penannulars from northern Britain.

Overall the copper alloys used at Fairy Knowe are broadly similar to those used on many Roman period sites in northern Britain: they contain varying levels of tin, zinc and lead. The average levels of the principal alloying elements are displayed in Table 7. It can be seen that the Fairy Knowe copper alloys generally have lower levels of zinc and lead but higher levels of tin.

In order to allow a more accurate description of the assemblage as a whole, each sample is classified into four major alloy groups (brass, bronze, gunmetal and copper) depending on the levels of the major alloying elements (Zn and Sn) and each of these is then divided into leaded and unleaded (with 1% lead as the dividing point). Those samples with at least 15% zinc are referred to as brass. Those with less than 5% zinc and more than 5% tin are referred to as bronze. Samples with a combined zinc and tin content of less than 5% are referred to as copper. The remaining samples are referred to as gunmetal. Illus 22 shows the proportions of the alloy types present at Fairy Knowe (compare with illus 23 which shows the proportion of the same alloy types from a wide range of Roman period sites in northern Britain). Unleaded bronze is clearly the most abundant alloy at Fairy Knowe with only small amounts of brass and copper. This contrasts with the results for contemporary Roman sites (illus 23) which have noticeably higher proportions of unleaded brass, leaded gunmetal and leaded bronze.

The differences between Fairy Knowe and contemporary Roman sites may have a number of possible explanations. The analysed assemblage of copper-alloy artefacts from Fairy Knowe is dominated by fragments of sheet metalwork and so simple comparisons with other sites may be inappropriate. Alternatively, a large proportion of the copper-alloys from Fairy Knowe may be residual from the pre-conquest/contact period which would have no brass. The supply of copper alloys to Fairy Knowe may have been arranged along substantially different lines to those of contemporary sites in northern Britain. Each of these explanations will be explored in turn. The lack of similarities between Fairy Knowe and other contemporary sites is all the more significant as Fairy Knowe is to date the most northerly Iron Age or Roman period site to have its copper-alloy assemblage subjected to systematic study.

Influence of artefact form on alloy composition

The analysed copper-alloy samples from different Roman sites have been taken from a wide range of artefact types (Dungworth 1997a). The samples from Fairy Knowe, however, are taken

TABLE 6

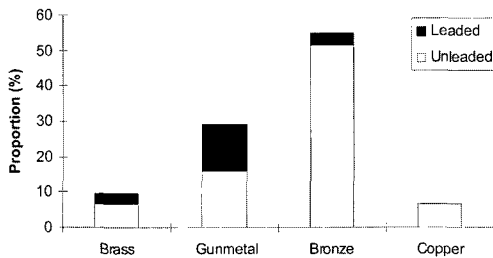
Chemical composition of a selection of copper-alloy artefacts

Sample No	Find	Area	Layer	Museum Acc No	Description	Cu	Zn	Pb	Sn	Fe	As	Sb	Ni	
015	20	54	4	A11442	Pin shank	92.6	3.4	0.53	3.1	0.38	nd	nd	nd	
004	28	54/64	3b	A11443	Handle?	86.1	4.2	3.5	5.9	0.25	nd	nd	0.10	
030	47	55	4	A11445	Penannular brooch	99.0	nd	nd	0.81	nd	0.14	nd	nd	
001	48A	55	4	A11447	Mount	86.9	7.5	0.53	4.8	0.25	nd	nd	nd	
005	50	55	4	A11448	Rectangular sheet with peripheral rivet holes and rivets	85.9	nd	0.60	13.3	0.06	nd	0.13	nd	
023	51B	55	4	A11449	Staple fragment	83.8	10.6	1.0	4.3	0.25	nd	nd	nd	
026	51C	55	4	A11449	Staple fragment	81.1	15.1	1.2	2.3	0.17	nd	0.14	nd	
024	51D	55	4	A11449	Strip	94.1	1.0	0.78	4.1	nd	nd	nd	nd	
025	51E	55	4	A11449	Fragments of strip	94.4	1.0	0.72	3.8	nd	nd	nd	nd	
013	57	55	4	A11453	Binding	85.9	nd	0.73	12.1	0.20	0.29	0.73	0.13	
019	60B	55	4i	A11455	Strip	84.9	nd	0.75	14.1	nd	nd	0.23	nd	
020	60C	55	4i	A11455	Sheet	87.3	3.2	3.5	5.9	0.18	nd	nd	nd	
002	63	64		A11456	Rod, round at thin end, rectangular at thick end	88.2	0.69	0.73	10.2	0.16	nd	nd	nd	
003	71	54	3b	A11457	Wire, rectangular in section 35 mm long	89.9	3.2	0.88	5.9	0.15	nd	nd	0.06	
018	90	55	4iii	A11459	Sheet	88.6	nd	0.48	10.0	0.08	nd	0.81	nd	
011	97	54/64	4	A11460	Strip	85.4	nd	0.25	14.0	0.05	0.10	0.16	nd	
017	100	55/65	4i/iii	A11461	Strip?	79.1	19.6	0.38	0.67	0.21	nd	nd	nd	
009	113	54/55	4	A11462	Sheet, folded at one end	86.5	0.17	0.42	12.8	0.07	nd	nd	nd	
010	118	55	4	A11463	Rectangular sheet in two fragments with one rivet hole	89.3	nd	0.27	10.0	0.13	0.20	nd	0.09	
028	120A	54/55	4	A11464	Sheet	88.8	nd	0.48	10.6	0.07	nd	nd	nd	
029	120B	54/55	4	A11464	Fragments of strip	87.3	0.29	0.28	11.8	0.09	nd	0.23	nd	
008	127	64/65	4	A11465	Rectangular sheet	86.3	nd	nd	13.7	nd	nd	nd	nd	
027	525	54	3b	A11471	Sheet	88.2	nd	0.37	11.2	0.06	nd	0.22	nd	
007	526	54/55	4	A11473	Triangular sheet	90.1	nd	0.51	9.2	0.13	nd	nd	0.06	
014	260	55	3b	A11472	Rectangular sheet with rivet hole and rivet	90.0	7.0	0.66	2.1	0.18	nd	nd	nd	
021	527	Trench A	2	A11481	Sheet	90.6	2.5	1.0	5.6	0.24	nd	nd	nd	
032	267	Trench A	2		Binding	87.6	0.39	0.57	11.1	0.05	nd	0.32	nd	
022	283	Trench A	3	A12822	Tankard handle	88.7	0.32	1.7	9.0	nd	nd	0.23	nd	
016	319	A1	3d/4	A11476	Square sheet with peripheral rivet holes	87.2	0.13	0.33	12.0	0.23	0.12	nd	nd	
031	322	A1	3d/4	A11477	Penannular brooch	76.4	22.6	0.31	0.19	0.43	nd	nd	nd	
006	385	55	F1	A12825	Triangular sheet	86.4	nd	0.22	13.4	nd	nd	nd	nd	
Minimum Detectable Level								0.10	0.15	0.10	0.04	0.10	0.10	0.05
Error (sd)								0.50	0.50	0.40	0.02	0.40	0.40	0.06

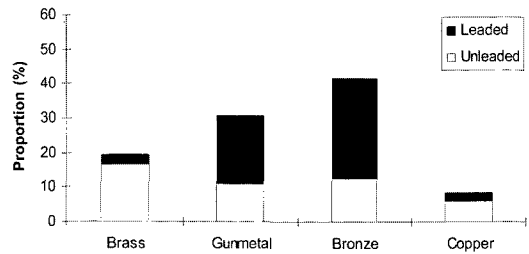
TABLE 7

Mean values for alloying elements from numerous Roman sites (data from Dungworth 1997a) and Fairy Knowe

	Zn	Pb	Sn
Roman	5.2	1.1	5.5
Fairy Knowe	2.3	0.7	9.2



ILLUS 22 Alloy types from Fairy Knowe



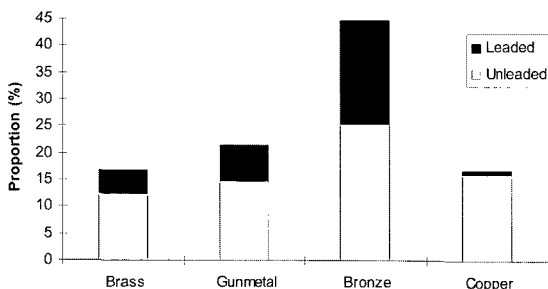
Illus 23 Alloy types from a range of Roman sites in northern Britain (data from Dungworth 1997a)

overwhelmingly from fragments of sheet (typically < 1 mm in thickness). The proportions of the eight alloy types used to manufacture 130 samples of Roman sheet metalwork are displayed in illus 24. The high proportion of sheet metalwork at Fairy Knowe almost certainly accounts for the low levels of lead in the Fairy Knowe samples. Nevertheless, it does not explain the high proportion of unleaded bronze at Fairy Knowe.

A comparison of illus 23 and 24 (ie Roman sheet metal with metalwork in general) shows that the proportions of bronze (leaded and unleaded) remains largely unchanged. There is, however, significantly greater use of copper and less use of gunmetal for Roman sheet metal. There is very little copper used at Fairy Knowe (and one of those samples is not sheet metal). It would seem, therefore, that the peculiar range of copper-alloys is not simply a product of the artefact types sampled.

Are some Fairy Knowe samples pre-Roman in date?

Previous work (Dungworth 1996) has demonstrated that copper-alloys in northern Britain before the period of Roman contact were exclusively of bronze (and usually unleaded). Brasses and gunmetals have not been recovered from securely stratified archaeological contexts in northern Britain dated to before c AD 50. The high proportion of bronzes from Fairy Knowe might therefore be residual. The analysis of copper-alloys from Broxmouth showed some typically Iron Age samples and some equally typical Roman period samples (Dungworth 1997a), which fits in with the interpretation of the occupation at that site starting in the pre-Roman Iron Age but continuing long after the Roman conquest. As there seems to be occupation at Fairy Knowe prior to c AD 50 this is an initially attractive explanation. In addition, the bronzes from Fairy Knowe are on the whole largely free of zinc (if zinc is present it was below the minimum detectable level of 0.10%). This is in contrast with most Roman samples where almost 70% of the bronzes had detectable levels of zinc (ie more than 0.10% zinc; information from Dungworth 1997a).



ILLUS 24 Proportions of alloys used to manufacture Roman sheet and strip (data from Dungworth 1997a)

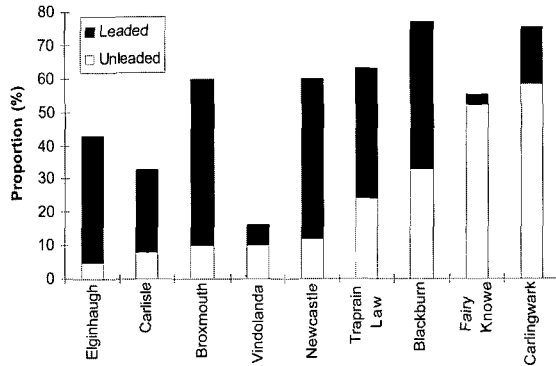
The interpretation of the Fairy Knowe bronzes as pre-Roman in date does not, however, stand up to close scrutiny, as few Fairy Knowe bronzes have any arsenic present. Iron Age bronzes from northern Britain are characterized by the presence of arsenic up to c 1% (Dungworth 1997a). Residuality cannot, therefore, explain the high proportions of bronze at Fairy Knowe.

Supply and demand or an expression of culture?

The idea that the proportions of brass amongst the copper alloys from Roman period sites in northern Britain provide information about the links to the Roman empire has been explored elsewhere (Dungworth 1997b). The very low levels of brass at Fairy Knowe are curious: they imply only limited contact with the Roman world. This cannot be explained simply as the result of the supposed 'backwardness' of such sites as other small rural sites in northern Britain of this period frequently have high proportions of brass (higher even than more Romanized sites). In addition other artefactual evidence (eg Samian) from the site indicates considerable contact. In general, there does not seem to have been any real attempt to control the supply of copper alloys from highly Romanized settlements (forts, towns, villas, etc) to less Romanized settlements within the Province or even to settlements outside the Province (although this is, to a certain extent to pre-judge the direction of any 'flow' of metal between settlements in the Roman period). There are other contemporary sites in the region (eg Traprain Law) which also have low proportions of brass, but these usually have substantial proportions of gunmetals and other alloys containing zinc. Brass and alloys containing zinc seem to have been fairly widely available in northern Britain at this time. Further south and at a slightly earlier date, brasses were widely used to manufacture items in an indigenous style, such as Piggott's Class IV swords (Dungworth 1996, 408–9) and many of the horse-trappings from the Stanwick hoard (Dungworth 1997a). Closer to Fairy Knowe, some massive armlets were manufactured from copper alloys with up to 14% zinc (Tate *et al* nd). While brasses were used to manufacture some indigenous artefacts in Scotland at this period (Dungworth 1997b; F Hunter, pers comm) they were not favoured amongst the metalworkers at Fairy Knowe.

Rather than seeing Fairy Knowe as odd because it does not conform to the Roman 'norm', however, it may be more helpful to explore the ways in which the Fairy Knowe smiths actively made choices about the alloys they used. The low proportion of brass at Fairy Knowe may be seen as simply the result of the high proportion of unleaded bronze. Fairy Knowe has the highest proportion of unleaded bronze of almost any site in northern Britain. In fact, the only other assemblage with a comparable proportion of unleaded bronze (illus 25) is the hoard from Carlingwark (probably due to the large proportion of cauldron samples — see below).

It is possible that the metalworkers at Fairy Knowe deliberately chose to use the traditional unleaded bronze over newer alloys (such as brass or gunmetal). Such an active selection of alloy types may have had nothing to do with technology or supply and demand but may have been linked to a sophisticated understanding of the cultural significance of different materials. That copper alloys can have symbolic and cosmological associations has been well established (Herbert 1984; Hosler 1994). Recent studies (Dungworth 1997b) have begun to tease such structures from data on Roman copper-alloys. The colour, luminosity and even tone of different copper alloys may have been of considerable importance. Different metals may have been seen as particularly appropriate for particular purposes. Brass may have been seen as appropriate for some uses but not for others. For example, brass was used to produce some cast objects in an indigenous style but cauldrons (such as those from Carlingwark) appear to have been made largely from the traditional tin bronze (Dungworth 1997a; P Northover, pers comm). It is possible that the



ILLUS 25 Proportion of bronze at various sites in southern Scotland/northern England

assemblage of strip and sheet bronze from Fairy Knowe includes offcuts from the manufacture of cauldrons, although sheet metal could have been used for a number of different artefacts and the assemblage also includes staples, u-sectioned binding, and fragments of wire and rod, none of which is likely to have been used in the manufacture of cauldrons.

Generalized statements about the nature of Iron Age and Roman copper alloys from Scotland are as yet still difficult to make. There are still relatively few scientific analyses and many of the objects analysed have imperfectly known provenances. Future work will hopefully examine spatial and chronological variations in copper-alloy usage, as well as the influence of cultural factors via an appreciation of depositional context and artefact typology.

CONCLUSIONS

The copper alloys from Fairy Knowe are unusual when viewed from the perspective of Roman copper metallurgy in northern Britain. Fairy Knowe seems to make considerable use of a traditional copper alloy (tin bronze) despite the availability of a new copper alloy (brass). Brass was extremely popular in England in the period immediately before and after the Roman Conquest (Dungworth 1996). Brasses and gunmetals are widely found in metalwork from southern Scotland at this period but are found in only a few samples from Fairy Knowe.

It is possible that copper alloys were carefully selected: that different alloys were viewed as symbolically different and able to communicate information about cosmologies, power and gender relations and the like (Herbert 1984; Hosler 1994). If so, then there was likely to have been selection of copper alloys in different social contexts. The apparent interest in 'Roman' copper alloys may even be seen in relation to acts of resistance to the Romans.

Clearly there is much need for further work. The analysis of the copper alloys from Fairy Knowe has produced more questions than answers. In order to fully understand the nature of alloy choice and use at Fairy Knowe, assemblages from other similar sites must be investigated.

LEAD

Fraser Hunter

CATALOGUE (ILLUS 26)

Artefacts

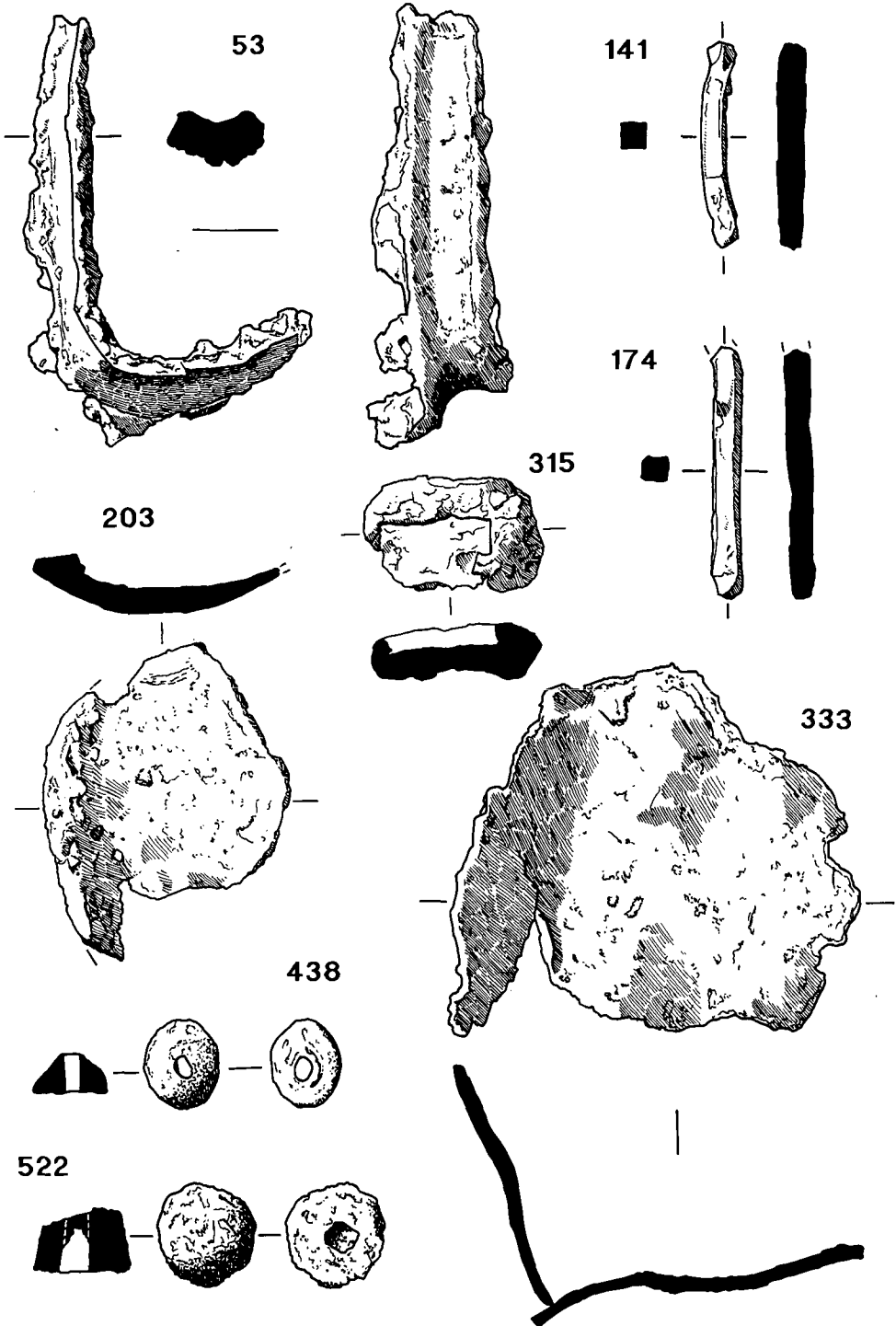
- 53 Lead strip, a shallow channel in section, curved through 90° (perhaps later damage). One long edge is original; the other is damaged, but it was clearly part of a larger item. Purpose uncertain (illus 26). L 89; W 32; T 9; m 96.9 g. 4, 54; Phase 3.

- 141 Square-sectioned bar, slightly curved. Apparently intact. Perhaps a blank for further working into an artefact (illus 26). L 44; W 5; T 5; m 10.2 g. 4, 54/55; Phase 3.
- 174 Square-sectioned bar. Perhaps a blank (illus 26). L 54; W 6; T 5; m 11.9 g. 4, 54/55; Phase 3.
- 203 Sheet fragment, curving up to a thickened, curved, flattened edge. The inside of this edge is now rather irregular due to corrosion, but the most likely explanation for such a morphology is that it derives from a shallow plate or dish-like vessel (illus 26). L 70; W 56; T 13; m 80.2 g. 3B, 55; Phase 3.
- 315 Flat sub-rectangular object, intact on three sides, with central rectangular hollow. The rim varies in thickness around this hollow (illus 26). This is an enigmatic object which is hard to parallel. Its fragmentary nature makes interpretation difficult. The hollow could be a socket to support something, although there are no remaining signs of any attachments. The shape does not resemble any typical containers. There is a parallel in an unusual Roman weight from Xanten, probably for restraint rather than measurement (Schalles & Schreiter 1993, 289, No 7). L 39; W 24; T 11; m 40.6 g. 3D/4, A3; Phase 3.
- 333 Reworked lead sheet, original edges lost, partly cut up and folded (illus 26). L 95; W 76; T (sheet) 3; m 140.1 g. 3e, A3; Phase 3.
- 438 Cone with slightly off-centre oval perforation, 3.5 mm by 4.5 mm. The morphology resembles that of a spindle whorl, but several factors mitigate against this, notably the off-centre perforation and its oval shape, which is inappropriate to accept a spindle. The flat surface suggests it is neither a bead nor a pendant, leaving a weight as the main possibility (illus 26). D 19 × 16.5; T 9; m 12.4 g. 4, A1; Phase 3.
- 522 Irregular cone, more heavily corroded than 438; indeed corrosion has blocked the top of the slightly off-centre perforation, 6.5 mm by 5.5 mm. As for 438, the balance of probability is that it is a weight (illus 26). D 22 × 21; T 13.5; m 22.0 g. 2B/3B, 64; Phase 3.
- 528 Sheet fragment, lacking original edges. Thickness varies — perhaps waste. L 38; W 25; T 5.5; m 15.0 g.

Melted pieces (not illus)

This category covers those items which have been melted and then solidified without their shape being deliberately formed. Nicholson (1997) has used the term 'nodular waste', which is an apt description of its morphology. The interpretation of this material is complicated by lead's low melting point, making it difficult to identify working debris as opposed to fire-damage. As there are no clear offcuts or ingots in the Fairy Knowe material, economy of hypothesis dictates this material is best seen as incidental molten debris rather than evidence of lead-working. While an extremely summary catalogue is more normal for such material, in this case a slightly fuller approach is preferred owing to the scarcity of lead on Iron Age sites. All items are non-specific nodular waste unless stated.

- 41 Two pieces, once joined. L 22; W 15; T 7 (largest); m 9.2 g (total). 4i/iii, 55; Phase 3.
- 140 L 32; W 13; T 6; m 10.5 g. 4, 54/55; Phase 3.
- 154 L 26; W 21; T 10; m 13.0 g. 3B/c, 64/65; Phase 3.
- 165 L 45; W 23; T 15; m 25.1 g. 3B/c, 54/55; Phase 3.
- 187 Nodular waste, flat on one side. L 18; W 14; T 6; m 3.7 g. 4, 54; Phase 3.
- 202 Four fragments. m (total) 10.8 g. Intra-mural chamber rubble, 64; Phase 3.
- 245 L 19; W 14; T 6; m 4.3 g. Intra-mural chamber rubble, 64; Phase 3.
- 303 L 39; W 27; T 15; m 51.7 g. 5(2), A1; Phase 2.
- 351 Flat on one side. L 42; W 21; T 6.5; m 14.2 g. 3D, A3; Phase 3.
- 440 Sub-rectangular, flat on one side. L 53; W 41; T 9; m 89.7 g. 4 entrance passage; Phase 3.
- 446 L 31; W 20; T 5; 13.0 g. Under large slab, entrance passage; Phase 1.
- 529 Flat on one side, charcoal in corrosion products. L 45; W 33; T 10.5; m 30.3 g.
- 530 L 52; W 23; T 12; m 23.7 g.
- 531 L 34; W 13; T 7; m 7.1 g.



ILLUS 26 Lead artefacts (scale 2:3)

- 532 Flat on one side with linear pattern suggesting it solidified on a surface of straw or similar. L 35; W 28; T 22; m 28.5 g.

Indeterminate pieces (not illus)

- 177 Flat linear piece, rounded at one end, expands towards the other, which separates into two smaller rounded terminals. Probably melted. L 43; W 27; T 7; m 28.0 g. 3B, 55; Phase 3.
- 229 Flat rounded fragment, slightly curved. Probably melted. L 25; W 20; T 8; m 8.8 g. Paving, 54/64; Phase 2.
- 338 Amorphous flat fragment, original edges largely lost. L 34; W 14; T 5; m 5.2 g. 4iii, A3; Phase 3.

DISCUSSION

Not until comments by MacKie (1982, 71) on the quantities of lead from Leckie broch was the question of lead use in the Iron Age raised seriously. MacKie astutely suggested the lead came from Roman sources, given the abundant use of lead on Roman sites compared to its general scarcity on Iron Age ones. This interesting possibility merits more detailed discussion here to contextualize the Fairy Knowe lead.

The first question is whether it is indeed lead rather than a lead alloy such as pewter (lead/tin). In Roman studies terminology has been regrettably lax, as analysis by Pollard (1985) has shown the importance of the distinction. Pewter in Britain is apparently a Roman metal, and although largely a third/fourth-century phenomenon, a recent survey shows its origins lie at least in the second century (Beagrie 1989, 175–6). Hence it is worth testing whether any of the lead is actually pewter, as a clear marker of Roman origins. Accordingly, Katherine Ercmin of the National Museums of Scotland Analytical Research Section analysed all the finds by qualitative X-ray fluorescence (XRF). Disappointingly, almost all were pure lead, throwing no light on any Roman origins. However, the principle remains valid, and an analytical study of Roman and Iron Age lead in Scotland would be a rapid and useful project. Interestingly, no silver was detected, suggesting either the use of desilvered lead or a non-argentiferous ore.

Does typology aid interpretation? While there are distinctive Roman types such as pipes, vessels and biconical and cylindrical weights (eg Frere & Wilkes 1989, 157–8; Brailsford 1951, 41–2, 62–6, fig 40), much lead from Roman sites is undiagnostic or at least little studied. None of the Fairy Knowe items is typologically clearly Roman.

Resolving this question must therefore rest on a broader examination of lead in Iron Age Scotland. Certainly pre-Roman lead is sparse: the lead stud from Howe is a definite example (Ballin Smith 1994, 216–17), and a piece from the Laws, Monifieth, may be another (Neish 1862, 445). Otherwise, a perusal of the literature and the National Museums of Scotland collections indicates an increased quantity in Roman Iron Age contexts, such as Hurly Hawkin (Taylor 1983, 231), Carlungie I (Wainwright 1963, 141), Leckie (MacKie 1982, 71) and Traprain (with 33 items in the NMS collections from this site). This appears to provide strong support for MacKie's theory, especially as most of the later sites have other artefactual evidence for Roman/native contact. We can therefore conclude that most of the lead on native sites did indeed come from the Romans, making it an important addition to our picture of Roman/native interaction.

The types represented at Fairy Knowe are of some interest, although as comparative material from Leckie is not published and the Traprain material only partly studied, detailed comparisons are not possible. Several of the pieces are enigmatic, notably 53 and 315, and the function of the bars is also unclear. The perforated cones (438, 522) have been discussed above,

where it was tentatively suggested they were weights. The general type of perforated circular objects can be paralleled at Hurly Hawkin (Taylor 1983, 231), where it was compared to Roman steelyard weights, and at Dun Mor Vaul (MacKie 1974, 132). The interpretation as weights is, however, by no means certain. Perhaps of most interest is the evidence for the use of sheet lead (333), suggesting a role as vessels or containers (cf also the likely vessel rim, 203). This is very similar to Roman uses of lead.

The subject of Iron Age and Roman lead merits further work, especially a more detailed typological study. The ultimate origin of the lead is also of considerable interest, and merits a lead isotope study given the recent work by Rohl (1996) in detailed mapping of the isotopic signatures of British ore fields. Were Scottish sources used? This is a real possibility, as it is now known they were exploited sporadically from at least the Early Bronze Age (Hunter & Davis 1994). More importantly, there is new evidence for the use of Scottish sources by the Romans. The Flavian lead ingot from Strageath, Perthshire, was considered by Gale (in Frere *et al* 1989) to match most closely the ores of northern England. However, Rohl's improved source data reopens the question: while there is overlap between ore fields, the ratios fall within the range for the Southern Uplands ores (the Leadhills/Wanlockhead sources). Such exploitation of mineral resources by the army is paralleled elsewhere in Britain (Frere 1987, 276–7). While doubt has been cast on theoretical grounds on the method's applicability to artefacts (Budd *et al* 1995), these concerns remain to be demonstrated (Tite 1996) and an isotopic study of Scottish artefactual material would be of value.

In summary, the Fairy Knowe lead is both a further index of Roman contact at the site and a pointer into a little-studied but intriguing area.

IRON

Fraser Hunter

CATALOGUE (ILLUS 27–31)

Measurements are taken from X-rays, and record the dimensions of the surviving metal core. They underestimate the original true size of the object by a few millimetres in most cases therefore, but have the great advantage of ensuring consistency within the record of the assemblage.

Ornaments

- 114 Long round-sectioned shank, probably from a pin, the head end bent through c 70° at the top and then back, where it is broken. The type cannot be securely reconstructed, although the form of the shank has similarities to the ring-headed pin series (Dunning 1934; Stead 1991, 91–2); there are a few other examples in Scotland (Piggott 1952, 122). The dating evidence has not been reviewed recently, but the type and its variants appear securely pre-Roman, dating to the last two or three centuries BC. This would be at odds with the dating of the brooch, but the possibility that it is a residual find from the round-house phase should be considered. Sadly the matter cannot be resolved given this specimen's incomplete state (illus 27). L 93; D 5. 4, 54/55; Phase 3.
- 373 Head of projecting ring-headed pin, broken at bend into shaft. For the type see Stevenson (1955, 288–90) (illus 27). Head D 18; wire D 4. 3A, A2; Phase 3.

Weapons

- 98A Spearhead with open socket 48 mm long and narrow leaf-shaped blade surviving to c 55 mm long. Heavily corroded. Socket diameter 15 mm, suggesting it could be a thrown rather than a thrusting weapon (illus 27). L 110, W (blade) 20, T (socket) 15. 4i/iii & F25, 65; Phase 3.
- 300 Spear blade fragment, lacking base of blade and socket. Elongated leaf-shaped blade with lozenge section. The fineness of the blade would be appropriate for a throwing spear (illus 27). L 86, W 23, T 4. F25, 65; Phase 2.
- 451 Knobbed ferrule, conical with a knobbed terminal. Socket D 10 mm, depth 30 mm. Most likely from the butt of a spear (cf Burley 1956, nos 410–18) (illus 27). Superficially it is similar to Roman javelin butts (Curle 1911, pl XXXVIII, 12–17), but comparison with these well-preserved Newstead examples shows the Fairy Knowe example is much more flared where the shaft enters it. However, the knobbed ferrule is very unusual in a local context, suggesting inspiration from a Roman source (W H Manning, pers comm). L 49, W 15, T 10. 4, B3; Phase 3.

Tools

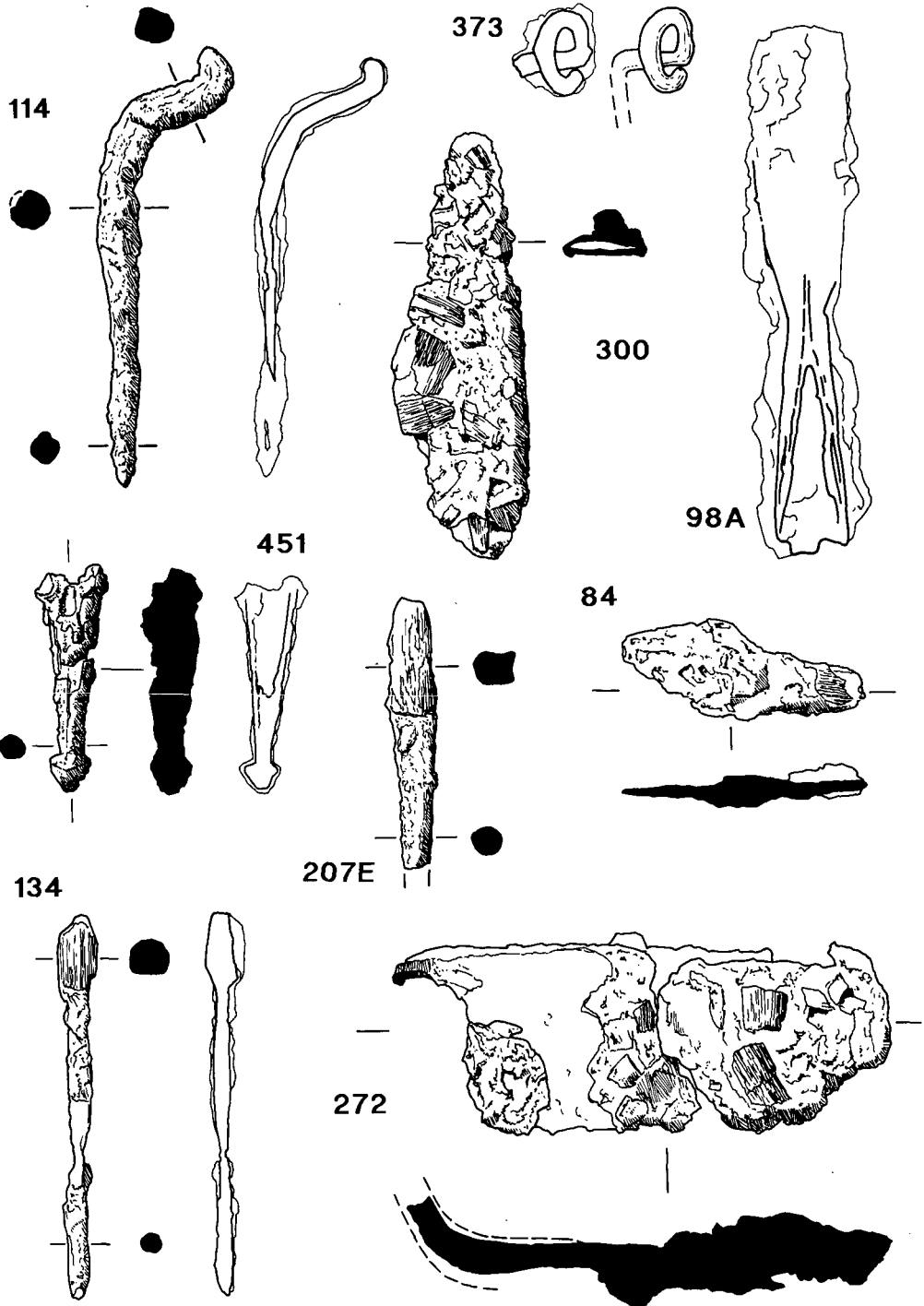
- 3 Large angled blade of uncertain use. Unfortunately this item is now in non-joining fragments, and the discussion is based largely on photographs taken at the time of excavation. This means that some details are uncertain.

This is an unusual implement, with a rectangular-sectioned tang and a blade, whose edge is angled forward of the tang and very slightly curved, forming an almost straight cutting edge. The back of the blade is strongly angled near the tang. It was described on excavation as a sickle, but it does not strictly fall into this class: sickles and reaping hooks have curved blades to gather and cut the stalks (Rees 1979, 450–1). There are knife types with forward-angled blades (Manning 1985, Q25–28), and Rees (1979, 465) discusses a diverse group of straight-bladed knives which may have been for agricultural purposes. An uncertain agricultural function is a possibility for this blade (illus 28). L (blade) 220, (tang) 90, W 43, T 6, tang section 10 by 6. 3B, 55/65; Phase 3.

- 84 Small knife blade with tapering slightly broken rectangular-sectioned tang and angular blade with humped back. The unusual shape may arise from extensive wear and resharpening. Traces of wooden handle on tang (illus 27). L 54, W 21, T 3.5. 4iii & 'F2', 55; Phase 3.
- 121 Draw-plate, in form a rectangular block tapering slightly in plan and more markedly in section, with a series of seven holes irregularly spaced along the longitudinal axis. One is very close to the narrower end, which is probably broken, and X-rays indicate the surface is badly corroded; the tapering section may be misleading (illus 29).

Draw-plates were used to make wire of gold, silver, bronze or iron by pulling a rod through a tapering hole. The most useful discussion is by Sim (1997), with British examples known in bronze from the late Bronze Age and iron examples in Roman contexts of first century AD date. Their rarity makes this find of considerable significance: Iron Age finds seem particularly unusual, although the occurrence of chain mail (eg Scott 1997; Piggott 1955, 38–40) suggests they were available. The highly corroded nature of the Fairy Knowe piece makes detailed discussion difficult: it is only on X-rays that the true character of the piece is clear, and the original form and dimensions of the holes cannot be determined with certainty. Neither are there any microscopic traces to indicate what kind of metal was being drawn, although future investigative conservation may assist here. L 58; W 19; T 15. 3c, 54/55; Phase 3.

- 134 Awl, comprising a rectangular-sectioned shank tapering to a point. The butt end is expanded and rounded off, with wood remains from the handle covering the first 14 mm, the wood grain in the same plane as the shaft. Probably for leather-working; compare Manning 1985, E9–24 (illus 27). L 82, handle D 9. 5 (on paving), 54/55; Phase 2.
- 189 Knife blade fragment, broken at both ends. Thick back, suggesting a large, heavy knife. L 34, W 23, T 6. 3B, 54; Phase 3.

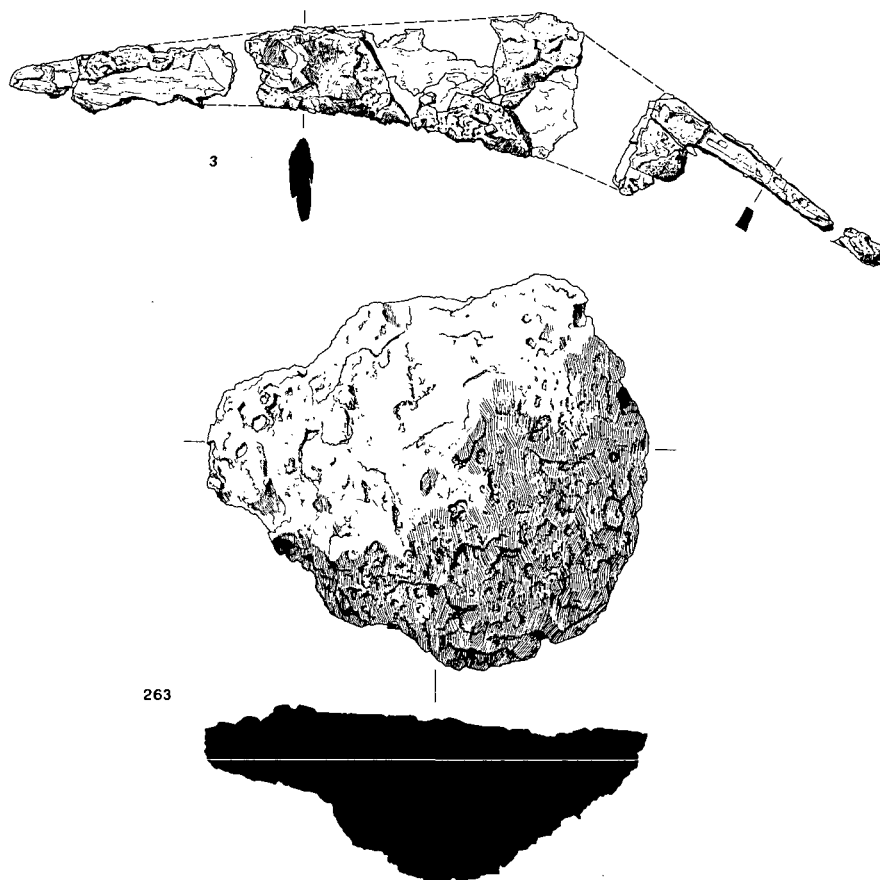


ILLUS 27 Iron ornaments and tools (scale 2:3)

- 192 Possible blade fragment, broken at both ends and completely covered in organic-rich corrosion products, obscuring surface and sections. The slightly converging edges and hints of a tapering section suggest it is a blade. L 63, W 32, T 4.5. 4, 54; Phase 3.
- 207E Broken tool, perhaps a punch: the tip is broken, preventing certain identification. Square-sectioned at one end, with remains of a wooden handle extending 25 mm down the shaft; section becomes circular and tapers towards point. The presence of a handle implies it was pushed by hand rather than struck, suggesting use on a soft material, perhaps leather (illus 27). L 57, D 9. 3B, 55; Phase 3.
- 272 Broken knife: four joining fragments form part of a bent and twisted rectangular-sectioned tang aligned with the back of a straight-backed blade. Below the tang the section runs vertically down and then curves into the blade edge. The end of the blade is lost. This would have been quite a heavy knife (illus 27). L 81; W 38; T 4 (back); tang 6 by 6.5. 3 & extra-mural 'drain', Trench A; Phase 3.
- 299 Tool fragment, comprising part of the flanges of a fairly open socket and the upper portion of a thick rectangular-sectioned head. This would be appropriate for a wide range of socketed tools: without more preserved, further identification is not possible (illus 29). L 40, W 21, T 8.5. F8, 54; Phase 2.
- 394 Pair of compasses, comprising two legs, each stepped and expanded slightly at about a third of their length, where they are riveted together. The handle portions are rectangular or sub-circular in section, and are squared off at the tip; the section of the legs changes from rectangular to circular towards the point. Much of one leg is missing (illus 29). L (leg) 100, section (below rivet) 7 by 4.5. 3D, A2/A3; Phase 3.
- 435 Chisel or punch. Square-sectioned rod, slightly tapered at butt, which is damaged, and narrowing to base; the tip is broken, but the section implies it had a narrow squared edge. A metalworking tool — the distinction between punches and fine chisels is hard to make at this size (Manning 1985, 9–10, A23–26) (illus 29). L 42, W 7.5, T 6.5. 3D, B3; Phase 3.
- 441 Broken end of a heavy parallel-sided blade, probably a small axe or an adze (illus 29). L 36, W 29, T 13.5. 3C entrance passage, Phase 3.
- 463 Probable paring chisel. Rhomboidal, with one end extended into a fine squared point (the tip lost), the other end broken. Compare Manning (1985, B26–29); the head end is relatively fine, suggesting a wood-working rather than a metal-working tool (illus 30). L 78; W 9; T 10. 4, B3; Phase 3.

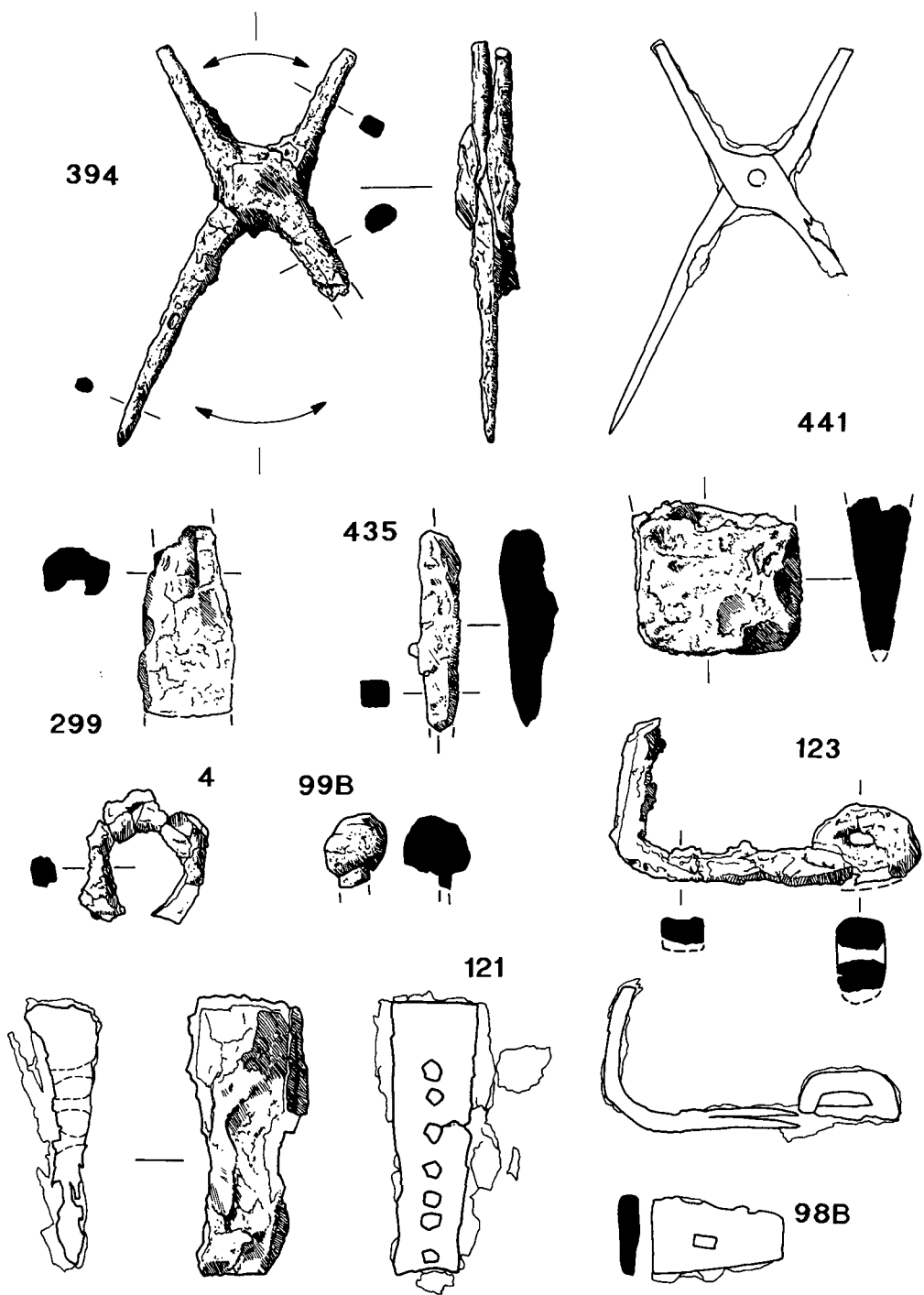
Miscellaneous

- 4 Penannular ring, square-sectioned, expanding towards terminals, which are incomplete (illus 29). D 33; section 5.5. 3B/c, 55/65; Phase 3.
- 96 Slightly curved sub-rectangular flat fragment. L 28; W 19; T 7. 4, 54, Phase 3.
- 98B Rectangular-sectioned flat rod fragment, tapering to rounded end, with rectangular perforation 5 mm by 3 mm. Function uncertain (illus 29). L 29, W 17, T 5.5. 4i/iii & F25, 65; Phase 3.
- 99B Hemispherical object with thin strip extending from underside, offset to one side. Perhaps the ornamental head of a binding strip (illus 29). H 14, D 14. 4i/iii & F25, 65; Phase 3.
- 109C Tapering circular-sectioned shank, slightly curved (illus 29). L 31; D 7.5 — 9. 4, 54/55; Phase 3.
- 123 Strip bent through 90°, with loop at one end and start of second (inwards) bend at other, broken end. Perhaps the end of a handle (cf Manning 1985, A40, O3–9) (illus 29). L 65; W 32; T 10. 4, 54/55; Phase 3.
- 132 Fragment, section tapering from rectangular to square. L 24; W 8–12; T 7. 5, 54/55; Phase 2.
- 137 Loop-ended rectangular-sectioned strip, broken at one end. Loops are found on a wide variety of ironwork, from handles to attachments (cf Manning 1985, H16–17, O3–9, R41–47) (illus 30). L 33; loop D 22; strip W 15. F25, 55/65; Phase 2.
- 157 Penannular ring with tapering rounded terminals, oval section. Rings have a diversity of uses, and no specific purpose can be suggested (illus 30). D 49 by 40 (internally 40 by 32); section 5 by 8. 3B/c, 64/65; Phase 3.
- 164 Flat bar. L 45, W 10, T 4.5. 3B/c, 64/65; Phase 3.
- 183 Ring fragment, square sectioned, estimated D 25 mm (illus 30). L 27, W 4.5, T 4. 4, 54; Phase 3.

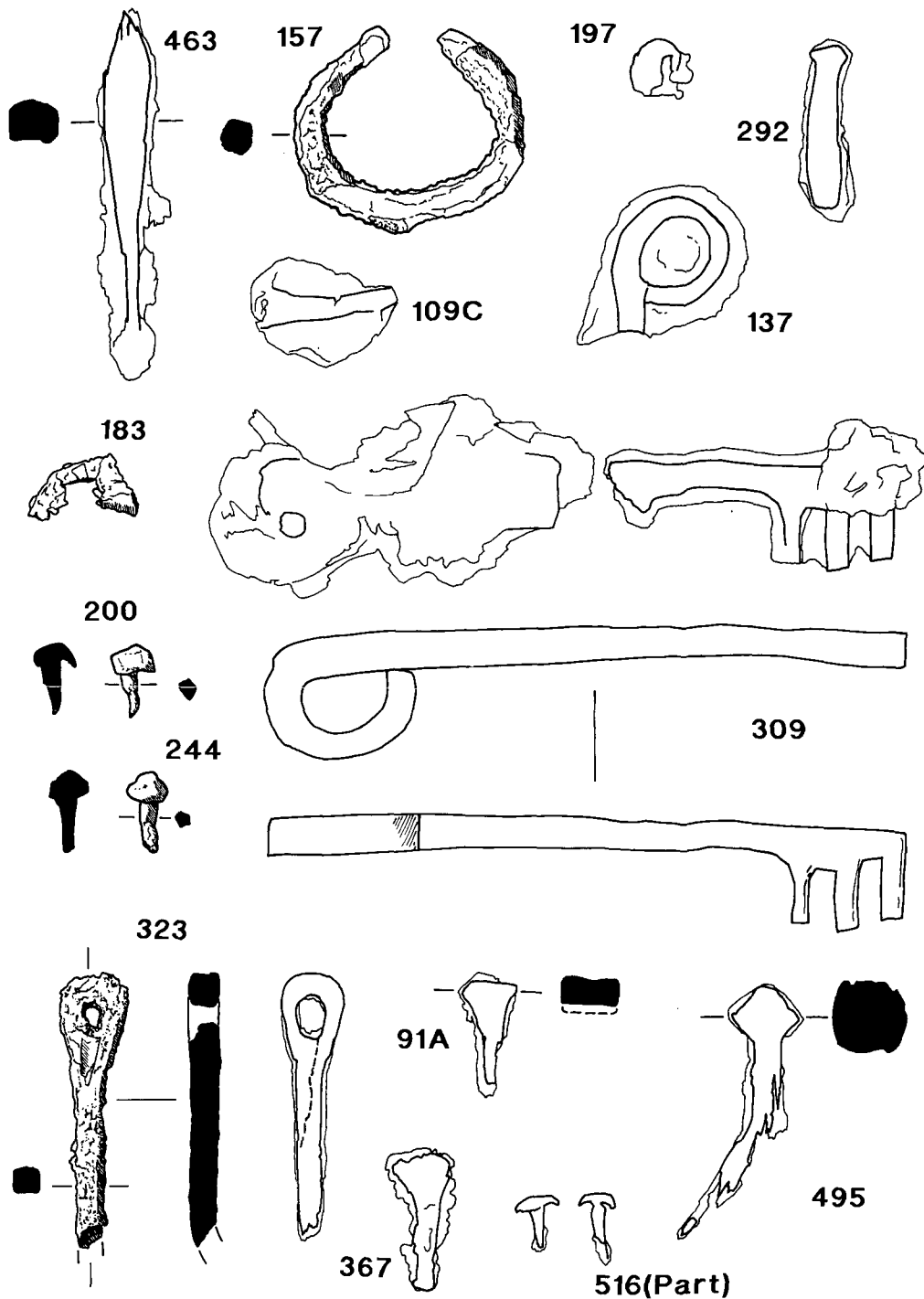


ILLUS 28 Iron blade and bloom (scale 1:3)

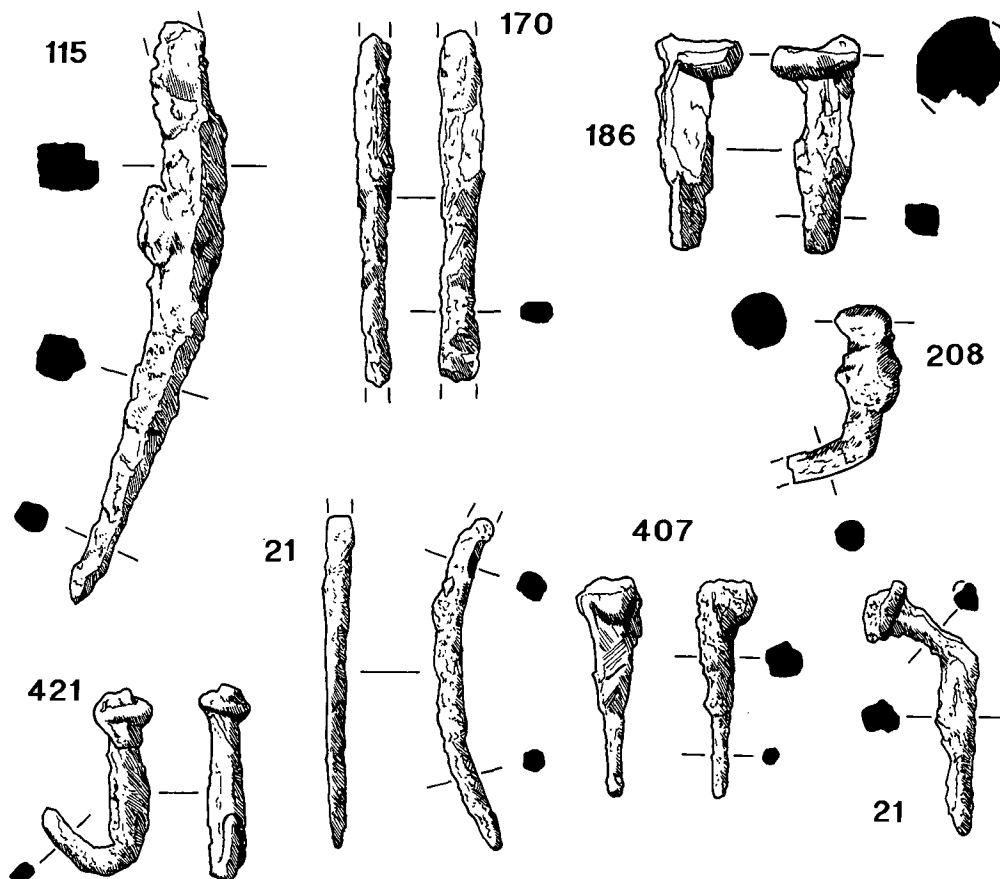
- 197 Hook fragment? Broken end of an object, curved through 180° and tapered to a point; section unclear (illus 30). L 12; W 11. Clay north of wall face, 53; Phase 2.
- 291 Tapering circular-sectioned rod. L 39; D 19. 3 & extra-mural 'drain' infill, A; Phase 3.
- 292 Broken slightly tapering rod, section unclear but possibly ovoid, expanding into an irregular terminal at end (illus 30). L 36; W 7; T 5.5. F23, 55; Phase 2.
- 309 Lift-key in two pieces, with three equally spaced rectangular-sectioned prongs, c 5 mm wide, the central slightly smaller. For the type, see Manning (1985, 90–92). The handle portion does not re-attach properly, but the fit is sufficiently close to say that it had a straight shank and a loop handle, not fully closed against the shaft, in a plane at 90° to the prongs (illus 30).
- This is the key for a simple form of lock, primarily a Roman type but with good Iron Age precursors, at least on the European mainland (Manning 1985, 90). There is a similar find in a native context from the Blackburn Mill hoard, Borders (Piggott 1955, 42), while simpler latch-lifters are known from the Carlingwark hoard and Traprain Law (Piggott 1955, 34; Cree 1924, 274, fig 19/2). L c 145; W 26 (prongs), 29 (ring); T 4 (prongs), 12 (shaft). 3e/5A, A1; Phase 2.
- 323 Looped fitting: a rectangular-sectioned shank, the end folded back on itself and welded to form a loop of internal D 8.5 by 7. The other end is lost, and its function is therefore unclear (illus 30). L 57, W (head) 14, (shank) 5.5, T 5.5. 4iii, A3; Phase 3.
- 454 Flat bar, one end curved and turned over slightly. Badly corroded. L 39, W 11, T 4.5. B1; unphased.



ILLUS 29 Iron artefacts (scale 2:3)



ILLUS 30 Iron artefacts (the dashed line on 323 indicates a weld) (scale 2:3)



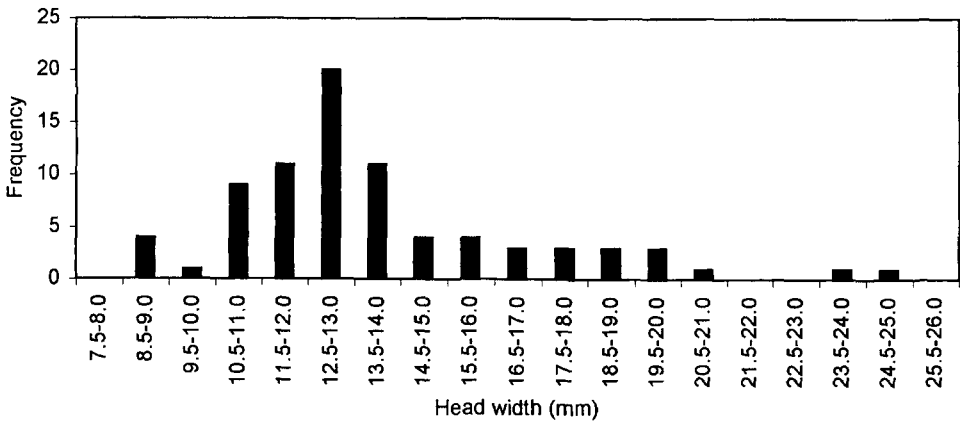
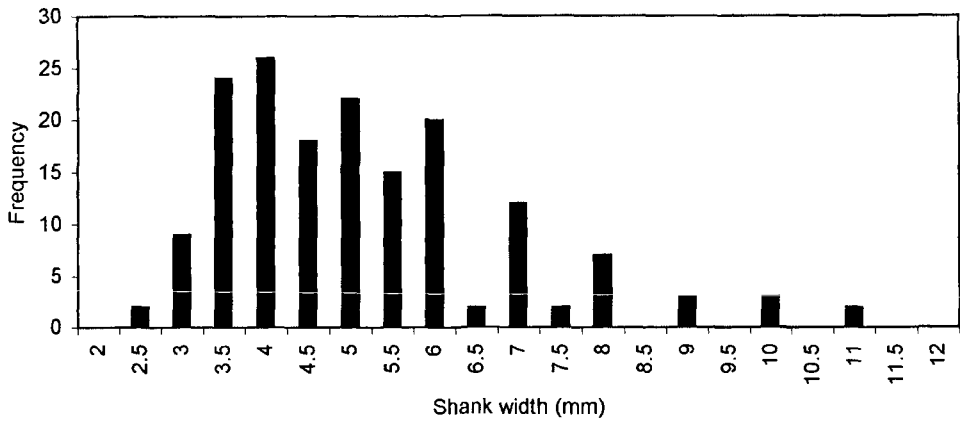
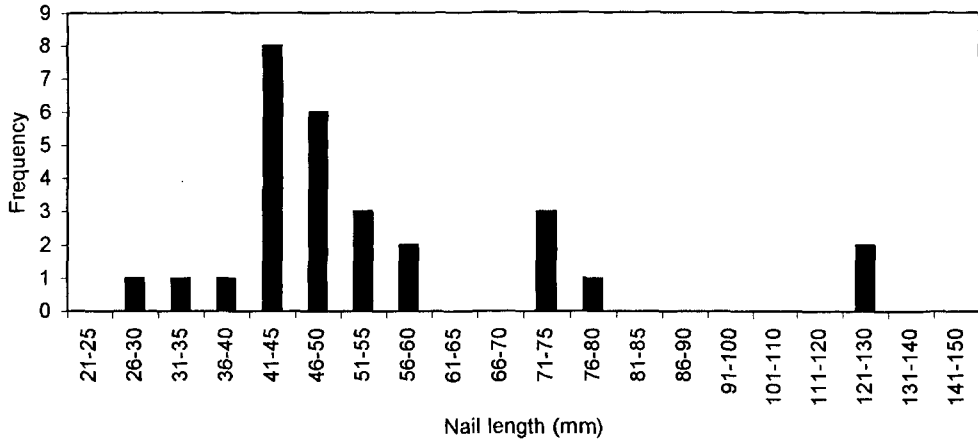
ILLUS 31 Iron nails (scale 2:3)

Nails

By far the most common iron finds from the site were nails, with 192 examples. (Square-sectioned rod fragments with no other distinguishing features were assumed to be nail fragments.) The vast majority had square-sectioned shanks and rectangular or sub-rectangular flat heads (Manning type 1B; 1985, 134). They are discussed collectively below and a selection is illustrated (illus 31). There were three other, far less common types, as catalogued here.

Tacks

- 200 Tack with slightly damaged ornamental domed head, slightly hollowed underside (illus 30). L 16; head W 10; shank W 3. 3A rubble in chamber, 64; Phase 3.
- 209 Corroded mass containing at least three tacks. L 18; head W 4; shank W 2.5 (tack dimensions). 4i/iii, 55; Phase 3.
- 244 Tack with ornamental pyramidal domed head (illus 30). L 16; head W 8; shank W 3.5. Rubble in chamber, 64; Phase 3.
- 516 Mass of corrosion containing numerous slightly domed tacks, slightly hollowed on underside (cf 200, 244), dimensions L 11, head W 9, shank W 2.5. Probably the contents of a container of tacks corroded together (illus 30). L 75; W 64; T 32. F19, 54/55; Phase 2.



ILLUS 32 Iron nails: (a) length, (b) shank width, (c) head width

Small tapering nails

- 91A Small nail, tapering smoothly from the head to the point (illus 30). L 23; head W 13. 4iii, 55; Phase 3.
 367 Small nail, tapering smoothly from the head to the point (illus 30). L 29; head W 12. 3A, A2; Phase 3.
 396 Small nail, tapering smoothly from head to point, head slightly domed. L 28; head W 12. 3D, A2/A3; Phase 3.

Large nail with ornamental head

- 495 Nail with pyramidal domed head, underside not flat but tapering into shank, fragmentary, bent (illus 30). L 58; head W 16; shank W 6. Unstratified -not certainly Iron Age?

These three types had more specialized functions: that of the tapering nails is uncertain, but the tacks are clearly for fine work, and the domed heads on several of the tacks and the large nail were for decorative effects.

The rest of the nails were measured and the results analysed to see if any groupings emerged. The lengths of the 28 intact nails are shown in illus 32. This gives a strong concentration in the 40–60 mm range, with a second lesser concentration at lengths of 70–80 mm, and two large nails c 130 mm long. The data was also analysed to investigate any correlation between overall length and either shank or head width, as this would allow the more fragmentary material to add to the picture. This showed little or no relationship at shorter lengths, but a somewhat stronger correlation at longer lengths, for the very practical reason that large nails need a larger shank for strength and a larger head for ease of use. Plots (illus 32) showed that most shanks fell in the 3–8 mm range; heads were more variable, but 10–16 mm wide was most common, although with a long ‘tail’ on the upper side. The presence in both plots of a few outliers (shanks 9–11 mm; heads c 24 mm) indicates that a few nails larger than the types represented by the intact specimens were also in use. 17.4% of the nails were bent or twisted in various ways, although whether from use or removal is unclear.

This data indicates that a range of nail sizes was used, with no particular control over length but an emphasis on the medium-length nails which could be put to a variety of uses. This pattern is seen also in Roman nails, which display an almost continuous range of sizes, though there is a strong concentration on nails in the 40–70 mm range (Manning 1985, 134).

Unidentified

A number of items were too fragmentary or too undiagnostic to be identified (58, 104, 163, 184, 205, 218, 235, 298, 345B, 372, 377, 379, 381, 382, 386, 398, 403, 427, 434, 519) but are described in the archive of the project records.

DISCUSSION

The iron assemblage from Fairy Knowe has proved to be a most important group of material. Very few Iron Age sites in Scotland have informative ironwork assemblages, with most producing only a few highly corroded fragments (Manning 1981, 56), and to date there has been no attempt to pull together what information there is: this would be very valuable, if only to highlight the gaping holes in the evidence. At the moment discussion constantly revolves around the material from Traprain (Burley 1956) and the three southern Scottish ironwork hoards (Piggott 1955). The material from Fairy Knowe greatly enhances our knowledge of iron use in the Scottish late

Iron Age; the equally rich material from Leckie broch (MacKie 1982, 71; 1989, pl 4) will be a further major advance when it is published.

The most striking and important find is the pair of compasses, 394. These must have been essential craftsman's tools, both for marking out patterns and, in softer materials, for applying decoration: for examples of their use in metal, note the Burnmouth spoons and the Balmaclellan crescentic strip; in bone, the Langbank comb; in wood, perhaps the patterns on the board from Lochlee (MacGregor 1976, nos 275, 281, 337 & 342; see also Stead 1996, 12). Yet these are, to the writer's knowledge, the only surviving Iron Age examples from Scotland, making them of considerable value (there is a Roman pair from Newstead: Curle 1911, pl LXXXII, 9). They can be paralleled by a possible example from Lough Crew, County Meath (Raftery 1983, no 596), here with the legs joined at one end rather than on the shank; this site has also produced bone combs and flakes with compass-drawn decoration (*ibid* 1983, nos 540–54, 621–780). There are also Iron Age examples from the European mainland, as in the French hoard from Celles (Guillaumet 1996, 56–7).

The other outstanding find is the draw-plate. Again these must once have been common craftsman's tools, but this is not reflected by their rarity in the archaeological record. While corrosion has inhibited a detailed study of it, it is a significant find which stresses once more the benefits of routine radiography, without which it would not have been recognized.

The other tools show a range of craft processes being carried out in and around the broch. While attributing tools to crafts can be a treacherous task, there seems to be evidence of leather-working (the awl 134), metal-working (the chisel/punch 435), and wood-working (the paring chisel 463); tools 207E and 299 cannot be identified in detail. The traces of wooden handles on 134 and 207E are rare and interesting insights into hafting methods; without these, 207E in particular, could easily have been interpreted as a metal-working tool, to be struck by a hammer. A wide range of knives is represented, from the very small example 84 to fragments of much heavier-duty knives, such as 189 and 272.

The pin head, 373, is typical for the Scottish Iron Age. Unfortunately the typology of the long pin shank 114 is uncertain, but these two ornaments reinforce the point that, although copper-alloy generally survives better, iron was also used for decorative purposes. The spearheads and ferrule again are typical: while there is no established typology of Iron Age spearheads (Stead 1991, 74–5), their slender form is readily paralleled at Traprain (Burley 1956, nos 384–98). Their size suggests they were probably throwing spears, whether for the hunt or for combat. The spear was the main weapon at the time, much more readily available than the sword, as the Danish war-booty deposits indicate (Ørsnes & Ilkjær 1993, 216). The lift key, 309, is a rarer find, although not unparalleled (see catalogue); it seems more likely to have been for a chest of valuables rather than a door key, given the scale of broch doors. There remain some puzzles, and the unusual bladed implement, 3, merits particular mention. It is clearly designed for a specific purpose, but the details evade this writer.

The study of the nails has proved of considerable interest. Nails are surprisingly rare finds on Iron Age sites. That this is not just a factor of poor preservation or selective retention may be illustrated by the results of two recent large-scale excavations in southern England: at Maiden Castle, from a total of 884 iron objects there were only 28 nails (Laws 1991), while 20 seasons of excavation at Danebury produced under 20 nails (Sellwood 1984, 370; Cunliffe & Poole 1991, microfiche). Yet nails are the single most common metal find on any Roman site (Manning 1985, 134), and were available in vast quantities to the army (cf Inchtuthil; Cleere *et al* 1962). This is not the place for a full study of the subject, but it is worthy of some comment. A survey of recent broch reports indicates that one did not need nails to build a broch: Howe has the largest

assemblage, with 30 (Ballin Smith 1994, 217–19); Hurly Hawkin produced eight (Taylor 1983, 231), Dun Mor Vaul seven (MacKie 1974, 125), Gurness two (Hedges 1987, 214–15) and Crosskirk one (Fairhurst 1984 119). They are equally sparse in crannogs (Munro 1882), and it is clear that the constructional techniques of the Iron Age used almost entirely organic materials. The only other published site in Scotland with large quantities of nails, and a range of other iron building fittings, is Traprain (Burley 1956, 215–16).

Chronology may play a part in the sparsity of nails, with increasing quantities of iron being produced only in the later part of the Iron Age, as is found also in southern England (Manning 1981, 52). The pattern of nail use at Howe confirms this, with only a single example from the last few centuries BC, the bulk being from the first century AD onwards. Yet several of the sites quoted above clearly continue into the Roman Iron Age. There seem to be two main possibilities. The first is that it is a taphonomic issue: nails would normally be recycled as a valuable raw material, and it is only in exceptional circumstances (such as destruction by fire, perhaps) that they remain in the archaeological record. The second is that they were used for specialized tasks. This calls for further study, but we may expect the picture to be a combination of the two. The general lack of metal finds on most Iron Age sites does indicate both copper-alloy and iron were extensively recycled; indeed for copper-alloys this has been demonstrated by analysis, showing remelted Roman metal was in use (Dungworth, above). Yet this cannot be the whole story. The sparsity of nails on well-preserved sites such as crannogs indicates they were alien to local building traditions, and their presence in quantities on a few sites suggests different or novel styles were in use there. What these might have been is unclear. As the building at Fairy Knowe is not noticeably different in structure from other similar buildings, it may have been the internal fittings and fixtures which employed nails. Unfortunately the intra-site distribution does not aid our interpretation greatly: not all the findspots are precisely located, and while there are concentrations to the south-west and north of the hearth, and a scatter in trench B3 outside the broch, how this should be interpreted is not clear.

We must admit with regret that the subject is far from closed. As a speculation, it is tempting to link the increasing use of nails to a familiarity with Roman building techniques; while there are no hints of Roman-style buildings in native contexts, the adoption of specific techniques is feasible. However, raw material availability must also have played a part, and details of the production of iron in the Iron Age remain frustratingly vague. Once again, the Fairy Knowe material has raised important questions which should inform further study.

PRELIMINARY METALLURGICAL ANALYSIS OF SOME IRON OBJECTS

Gerry McDonnell

Metallurgical analysis was performed on seven samples of ironwork found at the Fairy Knowe site. All of the samples analysed contained few slag inclusions, and all included low phosphoric iron. Four of the samples also contained carbon steel.

METHODS OF ANALYSIS

Thirty-five objects were available for metallurgical analysis. Routine X-radiography had already been performed on the objects after excavation but was repeated in the Bradford radiography laboratory to determine whether the amount of remaining metal in each object was still sufficient for sampling. Photographs (both colour slides and black-and-white prints) were also taken of

each of the objects to record them in their entirety before any sampling took place. On the basis of the X-rays taken at the University, seven of the objects were chosen for sampling. The remaining artefacts were believed to contain insufficient surviving metal to warrant sectioning. Samples of metal were taken using a jeweller's piercing saw and a hand-held rotary drill with cutting disc attachments. The samples were mounted in conducting bakelite, then ground and polished by hand. One micron diamond polish was used for the final polishing. The samples were examined in the polished state under a metallurgical microscope to determine the extent of any slag inclusions. Etching with 2–4% Nital revealed a variety of grain microstructures. Vickers hardness values are given for some of the structures (indicated by Hv; load 1 kg).

The seven samples are identified below by their finds number and original X-ray number.

OBJECT ANALYSES

Nail Finds no: 109A; X-ray no: 831936. The total length of this nail before sampling was 76 mm. The flat, rounded head was 19 mm in diameter; the stem measured 6 mm in width. The sample was taken from the end of the stem and mounted longitudinally. The metal was very clean with few slag inclusions present in the unetched condition. The small inclusions that were present were distributed throughout the sample. Etching revealed relatively large and uniform grains of ferrite (astm grain size 3; Hv = 140) with a small amount of phosphorus present as indicated by very faint ghost phases.

Nail Finds no: 287; X-ray no: 831950. This nail was 128 mm long before sampling. The head of this nail was also flat and rounded, and measured 18 mm in diameter. The stem was 6 mm wide. The nail was sampled by removing a section from a point about one-quarter of the distance from the end of the stem, since from the X-ray there appeared not to be a sufficient amount of metal remaining near that end of the object. This sample was then divided again so that both a longitudinal and a cross-section could be mounted. A few slag stringers were visible in the unetched condition. Etching showed a variety of grain sizes and structures, from phosphoric iron, to ferrite with grain boundary pearlite, to Widmanstätten ferrite. Although the carbon content ranged from about 0.5–0.7%, this does not necessarily imply that this object was deliberately carburized. The sample is heterogeneous in content with the carbon distributed fairly randomly throughout. Hardness values ranged from an average of 225 Hv in the higher carbon areas to 142 Hv in the lower carbon areas.

Nail Finds no: 270; X-ray no: 831949. Before sampling this nail was 50 mm long. The flat rounded head measured 13 mm in diameter, and the stem was 5 mm wide. The sample was removed from the end of the stem and divided again to mount both longitudinally and in cross-section. Virtually no slag inclusions were present in the unetched condition. Etching revealed varying sizes of ferritic grains (the majority were ASTM grain size 3) along with a small amount of phosphorus. There was a very slight amount of carbon along one edge in the cross section, and there were also a few Neumann bands present. These are usually signs of cold-working, but they are very few, and there is no deformation of the grains in which they appear, which is usually indicative of cold-working. This object was more likely hot-worked, and the Neumann bands are probably the result of some other type of shock.

Blade end Finds no: 441; X-ray no: 3721. The dimensions of this wedge-shaped object before sampling were 36 mm by 33 mm; the thickness ranged from 13 mm to 7 mm. One of the corners from the thickest part of this wedge was removed to ensure a sufficient amount of metal for analysis; the sample was divided again into two for mounting in two directions. A few slag stringers were visible in the unetched condition. The etched condition showed very small, uniform grains of low phosphoric iron with grain boundary pearlite

present throughout (about 0.3% carbon). The size and shape of the grains would indicate that no attempt was made at quenching the object although the edge itself was not analysed.

Looped fitting Finds no: 323; X-ray no: 831953. This object was 59 mm long before sampling; the looped end measured 14 mm at its widest point, and the stem was 5 mm wide. The section, taken from the broken end, revealed only a few fine lines of slag stringers in the unetched condition. Etching showed that this object had been annealed; spheroidized cementite, as well as carbide particles remaining intact in some corroded areas, can be seen throughout the sample. This object would originally have had a high amount of carbon (0.5–0.7%), but had been heated for a long period above about 300°C. There is a band of ferrite along one edge, which would imply that this object had been deliberately manufactured. The average hardness value was 172 Hv.

?Nail shank Finds no: 179; X-ray no: 3711. Before sampling this bar was 55 mm long and 10 mm wide. The sample was taken from the thicker end to ensure a sufficient amount of metal for analysis. In the unetched condition, small slag inclusions, similar in size to those in nail 109A, were distributed throughout the sample. Fairly large and uniform phosphoric iron grains were present in the etched condition.

Fragment of socket and head of tool Finds no: 299; X-ray no: 831980. This object was 45 mm long and 21 mm wide before sampling. As with blade 441, a section was removed from a corner that contained a sufficient amount of metal. Thin lines of slag stringers were present in the unetched condition. Etching revealed two distinct areas: phosphoric iron and grain boundary pearlite were visible in half of the section, while the other half showed a very fine pearlitic structure with Widmanstätten ferrite, indicating a relatively quick cooling rate. A few quench cracks are also visible.

DISCUSSION

The metallographic analysis demonstrates that the Fairy Knowe iron was manufactured from different alloys. The most striking aspect of most of the samples is the cleanness of the iron (ie the low volume fraction of slag present in the samples). Slag inclusions become entrapped in the iron from two sources. Firstly, there are small inclusions that derive from the smelting process, and are effectively inclusions of the smelting slag. The second, and larger source is the inclusions trapped in the iron during the bloom forging and subsequent smithing of the artefact. The cleanness of this iron suggests that, first, the smiths were using a very efficient smelting technology; and second, that there was minimum smithing carried out on the artefacts, so that the quantity of smithing slag generated was minimal.

The nails were manufactured from heterogeneous iron of good quality. There was no attempt to use either steel or the poorest-quality iron (high slag content).

The looped fitting had the potential to be an excellent tool. It had a high carbon content that would have had the potential to be heat treated. The presence of a spheroidized structure indicates prolonged heating of the iron, probably accidentally. Spheroidized structures are rare in the archaeological record.

Tool 299 was deliberately manufactured from two types of iron: ferritic/phosphoric iron and steel.

In conclusion, the Fairy Knowe iron is manufactured from good-quality metal. There is evidence for the use of ferritic iron, phosphoric iron and steel. This indicates a sophisticated level of ironworking technology.

IRONWORKING DEBRIS

Michael Spearman & Fraser Hunter

A small quantity of ironworking debris was recovered, largely from the area outside the broch. (Liz Slater, see below, records material from within the broch.) It comprises smelted blooms (263–5) and the slag from their refining into billets for artefact manufacture. While the smelting itself would presumably take place near the ore sources (most likely bog ore on nearby moorland), the blooms would be brought to the site for refining. This evidence points to such activity taking place immediately outside the broch, in the area of the ‘drain’.

CATALOGUE (ILLUS 28)

- 262 Bloomworking slag. m 328.1 g. Extra-mural ‘drain’, 3, Trench A; Phase 3.
- 263 Plano-convex bloom from furnace base (illus 28). L 170, W 150, T 65, m 1860 g. 2 above extra-mural ‘drain’, Trench A; Phase 4 .
- 264 Shattered iron-rich plano-convex bloom. 350 g. 2 above extra-mural ‘drain’, Trench A; Phase 4.
- 265 Plano-convex bloom fragment, perhaps broken to assess quality. L 80, W 50, T 44, m 270 g. 3 & extra-mural ‘drain’, Trench A; Phase 3.
- 281 Bloomworking slag. m 10.5 g. 3 & extra-mural ‘drain’ infill, Trench A; Phase 3.
- 533 Bloomworking slag. m 330 g. F1, 55; Phase 2.

METALWORKING DEBRIS WITHIN THE BROCH

Liz Slater

An examination of material from inside the broch indicated that six main types of material are represented in the samples analysed.

- 1 Cinder: defined as very light weight, extremely friable, porous material, often light in colour and in small pieces. This is the residue typical of domestic fires.
- 2 Clinker: hard, porous material. Similar in appearance to cinder but harder and less friable. Clinker produced in modern furnaces is often the non-molten residues of coal ie coal with the organic component burnt out and only the lithic component remaining. Here it is taken to be the residues from low temperature, domestic fires.
- 3 Vitrified stone: this is in two main forms (i) fused masses of stone with very little of the original form of the stones remaining, often seen in the walls of vitrified forts and also within natural blocks of igneous rock; this could either be natural or the result of the lithics being heated together in contact with wood ash or other forms of flux; (ii) lithics with reddening or porosity showing the effects of heat but with only one face or edge showing any fluxing down or melting; the context is important for interpretation because hearth stones, rims of crucibles and so forth can show this type of effect with general heating over the whole piece but melting/fluxing only in the portion of the object that comes into contact with a flux.

The term ‘vitrified’ is somewhat of a misnomer for the material here because none of the samples shows an actual vitreous or glassy phase; all are ‘heated’ stones that show different degrees of coloration, porosity, and/or melting due to heat.

- 4 Iron concretions: either the corroded remains of iron objects or iron pans formed via the deposition of iron compounds from an iron-rich environment.
- 5 Iron silicates/slugs.
- 6 Natural stones.

All samples were examined visually, under a x20 optical microscope, and tested with a magnet for the presence of metallic iron, metallic nickel or magnetic compounds of iron (magnetite, Fe_3O_4 , being the main possibility in this context). Pieces were removed for X-ray diffraction analysis from all samples except cinder, clinker and pieces of corroded iron. The aim was not to identify the compounds present, which can be difficult and complex for this type of material, but to check for the presence of certain forms of iron silicates (fayalites), iron oxides and so forth that may indicate iron slags.

SUMMARY

The material from the two main contexts — broch floor (Phase 2) and broch destruction layer (Phase 3) — is different. The broch floor material is primarily cinder and vitrified stone as well as iron concretions and clay. The cinder indicates heating/fires and most of the 'vitrified stones' show heating on one surface or face, indicating that they have been heated in that area alone. If they were structural stones, such as hearth stones, and are in their original positions, they should obviously come from contexts rich in ash or charcoal. The material from the broch destruction layer is far richer in iron. Here are corroded iron objects, iron concretions, cinder and a little iron slag; these very much less vitrified stone and this is more massive (eg 124) and could well be natural. Evidence indicates ironworking but not iron smelting.

INDUSTRIAL FIRED CLAY OBJECTS

Steven Willis

A small number of ceramic items was recovered which were evidently associated with industrial activity. They consist of parts of two crucibles, 10 fragments which appear to come from metal casting moulds (the more diagnostic pieces of which are numbered for convenience), a cracked and vitrified object and two fragments from ring-shaped artefacts of uncertain function but perhaps 'industrial furniture'.

X-ray fluorescence examination was kindly undertaken on several items by David Dungworth and Phillip Clogg at the Department of Archaeology, University of Durham. Surfaces were analysed to detect metal traces to give some indication of metals being used. In the case of the fragments from moulds this analysis might help in establishing whether the moulds had been used, for macroscopically and under the microscope these fragments appear very 'clean'. Many of the mould fragments from Jarlshof (Curle 1934, 278) come from moulds which had not been used. The results of this work are included in a separate report at the end of this section.

CRUCIBLES (ILLUS 33 & 34)

72 Crucible. This is a large crucible represented by 14 fragments weighing c 260 g. It is around 105 mm in diameter with about 75% of the rim present. This vessel is exceptional amongst the site material in that such a large proportion was recovered. Vitrification has occurred on the rim and interior and exterior surfaces on one side, opposite the spout. Within this vitrification a globule of green oxidizing non-ferruginous metal residue is visible, trapped in the interior vitrification. This vessel had one spout, evidently simply formed, now missing. This had been fashioned at the leather hard stage by indenting either side of the intended position of the spout, which was then pinched outwards.

The fabric is part oxidized, ranging from light grey to light brown. It has the matt biscuity appearance typical of ceramic crucibles of this period. It is hard with somewhat irregular hackly fractures. Surfaces, particularly the exterior, have been smoothed. The clay matrix has been tempered with well-sorted coarse rock fragments (up to 2 mm in longest dimension) in moderate frequency. These are sub-angular to sub-rounded and appear dark grey. Fracture lines indicate the coil construction method (illus 33).

The crucible's capacity (to the rim) is c 220 cm³, equivalent to a charge of around 1.5 kg of copper alloy. Such a quantity would be appropriate for the casting of large pieces of metalwork such as armlets and torcs. Crucibles of this size are rare although there is a parallel from Fisher's Row East, Port Seton (C Haselgrove, pers comm). m 260 g. 3B, 64; Phase 3.

- 277 Crucible rim fragment with tapering rim. The fabric is fairly soft and in parts is oxidized to a pale yellowish-brown. Well-sorted fine quartz grains occur in moderate frequency, probably representing a temper. This item has been hand fashioned and both its form and fabric suggest that it is from a crucible. There are no surface deposits nor vitrification (illus 34). m 4 g. 3 & extra-mural 'drain', Trench A; Phase 3.

MOULD FRAGMENTS (ILLUS 34)

Numbers 42A, 62, 256A, 470, 498 and 500 (illus 34) all come from two-piece moulds in a characteristically similar fabric and were presumably for use in the casting of copper-alloy objects. They are represented only by fragments which limits identification. Here the convention adopted by Close-Brooks (1987a; 1987b) for c eighth century AD moulds from Clatchard Craig, Fife, and those from the broch of Gurness, is followed in referring to the mould halves as valves (see also Curle 1934, 278–83). She was able to distinguish front and back valves which consistently related to keys and sockets on the moulds, front halves having projecting keys and back halves possessing matching sockets. A similar keying technique is apparent with the Fairy Knowe pieces with 498 (illus 34) displaying a projecting key and 42A (illus 34) two sockets on either side of a pouring gate. (In fact the key of 498 fits the socket of 42A although they are not from the same mould.) The Fairy Knowe pieces are too few and fragmentary to establish whether there is a correlation between projecting keys and the front of cast objects and sockets and backs. Nor is it clear what was being cast. In addition to the more diagnostic pieces there are several fragments which appear to come from the moulds or similar items. These are 42B, 249, 250 and 502.

Moulds 2, 3, 4, and fragments 42B, 249, and 250 occur in an essentially pink-buff fabric which appears to be a prepared clay. It is fairly soft with a smooth slightly powdery feel and irregular fractures. The fabric matrix is fine being essentially free of coarse inclusions; very fine mica plates are frequent. The fabric of Mould 1 is closely similar differing only in so far as the interiors and cores of the fragments are unoxidized mid to light grey, while the exterior surface is light red. The fabric of 502 is coarser, containing rock fragments (c 2 mm) in rare frequency. With the exception of 62 and 42A both the fragments and their mouldings are not finely fashioned.

A large proportion of the fragments was recovered from the black soil layer (Layer 4).

Measurements

- 42A One fragment, m 13 g; 9 mm thick; longest dimension 61 mm
 42B One fragment, m 2 g; 1–6 mm thick; longest dimension 22 mm
 62 One fragment, m 13 g; 0–16 mm thick; longest dimension 47 mm
 249 One fragment, m 2 g; 1.5–9 mm thick; longest dimension 23 mm
 250 One fragment, m 2 g; 0–9 mm thick; longest dimension 22 mm
 256A One fragment, m 13 g; 8–12 mm thick; longest dimension 42 mm

- 470 One fragment, m 22 g; 10–19 mm thick; longest dimension 54 mm
 498 One fragment, m 14 g; 0–8 mm thick; longest dimension 53 mm
 500 One fragment, m 13 g; 9–18 mm thick; longest dimension 41 mm
 502 One fragment, m 10 g; c 13 mm thick; longest dimension 38 mm

Mould 1 Fragments 256A, 470 & 500 (illus 34). Three fragments (48 g) from the same object, likely to be a mould. 256A was recovered from Layer 3B, area 64; 470 came from Layer 3C/4, area B3; and 500, from Layer 4, area 55. All three contexts are of Phase 3. 256A and 470 adjoin forming a section of a mould valve. They suggest that the fragments come from a quite roughly fashioned mould for a tapering artefact of some length, perhaps a bar or blade. The edges for the casting on either side are straight and regular but the surface for the width is somewhat uneven. 500 is evidently a casting gate. No residue is evident.

Mould 2 Fragment 62 (illus 34). This is a valve end with an apparent pouring gate. No residues are visible. m 13 g. Rubble in intra-mural chamber, 64; Phase 3.

Mould 3 Fragment 42A (illus 34). This is a mould fragment for an object of uncertain form with a casting gate and lead, either side of which are keying sockets. The mould is approximately concave and slightly uneven. No residues are visible. The core and exterior surface are pink and the interior surface is light grey. m 13 g. 4, 55; Phase 3.

Mould 4 Fragment 498 (illus 34). This piece is also a mould valve fragment, though for an object of indeterminate form. A part of the pouring gate appears to be represented, adjacent to a projecting key. This piece is fairly flat with a seemingly irregular fashioned moulding. The interior surface has two faint concave oval impressions, presumably deliberate mouldings rather than finger pad impressions. m 14 g. 4, 55; Phase 3.

Other fragments seemingly from moulds

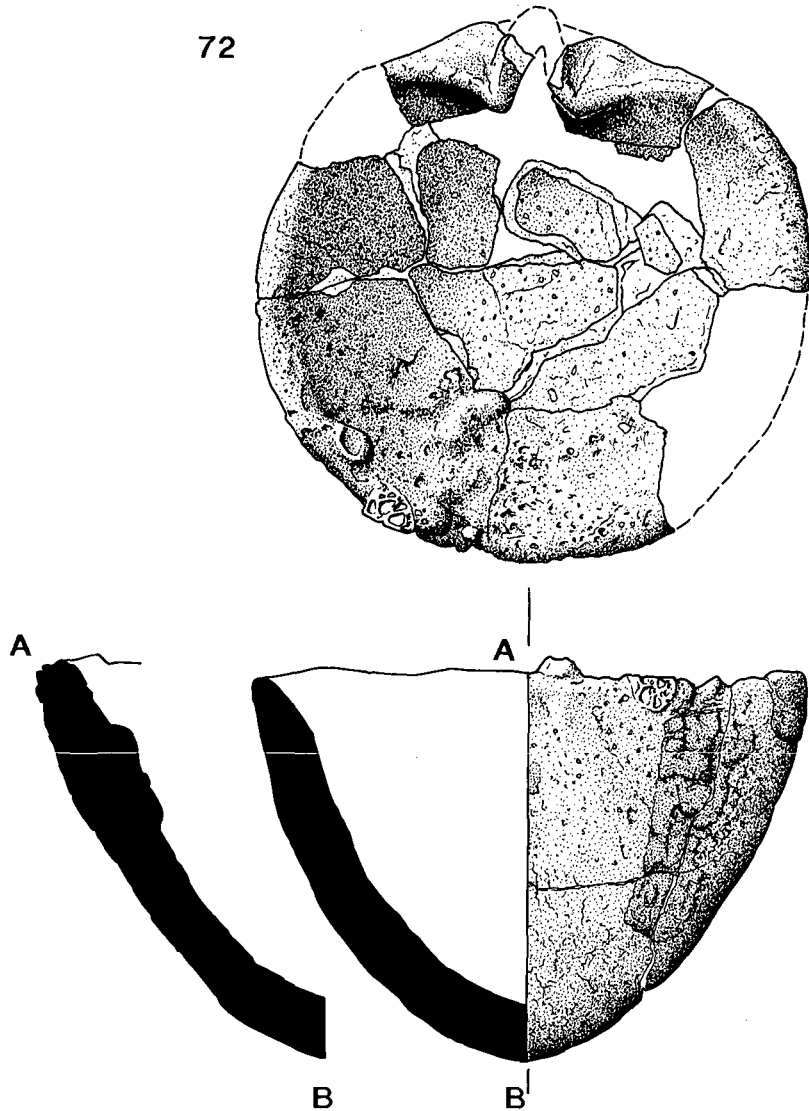
Of the remaining items in this category 42B, from Layer 4, area 55, Phase 3 (illus 34) (2 g) appears to be part of the lip and neck of a funnel or mould gate. 249 (2 g) and 250 (2 g), recovered from the chamber, area 64 (Phase 2), are both of irregular tapering form, flat on one side, possibly vestiges of splayed mould base or foot. They could be from the same object, though not necessarily.

Finally 502, from Layer 4, area 55, Phase 3 (10 g), is a crudely shaped amorphous fragment with a curving original exterior surface. It probably has an extant area of an original interior surface; it is possibly from a mould.

Fragments from ring-shaped objects (illus 34)

Both 497 & 501 come from the black soil layer (Layer 4, area 55, Phase 3) and weigh 9 g and 6 g respectively. Although from the same context and of similar form and fabric these two pieces are probably from different objects, the function of which is unclear. Rather than deriving from moulds it is more likely that they represent industrial furniture, perhaps dividers.

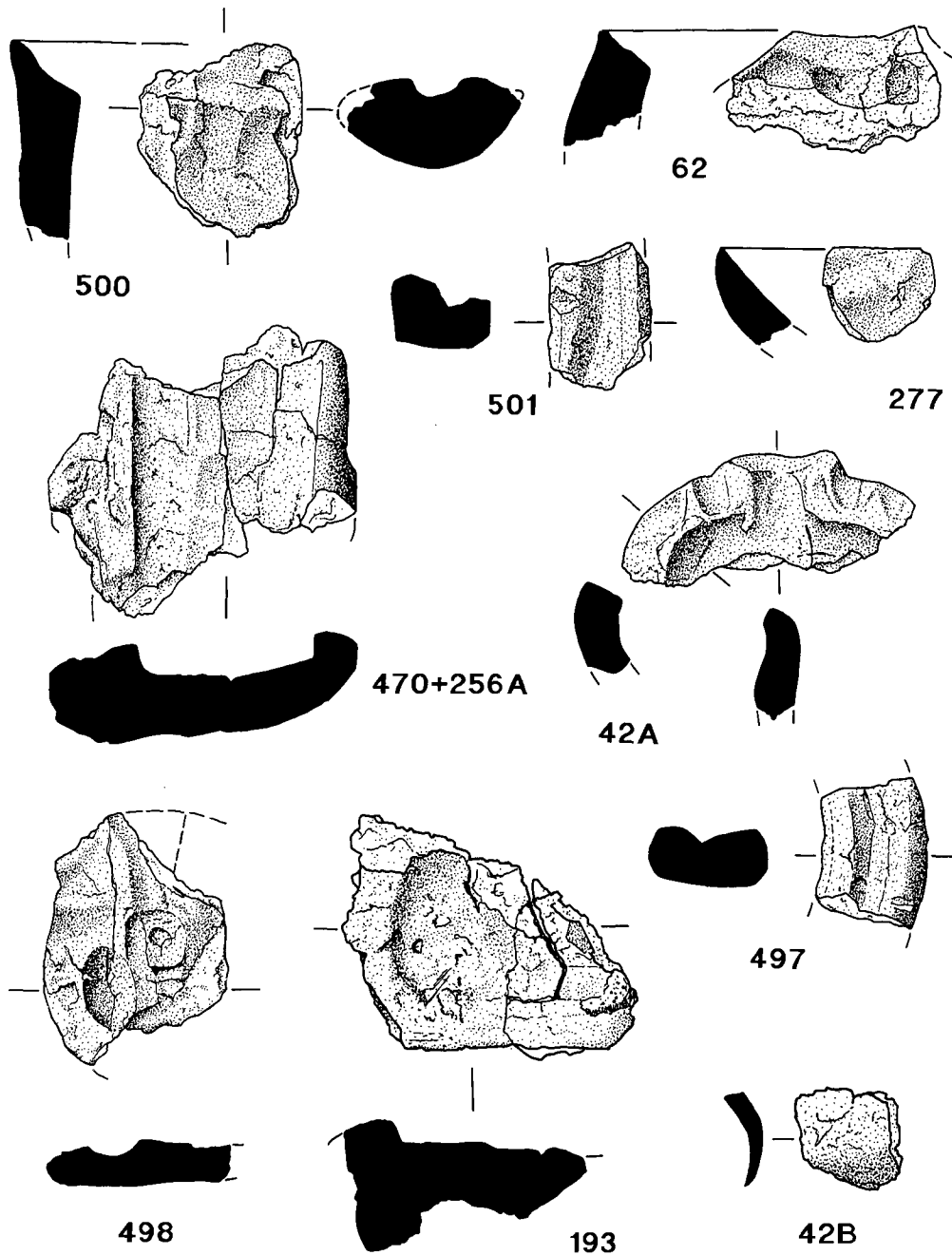
Assuming 497 was circular, its outer diameter was approximately 110 mm; c 9% of the circumference is represented. The edges are rounded and both of the broader faces feel smooth. As illus 34 shows, one side has a crudely fashioned channel. It is possible that this is a mould for a



ILLUS 33 Crucible 72 (scale 2:3)

circular object, c 95 mm in diameter but the irregular nature of the channel argues against this, even allowing for 'rough casting'.

Assuming 501 is from a circular object its outer diameter, will also have been c 110 mm; c 7% of the circumference is represented. The surfaces of 501 are also smooth. The channel on 501 is much broader than with 497 and again irregular. Both items are partially oxidized but generally grey-brown. They have been made from a prepared clay free of inclusions, apart from very fine mica. Hence they are characteristically similar in fabric to 256A etc.



ILLUS 34 Industrial ceramics (scale 2:3)

Objects of uncertain function

Amongst the ceramic material from the site are a number of characteristically similar fragments which have been exposed to abnormally high temperature indicative of industrial activity. This material amounts to 25 pieces weighing 219 g; all come from Phase 3 contexts (for details see archived catalogue). Several pieces lack any original surfaces; where original surfaces survive some have been vitrified, while others display a smoothed surface. As McDonnell (1987) has noted, the high temperature required to produce vitrification normally excludes domestic hearths as sources of such material. The fabric is variably oxidized and where oxidized is red or purple. It is of variable hardness, being hard in parts and therefore harder than other items of fired clay from the site. Fractures are extremely hackly and irregular. The fabric contains few inclusions; small stone fragments occur but are rare as are clay pellets. This would appear to represent a prepared clay.

Although they come from several contexts and are highly fragmentary there is a high probability that the fragments originate from one or possibly two objects; they may come from items subject to similar processes. Quite what object/s are represented, however, is unclear. By appearance the material can be subdivided into two groups.

The first group comprises 138B, 193A & B, 256B, 480, 510B, 511 and 513, of which only the largest fragment of 193 is illustrated (illus 34). This comes from the broch floor (Layer 4/5, area 54/55). This item is of irregular form and is unlikely to be from a mould. The surface of its 'rim' is noticeably smooth which suggests that it may have been pressed against another object. Its general form suggests a shallow 'reservoir' and it may be an example of a so-called 'heating tray' (Bayley 1982, 492). XRF analysis of the surface revealed a high tin content.

The second group consists of 499 and Museum Accession A12821A & B (a total of three fragments, 53 g). Unlike the other fragments these pieces all display a convex original outer surface; no other original surfaces survive. The outer surface of 499 is approximately a quarter-round. If it derives from an object round in section, its diameter would be c 65 mm. Its surface shows some vitrification. It is possible that these three pieces are associated with the other finds as they are in other ways closely similar. It is also possible that A12821A and B and 499 are from a tubular or funnel-shaped object, possibly a bellows guard.

EDXRF ANALYSIS OF CRUCIBLE AND MOULD FRAGMENTS

David Dungworth

Ten possible mould fragments and a crucible fragment 277 were submitted for EDXRF analysis: reconstruction of crucible 72 made access to the interior for analysis tricky. Each sample was analysed at 50 keV with no vacuum and the heights of diagnostic peaks were assessed visually. No attempt was made to quantify the results (for the reasons discussed below). The results are tabulated showing three levels of presence (x, xx, and xxx).

This method can identify different metals which have diffused into the crucible or mould fabric during the melting and casting of the metal. Analysis under these circumstances cannot, however, give a quantitative assay of the composition of the metal melted as the various metals behave differently. Some metals are extremely volatile when the alloy is molten (eg zinc and arsenic) and some metals diffuse more easily into crucible fabrics than others (eg zinc). In the Roman period, for example, almost all crucible fragments contain some zinc even though the alloy melted may have contained very low levels of zinc (Bayley 1988; Barnes nd). This is seen clearly in Table 8 (above) where higher levels of zinc are recorded for the crucible fabric than the

TABLE 8

Qualitative EDXRF analysis of mould and crucible fragments

Find No	Cu	Zn	Pb	Sn
470	x	xx	xx	x
256a		xx		
500		xx		
501	xx	xx	xx	x
497	xx	xx	xxx	xxx
42A	x	xxx	x	xx
42B	x			
62	x	xxx	x	x
498	x	x	x	xx
193	x	x		xx
Crucible 277 (slag dribble)	xx	x	x	xxx
Crucible (fabric)	xx	xx	x	xx

crucible slag. Determination of the composition of the alloy melted will be further complicated if the crucible was used to melt a range of alloys of different compositions.

Nevertheless the presence or absence of different metals in the crucibles can be noted. As copper alloys of the pre-Roman Iron Age are almost exclusively tin bronzes (Dungworth 1996) zinc should not be detected in any Iron Age crucibles. The only specimen with no zinc (42B) has almost no non-ferrous metals detectable and may never have been used as a mould. All the others have at least some zinc, although this is frequently at lower levels than encountered in many crucibles from Roman Britain. This may indicate that the alloys being melted and cast at Fairy Knowe were bronzes rather than brasses. Significant levels of lead and tin are encountered in most of the specimens. This picture of a largely bronze-working tradition is reinforced by the results of the analysis of the copper-alloy artefacts.

STONE

Ann Clarke

There are 50 objects of stone and three flint flakes (Table 9). The assemblage is diverse in character and it includes, amongst others, processing implements such as cobble tools and rotary querns as well as artefacts which functioned as weights, spindle whorls and bowls, lamps or mortars. There is also a small but significant collection of decorative or finely made pieces, a few of which were most probably for personal adornment.

CATALOGUE

Perforated weights and whorls (illus 35)

- 1 Weight. Felsite pebble, flattish in section, broken down length through perforation, burnt. Perforation formed by pecking from both faces. Some pecking over one face and on opposite face there is a pecked hollow placed at one end and on other end a localized area of pecking as if for a hollow (illus 35). L 117; T 29; D of perforation 14; m 220 g. 3c/4, 55/65; Phase 3.
- 35 Weight, central perforation. Irregular-shaped pebble of schistose grit, flattish in section. Perforation formed by pecking from either face. L 68; W 54; T17; perforation 9 by 6; m 90 g. 5, 55; Phase 2.
- 80 Weight, central perforation. Sandstone cobble, sub-oval in plan and flattish in section. Perforation has been finely pecked from opposite faces (illus 35). L 91; W 79; T 26; D of perforation 10; m 278 g. 4iii, 55; Phase 3.

TABLE 9

Stone artefact types

TYPE	PHASE 2	PHASE 3	U/S
<i>Perforated pieces</i>			
Spindle whorls	2	2	
Weights	5	5	
<i>Ornaments</i>			
Pendants		2(A); 1(E)	
Shale ring	1(B)		
Shale bracelet		1(C)	
Carved ball		1	
<i>Hollowed stones</i>			
Bowl		1(C)	
Handled bowl		1	
Mortar	1	1	
Single hollowed stones		1	
Bifacially hollowed stones		1	1
Stone discs	1	1	
Rotary querns	1(D)	1	3
<i>Cobble tools</i>			
Faceted		7	
Faceted and facially pecked	1		
Rubbing stones	1	3	
Hone		1	
Polisher		1	
Strike-a-light		1	
Counter	1		
Flaked Flint		2; 1(A)	

KEY: All objects from Phases 2 and 3 are from within the main area of the broch except A, wall core; B, intra-mural chamber — north; C, intra-mural chamber — south; D, primary paving of floor; E, extra-mural 'drain'.

- 128 Weight, central perforation. Irregular-shaped sandstone pebble, flattish in section. Perforation has been formed by pecking from either face (illus 35). L 71; W 58; T 21; D of perforation c.5; m 90 g. 5, 55; Phase 2.
- 148 Weight, probable central perforation. Sandstone, heavily burnt and damaged. Sub-circular in plan. Perforation formed by pecking on either face. L 101; W 85; T 18; D of perforation c.9; no weight. 3 b/c, 64/65; Phase 3.
- 231 Weight, central perforation. Irregular-shaped pebble of sandstone with flattish cross-section. Perforation has been formed by pecking from both faces. L 60; W 54; T 17; perforation 6 by 4; m 72 g. F22, 55; Phase 2.
- 295 Weight, fragment. Sandstone. [Cannot measure.] 3B/C, 65; Phase 3.
- 301 Weight, central perforation. Irregular-shaped piece of chloritic shale, one face split off. Perforation pecked from unbroken face. L 51; W 39; T 7; perforation 7 by 5; m 18 g. F13, 54; Phase 2.
- 310 ?Spindle whorl, central perforation. Shale, chipped around edge to form a sub-rectangular outline. Corners subsequently ground. Perforation pecked from both faces (illus 35). L 33; W 27; T 5; D of perforation 6; m 8 g. 4/5, A2; Phase 2.
- 346 ?Spindle whorl, central perforation. Flat pebble of fine-grained micaceous sandstone, sub-oval in plan with one end roughly squared off and ground. Perforation pecked from either face. L 35; W 31; T 8; m 14 g. 4iv, A3; Phase 3.

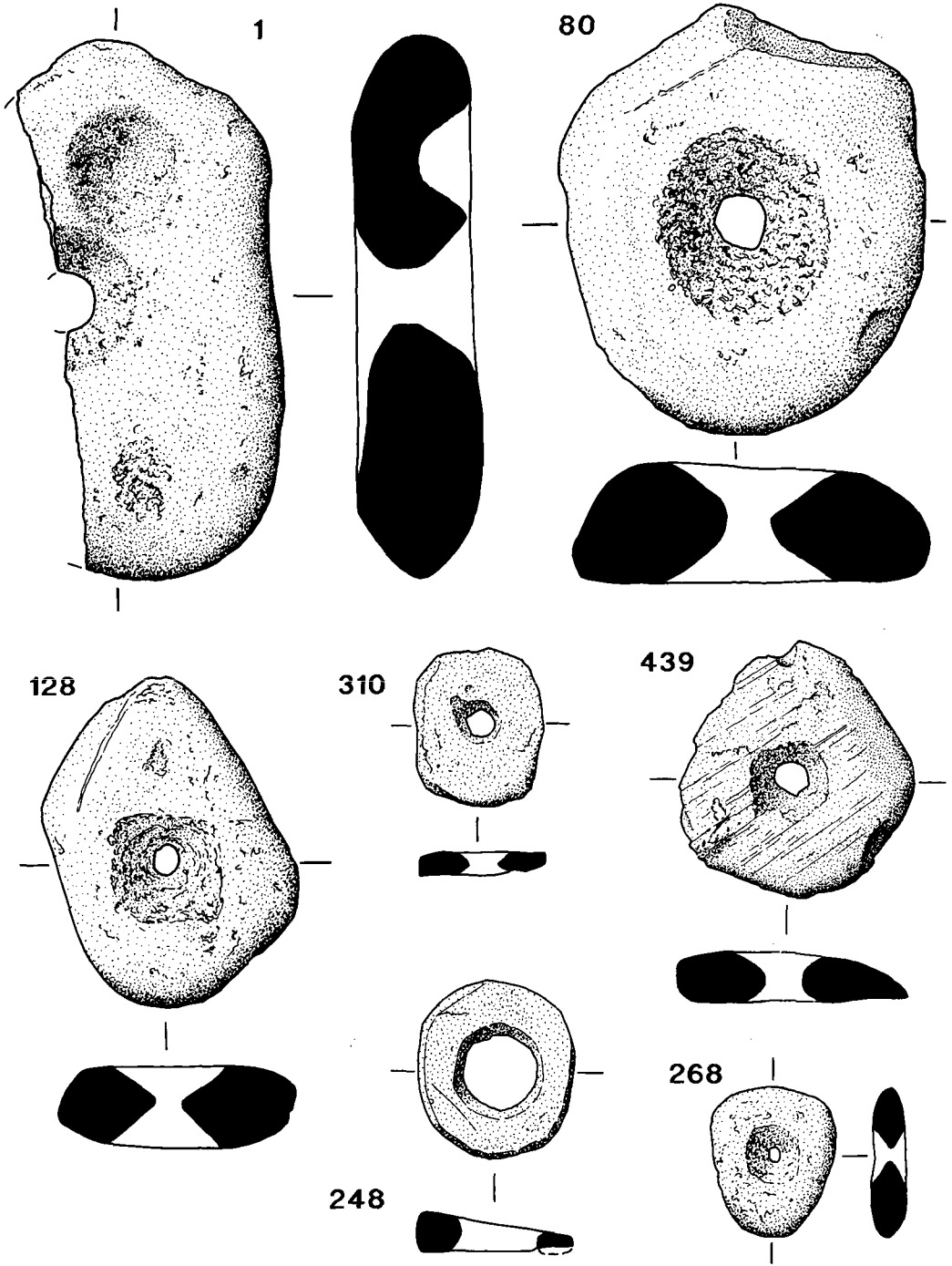
- 353 ?Spindle whorl, perforation slightly off-centre. Flat piece of chloritic shale, chipped around circumference to form a circular outline. Perforation 'carved' out from both faces. D 37; T 5; D of perforation 7; m 10 g. 4v/5, A3; Phase 3.
- 356 Weight, central perforation. Oval cobble of sandstone, flat in section. The perforation has been formed by pecking from both faces and is rather small and oval in plan. Localized areas of pecking on either end and on opposite faces, one forming a hollow. A patch of smoothing on one side of the weight may have been some attempt to re-shape the pebble. L 88; W 56; T 24; perforation 5 by 3; m 172 g. 3 d/5, A3; Phase 3.
- 420 Weight, central perforation. Made on cobble fragment of sandstone, abraded. Flattish in section and possibly chipped around the circumference to form circular outline. Perforation has been formed by pecking from either face and the inside is very smooth as if through friction. L 119; W 111; T 21; D of perforation c 14; m 334 g. F62; Phase 2.
- 439 Spindle whorl or small ?weight, central perforation. Banded siltstone, badly damaged and abraded. Most probably flat in section and sub-circular in plan. Perforation has been formed by pecking from either face (illus 35). L 52; W 50; T 12; D of perforation 6; m 34 g. F122; Phase 2.

Ornaments and jewellery (illus 35 & 36)

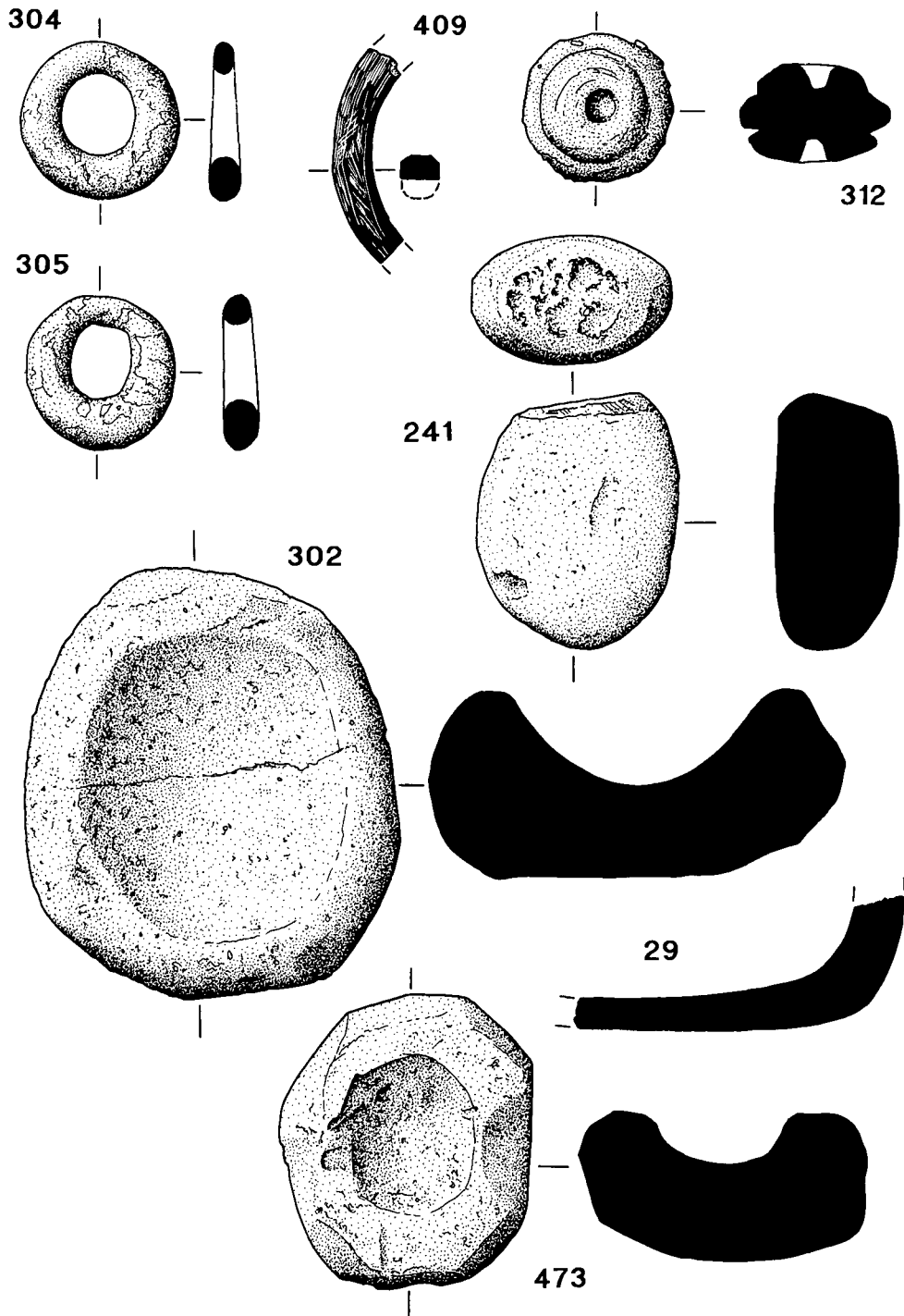
- 248 Ring or pendant of inorganic shale. Sub-circular in plan and shaped by grinding the edges. One part of edge is thicker than other. Perforation is circular in plan and 'carved'/ground to shape with a small notch (illus 35). L 38; W 34; T 8; D of perforation 15; m 10 g. Intra-mural chamber, 64; Phase 2.
- 268 ?Pendant, small central perforation. Flat pebble of sandstone, sub-triangular in plan. Perforation formed by pecking from either face (illus 35). L 32; W 27; T 7; D of perforation 2; m 8 g. 3, extra-mural 'drain' infill; Trench A; Phase 3.
- 304 Ring or pendant of bleached serpentinite. Circular outline with rounded and polished edges. The perforation is circular in plan and placed just off-centre (illus 36). D 33; T 7; D of perforation 16; m 6 g. Broch wall core; 3A, A4; Phase 3.
- 305 Ring or pendant of bleached serpentinite. Circular outline with rounded and polished edges. The perforation is oval in plan and placed just off-centre (illus 36). D 32, T 8; perforation 16 by 14; m 8 g. Broch wall core; 3A, A4; Phase 3.
- 312 Small, shaped ball of fine-grained sandstone, very soft and weathered. In shape it is a flattened sphere with two deep encircling grooves towards either end. The probable perforation has been worked at right angles to the grooves and from both faces and is incomplete (illus 36). L 20; W 31; T 31; D incomplete perforation 6; m 16 g. 3e/4, A3; Phase 3.
- 409 Bracelet fragment. Cannel coal. Facets and striations from the shaping of this piece are quite visible (illus 36). Internal D c 56; W 9. Broch floor/ steps to intra-mural chamber; 3, B2; Phase 3.

Hollowed stones (illus 36 & 37)

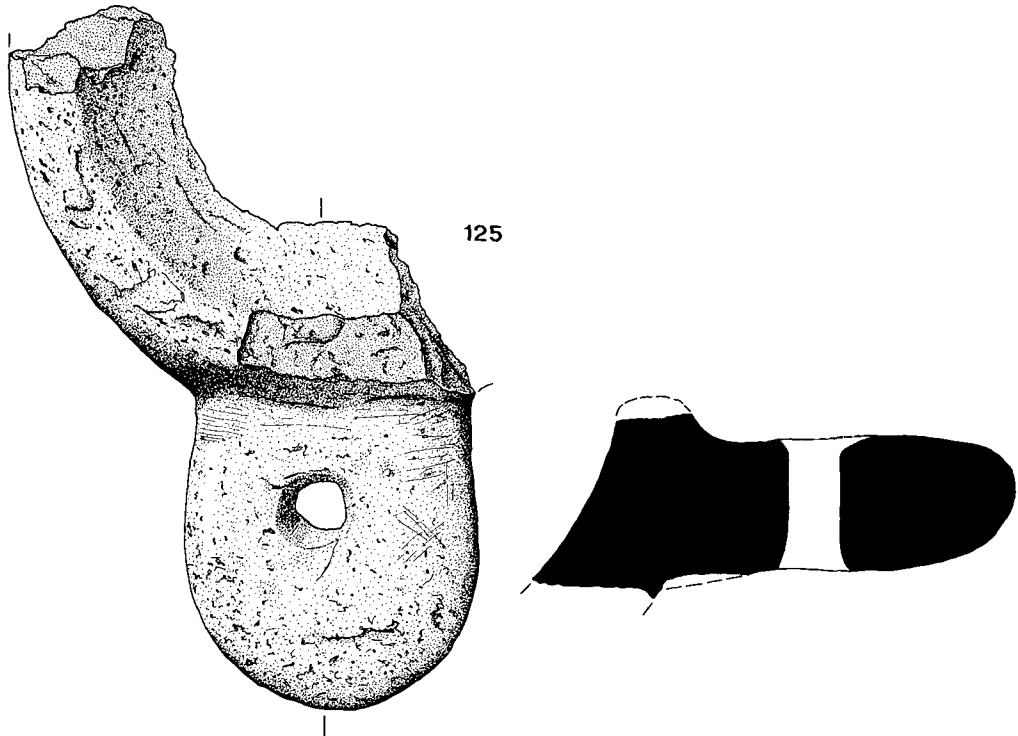
- 29 Base fragment of a bowl of tremolite schist. Shaped with great care and ground/rubbed to a smooth external face. Grooves and striations from manufacturing visible inside the bowl. Flat base (illus 36). D of base c 80; thickness in centre of base 6. 3B rubble in intra-mural chamber, 64/54; Phase 3.
- 125 Fragment of a handled bowl/lamp. Grey/black talc-tremolite-schist, worked with great care and smoothed all over. The handle is perforated and there are shiny patches where the handle was held and in the perforation where it was suspended (illus 37). Handle 75 long; 80 wide and 33 thick; possible external diameter of bowl 200. 3c/4, 54/55; Phase 3.
- 151 Bifacially hollowed stone. Sandstone cobble, irregular in plan, flattish in section. Single areas of pecking on either face are circular in plan and form shallow hollows. There is a patch of gloss 'residue' in and around one of the hollows. L 87; W 74; T 31; diameter of hollows 35, depth 3. 4, 64/65; Phase 3.
- 302 Single hollowed stone, ?mortar. Piece of coarse-grained sandstone, friable, sub-circular in shape with a flat base and a large round-based hollow. Evidence for some kind of white concretion inside the



ILLUS 35 Perforated stone artefacts (scale 2:3)



ILLUS 36 Stone artefacts (scale 2:3)



ILLUS 37 Stone lamp 125 (scale 1:2)

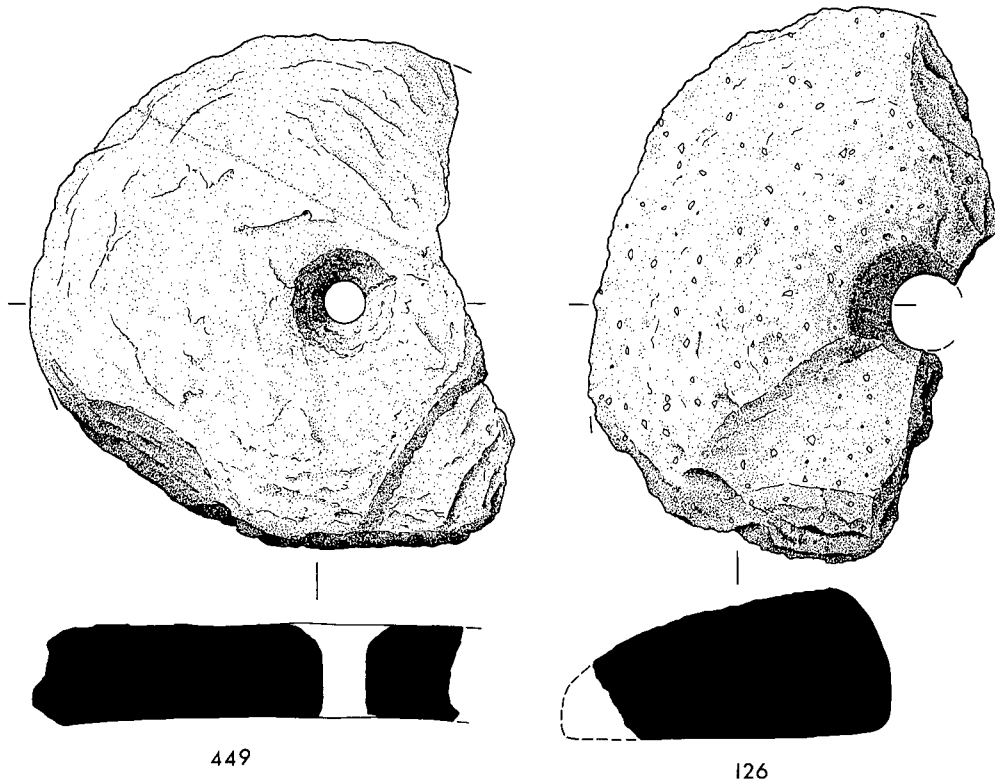
- hollow suggests that it is a mortar rather than a lamp (see below) (illus 36). L 91; W 84; T 41; D of hollow 56, depth 21. 3e, A1; Phase 3.
- 314 Single hollowed stone. Flattish pebble of schistose grit, oval in plan. Large, shallow hollow pecked on one face. L 56; W 48; T 20; D of hollow 27, depth 5. 3e/4, A3; Phase 3.
- 473 Single hollowed stone, ?mortar. Piece of fine-grained sandstone, abraded. Sides probably ground to a sub-hexagonal shape with a rounded base and a small round-based hollow. Yellow concretions in and around hollow (see below) (illus 36). L 59; W 56; T 32; D of hollow 29; depth 10. F88, Phase 2.
- 492 Bifacially hollowed stone. Sandstone cobble, abraded and damaged. Single areas of heavy pecking on either face are circular in plan and quite deep. L 96; W 86; T 32; D of hollows 40; depth 8. Unstratified.

Stone discs (not illus)

- 452 Laminated sandstone, chipped around circumference to shape then ground on parts of the edges. In plan it is sub-hexagonal. L 66; W 59; T 12. 4, B3; Phase 3.
- 509 Laminated sandstone, ground around circumference to form a vertical edge and sub-circular outline. Broken. L 73; T 12; F13, 54; Phase 2.

Rotary querns (illus 38)

- 126 Upper stone, broken across perforation. Coarse schistose grit. Upper face pecked to a dome shape. Lower face flat and smooth. Central hole is almost funnel-shaped (illus 38). D c.300; T 82; D of hole 36. 3B/c, 54/55; Phase 3.

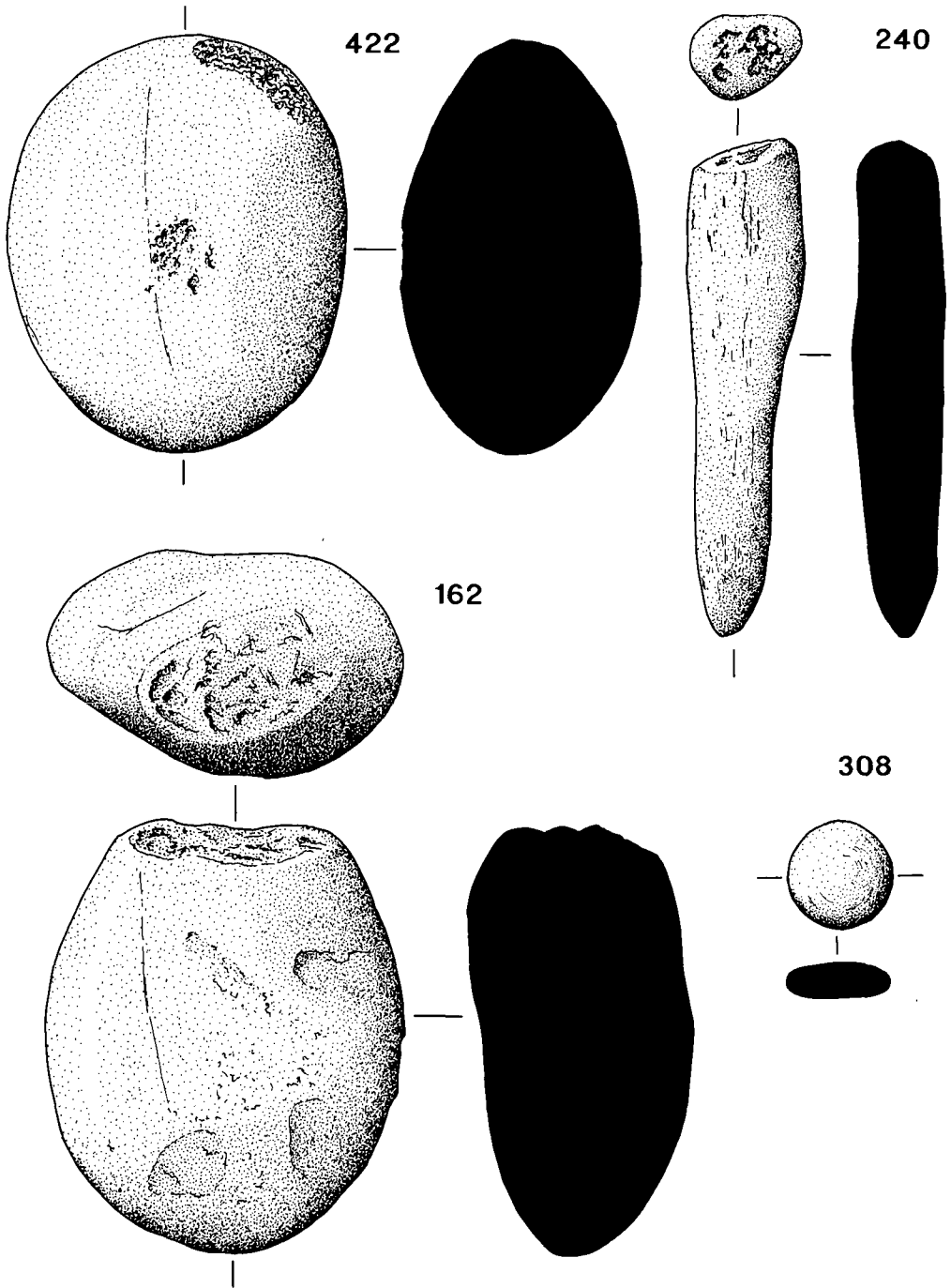


ILLUS 38 Querns 126 and 449 (scale 1:4)

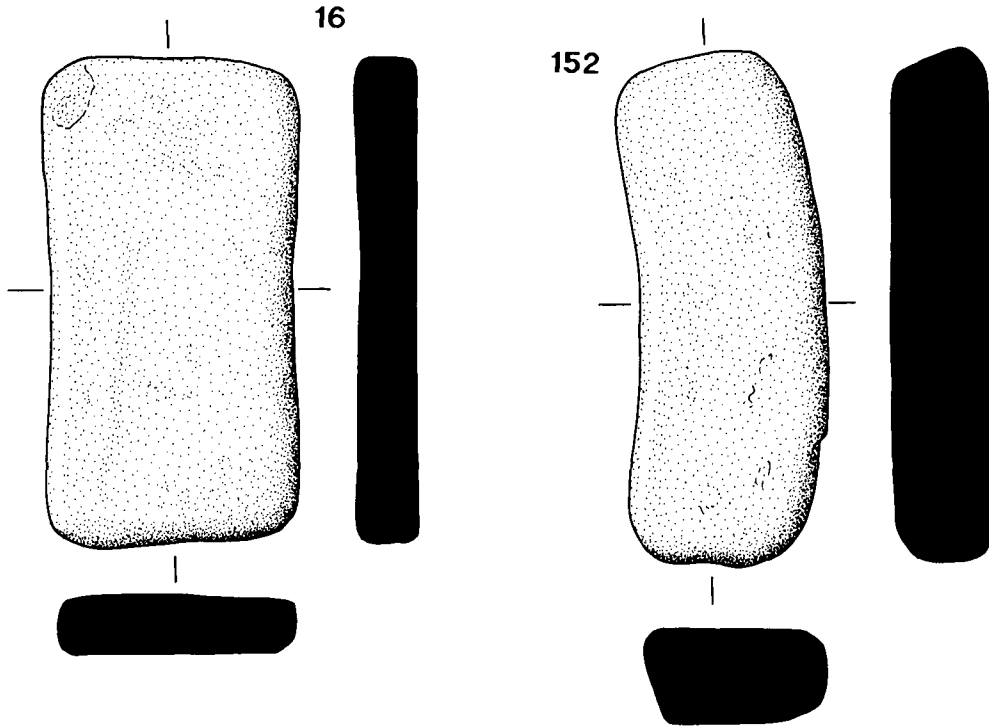
- 234 Complete stone of garnetiferous-biotite-muscovite-schist. No measurements, not seen — now missing. Broch floor, set in primary broch paving; 55/65, Phase 2.
- 266 Small fragment of an upper stone. Coarse-grained schistose grit. Upper face pecked to a dome shape. Lower face slightly concave and smooth. T 65. 2 above extra-mural 'drain', Trench A.
- 387 Fragment of ?quern stone of coarse grit. Probably burnt. No measurements.
- 449 Upper stone, broken across width. Schistose grit, abraded. Sub-oval in plan. Upper face flat. Lower face slightly concave in section and smooth. Central hole funnel-shaped in section (illus 38). Radius c 150; T 57; D of hole 26. Unstratified.

Cobble tools (illus 36 & 39)

- 25A 'Faceted' cobble. Sub-rectangular cobble of schistose grit. One flat end has been rubbed heavily and may be discoloured from the substance having been worked. Possibly some rubbed areas on one curved face. L 112; W 51; T 38. 4, 54; Phase 3.
- 25B ?Rubbing stone. Ovoid cobble of diorite. Both flat faces possibly smoothed from rubbing. L 70; W 63; T 33. 4, 54; Phase 3.
- 26 Rubbing stone. Ovoid cobble of siliceous siltstone. One face flattened and smoothed with polish on outstanding edges. L 75; W 47; T 30. 4, 54; Phase 3.
- 82 Small fragment of a ?rubbing stone/burnisher. Siltstone, burnt and abraded. Light multi-directional striations and short score marks on one face. L 30; W 29; T 20. 4iii, 55; Phase 3.



ILLUS 39 Stone artefacts (scale 2:3)



ILLUS 40 Stone hone and polisher (scale 2:3)

- 162 'Faceted' cobble. Sub-oval cobble of quartzose sandstone. One end appears to have been knocked off and subsequently worn by rubbing to form an irregular but smoothed face. Possibly area of high gloss/polish on one face (illus 39). L 91; W 77; T 48. 3B/c, 64/65; Phase 3.
- 227 'Faceted' cobble. Irregular-shaped cobble of siltstone. Two or three corners appear to have been knocked off and subsequently worn by rubbing to form an irregular but smoothed face. L 67; W 53; T 24. 4, 54; Phase 3.
- 228 'Faceted' cobble. Ovoid cobble of quartzose sandstone. One end appears to have been knocked off and subsequently worn by rubbing to form an irregular but smoothed face. Some pecking on opposite end and small patch of gloss/polish on one face. L 56; W 44; T 41. 3A, 64; Phase 3.
- 240 'Faceted' cobble. Finger-like pebble of schistose grit. One end has been knocked off and subsequently worn by rubbing to leave an irregular but smoothed face (illus 39). L 102; W 26; T 20. 4 & 'F2', 55; Phase 3.
- 241 'Faceted' cobble. Ovoid cobble of quartzose sandstone. One end appears to have been knocked off and subsequently worn by rubbing to form an irregular, but smoothed face (illus 36). L 51; W 45; T 26. 4 & 'F2', 55; Phase 3.
- 376 Rubbing stone. Ovoid cobble of quartzite. One face flattened and smoothed with small patches of gloss/polish. L 84; W 52; T 37. F57, A3/55; Phase 2.
- 422 'Faceted' and facially pecked cobble. Sub-oval cobble of quartzite. Small areas of light pecking on either face. One narrow facet and some pecking on one end (illus 39). L 86; W 72; T 51. F62; Phase 2.
- 472 'Faceted' cobble. Elongated pebble of fine-grained shaley sandstone. One end possibly knocked off and subsequently worn by rubbing leaving a flattish smoothed face. L 100; W 36; T19. 3c, A4; Phase 3.

Miscellaneous (illus 39 & 40)

- 16 Hone. Piece of fine-grained micaceous sandstone which is a slightly waisted rectangle in plan and flat in cross-section. The whole piece is smooth with rounded corners and edges and there are areas of high polish located specifically on the edges of both narrow sides (illus 40). L 97; W 53; T 13. 4, 54; Phase 3.
- 34 Polished stone axehead. This Neolithic axehead, now missing, was described by Collins as of bluish-green banded tuff and was provisionally identified by him as Great Langdale, Group 6. No dimensions. 5, 55; Phase 2.
- 152 Polisher. Fine grained siltstone. Rectangular and slightly curved in plan and flat in cross-section. Corners and edges are rounded. The whole surface is very smooth and bears a light polish. High gloss patches down one side and on one narrow end (illus 40). L 101; W 40; T 20. 4, 64/65; Phase 3.
- 156 Strike-a-light. Flat, circular pebble of quartzose sandstone. Both faces have a circular pecked area in the centre which is then bisected by a single deep groove worn across the stone. Traces of rust in the grooves remain from the use of an iron striker. L 61; W 60; T 25. 3b/c, 64/65; Phase 3.
- 308 Counter. Flat, circular pebble of quartzose sandstone. The fine, regular shape is naturally formed (illus 39). D 23; T 8. 4/5, 65; Phase 2.

Flint (not illus)

- 64 Large inner flake of black flint struck from flat platform. Parts of both long edges have been modified by the removal of small, irregular flakes, most probably representing edge damage through use as a ?strike-a-light. L 51; W 30; T 5. Rubble in intra-mural chamber; Phase 3.
- 230 Inner flake struck from natural flat platform. L 35; W 18; T 6. 4, 54/64; Phase 3.
- 232 Secondary flake struck from inner flat platform. Some irregular flaking from edge damage along part of one side and on distal end. L 42; W 29; T 7.; 2 & broch wall core, 53; Phase 4.

RAW MATERIAL

Adapted from an original report and notes by the late G Collins

A variety of stone materials has been selected for use and these include sandstone, siltstone, schistose grit, talcose schists, granite and diorite. The majority of the artefacts are of metamorphic rocks derived from the Lower Old Red Sandstone and most of the stones were most probably collected in pebble form from erratic boulders within the local glacial drift. The site itself occupies a hillock which is part of the terminal moraine of the Loch Lomond late-glacial re-advance.

Four of the artefacts are made from stone which was most certainly foreign to the area. The talcose schist from which the handled bowl is made (125) is known from St Catherine's, Loch Fyne, and around Aberfeldy. The other bowl fragment (29) is a tremolite chlorite schist and can be matched with rocks from the Kilcrennan district of Argyll. The two serpentinite pendants (304 & 305) are particularly fine despite having lost their original colour by bleaching and they would have looked more decorative when manufactured. Their source is less certainly exotic. Serpentinite occurs as altered basic minor intrusions but is best known from the highly coloured rocks of Portsoy, although a more local source is possible: historical use of serpentinite is recorded from Balmaha, Loch Lomond (Stirling Council SMR). It is highly unlikely that these exotic stones were collected as erratics from the local drift deposits and then manufactured into objects locally. Instead, these fine and decorative pieces were most probably brought into the broch ready made. Since no proper sourcing analysis has been carried out for these materials it is impossible to give their exact provenance. However, their presence acknowledges the wide extent of external contacts of the broch inhabitants.

ARTEFACTS

Cobble tools

Of 12 examples, the most common cobble tool type is the 'faceted' cobble (total 7) which appears to have been formed by knocking off a suitable end or corner of the stone and the break subsequently used as a rubbing or grinding surface. The resulting wear pattern shows a smooth ground area, particularly around the perimeter of the break whilst there is a more uneven surface in the centre of the broken face (240, 241). Three of these 'faceted' cobbles have additional patches of gloss/polish on one of the faces (162).

Four stones have been termed rubbing stones as one or both faces appear to have been flattened and smoothed as if through having been rubbed; two of these also have small patches of gloss/polish on parts of the face. One, a burnt fragment of siltstone may have been used as a rubber or burnisher as it bears a series of light multi-directional striations on one broken face.

There is also one cobble with a light facet on one end and some pecking on the face (422).

Just two cobble tools, the faceted and facially pecked piece and a rubbing stone, are from Phase 2 deposits while all of the 'faceted' tools as well as the remaining three rubbing stones are from Phase 3 of the broch interior.

Weights and whorls

There are 10 weights, all made on flat cobbles and usually with a centrally placed biconical perforation. Although the numbers are small there is a clear and even differentiation by weight with two clusters being present: those heavier than 200 g (80) and those lighter than 100 g (128). Two of the weights (1 & 356, not illus) have a small hollow worked at one end and a patch of pecking on the opposite end of the same face. These may be incomplete perforations but there is no expected matching hollow on the opposite face. Instead these hollows were most likely formed to aid some more complex form of suspension.

Four of the perforated pieces are catalogued as possible spindle whorls. None is circular in plan and there has been no real effort to shape piece 439, although 310 has chipped and ground edges.

Both the weights and the whorls are evenly distributed between Phases 2 and 3 and, with the exception of one of the larger weights, all the weights in Phase 2 are in the small size range, less than 100 g in size, whilst all those in Phase 3 are larger than 200 g.

Querns

Of five examples, all are upper stones from rotary querns most of which are made on schistose grit. One complete stone which was found incorporated into the primary paving of the broch is of garnetiferous schist but is unseen and unmeasured. Two other stone fragments have a domed upper face, one of which has a funnel-shaped central hole; one is from the extra-mural 'drain' and the other from Phase 3. The remainder are unstratified including a flat-sectioned sub-oval stone.

Bowls, mortars and hollowed stones

The handled bowl of black talcose schist (125) is broken but the short, perforated handle (75 mm in length) survives. The whole piece has a fine, smooth finish and there are areas of high polish where the handle was held and in the perforation where the bowl was suspended. The other bowl

fragment (29) is of tremolite schist and has a smooth exterior and scratches and grooves inside from shaping the bowl. The two mortars are made on sandstone cobbles both of which have deliberately shaped flat bases and a round-based hollow worked on the upper face. One (302) has no further shaping but another (473) has been ground on the sides to create a rough hexagonal outline. Both of these pieces have traces of white/yellow concretions on the interior surface of the hollow suggesting their use as mortars or containers rather than lamps (see report at the end of this section on the analysis of these deposits). A small, single, hollowed stone has a rather shallow hollow pecked on one face and it may have been a mortar. The two bifacially hollowed stones may be unfinished perforated weights, although patches of a glossy residue on one face of 151 (not illus) may even suggest its use as an anvil stone or other form of cobble tool.

The hexagonal mortar is from Phase 2; and the other mortar and the bowls and hollowed stones are from Phase 3.

Decorative pieces

This is a diverse category which includes a cannel coal armlet fragment, a shale ring/pendant, two pendants of serpentinite, another possible stone pendant and a small carved stone ball. The two serpentinite pendants are almost identical in size and are circular in plan with a large oval perforation formed off-centre and with rounded and polished edges (304 & 305). They were clearly made to match and were found together in the disturbed area of broch wall-core. The inorganic shale ring or pendant (248) is rougher in form with a ground edge and a circular perforation placed in the centre of the piece. A small notch on one side of the hole may have been to aid suspension. This is from the floor of the intra-mural chamber. One further piece (268) is a small, unworked triangular pebble which has been described as a possible pendant because the tiny central perforation would allow only the thinnest of twine for suspension. This was found in the extra-mural stone 'drain'. A fragment of a cannel coal armlet (409) was recovered from the intra-mural cell in the south-east of the broch (see end of this section for a report on the analysis of the armlet).

Finally there is a small carved ball of fine-grained sandstone which takes the form of a flattened sphere with two deep, encircling grooves at either end (312). A probable, but incomplete, perforation was begun from either end but then the attempt was abandoned possibly because the perforation was placed off-centre. This was found in the broch itself.

Other pieces

These include a hone of fine-grained micaceous sandstone (16) which is flat, and rectangular and slightly waisted in plan. The whole piece is very smooth and there are areas of high polish particularly down the edges of both sides. Another piece of fine-grained siltstone has been identified as a polisher (152). It has heavily rounded edges and is slightly curved in plan. The whole of its surface is polished with particularly glossy patches down one side and on one narrow end. There are just two stone discs, one of which has been chipped then edge-ground to form a sub-hexagonal outline. Another is sub-circular in plan with vertically ground edges. A strike-a-light and probable playing counter of a regular, but unworked pebble complete the assemblage.

CONCLUSION

The stone assemblage from Fairy Knowe is varied in composition as both functional and decorative items are present, as well as pieces such as the pendants of serpentinite and the talcose

bowls which have added value because of their use of exotic stone materials. Centrally perforated weights and cobble tools are the most numerous artefact types while objects such as spindle whorls, stone discs and hones/whetstones are represented at Fairy Knowe by only a few examples, though these tend to be the dominant artefact forms at other sites, such as Hurly Hawkin (Taylor 1983) and Traprain Law (Cree & Curle 1922).

The 'faceted' cobbles which have been formed by deliberately breaking off an end and using this broken face as a rubber/grinder do not appear to have been recorded as a particular cobble tool type before, but experience of other Iron Age assemblages shows that there can be a collection of a particular type of cobble tool which is peculiar to one site, such as the large collection of side-faceted, flat oval cobbles with glossy residue from Upper Scalloway, Shetland (Clarke, forthcoming). The use of the cobble tools from Fairy Knowe is not known, but the presence of rubbing stones and polish or glossy residue on the surface of some of the other cobbles is a common feature to many Iron Age sites and suggests that at least part of the cobble tool assemblage was used for the same functions over a wide geographical area.

Little can be said about the context of the assemblage; most of the artefacts are recorded from Phase 3 deposits, with only a few from Phase 2. The only clear difference between the Phases 2 and 3 is in the size distribution of the stone weights, as the smaller ones are almost exclusive to Phase 2 and the larger to Phase 3. Of some significance may be the distribution of the ring, armlet and pendants all of which appear around the edge of the broch (ie associated with the intra-mural chamber and the wall core), and there is also one possible pendant from the extra-mural 'drain'. Whether the distribution of these ornaments in these contexts reflects an act or acts of deliberate deposition is uncertain, but in this respect the incorporation of a rotary quern in the primary paving of the broch floor most likely had more significance than simply its reuse as building material.

The high incidence of decorative or non-functional items (ie those objects that are not strictly tools) is common to some broch sites, and is seen, for instance, in the collection of personal ornaments of bronze in the broch floor and filling at Hurly Hawkin (Taylor 1983). At brochs where the extra-mural structures as well as the broch interior have been excavated (eg Upper Scalloway, Shetland) it was clearly demonstrated that the decorative or well-made objects of stone tended to be found within the broch itself, while the stone artefacts from the extra-mural activity were strictly utilitarian. Here also, the significant contrasts in the stone assemblage were between internal and external contexts rather than between phases (Clarke, forthcoming).

The assemblage from Fairy Knowe is large in comparison to those from other excavated sites in the local area. All of the artefact forms are typical to later Iron Age assemblages in Scotland and, with the possible exception of the two serpentinite pendants, can be paralleled elsewhere. The Hurly Hawkin assemblage is larger than that from Fairy Knowe and is composed mainly of stone discs, including some polished ones, several whetstones and a few spindle whorls. With the exception of a carved spindle whorl and a 'jet' pin head fragment there are no decorative pieces or bracelets or pendants, although there is plenty of bronze jewellery (Taylor 1983).

More locally, sites such as the dun at Castlehill Wood produced a small collection, including a hollowed stone, a whorl, a whetstone, a rubbing stone, an anvil stone and a cup/lamp (Feachem 1959); while at Meikle Reive, a hillfort in the Campsies, a stone ball, a lamp, a spindle whorl, two stone rings and a stone disc were found (Fairhurst 1956). The assemblage from the Iron Age house at West Plean, Stirlingshire, included a handled sandstone cup (Steer 1956). The excavator summarized the characteristics of the 80 or so handled cups which were then known: only a few are found as far south as central Scotland; they are usually made of steatite; 60% have perforated handles; and 15% have long handles (> 50 mm in length); half are undecorated and those of

steatite are usually well finished (*ibid*, 244). Other artefacts from this site include a bun-shaped rotary quern, a hollowed stone, spindle whorls and other perforated stones which may be rings or pendants, stone discs, one of which is polished, and miscellaneous hollowed stones. With the obvious exception of the weights and cobble tools, this assemblage is close in character to that of Fairy Knowe.

ANALYSIS OF THE CANNEL COAL BANGLE FRAGMENT 409

Fraser Hunter

The bangle fragment was analysed by standard techniques of X-ray fluorescence and X-radiography supplemented by visual examination (Hunter *et al* 1993; Davis 1993). The identification of such black organic materials has rarely been treated seriously, and yet is of potential significance as the sources are geographically varied and (in the case of jet itself) exotic to Scotland. Analysis indicated the Fairy Knowe piece was a clean cannel coal. Although these non-destructive techniques do not allow precise characterization of sources, cannel coals are readily available in the Midland Valley, some tens of kilometres from the site (Cameron & Stephenson 1985). The presence of extensive toolmarks shows the bangle is unfinished, implying import of raw materials.

ANALYSIS OF THE DEPOSITS ON SANDSTONE MORTARS 302 & 473

Peter Davidson

The two mortars with deposits on their inner surfaces were submitted for analysis by X-ray diffraction (XRD) and X-ray fluorescence (XRF) in an attempt to characterize the deposits. In each case the powder diffraction photographs were very poor, indicating poor crystallinity.

- 302 Two photographs were taken using different sub-samples. Both produced the same result, with quartz and potash alum being identified. The poor quality of the pattern made more positive identification impossible. XRF revealed the presence of Fe, Ca, Si, K and S. Film nos 5702, 5705.
- 473 Two photographs were also taken of this sample. Both were blank except for a broad band indicating an amorphous phase. XRF indicated the presence of Fe only.

The possible identification of one residue as potash alum (aluminium potassium sulphate, commonly known as alum) is of considerable interest. Sources are recorded in Stirlingshire (Heddle 1901, 181), and alum is sometimes found on pyrite-bearing shale. Shale associated with coalfields in central Scotland is often pyrite-bearing, suggesting the alum could have been available locally. Historically, alum was used as a mordant in dyeing and a medicine (Shackley 1977, 126–30). Perhaps most common, however, was its role in curing hides — when rubbed into the surface (a process known as mineral tawing) it acts as a preservative.

AMBER

Fraser Hunter

CATALOGUE (NOT ILLUS)

- 340 Three amber fragments, one preserving part of a flat base and rounded square corner, the sides slightly sloping. Little can be said about its original form on the basis of such a tiny fragment, but the presence

of a corner puts it outwith the normal canon of Scottish later prehistoric amber, which is almost exclusively annular beads and pendants. Largest frag: L 3; W 3; T 2. 4iii, A3; Phase 3.

- 518 Seven fragments from a bead. No complete section survives, but the fragments imply a slightly swollen cylinder with rounded ends. The largest piece is 5.5 mm long; if the swelling were symmetrical, the bead would originally have been c 2–4 mm longer than this. Extrapolation from fragments suggests the perforation was around 3–5 mm in diameter; the wall thickness is 1.5 mm, giving an overall bead diameter of something under 10 mm. This would make it broadly equivalent to Beck & Shennan's (1991) type 7b (short cylinder bead with rounded edges). F25; Phase 2.

DISCUSSION

Amber in Scottish later prehistory has been little studied. Beck & Shennan's (1991) catalogue, while good for early prehistory, is markedly incomplete for the Iron Age. As this study showed, typological dating of amber beads is highly problematical: hence, while there is a broad scatter of beads throughout Scotland, discussion must be restricted to site finds. Even here, the long timespans of many sites makes precision difficult. There is, however, a widely scattered if small number of amber beads from fairly good Iron Age contexts. The table below of examples known to the writer may not be comprehensive, but gives some feel for the range and quantity.

TABLE 10

Scottish site finds of amber ornaments

Site	County	Description	Museum No	Reference
Edin's Hall	Berwickshire	pendant	GA 117	Dunwell forthcoming
Long Yester ?camp	East Lothian	2 beads	FN 45–6	PSAS 15, 189
Traprain Law	East Lothian	7 beads finger ring with amber bezel angular fragment	GV 57, 171, 368, 440, 441, 1226, 1438, 1440; GVM 156	ex inf NMS catalogue Burley 1956, no 156
St Germain's	East Lothian	phallic pendant?	Lost	Alexander & Watkins this vol.
Dowalton crannog	Wigtownshire	bead	HU 32	Stuart 1865, 121
Crosskirk broch	Caithness	bead / pendant		Fairhurst 1984, 119
White Gate broch	Caithness	2 beads	GA 611–12	
Dun Mor Vaul	Tiree	fragment		MacKie 1974, 133
Dun an Iardhard	Skye	necklace 2 biconical beads	GA 999 GA 1005–6	Macleod 1915, 64–5 (possibly Norse)
Gurness	Orkney	2 beads		Hedges 1987, nos 835–6

While some of these pieces are poorly dated, several are broadly Roman Iron Age date, confirming the presence of amber in small quantities at the period. Its exotic nature would probably make it something of a status good, although little detailed understanding of its social use at this period is yet possible.

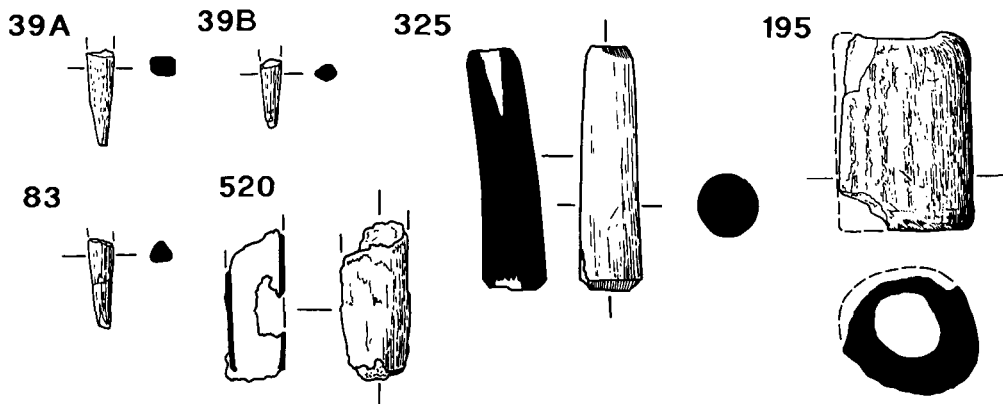
The source of the amber is also unclear. The finger ring with amber setting from Traprain is, if not a Roman import, heavily influenced by Roman types, but there is otherwise no strong case for seeing amber as channelled through Roman sources: Roman uses of amber tend in general to be rather more ornamental (eg Gerhartl-Witteveen *et al* 1989, 38–9), although some plain beads are known (eg Cool *et al* 1995, 1546), with single Scottish examples from the forts of Ardoch and Newstead. Rather, the amber probably indicates low-level contacts across the North Sea, although whether directly or at some remove is unclear, as there is little other contemporary evidence for such contacts. To the end user, it is likely that the amber was simply an exotic stone, with little knowledge of its source.

WORKED BONE AND ANTLER

Fraser Hunter (with zoological identifications by Catherine Smith)

CATALOGUE (ILLUS 41)

- 39A Broken tip from a burnt bone point. The shank is sub-rectangular in section, suggesting it is a point rather than a pin, which tends to be more circular. One face bears residual knife-trimming facets and file-marks. The whole tip has use-polish over it, and the end is broken and rounded from use. Although it cannot be demonstrated in this case, pig fibulae are typically used for such items (Ballin Smith 1994, 171) (illus 41). L 20; W 5; T 4. 3B/c, 55; Phase 3.
- 39B Broken tip from a burnt bone point. The shank is sub-rectangular in section, suggesting as above that it comes from a point rather than a pin. It bears use-polish, and the tip is rounded from wear. As with 39A, it may derive from a pig fibula (illus 41). L 14; W 4.5; T 3.5. 3b/c, 55; Phase 3.
- 83 Broken tip from a burnt point, in two joining fragments. The shank is sub-triangular in section, suggesting use as a point rather than a pin. Faint knife-trimming facets are visible near the tip, which is broken from use, and there is use polish on the surfaces. As above, perhaps from a pig fibula (illus 41). L 17.5; W 5; T 5. 4iii & 'F2', 55; Phase 3.
- 195 Antler cylinder. One side badly damaged, but enough remains to show that one end was cut square and filed smooth; the other was squared and the edges rounded, probably from wear. The centre has been hollowed out in a cylinder 14 mm D. Probably a small handle for furniture or similar; alternatively, could be part of a larger composite handle (cf Hallén 1994, 221) (illus 41). L 39, W 28, T 24. 3A, 63; Phase 3.
- 325 Antler tine cylindrical handle. One end has a tapering socket 5 mm in diameter and c 15 mm deep to hold a tang, although it is badly damaged due to inappropriate conservation. The other end bears toolmarks from its detachment from the beam by circumferential sawing and snapping, a typical method (MacGregor 1985, 55–8). Short, shallow knife cuts are scattered irregularly over the surface, which is badly eroded. The spongy core, typical for antler, shows signs of burning (illus 41) L 50; D 13 × 12. F56, 65; Phase 2.
- 520 Badly damaged remains of a cylindrical bone handle, lacking its original ends. It contains a highly corroded fragment of iron tang, of uncertain morphology due to corrosion. Identification as bone based on the probable presence of a marrow cavity; from a long bone, perhaps a small ungulate eg sheep (illus 41). L 30; D 14 by 13. F33, 54/55; Phase 2.



ILLUS 41 Bone and antler artefacts (scale 2:3)

DISCUSSION

The few bone artefacts are all of types which would excite no comment in the Atlantic regions of Scotland; their true value is a regional one, as valuable additions to the all-too-scant record of bone artefacts from Lowland Scotland. They appear typical for the period, as far as we can judge from our sample. Handle 520 is too badly damaged for further comment, but the size of handle 325 suggests it was for a fine iron tool such as an awl or similar (cf Clark 1997, no 1); 195 is for something larger, perhaps a doorknob for furniture. The burnt broken tips are interpreted here as points rather than pins, and the damage to the tips does suggest they were functional rather than ornamental, but there is a recognized category of pin/point (Hallén 1994, 215), in essence the lower end of the pin spectrum, into which they could fall. With such fragmentary material it is impossible to decide their original function.

DISCUSSION OF THE ARTEFACT ASSEMBLAGE

Fraser Hunter

The artefactual material from Fairy Knowe is very rich for a Lowland Scottish site. While each of the artefact categories has already received a full discussion in the relevant section, some more general conclusions can be drawn from the overall assemblage. Any such efforts are necessarily selective and subjective, and the individual specialists may disagree with the interpretations imposed on their material, but it is hoped it will serve to stimulate debate on some wider topics. Areas to be considered are: the dating of the site; life in the broch; taphonomy; ritual; contacts; and connections with the Roman world.

Dating

The artefactual dating rests on the presence of Roman artefacts. Iron Age material is notoriously poor for dating purposes. The Roman material, by contrast, is accurate and consistent, although its interpretation is never problem free. Here, however, it seems straightforward. The pottery, glass and coins are all of late first-century AD date, pointing to their arrival at the site during the Flavian occupation. The nature of the evidence of course constrains the dating available: as there was very little Roman material arriving in Scotland in advance of the conquest, we cannot know how long before c AD 80 the site had been in occupation. Equally, it seems few Roman finds reached Scotland between the Flavian and Antonine occupations, as studies of coinage and Samian have shown (Sekulla 1983; M Erdrich, pers comm). However, the total lack of Antonine material strongly suggests the site had gone out of use before the reoccupation of Scotland, as we would expect a site so rich in first century goods to have renewed contact with Rome if it had been occupied. The Roman artefacts suggest therefore that the site was occupied by c AD 80 and abandoned before c AD 140.

The only Iron Age artefact of some dating value is the possible ring-headed pin 114, but it is laden with imponderables. It is fragmentary, and therefore its identification is insecure; and its Phase 3 stratification would be inconsistent with the type's normal dating of third to first century BC. However, the possibility that it is a residual find from the round-house phase should not be dismissed, although it cannot be demonstrated.

Life in the broch

The evidence for the habits of the broch inhabitants has been detailed in the individual finds reports (above), but a brief summary here may be of some use. In seeking to attribute function to the objects, some areas are more difficult than others: coarse stone tools, in particular, remain a category where it is often hard to determine an object's function. However, the finds from Fairy Knowe give a well-rounded picture of the activities of the broch's inhabitants.

The processing and preparation of food is represented by the rotary querns and perhaps some of the coarse stone tools. Storage, cooking and consumption is indicated by the Roman pottery (primarily tablewares) and the evidence in the surviving copper-alloy material for the former presence of wooden vessels. The variety of knives from the site provides some utensils.

Rather more can be said about craft processes. Some putative stone whorls imply the weaving of cloth, while the iron tools indicate that leather-working and wood-working took place. It seems very likely that high-quality metalwork was being produced on the site. Crucibles the size of 72 are rare, and could have held enough bronze to cast such prestige items as a torc or a massive armlet, while the compasses suggest the production of decorated metalwork, another status indicator. The drawplate hints at the production of ironwork of some sophistication.

The scientific analysis of the copper alloys and iron has been most valuable, showing the potential of such work in approaching the technologies of the Iron Age. So little equivalent work has been done in Scotland that Dungworth's and McDonnell's analyses (above) inevitably raise more questions than answers. Production in both copper alloy and iron show high levels of technological skill, as we would expect. The implications of the copper-alloy results were discussed by Dungworth above, but the ferrous metallurgy merits further discussion. It clearly shows the ability of Iron Age smiths in the area to manipulate iron in order to obtain different structures and properties. The good quality of the iron is also interesting. The only previous work in Scotland, by Hutcheson (1997), compared the material from Roman Newstead with that from Traprain Law and the Iron Age hoards of Carlingwark and Blackburn Mill. These results suggested that the native iron contained markedly more slag than Roman metal. This contrasts with the Fairy Knowe results, and suggests either regional differences in iron production or, more tentatively, some Roman influence in the Fairy Knowe iron. Ferrous metallurgy is an area which cries out for more detailed work; an understanding of iron in the Iron Age is a prerequisite for further study.

There is a considerable diversity of ornaments from the site, in stone, amber, copper alloy and iron, several of which are exotic and some, such as the enamelled finger ring, probably of considerable value. This suggests people of wealth inhabited the broch. The gaming counters in glass, stone and perhaps clay, and the clay balls indicate recreational activities: it has been argued above that board games may be another indicator of the high status of the inhabitants. It is unfortunate that more of the extra-mural deposits were not examined, as the contrast with activities within the house would have been of interest. The small quantity of artefacts in Phase 2 limits the validity of comparison between the phases: there are no stark differences, although Clarke (above) noted some variations in the stone material.

Little of this material is unexpected or unusual: the great value of the Fairy Knowe assemblage is that it derives from one site. While some of this material has been interpreted above as evidence of high status, in truth we know little of expressions of status at the time. The site's richness could simply be a reflection of the sudden destruction of the site and the accretion of deposits inside the broch's shell, as opposed to the exposure and erosion of deposits so typical on most Lowland Scottish sites. Yet to argue that the differences between site assemblages are purely

the result of differential preservation would be perverse: some items from the site, notably the exotic material, the Roman goods and the evidence of high-quality metalworking strongly indicate that this was indeed the abode of people of some status. These issues will be considered further below: first, the issue of taphonomy merits a slightly more extended discussion.

Taphonomy

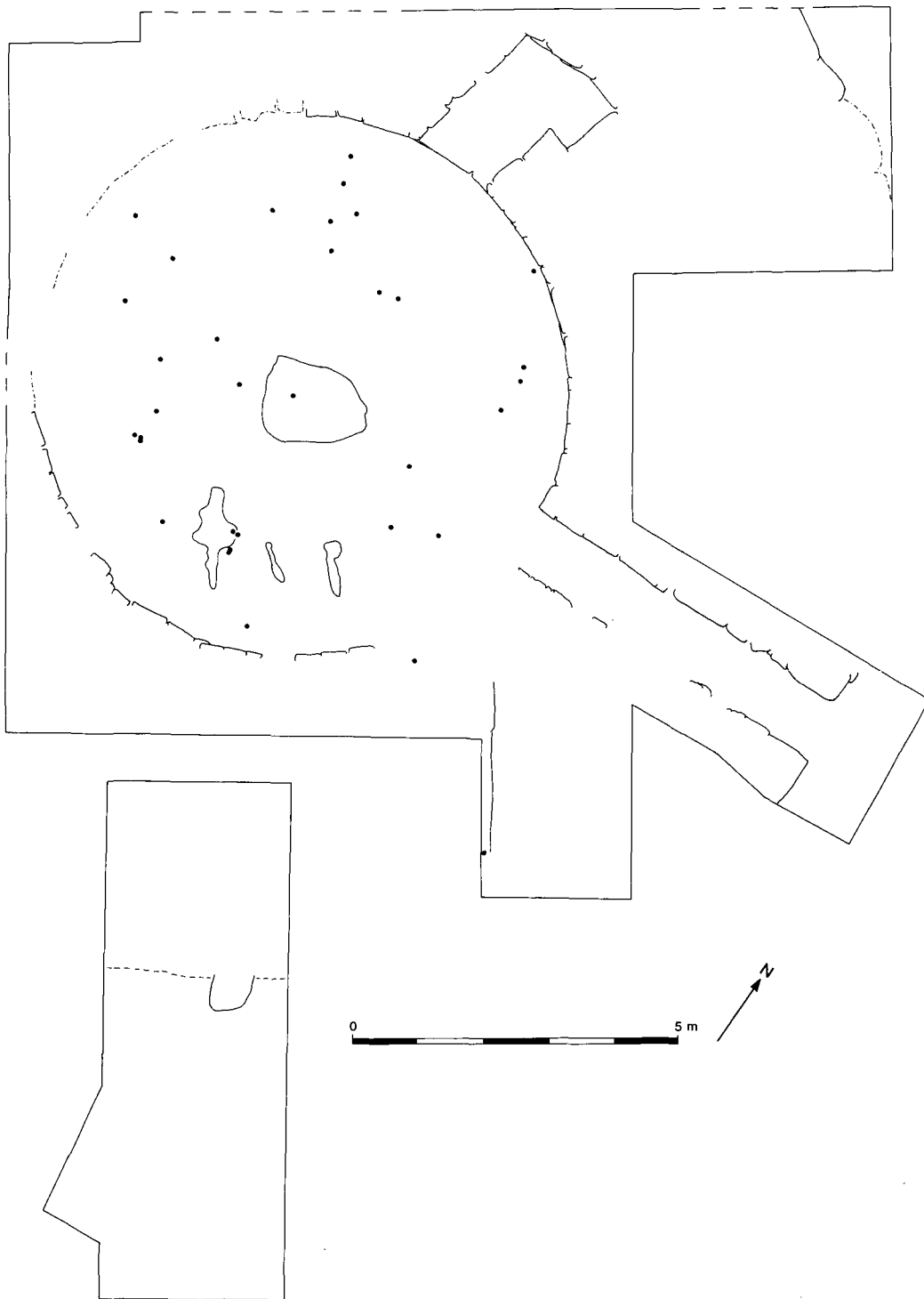
Recent work, especially in Wessex, has looked at how objects are incorporated in the archaeological record, and demonstrated that much superficially simple rubbish was purposefully deposited as a part of the community's rituals (Hill 1995). This kind of analysis has mainly been applied to deposits in pits and ditches, but work on the distribution of objects in round-houses has suggested patterns of activity related to the use of these buildings, with the daily cycle of activities mirroring the cycle of day and night (Fitzpatrick 1995). Fairy Knowe should be a valuable test case for such ideas.

Yet the question of the nature of the deposits must first be addressed. While the Phase 2 material, with a limited quantity of artefacts, is plausible as detritus on a floor surface, the quantity of artefacts within the broch in Phase 3 deposits is such that we must question whether it represents a living surface. It seems more likely to have stemmed from destruction or abandonment (there is some evidence for the former in the signs of burning). Hence the artefact distributions may have more to do with the fate of the house than its normal use and may represent an accumulation of material originally on several storeys. The nature of this fate is not clear, which makes interpretation difficult: for instance, while a destroyed site may preserve a 'snapshot' of the house in some circumstances, abandonment is likely to leave an entirely different set of traces, and purposeful deposition within the abandoned building cannot be ruled out. It is unfortunate that we cannot be more certain about the interpretation of the Fairy Knowe sequence, and if such an opportunity presents itself again, the application of soil micromorphology, phosphate analysis and magnetic susceptibility to clarify the nature of the deposits would be vital.

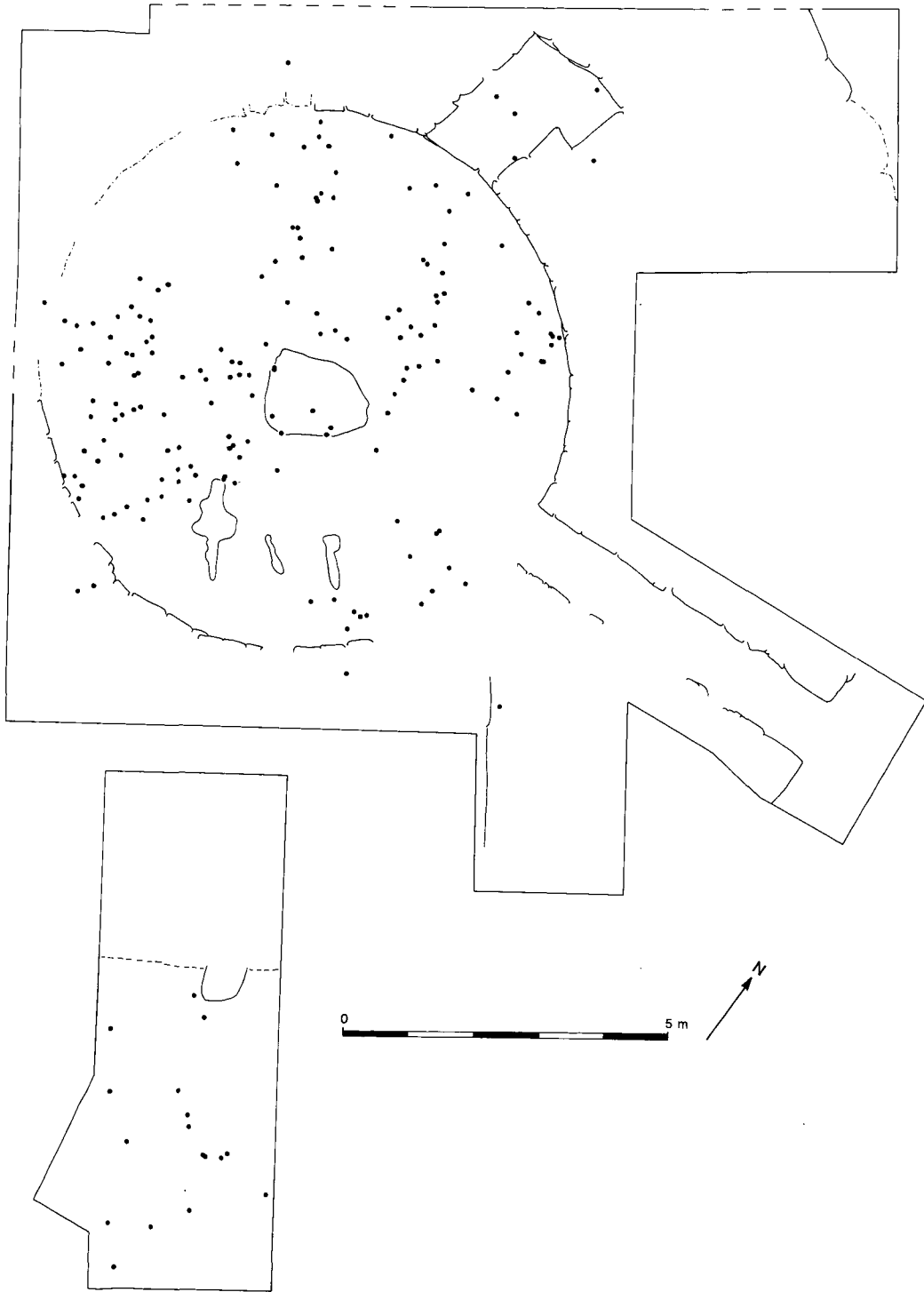
With these qualifications in mind, the distributions were considered to see what patterns, if any, emerged. Regrettably only half of the finds had precise findspots recorded, and a recommendation for future work is that three-dimensional plotting of all artefacts is vital: without this, we cannot approach the more detailed analysis which is the key to understanding the archaeological record. However, the sample which was plotted did reveal some interesting patterns on the macro-scale, and the excavator confirms that the unplotted material would not significantly alter these perceptions.

The gross distribution of all finds within the broch is plotted in illus 42 and illus 43 for Phases 2 and 3. In Phase 2 there is a general thin scatter across the broch floor, with no noticeable patterning. The Phase 3 distribution is characterized by its unevenness. While the blank from the doorway to the hearth could represent as an access route, that opposite the door, beyond the hearth, cannot be explained in these terms. There are blanks or sparse distributions on either side of the door in the north-east and (more markedly) south-east quadrants. The greatest concentration of material is in the south-west, with a scatter over the northern part of the broch as well. This is more restricted than the distribution of the black soil (Layer 4) which contains the material, suggesting the artefact distribution does not simply correlate with the presence of this layer.

This data looks promising: there are clearly processes affecting the broad patterning of material within the house. In detail, however, the distributions are frustratingly diffuse. There are



ILLUS 42 Distribution of finds in Phase 2



ILLUS 43 Distribution of finds in Phase 3

no clear groupings of functionally related types or of particular materials; rather, all follow more or less the broad pattern highlighted above. This means we cannot pinpoint specific activities within the broch: the crucibles and moulds, for instance, are not accompanied by any evidence of *in-situ* metalworking, and we cannot demonstrate whether this activity took place within the broch's walls.

What conclusions can be drawn from this work? There are broad patterns in the deposition of material within the broch. The concentration of material in the south-west quarter might tentatively fit Fitzpatrick's (1995; 1997, fig 78) model of daytime activities in the south of the house and night-time ones in the north. While we would not expect a direct concordance between early Iron Age Wessex and late Iron Age Stirlingshire, the scatter of material in the northern part is less easy to explain in this model. However, we are hindered here, as stated above, by our ignorance as to how and why these Phase 3 deposits formed. In Fitzpatrick's case study, the Dunston Park round-house had poorly preserved floor levels, and there were good grounds to believe the material had made its way into the features during the use of the house. The better preservation and more complex floor levels at Fairy Knowe serve to complicate interpretation, and we lack the detailed knowledge of taphonomy to help us. The work of Sharples & Parker Pearson (1997) in Shetland and South Uist on similar problems, tackled at the outset during fieldwork, may ultimately provide a guide in understanding such complex sites.

The data will merit re-examination as our knowledge increases. For the moment, we can say that different areas of the Fairy Knowe house were used in different ways, but the nature of the activities is uncertain.

Ritual

As indicated above, it is increasingly realized that ritual in the Iron Age was not a separate category like modern religion, but was bound in with the everyday (Fitzpatrick 1997). This can be seen in simple matters like the preference for east-facing entrances (as at Fairy Knowe), which can be linked to the daily cycle of the sun (Oswald 1997). Houses themselves had life-cycles, with offerings to mark their foundation, rituals connected with their use and ceremonies associated with their abandonment. For instance, the occurrence of offerings in pits under houses or in floors has been linked to foundation and propitiation rites (eg at Sollas, North Uist; Campbell 1992, 141–7; Armit 1996, 153–7), while the presence of high-quality artefacts in the broch at Hurly Hawkin has been seen in terms of offerings connected with the abandonment of the site (Hunter 1997, 115–16). This offers fertile scope for interpretation, although care is needed to avoid the subjective or wilful imposition of patterns on inappropriate data.

Does the Fairy Knowe data offer any evidence for ritual activities? The examination of the gross artefact distributions provided evidence of some structure to the evidence, which may have links with the cosmology of the inhabitants, although the details were not clear. However, in general, the picture is opaque. Clarke (above) commented on the possible significance of the quern built into the floor, and Hingley (1993, 32) has looked more generally at the possible symbolism of querns included as building materials, given their connections with the agricultural cycle and concomitant concerns with fertility. Clarke also noted the tendency of the stone ornaments to occur at the edges of the broch, and again Hingley (1990, 106–8) has discussed the significance of edge or boundary locations as places where ritual offerings were made to reinforce the bounds of the community, and hence its identity.

The difficulty in such analyses is to avoid imposing interpretations on the data. The artefact distributions at Fairy Knowe show patterning, but as discussed above this is hard to interpret.

One area which previous work has suggested could be profitable is the study of intact ornaments; while people might easily have lost brooches and rings, these were also seen as suitable offerings for the gods. The stone ornaments tend to cluster towards the edges of the broch; with the intact copper-alloy ornaments, we may note that the spiral finger ring 332 and the penannular brooch 322 (which lacks its pin) are both from the edges of the south-east quadrant, an area otherwise sparse in artefacts. This suggests adherence to the pattern of deposition in boundary locations, which may well be significant. The enamelled finger ring 49 could also be seen as a votive offering; its wear shows that it was carefully curated after breakage, emphasizing its value, while its patina is markedly different from the other copper-alloy objects, suggesting a degree of special treatment. The scale of the offerings is small, perhaps personal, and this offers a useful counterpoint to previous work, which focused on rather more spectacular metalwork (Hunter 1997). The uncertainty over the nature of the Phase 3 deposits means we cannot speculate as to whether they are offerings made during or after the life of the broch.

In summary, while the evidence is sparse and not clear-cut, there are hints of a pattern of ornament deposition at the edges of the house. While perhaps not convincing in itself, this does tie in with evidence from elsewhere, lending it rather more plausibility.

Contacts

The main evidence for contact is with the Romans, and this is discussed below. However, there is also evidence for other connections within Scotland and perhaps beyond. This is an area which has been under-studied in the Scottish Iron Age. The existence in Lowland Scotland of valuable metalwork showing clear signs of contacts to elsewhere in Britain and beyond (MacGregor 1976; Hunter 1997, 109, 121) ought to alert us to the networks in operation here. This is not to return to the days of diffusionism, nor to assign to such exotic artefacts a disproportionate role in the study of the Iron Age. However, the inhabitants at Fairy Knowe were clearly able to acquire artefacts whose ultimate source was upwards of 100 km away. The clearest examples are in the stonework, with the bowls from Loch Fyne and Argyll (29, 125) and the amber, ultimately from the Baltic (340, 518). The bracelet fragment (409), while not as exotic as the above, is also not of local material. It is of cannel coal, and probably derives from Carboniferous deposits which outcrop at various locations in the Midland Valley, some tens of kilometres distant (Cameron & Stephenson 1985). It is an unfinished piece, implying it came to the site as raw material rather than finished artefact, in contrast to the other exotica.

This is a very small amount of the total assemblage from the site, most of which shows no exotic influences at all. However, it is noteworthy that the exotic artefacts are either ornaments or vessels. Ornaments would have an obvious role as markers of personal status and identity, and it is no surprise that non-local ones should be sought out. The two bowls perhaps seem rather more unusual, and interpretation is hindered by the continuing doubts as to their function (Stevenson 1966, note 68) — this class of objects merit a fresh study. However, it is argued elsewhere (Hunter 1997, 119) that vessels had a particular significance in the Iron Age, not simply as containers, cooking or eating vessels, but as symbols of abundance, healing and rebirth (Green 1992, 57–8). In this light it is perhaps less strange that vessels of exotic and attractive stone would be sought-after goods.

The enamelled finger ring (49) also indicates something of contacts, or at least participation in a widespread metalworking tradition, as the distribution shows (above).

In summary, the number of exotic items may be small but they are of considerable significance. It is clear that while local resources provided for everyday needs, the inhabitants of

Fairy Knowe broch saw exotica, particularly ornaments, as an important part of their lives. While there has been insufficient work at other sites to assess the extent of exotic items in the assemblages, some of these artefacts are clearly rare finds, notably the amber. We may be justified, therefore, in interpreting them as markers of high status for the broch inhabitants. It is in this light that we should consider the Roman artefacts from the site.

Contact with Rome

Fairy Knowe is a very rich assemblage in terms of Roman goods. We may summarize the evidence for access to Roman material as follows: pottery — Samian, coarse wares, amphorae, mortaria; glass — container vessels, gaming counter; and bronze coins. In addition, Roman influences have been identified in the copper alloys employed, in the use of lead, and in one of the iron objects (451).

The range of Roman material is broader than on most native sites, and this accords well with MacInnes' (1985, 241–2) proposal that first-century Roman material is focused on certain sites. This breadth is unusual. As Robertson (1970, 200) noted, the Roman material in native contexts in Scotland is characterized by quality rather than poverty, with a strong bias towards the upper end of the spectrum. This is seen, for instance, in the great dominance of Samian over coarse wares. Fairy Knowe is unusual in its quantity of coarse wares, and especially in the presence of specialized vessels such as mortaria. However, there is still a strong selectivity operating. The pottery assemblage is dominated by Samian, including unusual forms such as the Drag. 22/23, while the pottery as a whole largely comprises tablewares or vessels connected with drinking (such as flagons). This suggests a selection by the inhabitants of pottery which they saw as useful, although their source of material, the military, itself shows a restricted and specialized range of pots (S H Willis, pers comm).

The bronze coins are also noteworthy. As Robertson's (1975) data illustrates, such coins are relatively rare on native sites, with silver being preferred. The presence of such small change at Fairy Knowe perhaps implies a trading relationship with the Romans, which may be hinted at also by the (possible) lead weights.

In summary, the evidence points strongly to a site in close contact with the Romans. The presence of a wide range of material here, in contrast to the more restricted range found on many native sites, suggests that there was a redistribution system operating within local society in which contact with Rome was mediated by chieftains on sites like Fairy Knowe. Having acquired Roman material through trade, exchange or diplomacy, these chieftains passed selected items on to dependants or peers in return for such commodities as tribute, service or respect.

Perhaps less appreciated is the role of the Romans as a source of raw materials. This can be seen at one level in the Roman pottery. While there is no reason to doubt this arrived at the site as whole pots (given the size of some of the sherds and the joins between others), much of it was reused after breakage: cut down to make smaller vessels, more appropriate perhaps to native use, or reused as rubbers, polishers or perhaps (for the Samian) cosmetics. This reuse of Roman material culture in a native context is even more marked in those materials which can be recycled: copper-alloy and lead. As described above, it was only with MacKie's (1982) observations that the significance of lead in native contexts was realized. While as yet we know little of the uses it was put to, it illustrates graphically the availability of new resources as a result of the Roman invasions.

More work has been done on copper alloys, and their analysis is proving a most fruitful area. Dungworth's discussion of the data (above) illustrates something of the complexities of

copper-alloy supply, and the active choices which went into alloy use, informed by more than simple technology. Qualitative analysis of the remainder of the assemblage by Eremin showed rather more gunmetal and leaded gunmetal than in Dungworth's sample, although it does not affect the broad patterns of a dominance of bronze and lack of brass. As Dungworth has observed, this indicates a deliberate choice for traditional alloys. Yet the influence of Roman metal was still felt. Much of the assemblage contains zinc at above trace levels, which must derive from remelted Roman metal (Dungworth 1997c). Taking 1% zinc as a cut-off point, some 44% of the copper-alloy objects included remelted Roman metal in their composition, showing its importance as a raw material.

This discussion highlights just a few of the implications of the Roman material from Fairy Knowe. As with much of the material from the site, it is an important assemblage, and it is to be hoped that its publication will stimulate others to ask further questions of it.

GENERAL DISCUSSION

THE TIMBER ROUND-HOUSE

There are a number of possible interpretations of the Fairy Knowe timber round-house plan. Some of these are shown in *illus 44* (nos 1–4), which also provides a comparison with the plans of other similar excavated round-houses in the Forth Valley (nos 5–7).

Option 1

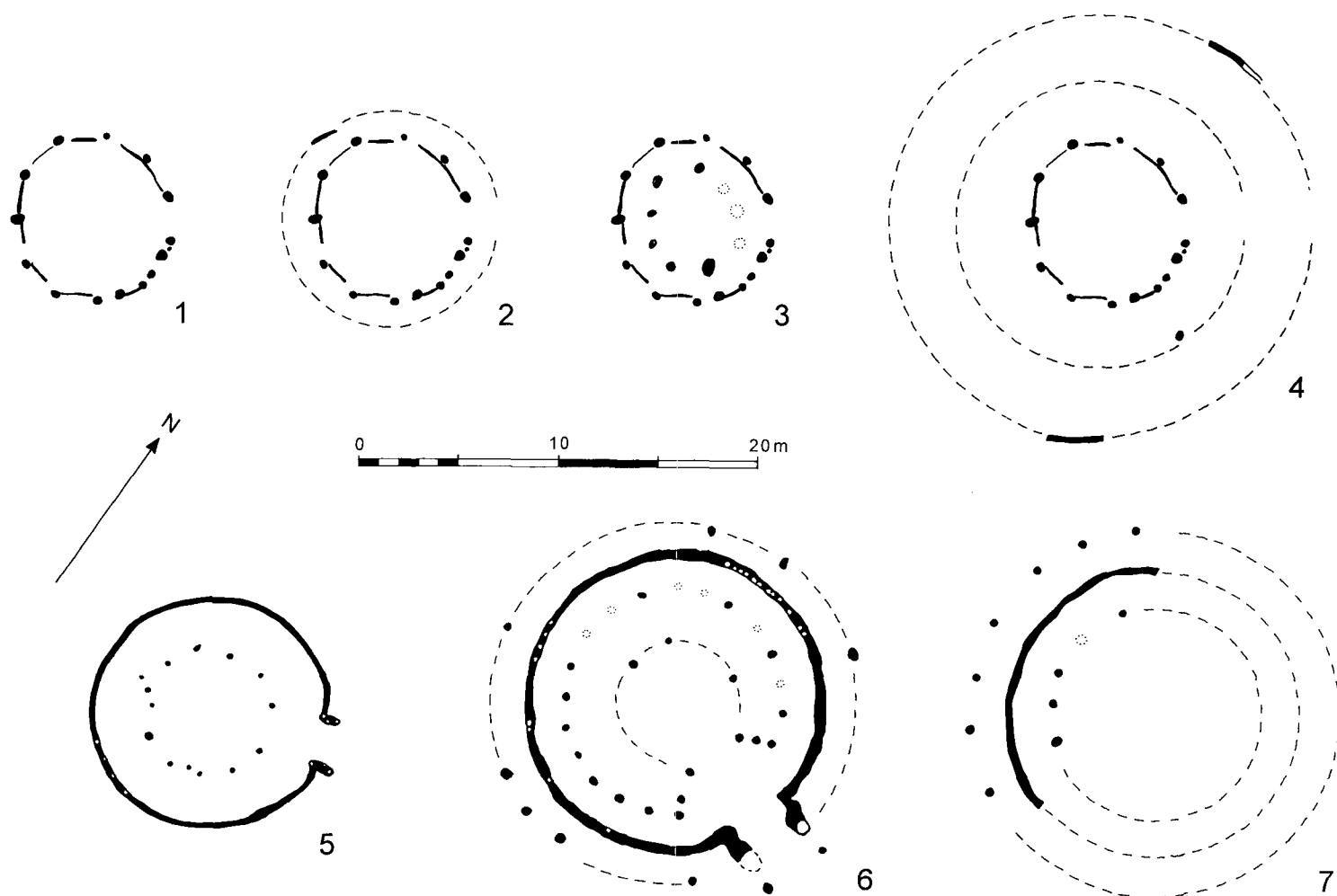
The house comprises the single post-ring and associated ring-groove giving an external diameter of c 8 m; it is surrounded by an outer palisade of some 21 m.

Hill (1982, 24) suggests that where a single ring of posts is interpreted as forming the outer wall and also supporting the roof 'it seems probable that these post-rings represent the internal roof supports of buildings, the outer elements of which had been destroyed or were obscured'. He argues (*ibid*, 27) that a post-ring is a structural component and not a house type in its own right. Musson (1970) had earlier recognized that some round-houses which at first sight in the archaeological record seemed to have been of single-ring construction were most probably double-ringed. If these arguments are accepted, they reduce the likelihood of option 1 being a viable proposition.

Option 2

The house comprises a double ring with the inner ring at c 8 m, but evidence for the outer ring is missing; once again it is surrounded by a palisade some 21 m in diameter.

Guilbert (1981) attempted the restoration of the outer wall line to houses where only an inner ring of post sockets survived intact. Following on from this work a survey of the available double-ring round-house plans which show a fairly uniform design led Hill (1984) to conclude that there is an optimum ratio between the diameters of the two rings. There would appear to be a structural balance when the area of the larger circle is twice that of the inner circle. This gives a ratio of outer to inner diameter of 1: 0.707. When this calculation is applied to the post-ring at Fairy Knowe it suggests an outer diameter of 11.31 m. It should be noted that linear slot F113 lies 1.1–1.5 m beyond the 8 m post-ring on the north-west (*illus 7*) and, when projected as the arc of a circle, results in a diameter of somewhere between 10 and 11 m. This could lend support to



ILLUS 44 Round-house comparative plans — 1 to 4: Fairy Knowe reconstruction options; 5: West Plean House II; 6: Lower Greenyards, Bannockburn, fort, House 1; 7: Lower Greenyards, Bannockburn, Homestead 1, House B

option 2. House 2 at West Plean (illus 44, 5) provides a comparative plan at 11.6 m in diameter (Steer 1956).

Option 3

The house comprises a double ring with the outer wall c 8 m in diameter and an inner ring of posts between the ring-groove and the central hearth; once again it is surrounded by a palisade some 21 m in diameter.

In this option, based on an 8 m external diameter for a double-ring house and using Hill's (*ibid*) argument in reverse, it might be expected that there would be an inner ring of posts at approximately 5.65 m diameter. There are some features in the interior which could have formed an inner ring of supports with an approximate diameter somewhere between 4.8 m and 5.4 m but it is not possible to allocate these definitely to the round-house phase.

Option 4

The excavated features comprise a triple-ring house with the outer wall at c 21 m, an inner wall at c 8 m and a third wall between these two.

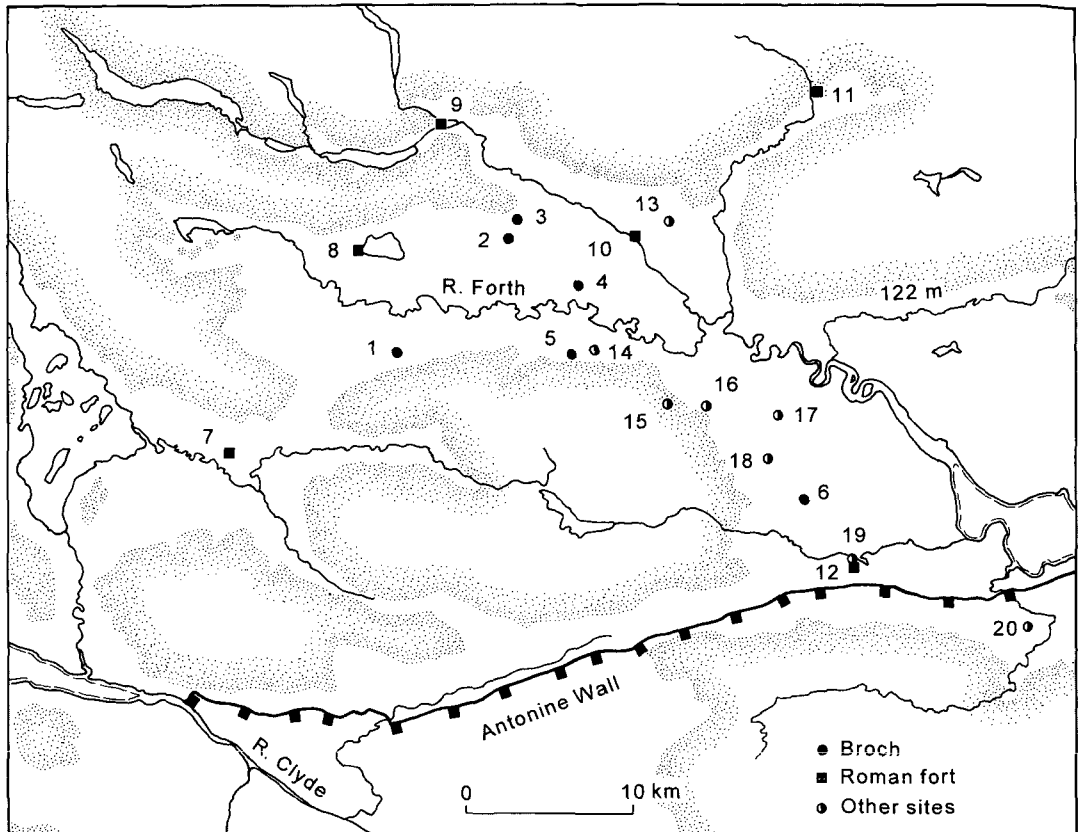
When Hill's (*ibid*) ratio is imposed in reverse on an external wall diameter of 21 m it suggests an inner wall-line at 14.8 m. Post-hole F134, in the south-east quadrant, lay under the wall core of the later broch. This could have represented the remains of a round-house wall with a diameter of 13.0 m and thus might support option 4. There is also the possibility that an inner fourth or alternative median ring may have existed at 10–11 m diameter (cf option 3). The option 4 house would seem to have been unenclosed, although it should be remembered that no excavations were undertaken outwith the confines of the mound and external defences may formerly have existed beyond the house.

In options 1, 2 and 3 the building represented would have been a timber round-house enclosed by a timber palisade. Such palisaded homesteads are widely distributed in the Scottish Iron Age. Locally excavated examples are known from West Plean (Steer 1956), Keir Hill, Gargunnoch (MacLaren 1958), Myrehead (Barclay 1983), Easterton of Argaty (Main 1989), and Bannockburn (Rideout 1996) (illus 45). Unexcavated examples are known mostly from aerial photographs where the sites survive only as crop marks (Maxwell 1982). A number of these are recorded in the Forth Valley, some only a few kilometres north of Fairy Knowe. The diameters suggested from aerial photographs for both the enclosures and the homesteads which they surround show considerable variation (Maxwell 1982, 51).

Large timber houses such as that represented by option 4 are an established feature of both Lowland Scotland and northern England during the late first millennium BC. They include a number of excavated examples, including Scotstarvit at about 18.4 m (Bersu 1950, 250, fig 6, central house Phase 1), West Brandon House B at c 16.8 m (Jobey 1962, 14, fig 5), Camelon native site House 2 at 14.64 m (Proudfoot 1980), and Bannockburn Fort, House 1 and Homestead House B, at 18.0 m and 18.6 m respectively (Rideout 1996). For the suggested reconstruction of such houses see Rideout 1996, 260–2.

At around 21 m in diameter the Fairy Knowe house would be at the top end of the scale.

These large timber houses tend to be found in prominent locations forming obvious features in the landscape. It should be noted that some of these houses are also enclosed by an outer palisade. Such houses could all be classed as 'substantial' on the basis of the scale of their construction (Hingley 1995, 186). Such large scale is often also associated with evidence for the



ILLUS 45 Distribution of Roman forts, brochs and other Iron Age sites in the Forth valley — Brochs: 1. Fairy Knowe; 2. Easter Borland; 3. Boquhapple; 4. Coldoch; 5. Leckie; 6. Torwood; Roman forts — 7. Drumquhassle; 8. Malling; 9. Bochastle; 10. Doune; 11. Ardoch; 12. Camelon; other Iron Age sites — 13. Easterton of Argaty palisaded homestead; 14. Keir Hill homestead, Gargunnoch; 15. Castlehill Wood dun; 16. Wallstale dun; 17. Lower Greenyards fort and homestead, Bannockburn; 18. West Plean palisaded homestead; 19. Camelon 'native' 'fort'; 20. Myrehead palisaded settlement

complex internal division of space (following Hingley 1993, 27). On this basis the Fairy Knowe option 4 round-house certainly falls into the class of substantial houses under the scale criterion. While it also seems likely that some of the possible internal divisions (illus 13) may reflect divisions within the timber round-house, this could not be proven since it was not possible to allocate the majority of these features to Phase 1 or 2.

THE RELATIONSHIP OF THE TIMBER ROUND-HOUSE AND THE BROCH

Following a series of excavations in the Tyne/Forth area, Jobey (1975) recognized that stone-walled buildings were frequently preceded by wooden structures of similar size, which occupied the same building stance, and that in certain cases this sequence could have pre-dated the arrival of the Romans. This led to the conclusion that the distinction between stone and timber construction as a cultural phenomenon must be treated with caution (Hill 1982, 27).

There is also some evidence in the Atlantic Province for the appropriation of old house sites, especially those which could be described as substantial, and the reconstruction on them of

substantial new houses. Hingley (1993, 16) proposes that such reuse of substantial house sites and the reconstruction of the ruined houses of their predecessors could have served to enhance the status of the new household. The recreation of a substantial house may represent the continued power of a particular locally dominant household. There are a number of possible explanations for the motivation behind the construction of a substantial house. It may represent a projection of both status and power or act as a symbol of social isolation (Hingley 1995, 187).

The ground plans of the timber round-house and the broch at the Fairy Knowe are so closely matched that it is apparent that the broch is the direct replacement in stone of the earlier wooden house. Although it is considered that the round-house had already fallen into disuse with the decay of the wooden uprights of the post-ring in their sockets and the probable subsequent collapse of the building, some clear evidence for the former existence of the timber round-house and its layout must have been visible when the decision was taken to reuse the site for the building of a broch of such similar dimensions and plan. On a like-for-like basis, the closest parallel between the two buildings is provided by the option 4 round-house, where a timber house some 21 m in diameter with an inner ring of posts c 8.0 m across is replaced by a stone house 19.2 m in external diameter enclosing a courtyard 8.2 m across. It should, however, be noted that there would be more space in the round-house because diameter of the internal space is much bigger.

THE BROCH

When the Stirlingshire *Inventory* (RCAHMS 1963) was published only two brochs, Tappoch and Coldoch, were recorded in the Forth Valley (illus 45). At that time they were viewed as representing a locally unfamiliar type of Iron Age monument (RCAHMS 1963, 30) forming part of an outlying group of brochs known as the Tay/Forth/Tweed group. Subsequent fieldwork has confirmed four more — at Fairy Knowe (Main 1978), Leckie (MacKie 1982), Boquhapple (Nicoll 1975) and Easter Borland (Chrystal 1903, 138) — increasing the Forth Valley group to six, including three excavated examples at Fairy Knowe, Leckie and Tappoch (illus 45).

Few of those structures currently classed as brochs still possess evidence (in the form of at least one upper gallery or a void in the inner wall face) for the former existence of a high double wall. Some brochs are galleried on the ground floor while others have a solid base with the walls dividing at first floor level to provide the characteristic hollow wall construction. The majority of brochs are interpreted as such on the basis of a number of distinctive features: circular ground plan, massively thick walls, narrow entrance passage and a scarcement ledge. On this basis it has been assumed that the stone-built structure at Fairy Knowe is a broch of the solid-based group, even though the walls survived to an insufficient height for any remains of a scarcement ledge or any upper galleries to be noted. The brochs at Tappoch, Leckie and Coldoch have also been classed as solid-based.

There is now a widely held view that brochs are simply large round-houses, a view which was first promoted 50 years ago by Scott (1947). This is more readily accepted if the view expressed by Fojut (1981) that many brochs were not very high towers is also accepted. At Fairy Knowe the broch could reasonably be considered as a stone round-house which incorporates a number of typical broch features, such as massively thick walls, intra-mural chambers and a narrow entrance passage, but which lacks a number of other standard broch features, such as evidence for double wall construction, scarcement ledge, door checks and bar holes. The Fairy Knowe broch is considered to be an elaborate stone version of an existing local architectural tradition already apparent in the construction of large isolated timber round-houses.

DATING THE SEQUENCE

Four radiocarbon dates were derived. These have been calibrated by Patrick Ashmore using OxCal 1986 (Stuiver & Kra 1986) with corrections advised by Mike Stenhouse. Species identifications are by John Barber (GU-1244) and the late Camilla Dickson (GU-1107–9).

TABLE 11

Radiocarbon dates

Lab code	Context/Sample	Yrs BP	Calibrated date (two sigma)
GU-1244	Charcoal (<i>Quercus</i>), from post-hole F93 in the roundhouse post-ring.	2030 ± 110	400 BC–AD 250
GU-1107	(<i>H. vulgare</i> , <i>A. fatua</i> , <i>polygonum persicaria</i>) from the black soil (Layer 4) in the broch interior. Seed charcoal	1870 ± 180	400 BC–AD 550
GU-1108	Charcoal (<i>Alnus</i>) from the black soil (Layer 4) in the broch interior.	1750 ± 110	AD 1–AD 550
GU-1109	Charcoal (<i>Alnus</i>) from broch destruction Layer 3d.	1740 ± 110	AD 1–AD 550

A 95.4% confidence level represents an 82.8% chance that all four dates lie between the quoted limits

In the absence of any dateable artefacts, the date of the round-house is dependent on a combination of the radiocarbon date for one of the oak posts, the relationship of the round-house to the later broch and to a consideration of parallels elsewhere and particularly in the local area. The broch can be more closely dated by an analysis of the Roman artefacts which were recovered.

An examination of the radiocarbon dates shows that the statistical deviations from the central dates are so great that they cover the broad period, from the late pre-Roman Iron Age to the late Roman period placing the construction, occupation and abandonment of the round-house and the construction, occupation and destruction of the broch which replaced it anywhere between the fifth century BC and the sixth century AD.

Dates for excavated examples of round-houses, where these are available, generally fall in the mid to late first millennium BC (eg Bannockburn fort House 1 at between 790–400 cal BC: Rideout 1996). The calibrated radiocarbon date for the oak timber from the Fairy Knowe round-house is between 400 BC and AD 250. Barber (above) suggests a life-span for the round-house of 20–25 years, taking account of the wet conditions which existed on the clay mound upon which the house stood. However, it should be noted that his arguments related to the longevity of a post-ring which had formerly been thought to be the outer wall of the building. In addition, a building which is permanently occupied and maintained in good condition could well have survived in use for a longer period, perhaps of the order of a century. Barber also suggests that the broch at Fairy Knowe was built probably less than a century after the round-house went out of use. The close relationship between the ground plans of the round-house and the broch confirms that some remains of the former were still visible when the latter was constructed on the site and that the time gap between the abandonment of the round-house and the construction of the broch could have been considerably shorter. In view of this and the presence of Flavian material from the broch, a date in the first century BC/first century AD is suggested for the round-house construction, occupation and abandonment.

The presence of Flavian material suggests a likely *terminus post quem* for the occupation and destruction of the broch, but does not, however, date its construction, which could conceivably have been some time in advance of the Roman arrival in the area. If Roman material was most readily acquired by the native population while the Roman army was in the area, then Fairy Knowe was probably in occupation soon after the arrival of the Roman army under

Agricola in AD 79 or 80, when Flavian material became locally available. Two coins of the Emperor Vespasian were recovered from the broch, one of which came from the clay floor beneath the destruction layer. The late Anne Robertson has confirmed (above) that although one coin (SF 145) was corroded, it showed no signs of heavy wear, suggesting that it was likely to have been in circulation for only a short period before arriving at the site, probably in the late first century AD. This view is consistent with other specialist reports on the Roman glass and pottery from the site.

Macinnes (1984, 241) indicates that first-century Roman material is found in abundance on only a few native sites. They are predominantly large isolated sites of some architectural complexity (eg Hyndford crannog, Torwoodlee, Leckie and Fairy Knowe brochs).

At Torwoodlee, quantities of late first-century pottery and glass were found both inside and under the broch favouring a date in the late first or early second century AD for its construction and occupation. The absence of any later Roman artefacts probably mitigates against a late date for its abandonment/demolition, suggesting that this happened before Antonine material became locally available. Although Hurly Hawkin and Leckie are also thought by their excavators to have been erected in the late first century AD, second-century pottery from both sites indicates that these two brochs continued in occupation until after AD 139 and their destruction post-dated the beginning of Antonine period. At Leckie, the pre-broch hut was also associated with Roman pottery (MacKie 1982). However, since there is no definite Antonine material from Fairy Knowe it is proposed that the end of the broch occupation came prior to the start of the Antonine period. The dating evidence from the excavated Lowland brochs is therefore not entirely consistent. Of these only Leckie and Hurly Hawkin have produced certainly later Roman material while others such as Edin's Hall produced no Roman material. The implication that at least some of the southern brochs were constructed and occupied at an early stage in the period of Roman activity in Lowland Scotland seems unavoidable. Indeed there need be no one reason or date for their destruction/abandonment (Macinnes 1984, 238). Variations from site to site would have been influenced by local circumstances.

There is also the question as to how the Flavian material found in such quantity at Torwoodlee, Leckie and Fairy Knowe reached these sites. It could have been obtained either by trade during the late first-century AD Roman occupation of the area or looted a short time later from abandoned Roman forts. At Torwoodlee the excavator (Piggott 1953) concluded that the broch was both built and systematically demolished during the interval between the two Roman occupations of Scotland and in this scenario Roman material was allegedly acquired from abandoned Roman sites in the vicinity. The nearest Roman sites to Fairy Knowe are the line of Agricola's 'glen-blocking' forts which include Drumquhassle (Drymen), Malling (Port of Menteith), Bochastle (Callander) and Doune (illus 45), of which the nearest is the fort at Malling on the Lake of Menteith lying only some 6 km to the north across the River Forth (illus 45). Additionally, the important Roman road north through the major forts at Ardoch and Camelton, which crosses the later Antonine Wall in Falkirk and must have required a fort in Stirling to guard the crossing over the River Forth, lies some 21 km to the east. However, the likelihood of looting being a viable suggestion for the appearance of such material at Fairy Knowe is compromised by the high degree of selectivity which has clearly been exercised in the acquisition of Roman artefacts by the occupants of the broch (eg the rarity of some of the pottery types, especially Drag. 22/23 and the glass, being all from one type of vessel). In addition, the presence of large sherds of Roman pottery and a number of joining fragments also seems to suggest that at least some of the material came to the site as intact vessels.

THE BROCH BUILDERS

MacKie (1981, 67) suggests that at least some of the southern Scottish brochs were set up by warrior chieftains and their armed followers and households who had come down from the far north and established themselves with the agreement of the Roman authorities, sometime during the Flavian period, probably in the AD mid-80s. He considers that these broch people were allies of Rome, encouraged to come south to form a buffer state north of the frontier, after the Roman withdrawal from Scotland before the end of the first century. Hamilton (1968, 108) had also argued that the Lowland brochs were built by northerners invited as mercenary defenders or invaders from the north and Piggott (1953) linked the appearance of brochs in the southern mainland and the first penetration of this area by the Roman forces in AD 79 or 80. He further suggested that the broch builders expanded into the area to fill the power vacuum left by the withdrawal of the Roman forces and dated the occupation of the broch at Torwoodlee to the period between the two Roman occupations. By 1978 this view had softened somewhat with the Lanarkshire *Inventory* (RCAHMS 1978, 28) suggesting that the Lowland brochs were built as a result of gradual infiltration of small detached groups of northern tribesmen rather than by a concerted invasion. Taylor (1993) indicates that the broch at Hurlly Hawkin was built and occupied in the late first to early second centuries AD but then concludes, following Piggott (1953), that the broch builders appeared in the first half of the second century. Another suggestion has been that the brochs were built by a class of professional broch builders from the north. The relatively poor quality of the masonry construction in parts of Fairy Knowe and Coldoch brochs (Graham 1949, 12–14) using readily available local materials, casts some doubt on this idea.

The apparent lack of artefactual evidence from the excavated Lowland brochs which is clearly of northern origin, particularly domestic items such as the fine native pottery which is characteristic of broch material culture in both the Hebrides and the far north (MacKie 1989), would also seem to mitigate against the acceptance of any theory of a wholesale movement of broch builders into the area. Perhaps a more straightforward explanation of their presence was as a result of a network of extensive social and political contacts within Scotland at this time (Hingley 1993, 28). Contacts associated with links such as those of kinship, marriage and trade (this last reflected in the artefact assemblage at Fairy Knowe) would provide a satisfactory alternative to a movement of people in explaining structures outwith the main 'broch province' which display a number of typical broch features. This suggestion is given additional credibility by the excavations at Fairy Knowe, where it can be viewed as continuing a local tradition of substantial round-house building. This is especially reflected in the transition from timber to stone-built round-house on the same site and on almost exactly the same plan, with the same central focus of the hearth, and perhaps incorporating similar internal subdivisions with an entrance on the east.

CONCLUSIONS

Many of the Roman objects from the site are high-quality 'luxury' goods such as glass and Samian and there is an equally impressive range of high-quality artefacts of native manufacture. Similar first-century finds are known from crannogs, duns and other brochs, including locally from Leckie (MacKie 1982), Castlehill Wood Dun (Feacham 1957) and the homestead at Keir Hill, Gargunnock (MacLaren 1958), although in the case of the last two only small numbers of finds are involved. Macinnes (1984, 243–4) suggests that exchange between Romans and natives

in the late first/early second century AD was dominated by a native élite occupying these brochs, crannogs and duns and that the distribution of Roman goods may have been constrained by internal social and political factors.

That the broch occupants practised a mixed-farming economy is reflected in the range of domestic animals identified in the bone assemblage from the site, the presence of several rotary querns and the identification of cereals, especially barley. The evidence also illustrates the presence and probably deliberate use of wild plants such as hazelnuts and wild garlic, also game such as deer and wild boar. Its central hearth and the artefact assemblage confirms the permanent domestic use of the building. The broch at Fairy Knowe functioned therefore as a fortified farmhouse. But the evidence from the artefact assemblage also confirms that the occupants of the broch were a wealthy native family of high social status. They had contact with the Roman forces occupying Scotland in the late first century AD and their links to Iron Age communities elsewhere in Scotland, and indeed beyond, are reflected in their possession of stone bowls from Argyll and Loch Fyne and amber beads from across the North Sea. That they had a sophisticated knowledge of both bronze and ironworking, reusing metals acquired from Roman sources, is clear from the various metallurgical analyses which have been undertaken on both the copper-alloy and ferrous material from the site.

Hingley (1993, 40) proposes that substantial houses (which both the broch and the round-house at Fairy Knowe are considered to be) are either the houses of the élite in a hierarchical settlement pattern, or a distinctive house type within a relatively egalitarian social context, wherein the individual household was isolated from other households within the society. Excavated evidence for the contemporary settlement pattern of the rest of the Forth Valley is insufficient to allow a firm conclusion to be drawn at this stage as to which model applies but it is a topic which would undoubtedly benefit from further study.

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