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FICHE 2: CONTENTS

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EXCAVATIONS AT DUNOLLIE CASTLE, OBAN, ARGYLL, 1978

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CONTENTS

INTRODUCTION

The excavation at Dunollie Castle which is reported here was part of a programme of research on Early Historic fortifications in Scotland - that is, fortifications which are dated to the 7th-9th centuries AD on the basis of historical references. The general character of the programme was set out in these Proceedings, Vol 116 for 1986, and need not be repeated here. Three aspects of the excavations which formed part of the programme must, however, be stressed. First, work concentrated on the defences, at the expense of research on the occupation area of the sites. Secondly, although most Early Historic forts came to be overlaid by medieval castles, excavation concentrated largely, but not exclusively, on the earlier phases. Thirdly, in consequence of this policy, the excavation reports concentrate on artefacts of the 6th-9th centuries, and later material is only briefly catalogued.

The present report first surveys the history and topography of Dunollie as it was known before excavation. The structural and artefactual data revealed by excavation are then described in detail; the chronological evidence is surveyed; and finally the character of the two earliest defensive structures is established in a section of synthesis. An illustrated catalogue of the finds then follows.

Like others in this series, this Full Report is directed narrowly at reporting and interpreting the evidence from Dunollie itself. A wider and more speculative view of Dunollie against the background of Lorn, and in relation to contemporary fortifications, will be found in the Summary Report in the printed section of the Proceedings.

HISTORY AND TOPOGRAPHY

The historical indications of an Early Historic fortification at Dunollie come from the Annals of Ulster (MacAirt & MacNiocaill 1983), and especially from that section which, it is considered, was compiled at the Iona monastery, some 60 km from Dunollie itself (Bannerman 1968; 1974, 9-26). It has, indeed, been said that 'notices of battles are quite convincingly contemporary from the 680s onwards' (Anderson 1973, 1980, 14). (Illus 10).

The relevant entries may be translated as follows:

686 Tula(?) burned Aman(?) of Dun Ollaigh

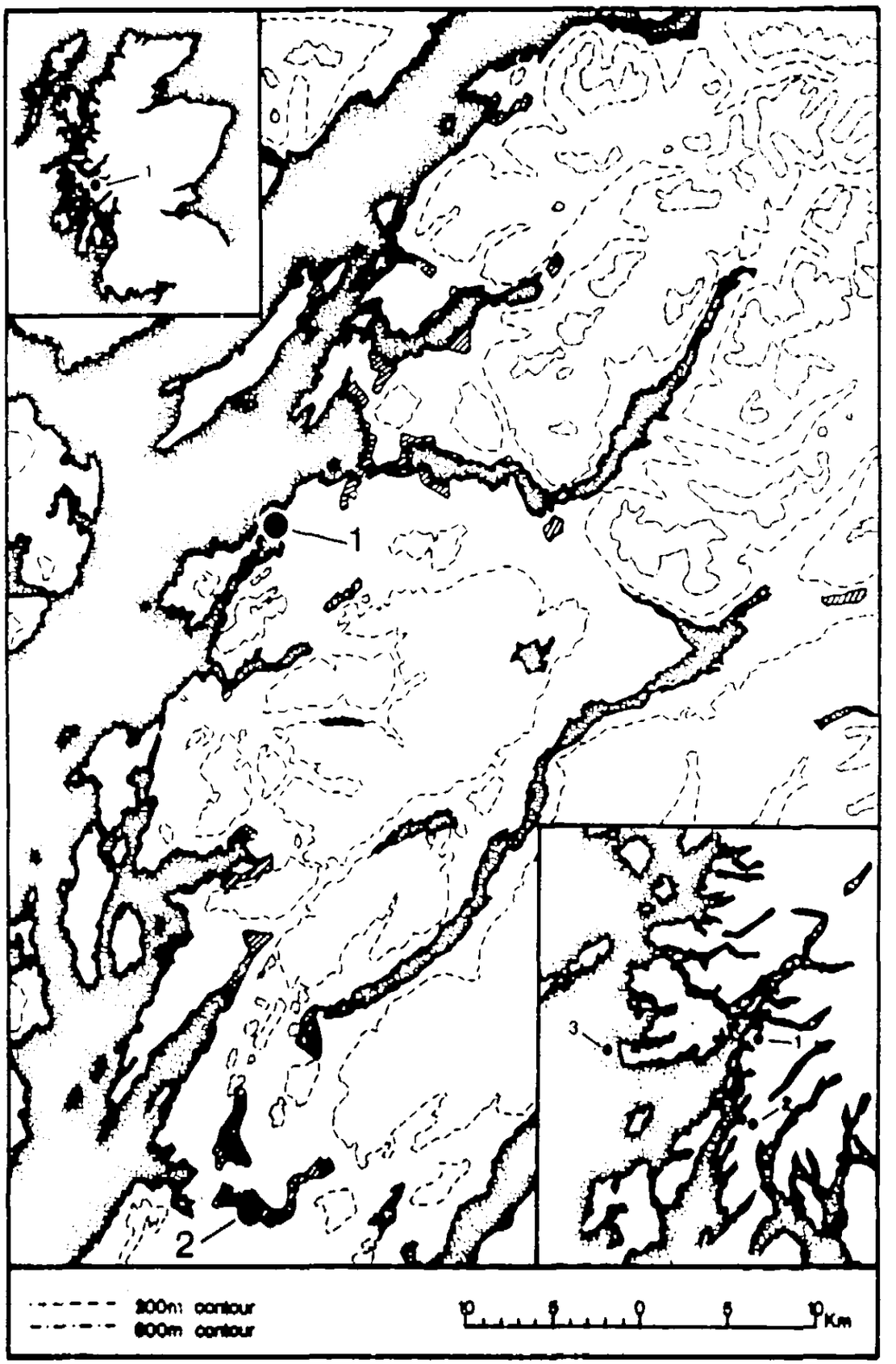
698 Burning of Dun Ollaigh

701 Destruction of Dun Ollaigh by Selbach

714 Dun Ollaigh is built by Selbach

734 Talorgan son of Drostan is captured and bound near the citadel (arcem) of Ollaigh

Of the persons mentioned in these entries, Selbach is readily identified with Selbach son of Ferchar Fota, of the kindred of Lorn (Cenel Loairn), a contender for the kingship of the Scottic kingdom of Dal Riata in the late 7th and early 8th centuries. It is usually considered that the reference to his building of Dun Ollaigh in 714 should be understood as the rebuilding of a site which he had previously destroyed; and it will appear in the sequel that he may have been responsible for the major building work of Rampart A in Phase 2 of Dunollie. Talorgan son of Drostan is shown by his name to have been a Pict. He may have been a rival to the powerful Pictish King Oengus son of Forgus, and have been betrayed to Oengus by a Dal Riata leader as a move in the



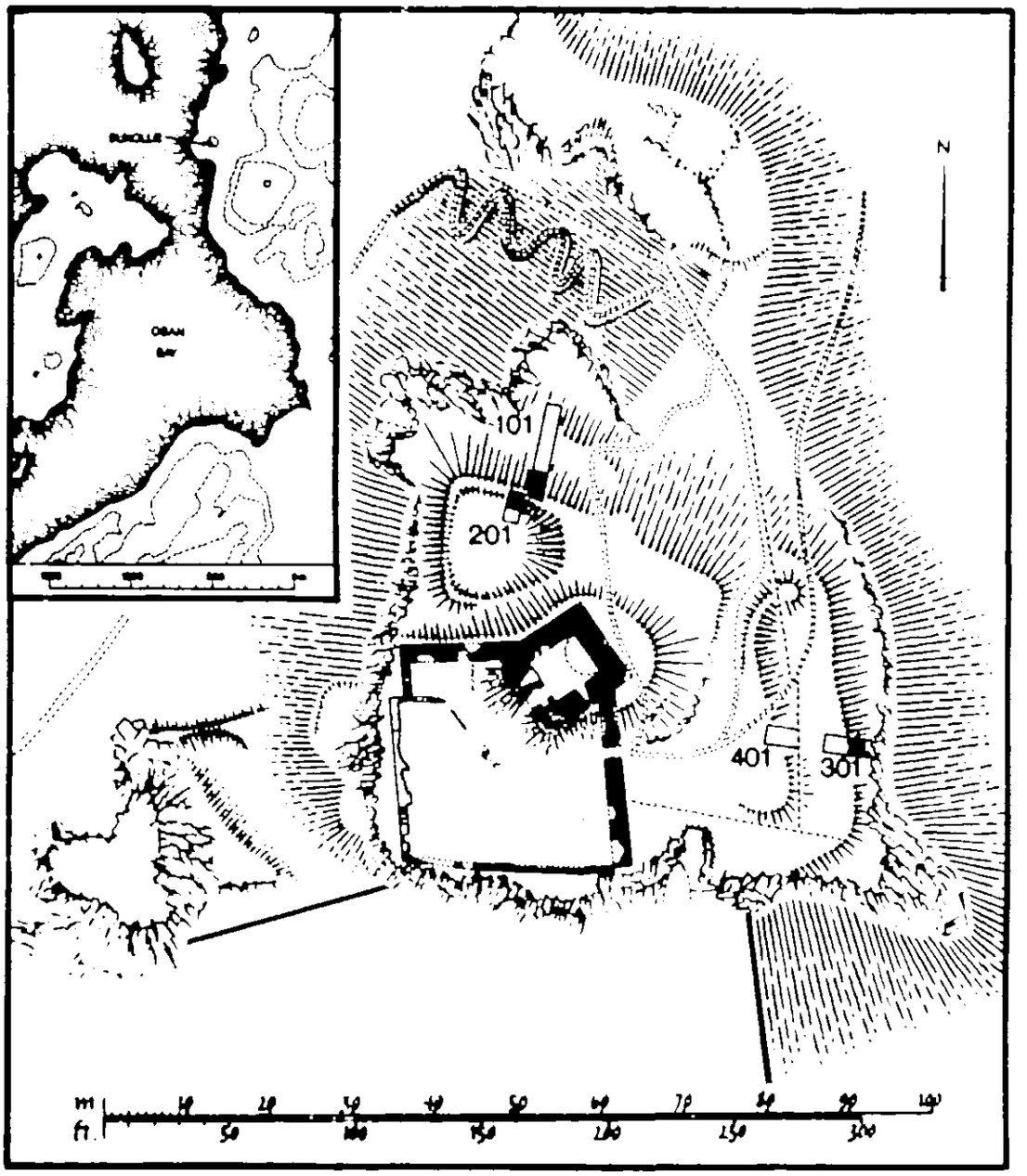
ILLUS 10 Location maps for (1) Dunollie, (2) Dunadd, (3) Iona. Hatching marks better land, as defined by the Macaulay Institute for Soil Research.

Scotto-Pictish struggle for dominance. Tula and Aman are otherwise unknown, and the meaning of this element in the annal for 686 is not altogether certain: indeed, some doubt may be felt about the integrity of this particular entry.

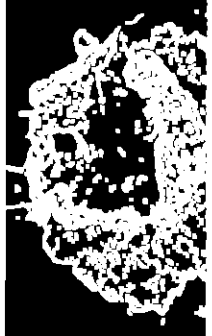
In summary, then, the annals provide evidence for activity at or around a fortified place - dun in Irish, arx in Latin. It was burned in 698 (and less certainly in 686); destroyed in 701, suggesting perhaps that the burning of 698 was not complete; it was rebuilt in 714, perhaps on a scale worthy of note; and it was a useful locational marker for an important politico-military event in 734. The identification of Dun or Arx Ollaigh with the modern place-name Dunollie seems assured on both philological and traditional grounds. Despite the gap of many centuries between the events of the Iona Annals and the building of the late medieval tower house, Dunollie Castle, it is natural to seek the original Dun Ollaigh on the same site (illus 11).

The history of the castle is bound up with that of the MacDougall lordship of Lorn. It may be summarized from the account given in the Lorn Inventory (RCAHMS 1975, 197-8). Dunollie may have been one of three otherwise unnamed Lorn castles mentioned in a document of c 1308. It would have been forfeited by the MacDougalls as a result of their defeat by Robert I in 1309, and was only regained by the family in 1451. Their re-establishment at Dunollie may have been the occasion for the building of the tower house. The family, and on occasion the castle itself, were involved in the wars of the 17th and 18th centuries, and these have left some mark in the archaeological evidence disclosed by the present excavation.

The site of the medieval castle is 'a basalt-capped sandstone



ILLUS 11 Dunollie Castle and earthworks, planned by the Royal Commission on the Ancient and Historical Monuments of Scotland, showing the 1978 cuttings, and the exposed traces of Rampart A (Crown Copyright). Inset, Dunollie Castle in relation to Oban Bay: contours at 30 m, 60 m and 90 m.



crag at the Oban harbour entrance' (Whittow 1977, 202). The crags fall precipitously on the east, south and west, where they are most closely approached by the modern shore line. To the north, however, the summit sends out a broken spur, which descends in steps and gentler slopes, partly into a wide gully. The tower house and its courtyard occupy about one third of the overall summit area, with the west and south sides of the courtyard standing actually at the head of the crags, and the tower itself sitting on the highest point of the summit. To north and east, however, the line of the masonry castle walls are set well back from the steeper slopes; and it is here that we find the traces of apparent banks or ramparts which formed the subject of the excavations.

It is not easy, however, to give a coherent account of these banks, because at the northeast corner there has been considerable landscaping in order to create terraced paths. One of these zig-zags down to the beach on the NW while the other runs NE to Dunollie House, which replaced the castle as the MacDougall residence in the mid-18th century. To the W of the zig-zag path, a rampart with strongly marked inner and outer slopes runs out to the cliff, and then returns to the S. Below this rampart on the N, there are slight surface indications of a silted ditch and counterscarp bank. Beyond this again, broken ground drops off northwards into the wide gully. Essentially the appearance is that of a double-banked defence.

To the E, two courses of a drystone revetment were visible before excavation at the head of the eastern cliff. Some 10 m W of this, a well-defined terrace suggested a second parallel bank. In other words, the surface appearance was of a double ramparted

defence on both N and W, the continuity of the banks being broken by the terraced path and other landscaping at the NE corner.

Trenches were laid out therefore to test two hypotheses:

1) that the surface indications had been correctly interpreted in terms of double ramparts running continuously round the E and N side of the hilltop
2) that these ramparts had no structural or chronological association with the masonry castle, but were those implied by the 7th and 8th century annals.

In the sequel, it will appear that hypothesis 2 was correct but over-simplified, whereas hypothesis 1 was almost certainly incorrect.

THE EXCAVATION

CHARACTER OF THE EXCAVATION AND REPORT

The objectives of this excavation, like those of others in the overall campaign of research, were simple: to test the identification of Dun Ollaigh of the Annals with the site of the later Dunollie Castle; and in particular, to see what, if any, marks the burnings, destruction, and building of the written sources had left in the archaeological record. To this end, a team of 9 students from the Archaeology department of Glasgow University excavated from August 27 to September 15 1978. The weather over this period was often poor, and digging and recording were further hampered by trees and their roots. Despite these difficulties, significant contributions were made to our knowledge of Dunollie itself, as well as of the middle ages in coastal

Argyll.

Given the research objectives, excavation was limited to those defensive features which had no obvious connection with the masonry castle. As has been described above, these were a pronounced bank, and apparent ditch, to the north of the tower and courtyard wall, at the head of the northern spur of the castle stack; and terraces and revetments to the east of the masonry castle, above a vertical crag. In each case, the excavation took the form of a trench 2.0m wide: wide enough, it was hoped, to pick up traces of timber palisades and revetments if there had been such (illus 11).

The excavation is presented thus. The northern cuttings, 101-201, are described first, because the evidence from them was both richer and more coherent than that from the eastern cuttings, 301-401. An interpretative account of the stratified sequence is first presented, illustrated with a schematic section (illus 12). This is then supported by a detailed list of observed features and special finds, which is slightly edited, principally by way of condensation, from the original site record. This is supported by a veridical section, essentially a fair copy of that recorded in the field (illus 13).

In the case of cuttings 301-401, the relative simplicity of the stratification removes the need for a schematic section. The account of the sequence of stratification is therefore followed by a fair copy of the on-site section (illus 14) and the list of features and special finds.

Having thus established the structural sequences on the north and the east independently of one another, the chronological evidence is then deployed. The key to the correlation of the

structures with the historical references is a series of radiocarbon dates from cutting 101. These are supported by stratified finds, especially from the northern defences: on the east, especially in 301, it will be seen that the stratification of finds has been very seriously disturbed by tree roots.

Finally, in a section of synthesis, correlations are proposed between the major structural phases in 301 and 101-201. This leads on to speculations about the layout of Dunollie in its two earliest structural phases, coinciding with the references in the Annals: that is, with Early Historic Dunollie.

THE SEQUENCE OF THE NORTHERN DEFENCES

Because of the configuration of the modern ground surface, it was decided to lay out the trench across the northern defences as two separate cuttings, staggered either side of a common section face: 101 to the north, or scarp side, of the crest of the bank, and 201 to the south or rear. Because the bedrock falls from west to east as well as from south to north, there is an imperfect match at the junction of the two cuttings. Fortunately, as the on-site section (illus 13) makes clear, layer 208 forms a strong link between the two; but reference to the schematic presentation of the rampart layers (illus 12) is needed to pull together the evidence from the two cuttings.

Before any detectable human occupation of the Dunollie summit, bedrock was falling gently and brokenly to the north (and also the east) at an average angle of about 9° from the horizontal. The earliest human activity, in Dunollie 1, is represented by a layer of charcoal, 119, which is dated to the

middle or later Ist millennium AD by a composite comb of antler or bone, SF 139. The charcoal spreads out from a built hearth, 118, which marks the earliest structural phase at Dunollie. Only part of this was preserved in the trench as a trapeze-shaped lens of pale ash, originally over 600mm long and 600mm wide, tapering to 300mm. On the three sides that were exposed, the hearth had a rough kerb of blocks of stone, varying in length from 100 to 300mm. The hearth itself was overlaid by wider spreads of charcoal and ash, 117, which ran forward into 114, a definite burned layer; and more diffusely to the rear as 214.

Layers 114, 117 and 214 form the base for the first detectable defensive work at Dunollie: Rampart A, of Dunollie phase 2. This was a 5m wide bank of boulders and slabs exceptionally up to 300mm in size, but including many smaller cobbles and slabs as well. To the rear, in 209, the boulders are frequently pitched, whereas to the front, in 116, they are laid rather as horizontal slabs. Towards the interior, this rubble rampart is bounded by a rough kerb, 215. To the front there is a built revetment of slabs, 120. Some of these slabs are indeed massive, up to 650mm long.

It should be said here that in the section, (illus 13), this revetment appears very convincing; but partly because it lay obliquely across the trench, partly because it had suffered considerable collapse, and partly, perhaps, because the face had always been somewhat irregular, the revetment appeared rather less convincing across the width of the trench than in either section. Nevertheless, the existence of the revetment 120 need not be doubted, because the fills to its north certainly gave more evidence of collapse than did the slabs immediately behind it. In particular, there is a strong contrast between the horizontal slabs of 116, and the slabs and blocks north of the revetment,

which lie with the slope of the ground, as is appropriate for material collapsed from a rampart.

It seems likely that Rampart A, consisting of 120, 116, 209, 215, was fronted by a shallow ditch, about 2 m wide, with a quarried scarp slope little more than 1m high. There is evidence that this ditch had been re-cut. Between the main ditch fill, 109, and a dark rubbishy fill lying against the rock scarp, 110, there was a clean and sharp break, marked especially by steeply tilted slabs and chips of rock. It seems that 110 represents the initial silting of the ditch and collapse of the primary rampart. The break between 110 and 109 bears witness to a subsequent cleaning out or even re-cutting of the ditch. Layers 109 and 105, with varying quantities of rubble all lying with the slope, are the infilling of that secondary ditch, probably the result of collapse from the second-phase rampart which will be described below. This is certainly suggested by the lie of the strata.

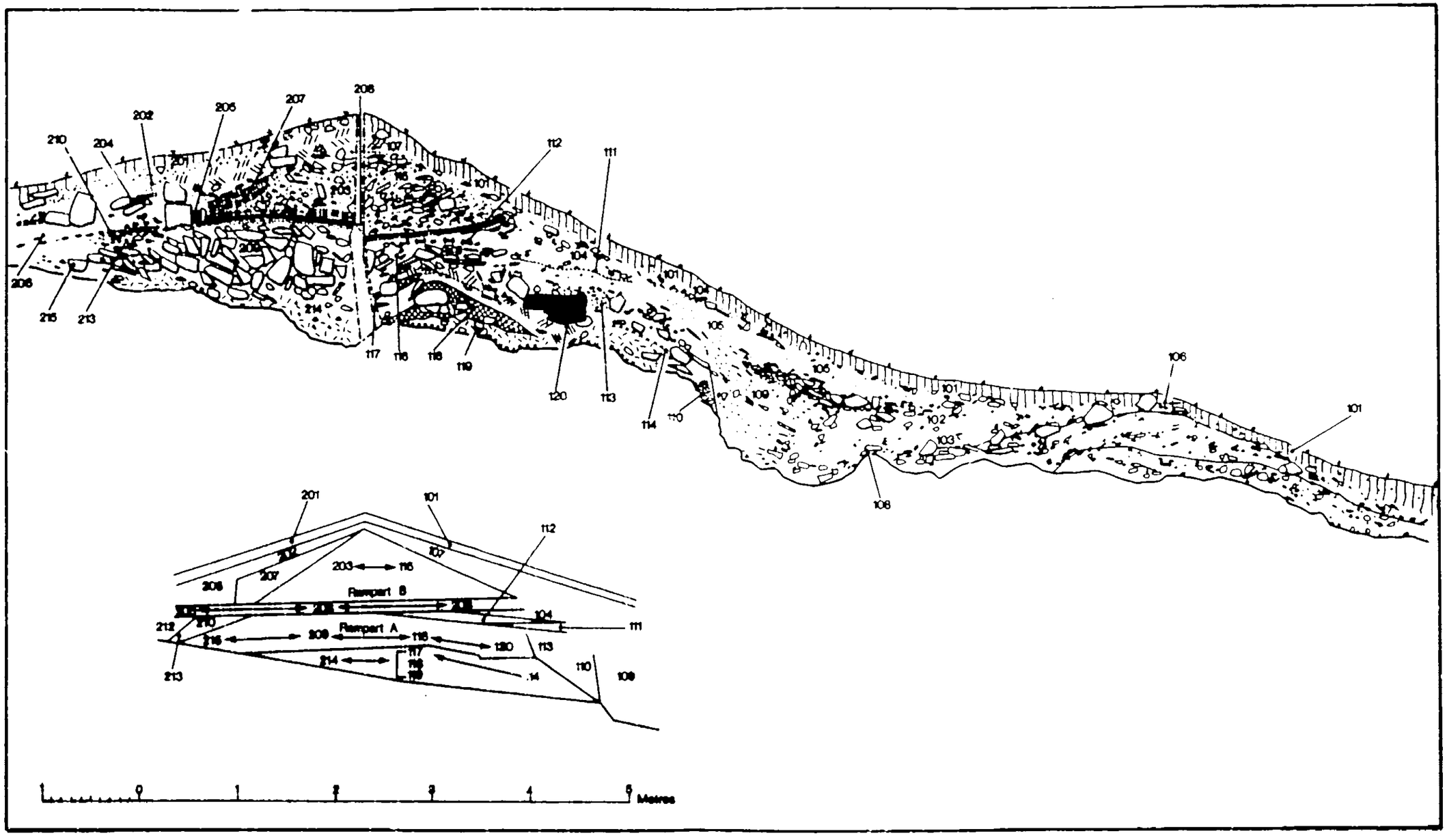
After the collapse of the primary revetment 120 and the rampart core 116, their remains were partly overlaid by an upper burning layer 111, very similar in composition and associated finds to the lower burning layer 114 which underlay the rampart. The burning layer 111 continues over the denuded rampart top into a horizon extremely rich in animal bones, 112. These two layers may reflect a definite phase of activity on the site at a time when the rampart was derelict in Dunollie Phase 3. Alternatively, they may comprise refuse which had originally accumulated on the back of the primary rampart, and which was dispersed downhill after the collapse of its revetment.

Above this again, a major break in the stratification is marked by the sticky brown clay, 208. This is best preserved under the second-phase rampart (107, 115, 203), but it also continues to the south as a gritty or chippy humus-rich layer, 210 and 206. It was indeed the construction of the rampart which

had preserved the fossil soil. It is reasonable to believe that the formation of the soil is the result of a long period of abandonment between the dereliction of Rampart A and the building of Rampart B in Dunollie phase 4.

The body of that rampart, 107, 115, 203, consisted of rather loose stones, mostly chips or thin slabs, with occasional lenses of brown, clayey soil. To the rear was a triangular wedge of very clean sticky clay with darker streaks, 207. This was probably a cheek of stacked turves, intended to strengthen and support the rear of the rather loose stone core of the rampart. It may have been that a stone kerb was subsequently cut into the rear of 207 on the line marked 205, which certainly ran right across the trench, but the evidence was too nebulous for any certain interpretation. (Certainly the two large blocks shown beside 205 in the drawn section (illus 13) give a quite spurious impression of a massive rear revetment.)

Given the looseness of the stone core 107, 115, some front support would have been needed for Rampart B. No trace of this remains in place, though it is likely that the dense collapse of blocks, slabs and chips which lies in the centre and towards the counterscarp of the ditch may represent its collapse. It has already been suggested that 109 represents the silting up of a ditch which had been recut at the time that Rampart B was built. It is also probable that the main body of the counterscarp bank, beneath 106 and to the north of 103, was formed by the clearing out of silt and collapse from the original ditch. But it must be said that the standards of excavation and recording across the ditch and counterscarp bank do not allow of any detailed analysis and interpretation. The same must be said about the area to the south of the rampart, including features 202 and 204. This comment does not, however, invalidate observations and inferences about the rampart itself.



ILLUS 12 Dunollie: section of cuttings 101-201. Above: as and 13 recorded. Below: schematic correlation of layers.

LIST OF FEATURES AND SPECIAL FINDS IN CUTS 101 & 201 (illus 13)

CUT 101

2.0 m wide cut down N slope of main bank from crest across apparent ditch and counterscarp bank.

100 UNSTRATIFIED	SFs 131 sherd E ware 132 ingot mould? 143 quern stone 147 whetstone
101 TURF Tussocky turf	
102 UPPER DITCH FILL Stones, especially slabby of varied size, but some medium sized blocks in a dark soil; angle conforming to slope.	SFs 001 glass rim 010 utilized pebble 011 mould frags. 073 stone disk 088 coarse rim 089 iron strip 093 pot base 148 inscribed slate 151 slag
103 LOWER DITCH FILL Stones become very sparse	SF 059 iron nail
104 SLOPE RUBBLE On f rward slope were stones of varied sizes lying with the slope. Slatey stones common, no signs of mortar.	SFs 005 quern stone 006 2 flints 007 blue glass bead 008 perforated slate
105 SLOPE GRAVEL Beneath 104, a layer of chippy, gravelly stones.	SFs 015 flints 016 indet. iron 019 iron knife
106 COUNTERSCARP BANK Superficially, there appears to be a slight c/s bank. Just below the turf is a rough line of rather large stones, not firmly bedded; probably not structural.	SFs 017 mould frag. 018 daub

107 TOP STONE PACK

On very crest of main bank, a dense concentration of medium to small stones.

SF 153 mould frag.

108 BASAL STONE LINES

At the foot of scarp, separated from bedrock by a thin dark layer, is a line of stones, 2 courses high. Rather higher in apparent collapse is a second line. Are these collapsed revetment, or a structural feature?

SFs 049 blue glass bead
074 thin stone disk
145 flint pebble
157 polishing stone

109 ARROW WEDGE

A relatively stone free wedge another lens or tip in the general collapse on the slope

SFs 052 flint knife
053 carbonized wood, carved
055 iron arrow
056 iron knife
057 iron loop

110 BLACK WALL

109 pealed off an almost vertical plane, marked especially by uptilted slabs. Behind a dark, rubbishy fill, 110 Black Wall

SFs 060 two-pronged implement
061 mould frag.
062 crucible lug
063 iron strip
092 mould frag.
146 whetstone

111 UPPER BURNING

A layer of burning, ie, charcoal, reddened soil. Probably overlies 116 Sandstone Slabs

SFs 076 iron frag.
077 iron blade
078 flint
085 sherd E ware
104 mould
105 mould
129 7 iron objs.incl. arrowhead
133 ppt lid

112 BONE LAYER

Immediately on 111 Upper Burning, but below tumble, was a black layer with much animal bone incl.complete jaws.

SFs 094 iron strip
096 iron axe blade
123 daub/mould

113 BUFF GRAVEL

Layer of wet, pale clay and stone chips.

SFs 084 gold ring
106 4 iron objs. incl.knife frags.
116 vitreous material
155 mould frag.

114 LOWER BURNING

Charcoal and reddened soil, of 111, but actually spread from 117.

SFs 107 tuyere
108 flints
109 mould frag.
110 mould
111 iron loop
112 mould
113 iron obj.
125 iron arrowhead

115 TOP STONE CORE

Very loose stones, often slabby, often tilted to rear, cf. 203.

SF 137 hammer stone

116 SANDSTONE SLABS

A dense pack of medium-large slabs, often of sandstone; at top, land roughly horizontal, but lower tilted, cf. 209

SFs 097 bone gouge
098 bronze clamp
118 iron chisel
126 bone pin

117 SUB-SLAB BURNING

Extensive lenses of ash and charcoal

SFs 099 bone pin
100 mould frag.
101 sherd E ware
102 flint
103 iron rod
114 bone point
115 iron arrowhead
119 crucible frag.
120 mould frag.
121 iron arrowhead
127 nail-headed bone pin
128 10 iron objs. incl. spearhead and arrowhead
136 bone point
158 3 sawn antlers

118 BUILT HEARTH

Hearth with a rough stone surround

SFs 135 bone pin-point
138 antler handle

119 BOTTOMEST BURNING

On bedrock

SF 139 antler comb

120 QUEER REVETMENT

3 (4?) courses of flat bedded stones, incl. one very massive, mark the termination of 116 Sandstone Slabs. Their leading edge runs obliquely across the trench. It seems very probable that the bedded stones are a revetment to 116 Sandstone Slabs. To N of them is undoubted collapse.

CUT 201

2.0m wide cut down the S slope of main bank from crest to levelling of interior.

201 TURF

Tussocky turf — SF 141 3 pipe stems

202 LOOSE STONES

Of all sizes, in loose, dark, humus soil, lying with slope. — SFs 004 ?base silver strip
024 clay pipe bowl

203 STONES WITH VOIDS

Rather smaller stones, chippy, loose, some voids. Likely that this is bank core.

204 BOULDER SETTINGS

Large boulders, more or less set in dark soil. Excavation suggested that it was very unlikely this was a deliberate setting. — SFs 034 iron nail
036 iron nail
041-043 iron nails
044 glass frag.
045 iron slag
048 iron nail

205 LINED SLOT

Appeared on N as a sharp cut in 207 Orange Brown Clay, and was further defined by pitched stones, incl. slates. The lined slot cannot have been for a timber stockade or timber rear revetment because it did not penetrate below base of 207 or thru' 208. Perhaps marked where a stone kerb had butted against the back of 207. — SF 028 iron sheet

206 CHIPPY

A very dark, humus rich soil with chippy stones, which looks very like an OGS.

207 ORANGE-BROWN CLAY

Darker streaks amid very clean sticky clay - most probably turf streaks.

SF 066 iron obj.

208 STICKY BLACK

A sticky black fill, apparently an OGS.

SF 075 iron ring

209 JOGGLED STONES

Rather angular stones, many of them very tilted, with more massive pitched stones throughout.

SFs 083 antler comb
130 iron awl
134 iron rod, strip

210 FINE COBBLES

Area of small beach-pebble cobbles.

211 STONE-PACKED HOLE

A local variation within 209

SF 090 iron strip

212 SOUTHERN DISTURBANCE

Dark soil, filling the gap down to bedrock.

213 COBBLE MAKE-UP

Small sandstone chips or mini-slabs, forming bed for 210 Fine Cobbles.

214 UNDER JOGGLED STONES

Gritty black soil with a noticeable quantity of charcoal.

SF 117 ingot mould

215 SOUTHERN STONE LINE

A rough stone line, principally of slatey slabs, up to 330 mm long x 110 mm high, presumably a ruined revetment, marking the S edge of 209.

THE EASTERN DEPOSITS AND TERRACES

Above the eastern cliffs of the Dunollie stack, a trench 2 m wide and 12.20 m long was laid out, but was only partly explored in a 5.30 m long cutting immediately above the cliff, and in a second cutting 4 m long across a pronounced terrace. These were respectively 301 and 401. Because of lack of resources, 401 was not carried to any depth. Only recent features were uncovered; and since they have no relevance to the overall campaign of excavation, they are not discussed here, though the section and list of features are published. It must be admitted that early defences may lie buried beneath the 401 terrace, and if so, the correlations which are proposed below between structures in 301 and those in 101-201 could well be falsified. More important, much evidence for early interior structures and activities may lie sealed by the build-up for the terrace (illus 14).

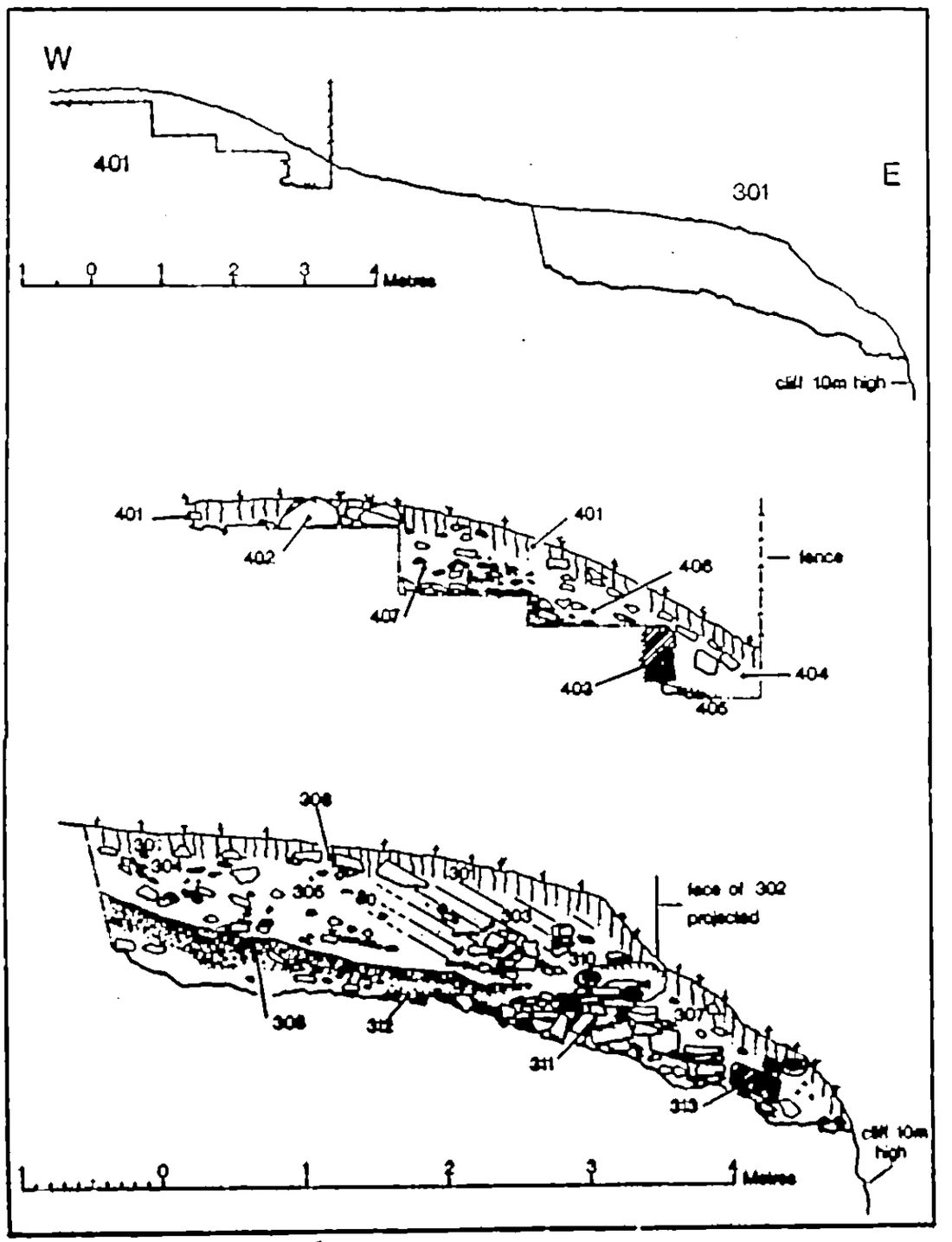
Cutting 301 was, however, carried down to bedrock. This was found to have a very irregular surface, falling eastwards at an angle of about 12°, before plunging in a nearly vertical cliff some 10 m high. There was nothing here comparable with the Dunollie 1 deposits of Cutting 101. Lying on the bedrock, however, 0.5 m back from the edge, were three large slabs, 313, up to 170 mm high and 440 mm or more long. These marked a ruined revetment to a solid pack of medium-sized blocks, 311: a rampart core just over 2m wide, presumably to be regarded as Rampart A in Dunollie phase 2. The rear of this was overlaid by a powdery fill, 308, containing small angular and slabby stones and gravel, and capped by a thin humus-rich layer. Associated artefacts date this to the 7th-8th centuries AD or later.

The humus-rich capping of 308 served as the base for a second rampart, faced with a revetment of blocks up to 360mm wide and 170mm high, 302. This is presumed to be Rampart B of Dunollie phase 4. Although these are not visible in the drawn section (illus 14) two courses were present across most of the trench, and the upper one is still visible protruding through the mossy surface of the ground. The body of this later rampart consisted of a rather loose pack of medium-sized stones in a dark soil, 310; and a possible turf stack, 303. The latter was heavily weathered, and only towards its base was there any trace of turf-streaks. Indeed, its interpretation as a turf-stack is to some extent based on analogy with layer 207 at the rear of Rampart B on the north of the castle. Layer 310 had been greatly disturbed by massive tree roots, and this no doubt accounts for the discovery of a large part of a 7th or 8th-century beaker, a 13th-century silver penny, and a 17th-century copper coin, all close together amid the stones.

Three other copper coins, a Nuremberg jetton of c 1580-1610 AD, and a glazed sherd all came from features 305 and 306, which, it may be inferred, had accumulated, or had been deliberately piled up, behind the rampart during the occupation of the masonry castle; that is in the Dunollie post-4 phases. Immediately below the modern ground surface, on a line corresponding with a change between the brown soil 303, and the darker soil to its west, was a marked break in the stone scatter which lay throughout the trench. This break or slot, 306, did not continue down as, for instance, a stone-lined palisade slot, though it did correspond with the rather ill-defined distinction between 303 and 305. Although no satisfactory structural explanation can be offered for it, it may

be significant that its position corresponds with that of the equally enigmatic slot 205 in Cut 201.

It should be added that the interpretative elements of the above account are based on a very careful and critical analysis of the stratification revealed in cutting 301 when the trench was fully excavated. The List of Features which follows, on the other hand, is a record of observations made during the course of the actual digging; and does not necessarily correspond to the final analysis.



ILLUS 14 Dunollie: section of Cuttings 301 and 401.

LIST OF FEATURES AND SPECIAL FINDS IN CUTS 301 & 401 (illus 14)

CUT 301

2.0 m wide cut across the terrace banks on the E side of the castle.

300 UNSTRATIFIED — SFs 035 potsherd, 071 crucible

301 MOSSY TURF

Humus layer behind revetment 302.

302 MOSSY REVETMENT

Stones already visible before excavating. Two courses of blocks up to 450 mm deep front to rear, 360 mm wide, 170 mm high, laid mostly as headers, tilted by root action. Not present in S section.

303 BROWN SOIL

Slightly overlapping rear of 302, and extending about 2.15 m to W of face, the soil is rather brown, whereas further W again it is darker, free of large stones, though it had small gravel. Suggestion of dark streaks low down; perhaps a very weathered turf stack? — SFs 002 window glass, 003 iron nail, 067 flint

304 TERRACE RUBBLE

To W of 303, a layer of angular rubble. Some sandstone, some slatey rock. Top is very irregular, hence no appearance of metalled path.

305 GRAVEL BEDDING

Small stones, chips, soil

SFs 012 coin
013 iron strip
014 iron rod
021 multi-perforated slate
022 ring-and-pin mould
025,029,030,032 copper coins
033 iron nail
037 clench nail
046 glazed pot
047 copper alloy strip
068 flint
069 iron frag.

306 SLOT

Between 303 and 304, 305; a clear gap in surface stones suggesting a timber partition. But no sign in section that this continued down.

SFs 020 slate disk
026 iron nail
031 copper jetton

307 BEFORE MOSSY REVETMENT

Stones, humus, presumably collapse

308 BOTTOM GREY RUBBLE

Loose angular rubble, in a powdery grey soil. Section shows several components, not noted during excavation.

SFs 064 crucible
070 iron hammer
072 E ware rim, joins 081
079 pin mould

309 BURNT SURFACE

A lens of burnt material at the base of 305 (not in section).

SF 065 window glass

310 CORE OF MOSSY REVETMENT

A pack of medium stones, with dark soil; exceptionally heavily disturbed with massive roots. Very rough sloping back.

SFs 080 silver coin
081 E ware beaker, joins 072
082 copper coin
087 iron knife

311 UNDERLYING CORE

Below 310. A very solid pack of angular medium stones, quite different from anything elsewhere in trench.

312 SANDY GRIT

Probably weathered natural.

313 FRONT SLABS

Protruding from section was stretcher, 440 mm wide, 170 mm high, 350 mm deep. N of this was header; 130 mm wide, 160 mm high, 500 mm deep; below which a thin slab stretcher 250 mm wide, 40 mm high.

CUT 401

2.0 wide cut, continuing the line of 301 across the W terrace bank.

401 TURF

SFs 038 Delft ware
054 glazed potsherd

402 BOULDERS

On the level terrace, some very massive boulders and some smaller ones;of 304 in general character.

403 DRY REVETMENT

A ground course of large blocks, often very rectangular, up to 375 mm long and 310 mm high. Above this are roughly coursed slabs. Altogether a very neat piece of dry masonry.

404 BEFORE REVETMENT

Tumbled stones.

SFs 039 coin
058 glazed potsherd
140 quern stone

405 BROWN SOIL

SF 142 quern stone

406 BEHIND REVETMENT

407 BEHIND BREAK

A slight change in character of fill, apparent at superficial level. In digging, a marked difference was quantity of slag from 406, nil from 407.

SFs 091 3 iron objs.
144 2 iron nails

CHRONOLOGY: RADIOCARBON DATES

The archaeological dating of the phases identified in the ramparts is based primarily on two groups of radiocarbon age-estimates, supplemented secondarily by the typological dating of stratified artefacts. To a lesser extent, certain unstratified objects which are well dated in themselves also indicate periods of human activity at Dunollie.

The radiocarbon age estimates are derived partly from animal bones, identified by G W I Hodgson, partly from charcoal identified by Camilla A Dickson. The earlier series are from DH 117 *Sub-slab Burning*, i.e. *the charcoal of the hearth which* underlay Rampart A: they relate therefore to Dunollie 1. The *second series are from* DH 112 Bone layer, *the dereliction layer* overlying the ruined Rampart A and are therefore referrable, in terms of stratification to Dunollie 3: the bones may, however, derive from the Dunollie 2 occupation.

DH 117 SUB-SLAB BURNING

GU-1395	Animal bones (Bos). DH 117.1.	1210± 60 $\delta^{13}C$: -22.1°/oo	630-905 AD
GU-1396	Animal bones (Bos). DH 117.2 Duplicate of GU-1395.	1360 ± 60 $\delta^{13}C$: -24.7°/oo	580-780 AD
GU-1397	Animal bones (Sus and Ovis). DH 117.3	1270±60 $\delta^{13}C$: -22.5°/oo	610-880 AD
GU-1398	Charcoal (Quercus). DH 117.4	1425±60 $\delta^{13}C$: -26.1°/oo	470-650 AD

DH 112 BONE LAYER

Two replicate bone samples (Bos, Sus and Ovis).

GU-2102	DH 112.1	1060±50	875-1055 A
		$\delta^{13}C$ = 21.74°/oo	
GU-2103	DH 112.2	1080±50	865-1045 A
		$\delta^{13}C$ = 23.21°/oo	

The above C-14 dates are quoted in conventional years b. (before 1950 AD) on the 5568 half-life, and errors are expresse at the ± one sigma level of confidence. They are then calibrate to the 2-sigma, 95% probability level using Klein et al 1982.

Dr M Stenhouse, formerly of the Glasgow Universit Radiocarbon Dating Laboratory, commented on the dates from DH 117

> Samples GU-1395 and GU-1396 are derived from the same bag of bones, so that the observed difference is surprising. Certainly the bones comprising GU-1395 were rib bones whereas GU-1396 contained an assortment of bones. On the counting side, there is no reason for selecting one sample date over the other. Thus in this case I would argue in favour of giving each bone sample equal weighting; this treatment of results gives a mean date of 1280 ± 75 b.p.
>
> The Quercus sample appears to follow the general trend of yielding a date which is slightly older than the other samples.
>
> The date of 1280 ± 75 would calibrate, at the 2 sigma leve as 600-890 AD, which conforms well with that derived from GU-139

CHRONOLOGY: DATABLE FINDS

The present statement about the Dunollie finds is concerned solely with their chronological significance. A detailed catalogue will be found below. First to be considered are those artefacts which are not only readily datable on typological grounds but are also securely stratified in relation to the successive rampart phases. These are then followed by objects which are not so well stratified, but which nonetheless provide clear chronological pointers to activity at Dunollie.

The pre-rampart phase in Cuttings 101-201, represented by features 117, 118, 119, 214 (and probably also 114) yielded bone or antler objects, and evidence for metalworking, all with good parallels of 7th and 8th century date at Dunadd and elsewhere. In making this statement, I am largely dependant on a study by Duncan (1982) of finds from Buiston, Dunadd and Dunollie.

The stratigraphically earliest of these finds, lying actually on the bedrock, was SF 139, cat no 108: substantial fragments of a double-edged composite comb. Such combs have usually been described as bone in the past, but it is now considered that they were actually made of antler (MacGregor 1985, espec 28-9). The multiple dot-and-circle ornament may be paralleled at Dinas Powys (Alcock 1963, pl viii; 1987a, illus 7.2) as well as at Buiston (Munro 1882, figs 217, 218 and especially 219), and in the Pictish assemblage at Brough of Birsay (Curle 1982, illus 10, 196, 197a and 198).

From 117, the layer of burnt material overlying the hearth or oven, 118, came two pins of bone. SF 099, cat no 110, is a ball-headed pin, broadly comparable with examples from Buiston (Munro

1882, figs 203, 212) and Brooch of Burrian (MacGregor 1985, fig 64.9). At both sites a 7th or 8th century date is indicated. SF 127, cat no 111, is a simple nail-headed pin, also of a type known from Buiston (Munro 1882, fig 203). Such objects may have been used as pins in their own right, but as Stevenson noted long ago (1955, 285-6), they also served as dies for forming the moulds in which bronze nail-headed pins were cast.

Moulds of this type do occur at Dunollie: for instance SF 022, cat no 86 and SF 079, cat no 87. They are well known at Dunadd (Duncan 1982, fig 53) but they do not help the dating of the Dunollie rampart-sequence, because they were found, presumably in secondary contexts, in layers attributed to Dunollie 3 (308) and post-Dunollie 4 (305). But well stratified evidence for metalworking in Dunollie 1 is given by crucible (SF 119, cat no 80), tuyere (SF 107, cat no 84) and mould (SF 100, cat no 93; SF 112, cat no 91) fragments from features 117 and 114, as well as a stone ingot mould from 214. All these have parallels at Dunadd. The most interesting is SF 100: a fragment from one valve of a mould, showing a pouring gate and channel. From Dunadd comes a more complete valve with a similar gate, which had been used for casting a penannular brooch of Class G (Duncan 1982, fig 46; Dickinson 1982).

In cutting 101-201, the core of the rampart built in Dunollie 2 produced two objects of the same broad date as those from Dunollie 1. SF 126, cat no 112, is a relatively coarse pin made apparently from a pig fibula (inf from S T Driscoll), with a good parallel from Buiston (Munro 1882, fig 204). SF 083, cat no 109, is one end from a double-sided composite comb of antler. There are no finds at all from the earliest rampart phase on the east,

represented by features 311 and 313. This is in part a result of the character of the make-up of that rampart, but it may also indicate its early position in the history of Dunollie.

In addition to the abundant animal bones of feature 112, the dereliction layers of Dunollie 3 contained mould fragments and iron objects which may have derived from Dunollie 1 and 2, but which cannot be closely dated typologically. These included the pick-hammer SF 070, cat no 27, and the blade of a T-shaped woodman's axe, SF 096, cat no 26. Certainly referable to Dunollie 1 and 2 are fragments of Class E pottery, including a joining sherd from the beaker which is dealt with below.

In cutting 101-201 the core of Rampart B, built in Dunollie 4, contained no datable material at all, suggesting that artefacts of Dunollie 1 and 2 had been well sealed by the fossil soil, 208, before the rampart was built. But in cutting 301, the pack of medium stones, 310, which is held to represent Rampart B on the grounds of stratification and structural character, contained an extraordinary mixture of closely datable finds. The earliest was a substantial part of a Class E2 beaker (SF 081, cat no 69) with an excellent parallel at Buiston (Munro 1882, fig 250), and appropriate therefore to Dunollie 1 or 2. Close beside it were two coins: a silver penny of John of England dated 1205-10 (SF 080) and a copper turner of Charles I, dated 1632-39 (SF 310). This conjunction of finds extending over a millennium is to be explained by the disturbance to the stratification caused by the intrusion of massive tree roots. An example is to be seen in the 301 section at the junction of features 310 and 311.

Other coins are not only well-dated in themselves, but were also found in a significant stratigraphic context. The Nuremberg

jetton of c 1580-1610 (cat no 2) and the seven Charles I copper turners issued between 1629 and 1639 (cat nos 3-9) clearly belong to the occupation of the tower house and its courtyard. Moreover the five turners of the 1632-39 issue came from a very limited area in the two features 305 and 310. They strongly suggest, therefore, a dispersed hoard. Two of them have traces of straw and heather adhering to them, as though they had been hidden in the thatch of a roof, as Drs Camilla and J H Dickson comment in their botanical report. Dr J D Bateson, however, reporting on the coins, prefers the simpler explanation that they do not come from a hoard, but are casual losses on a floor surface covered with straw and heather.

If, on the other hand, the hypothesis of a dispersed hoard is accepted, then given the date-range of the coins, and given also that they appear to have little wear, it is tempting to think that the Covenanting Rebellion of the 1640s, when the castle was successfully attacked by the Marquess of Argyll (RCAHMS 1975, 198), may have been the reason for hiding the coins. Their deposition in feature 305 dates this to an even later period in Dunollie's history, probably after the abandonment of the tower house.

The silver penny of John of England of 1205-10 (cat no 1) poses quite a different problem. Since it shows 'apparently little wear', it is likely to have been lost at Dunollie early in the 13th century. The Inventory account (RCAHMS 1975, 197), however, produces no documentary evidence for activity at Dunollie at that time. On the other hand, the neighbouring MacDougall castle of Dunstaffnage 'may be ascribed on architectural grounds to about the second quarter of the 13th century', as the work

either of Duncan son of Dugald (died 1237 x 1248) or Duncan's son Ewen (RCAHMS 1975, 210). Despite the lack of earlier documentation it is not unreasonable to suggest that at this time Dunstaffnage replaced Dunollie.

Certainly the silver penny demonstrates activity on the Dunollie headland, and for that activity we may reasonably expect a more appropriate setting than the derelict fort which had been built by Selbach five centuries earlier. On the available archaeological evidence the most likely candidate for that setting might be Rampart B, the earthwork defence of Dunollie 4. It is true that there is no direct evidence for the date of that rampart; but plainly it post-dates Rampart A by an interval of dereliction during which the fossil soil 208 was formed; and it is unlikely that it constituted an outwork to the tower house.

This exhausts the list of those finds which are datable in themselves, and which are stratified in contexts which help to date the sequence of the earthwork defences of Dunollie. It is now possible to correlate the structural and chronological evidence from cuttings 101-201 and 301 to produce a general account of those defences.

SYNTHESIS

The excavations revealed five broad phases in the history of the Dunollie earthworks. These are presented in both tabular and graphical formats (illus 12-14: see also illus 5).

Dunollie phase 1 is represented in cutting 101-201 by features 119, 118, 117, 214 and probably 114: it is absent from cutting 301. The main feature is a stone kerbed hearth or oven,

shown by associated finds of moulds and other metalworking debris to be an industrial heath. Radiocarbon age estimates place it in the 7th to 9th centuries AD, and datable finds are in agreement. It is reasonable to believe on these grounds that Dunollie 1 is the place referred to in some of the Iona Annals of the decades 686-734 AD.

The immediate evidence for Dunollie 1 reveals nothing more than industrial activity on the north side of the summit, perhaps where there was a steepening or drop off in the natural slope. Such activity suggests that the site was already one of high social status: the residence of what I have elsewhere called a potentate (Alcock 1987b). It is unlikely that metalworking was the sole activity, or that it took place in a settlement which had no form of defence other than the natural protection provided by the cliffs. If this is accepted, then we may attempt to infer the minimum form which artificial defences might have taken. An acceptable answer would be a circular or oval drystone fort on the very summit of the hill: in short, a typical dun as defined by the Royal Commission on Ancient and Historical Monuments Scotland (eg RCAHMS 1971, 18):

> a comparatively small defensive structure with a disproportionately thick drystone wall, usually but not always sub-circular or oval on plan, and enclosing an area not exceeding about 375 sq m.

Had there been such a drystone structure on the Dunollie summit, it could well have been destroyed during the building of the medieval tower house, if not indeed earlier.

Dunollie phase 2 in cutting 101-201 was a drystone rampart overlying the phase 1 hearth. It comprised a core of stone slabs and blocks, 116 and 209, with a front revetment including massive blocks, 120, and a slight kerb at the rear, 215. Overall, this structure, Rampart A, was 5 m wide. In front of it, the rock had been artificially scarped, and a slight ditch was cut in Dunollie 2 or later. Outside this again was a broad but shallow counter-scarp bank, probably the result of recutting the scarp and clearing out the ditch, rather than a deliberate defensive work. Certainly the prediction, based on surface indications, that early Dunollie was defended by a double line of ramparts, was not supported by the evidence of cutting 101.

This observation must influence the attempt to correlate the structures in 101-201 with those in 301-401. On the basis of surface indications, and given that any physical link between the two pairs of cuttings had been destroyed by landscaping and paths at the NE corner of the site, it seemed reasonable to correlate the counterscarp bank on the N with visible traces of a drystone revetment immediately above the cliff on the E; and likewise to correlate the main bank on the N with the marked terrace edge, some 8 m back from the cliff on the E. Now that the slightness of the counterscarp bank in 101 has been revealed by excavation, it is more reasonable to draw analogies between a single rampart at the head of a quarried scarp on the N with a single rampart at the head of a natural cliff on the E.

In other words, the defences of Dunollie 2 should be seen as a single dry-stone rampart. On the E, this is most likely represented by a rampart with a core of slabs and blocks, 311, and a front revetment of massive blocks, 313. This is the earliest

structure discovered in cutting 301. It lies directly on bedrock, showing that the metalworking of Dunollie 1 was a localized activity. Its structural character is similar to that of Rampart A in cutting 101-201; and though it is only some 2 m wide, its formidable defensive value is guaranteed by the 10 m high cliff below it. Finally in this chain of reasoning, it is partly overlaid by a dereliction layer containing material contemporary with that found in cutting 101. On a number of counts, therefore, features 311 and 313 may be considered as constituting Rampart A on the E of the Dunollie summit.

There is little artefactual evidence for the date of Rampart A: in fact, only the pin made from a pig fibula (cat no 112) and the fragment from a composite antler comb (cat no 109). It is, however, bracketed stratigraphically between the two sets of radiocarbon dates respectively from 117 Sub-slab Burning and from 112 Bone Layer. As we shall shortly see, the bones in 112 may be interpreted either as occupation debris from Dunollie 2 which had become dispersed over the top of a derelict rampart during Dunollie 3; or, less likely, they may mark actual occupation and activity during that phase. In either case, the radiocarbon age-estimates fix, rather imprecisely, the earliest possible date for the formation of the fossil soil, 208, over the derelict top of Rampart A. They indicate a date not earlier than the late 9th century for this. The actual building of the rampart lies earlier than this by a number of decades or even centuries which cannot be calculated.

Given the inevitable imprecision of the chronology derived from radiocarbon assays, it is tempting on a historically-documented site to endeavour to increase the precision by an

appeal to historical events. This again has its hazards, because so few events are recorded for Early Historic Dunollie. Indeed, the most that can reasonably be claimed is this:

1. the construction of Rampart A was a major building activity.
2. the statement in the annal for 714 'Dun Ollaigh is built by Selbach' appears to mark major construction work there.
3. A date of 714 for the building of Rampart A would be entirely compatible with the artefactual and radiocarbon evidence.

It must be admitted that on the available evidence, constructional dates of, say, 764 or 814 would be equally compatible; and if the Annals had recorded several building events at Dunollie in the 8th and 9th centuries we would have no basis at present for attributing Rampart A to one rather than another of them.

Dunollie phase 3 is clearly defined in both 101-201 and 301 by material overlying the ruined top of Rampart A, and itself covered by a fossil soil or humus-rich layer, 208 and 308. Below this old ground surface, layers 111, 112 and the lower part of 308 contain moulds, a crucible and definite or probable sherds of E-ware pottery, all characteristic of the Dunollie 1 and Dunollie 2 phases. This argues very strongly that we are dealing here not with material from a separate phase of occupation, as has been suggested several times above, but rather with detritus from the Dunollie 2 occupation which had originally accumulated on the back of Rampart A, as indeed it still appears in the 301 section. In the 101 section, on the other hand, it had become scattered

downhill, and even forward of the rampart, as the front revetment, 120, collapsed.

Given the similarities of the artefactual assemblages in Dunollie 1 and Dunollie 2, we may assume that these represent a single continuous occupation, punctuated, but not interrupted, by the building of Rampart A. In that case, the chronological gap between the radiocarbon dates from the bones in layer 117 and those from layer 112 give us a rough estimate for the duration of the combined Dunollie 1 and 2 occupation: some two or three centuries, perhaps from the mid- or late-7th century to the late 9th or 10th century. Before this chronology hardens, we must recall the imprecision of radiocarbon dates calibrated at the 95% (2-sigma) probability level.

After the dereliction of Rampart A, the Dunollie summit seems to have been abandoned for a period long enough to allow the formation of a humus-rich soil, 208 and upper 308, lacking artefacts, which sealed in the remains of Dunollie 1 and 2.

Dunollie phase 4 is represented by a second defensive work, Rampart B, which was founded on the old ground surface formed by 208 and 308. In 101-201 this had a loose rubble core, 107, 115, and 203, and was backed by a turf stack, 207. In cutting 301, turf streaks were less apparent, but 303 may reasonably be interpreted as a turf stack on analogy with 207. In front of this was a rather loose stone core, 310. The major difference in cutting 301 was, however, the preservation of two courses of a dryatone revetment of large blocks, feature 302. The evidence from 301 allows us to infer the former existence of just such a revetment in cutting 101. Indeed, something of the kind would

have been needed to hold up the loose rubble of 115, and its former existence may also be inferred from the large blocks which had tumbled down the slope. The overall width of Rampart B was about 3 m on the N of the defences, and about 2 m on the E.

On the E, the face of Rampart B was set back a metre or more from the actual eastern cliff, but it was nonetheless at the head of a dauntingly steep slope. On the N, it was probably at the beginning of Dunollie 4 that the face of the Dunollie 2 scarp was recut, and the material which had accumulated against it was cleared forward to form the slight counter-scarp bank. Later still, the shallow ditch which was then formed silted up, partly with stones of all sizes which had collapsed from the front of Rampart B.

The defences of Dunollie 4, like those of Dunollie 2, comprised a single-banked earthwork, using the term in its customary archaeological sense of 'mounds, banks...whether built of earth or of stone or of both, so long as these show no signs of mortar' (Allcroft 1908, 1 n 1). There is no clear evidence for the construction date of this earthwork; but it must certainly have been built after the deposition of bones with a radiocarbon dating bracket of 865-1055 AD - perhaps even considerably later, given the time needed for the formation of the fossil soils 208 and 308. This brings the date towards that of the silver penny of John. It has been suggested already that Rampart B might have provided the setting for the activity which the coin implies. The most reasonable suggestion is that Dunollie 4 saw the building of an earthwork castle in the later 12th or early 13th century. For this castle there is no documentary evidence. Despite this, it may be expected that Dugald, founder of the MacDougall family,

would have required a stronghold before Dunstaffnage was built, probably by his son Duncan or grandson Ewen, in about the second quarter of the 13th century.

Dunollie post-phase 4 is represented in cuttings 101-201 and 301 by deposits against the back of Rampart B, especially 204 and 305. These features are little understood; and since it is by no means certain that they followed directly after phase 4 the term 'post-phase 4' is preferred to 'phase 5'. Layer 305 is dated after 1632-39 by four copper turners of Charles I.

Two other comments may be made on these features. Firstly, they contain a number of stout iron nails, between 45 and 75 mm in length. This is the earliest appearance of nails in the stratification: an observation with obvious implications for building techniques in phases 1-4. Secondly, recalling the apparent slots 205 and 306, perhaps for timber uprights, at the interface of Rampart B and the layers behind it, the following suggestion is advanced very tentatively. Around the middle of the 17th century, or later, the area lying outside the masonry castle to the N and E was roughly protected with a palisade set against the toe of Rampart B, and held upright by 204, 305, and other material piled around it. This interpretation was not considered at the time of the excavation, and so the stratification was not particularly examined to test it, but it certainly does not conflict with the recorded evidence.

CATALOGUE OF FINDS FROM DUNOLLIE

The finds are catalogued by material - coins, other metal, pottery and other fired clay, glass, antler and bone, wood, stone, slag - and then by type of object. Full descriptions are provided only for those objects considered as relevant to Phases 1-4: with the exception of the coins, later material is listed in summary fashion. The description of each find is preceded by its context and special find number. Illustrated objects are distinguished by an asterisk. Where these are not obvious, dimensions are given as L = length, W = width, D = diameter.

COINS by J D Bateson

The nine finds consist of a medieval English penny, a sixteenth-century reckoning counter and seven seventeenth-century Scottish copper coins. They are listed chronologically.

1. DH 310, SF 080

   England John silver short cross penny class 5(bii) (1205-10)
   mint: London moneyer: Willelm B +WILLELM·B·ON·LV
   surfaces corroded but apparently little wear
   wt. 0.89 gm (13.8 gr) die axis 180°
   ref. North 970 (J.J. North, English Hammered Coinage, 1, London, 1980).

2. DH 306, SF 031

Germany Nuremberg reckoning counter or jetton

copper 24 mms little wear

stock jetton of Hans Krauwinckle (c 1580-1610)

obverse 3 crowns and 3 lis alternately around rose

legend: HANNS·KRAVWINCKEL·IN·NVRENB

reverse the Reichsapfel within a double treasure of 3 curves and three angles

legend: VERBVM DOMINI MANET IN EIERNM (aeternum)

cf. Barnard, p 222, no 84 (pl XXXIII, 84) but slightly different obverse legend and different reverse legend.

(F P Barnard, The Casting-Counter and the Counting-Board, Oxford, 1916)

3. DH 404, SF 039

Scotland Charles I copper turner or twopence of 1629 issue

badly corroded and edge ragged wt 0.77 gm (11.9 gr)

ref. Burns 1039(1) (E Burns, The Coinage of Scotland, Edinburgh, 1887)

4. DH 305, SF 025

Scotland Charles I copper turner or twopence of the issue of 1632-9 sometimes called the 'Earl of Stirling' coinage

badly corroded and edge ragged wt 0.32 gm (5.0 gr)

see Stewart p 157, no 237 (I H Stewart, The Scottish Coinage, London 1967)

Note that this and the following five coins are in too poor condition to assign to a reference to Burns or the more detailed analysis of this coinage by Stevenson (R B K Stevenson, The 'Stirling' Turners of Charles I, 1632-9, British Numismatic Journal, 29, 1959, 128-51)

5. DH 305, SF 029

as last — wt 0.24 gm (3.7 gr)

6. DH 305, SF 012

as last — wt 0.38 gm (5.9 gr)

7. DH 305, SF 030

as last — wt 0.44 gm (6.8 gr)

8. DH 310, SF 082

as last and pierced off-centre — wt 0.42 gm (6.5 gr)

9. DH 305, SF 032

as last but incomplete and broken in two

The most important find is the medieval English penny. Short cross pence were struck in England up to 1247 and in Scotland until 1250 when they were rapidly and completely replaced by the long cross pence. This specimen could have circulated as late as 1250 but since it appears to have little wear may have been lost soon after its striking between 1205 and 1210 - a date of loss during the second decade of the thirteenth century would not seem unreasonable. The find provides firm evidence of activity at Dunollie during the early part of the thirteenth century and adds to the steadily increasing list of finds of late twelfth/early thirteenth century coins from Scotland, indicating a more widespread use of coinage at that time than previously thought.

The reckoning counter is a not unexpected find from a type of site where accounts were kept usually necessitating the use of a chequered counting board and counters such as this. By the sixteenth and seventeenth centuries the majority of these were imported to Britain from Nuremberg where Hans Krauwinckle was a member of one of the leading manufacturing families. Lack of wear would imply a loss at Dunollie within a twenty year period either

side of 16 00.

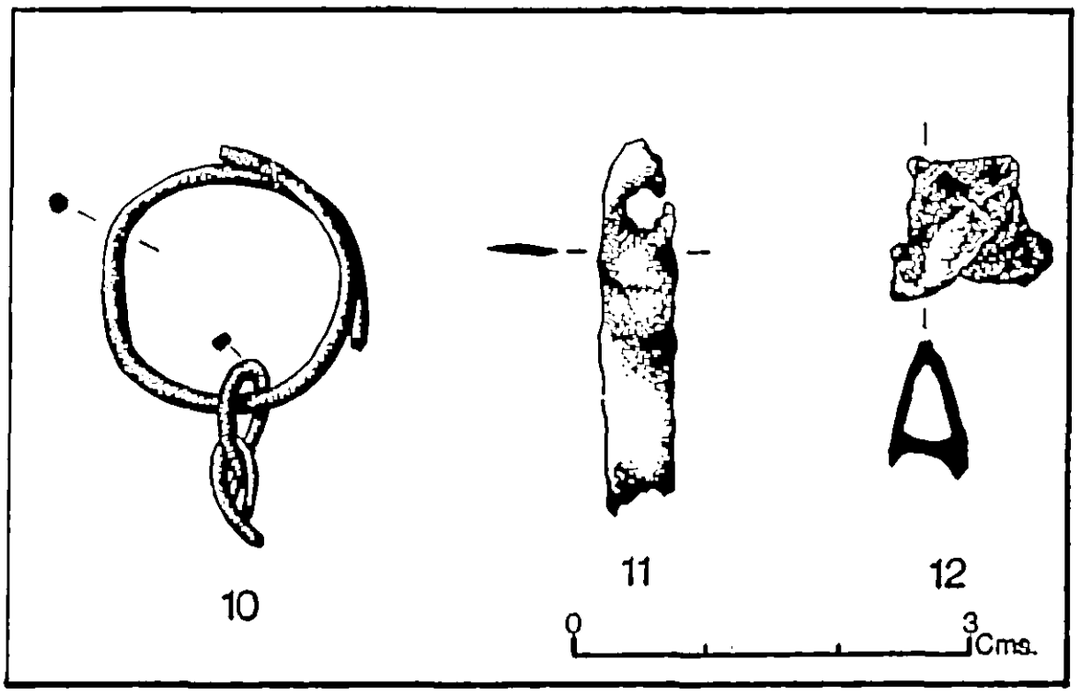
The seven turners represent the most common of Scotland's seventeenth century coins which turn up in large numbers as site finds. There were several issues throughout the century and those of 1629 and 1632-9 are represented by one and six specimens respectively. The latter are badly corroded but appear to have little wear. The 1630s light issue was replaced in 1642 by the more usual larger and heavier coin and the former are unlikely to have continued to circulate after that. The piercing of No 8 is probably contemporary perhaps carried out after the 1640s issue had rendered the previous turners obsolete and wretched-looking in comparison. Two of the turners (nos 5 and 7) had traces of straw adhering to them suggesting they had been dropped on a straw-covered floor on the site. Little effort would have been spent in trying to recover such pieces and they probably reached their final resting place during a subsequent cleaning out of the floor.

OTHER METAL OBJECTS

With the exception of those of iron, metal objects were rare.

GOLD (illus 15:10)

10.* DH 113, SF 084. Crude ring, D 17 mm, of wire, with overlapping ends, and two links of equally crude chain. The cross section of the wire is mostly circular, but with occasional marked flattenings. Perhaps a keeper for a pin or brooch; or a ring from one of a pair of loose ring



ILLUS 15 10, gold ring and chain. 11, base silver strip. 12, copper alloy clamp or binding.

pins. The crudity of the workmanship is quite incongruous with the use of a noble metal.

No parallels can be cited and no date is suggested.

BASE SILVER & COPPER ALLOY (illus 15:11-12)

11.* DH 202, SF 004. Rather crude strip probably of base silver; parallel sided, tapering to one end. L 26 mm. Rivet hole towards the tip, and broken at another rivet hole. Perhaps a backing plate for a strap tag.

The identification as base silver is a visual one only.

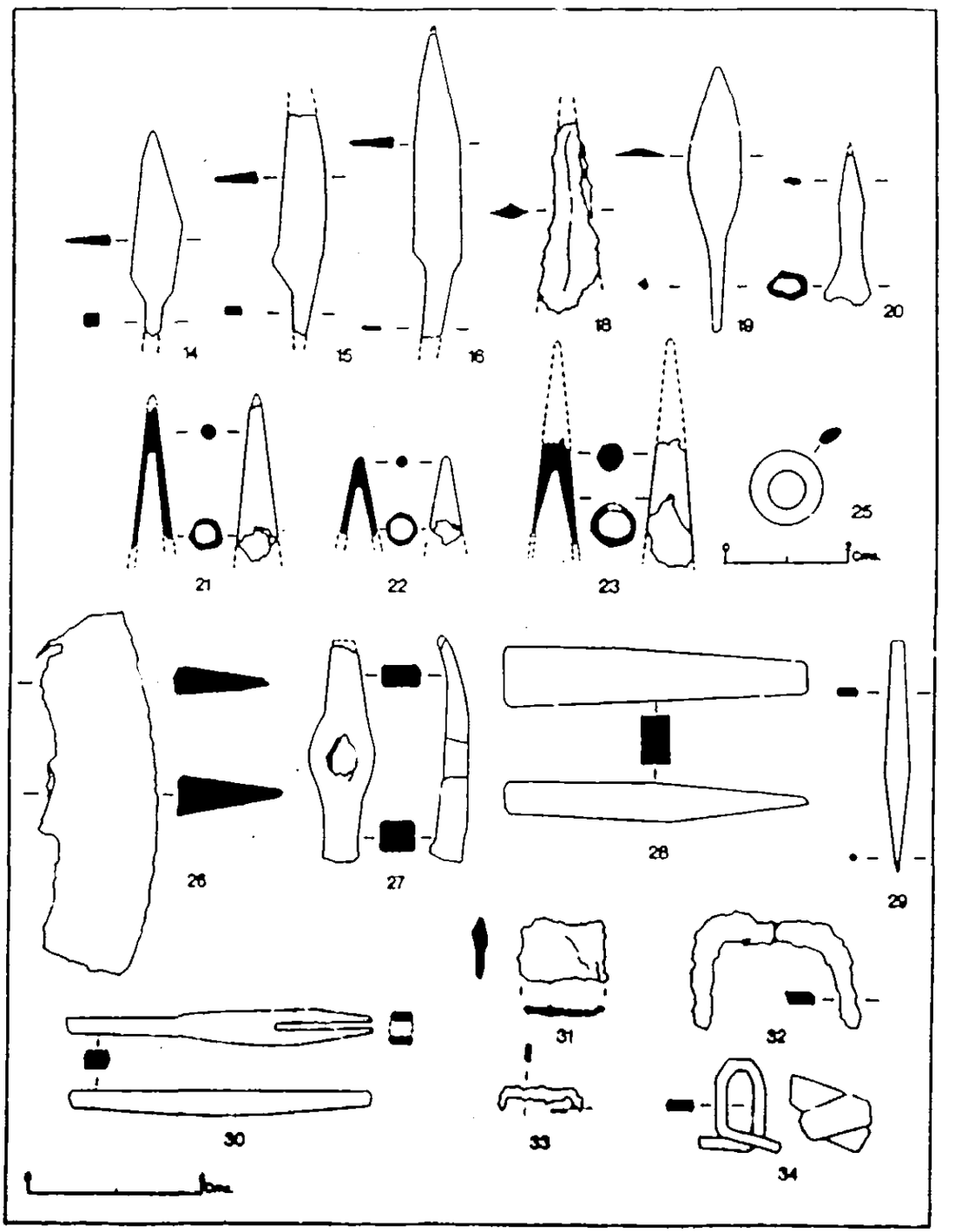
12.* DH 116, SF 098. Copper alloy clamp for attaching a binding strip to the rim of a cup or drinking horn. Poor, incomplete condition; but one rivet still in place.

A simpler version of the clamps found in Anglo-Saxon contexts, outstandingly at Sutton Hoo (Bruce-Mitford 1983, chap III); and in a western context at Dinas Powys (Alcock 1963, figs 19 & 20; 1987a illus 5.1, 5.2), and Briston (Duncan 1982, fig 31).

13. DH 305, SF 047. Irregular, corroded strip of copper alloy. L 16 mm, W 3 mm.

IRON (illus 16)

Iron objects were very numerous, with both weapons and tools frequent in Dunollie 1-2, and iron nails in the post-4 phase. The state of much of the iron was very bad, and some has disintegrated



ILLUS 16 Iron objects.

since it was first drawn and catalogued. The drawings attempt to show the original rather than the corroded state of the object.

14.* DH 109, SF 056. Small tanged knife, with thick, markedly angled back.

15.* DH 310, SF 087. Tanged knife with thick, gently curved back. Blade somewhat reduced by whetting.

16.* DH 105, SF 019. Tanged knife with thick, slightly angled back.

17. DH 113, SF 106. Two fragments from a tanged knife, too badly corroded for illustration.

Although Nos 14, 15 and 16 come from layers of Dunollie 4 or later, it is probable on typological grounds that all these knives belong to phases 1-3, but in the 9th or even 10th century, rather than 7th-8th.

18.* DH 117, SF 128H. Fragment of a spearhead, with pronounced ribs on both faces. It is not known whether this was socketed or tanged, nor is the overall shape of the blade known.

19.* DH 109, SF 055. Tanged arrowhead, with thin leaf-shaped blade. Stratified in phase 4, and perhaps belonging to that period: cf the London Museum Medieval Catalogue (1940) fig 17, 11.

20.* DH 117, SF 128A. Small socketed arrowhead, with disproportionately large socket and flat blade.

Apparently a smaller version of one from Bulston (Munro 1882, fig 236).

21.* DH 306, SF 206. Socketed arrowtip of elongated conical form, lacking point and part of socket. Present weight approx 5 g (0.18 oz).

22.* DH 117, SF 115. Point of a similar arrowtip, much of socket missing.

23.* DH 114, SF 125. Part of socket from a similar arrowtip.

24. DH 111, SF 129C. Probable socketed arrowtip of elongated conical form, too badly corroded for certainty.

Nos 21-24 have previously been classed as ferrules (Duncan 1982, 7 following Craw 1930, 117, with fig 5, 32-35, as examples from Dunadd); but it is difficult to imagine a shaft of a mere 10 mm diameter requiring a ferrule. The interpretation as arrowtips may be supported by medieval examples: eg London Museum Medieval Catalogue (1940) 66-8, fig 16 type 1, and pl XV, 21 and especially 20. Allowing for corrosion and damage to the most complete of the Dunollie examples, the original weight was probably less than a quarter of an ounce (c 7.0 g). While this would not add much weight to an arrow shaft, the sharp point would undoubtedly have increased its penetrating power.

The occurrence of Nos 22-24 in layers of phases 1 and 2 shows that these arrowtips go back to the earliest period at Dunollie. This need not rule out their use with a crossbow, (as suggested in the Medieval Catalogue), given the presence of the nut for the trigger mechanism of a crossbow at Buiston (MacGregor 1985, fig 84).

25.* DH 208, SF 075. Ring, of flattened oval section. It is difficult to see the function of this, unless possibly as a link in a piece of ring-mail.

26.* DH 112, SF 096. Blade of a woodman's T-shaped axe, and stump of the tang that linked the blade to the socket. A small version of a common medieval axe, which appears in early contexts on some Pictish cross-slabs, sometimes in

the hands of centaurs. This example comes from phase 3, and is therefore likely to be residual from Dunollie 1-2.

27.* DH 308, SP 070. Small hammerhead, one end slightly splayed, the other tapering perhaps to a wide-edged pick. The smallness and lightness of this (about 1.5 oz, 42 g), show that it was intended for relatively delicate work, perhaps metalworking.

28.* DH 116, SP 118. Iron chisel, now totally disintegrated along corrosion planes, suggesting that it had been wrought by piling thin strips of iron.

29.* DH 209, SP 130. Iron awl, with rectangular sectioned tang, round-sectioned point.

30.* DH 110, SP 060. Two-pronged implement, heavily corroded, and now largely disintegrated. It appears to have consisted originally of a circular stem, which widened and bifurcated into two blades of narrow oblong section.
I know no parallels for this object. The blades appear insufficiently springy to be part of a lock mechanism. Very tentatively I suggest that this might have been the upper arm of a balance; or more doubtfully, a simple handle for an iron mirror. (For an iron mirror of suitable thickness, see Maiden Castle (Wheeler 1943, 272-3, fig 69, 2)).

31.* DH 114, SP 111. Fragment from a loop or tab; or less possibly a lug or handle from the rim of a small vessel.

32.* DH 113, SP 106. Regular strip, bent in two right angles; the ends missing. Perhaps a large cleat or staple.

33.* DH 117, SP 121. Small strip, bent in two right angles;

the ends missing. Probably a small cleat or staple.

34.* DH 109, SF 057. Regular iron strip, bent into a loop with overlapping ends.

35-43. There are a further 9 fragments of regular strips, straight or curved, 6-12 mm wide, and 2-6 mm thick, as follows: DH 102, SF 089; DH 110, SF 063; DH 111, SF 129; DH 112, SF 094; DH 113, SF 106C; DH 117, SF 128; DH 209, SF 134A; DH 211, SF 090; DH 305, SF 013.

44. DH 305, SF 037. Clench nail, L 25 mm.

44-55. Straight nails, normally of oblong section with flat, offset heads. L 35-75 mm. The stratification is as follows: DH 103, SF 059; DH 204, SFs 034, 036, 041, 042, 043, 048; DH 303, SF 003; DH 305, SF 033; DH 407, SF 144 (2 examples).

56. DH 205, SF 028. Fragment of sheet, L 110 mm, max W 55 mm, thickness 2 mm. Purpose indeterminate.

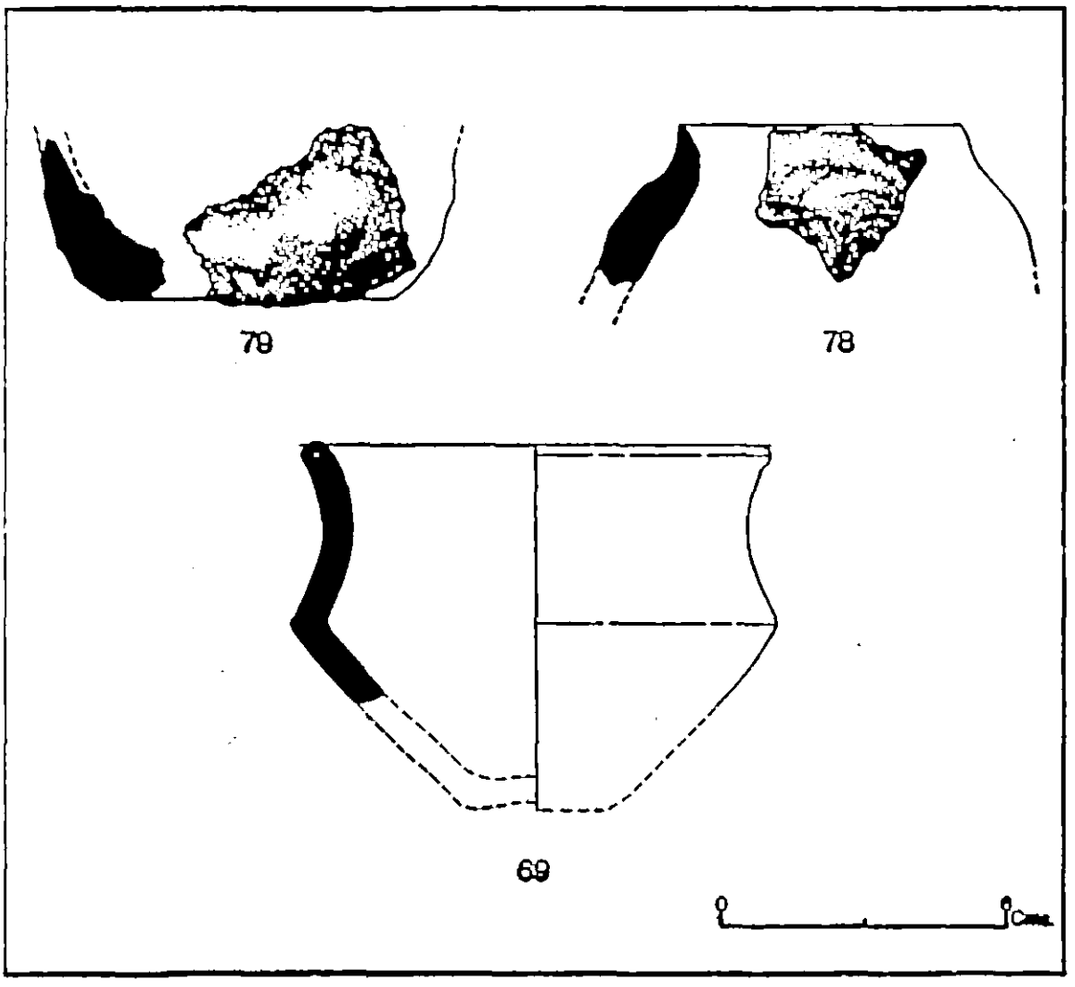
57,58. Two indeterminate sheets of iron: DH 111, SFs 077, 129A.

59-62. Indeterminate rods, 5 mm or less in diameter: DH 111, SF 129B; DH 117, SF 103; DH 209, SF 134; DH 305, SF 014.

63-68. Indeterminate fragments of iron. DH 105, SF 016; DH 111, SF 076; DH 114, SF 113; DH 117, SF 128B plus 4 other frags; DH 207, SF 066; DH 305, SF 069.

POTTERY (illus 17)

69.* DH 308, SF 072, joins DH 310, SF 081. Rim and upper body of an E 2 beaker. Hard buff fabric with much fine quartz, also small black grains, and limonite or haematite particles. Rim D, 90 mm.



ILLUS 17 Pottery.

70. DH 100, SF 131. Body sherd of Class E, with purple stain on interior.

71. DH 111, SF 085. Small (L 25 mm) body sherd of Class E: hard gritty buff fabric.

72. DH 117, SF 101. Heevily gritted body sherd, with internal throwing grooves and external horizontal striations characteristic of an E 1 jar. The fabric is pinkish rather than buff, but this may be the result of post-breakage re-cooking since the context is the Phase 1 hearth or oven.

73. DH 300, SF 035. Small body sherd of a very thin walled (T 3mm) jar in a white oxidized fabric with abundant fine rounded quartz grits, rare particles of red sandstone. Though the colour and hardness suggest E-ware, the fineness of the grit, and the thinness of the walls, argue for a later date. Mr G R Haggarty comments 'possibly 12th century'.

74-77. Glazed sherds from layers later than Dinollie 4.

DH 305, SF 046 and DH 401, SF 038 have a red, iron-rich sand tempered fabric with a few large fragments of sandstone and an external patchy green glaze. They are possibly 14th or 15th century, and may be from a jug.

DH 404, SF 058 has a very well sorted quartz tempered reduced fabric with an external dark olive green glaze. It is probably 14th or 15th century.

DH 401, SF 038 is a very small (L 15 mm) sherd of tin-glazed earthenware glazed on both surfaces, and with blue line decoration on the exterior. It is probably 18th century.

I am grateful to Mr G R Haggarty for his comments on Nos 73-77.

78.* DH 102, SF 088. Rim and shoulder from a small crude jar or bowl with everted rim. Fairly hard buff fabric with sparse quartz, frequent finer grits, and probably very fine particles of mica.

79.* DH 102, SF 093. Base of a crude jar or bowl, in a fabric with a pink core and buff surfaces. Rather soft fabric with frequent quartz and other grits.

Despite differences in fabric, these two vessels are linked both by their crudity of manufacture and by their stratification in DH 102 Upper Ditch Fill. They appear to indicate a crude pottery industry at a very late period in the history of Dunollie.

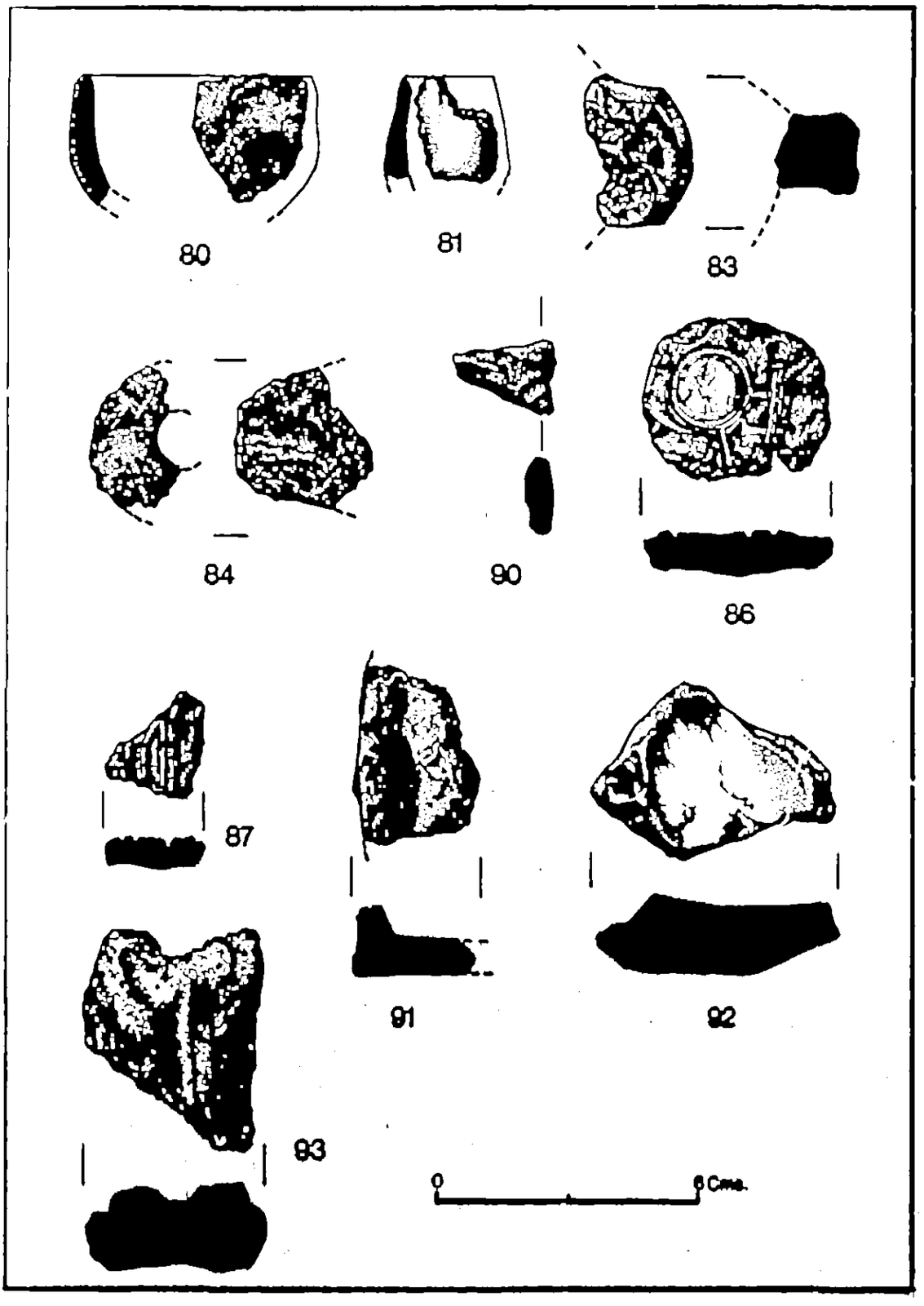
CRUCIBLES (illus 18: 80, 81, 83)

80.* DH 117, SF 119. Rim and wall of a small crucible in pale grey densely gritted fabric, with an external layer of vitrification. Given the range of crucible types in use in Celtic Britain, this sherd is too small to determine the particular type from which it comes. D 60 mm or less.

81.* DH 300, SF 071. Fragment of rim and wall of a very small cylindrical or thimble-shaped crucible in pale grey densely gritted fabric, with slight external crazing and vitrification.

Despite the small size and irregularity of the sherd, the reconstruction is reasonably reliable. For a cylindrical crucible from Dunadd, Craw 1930, 123, fig 8.4.

82. DH 308, SF 064. Body sherd in characteristic crucible fabric, the exterior crazed and partly covered in black



ILLUS 18 80-83, crucibles. 84, tuyère. 86-93, moulds.

bubbly vitrification, the interior slightly crazed.

83.* DH 110, SF 062. Crude lug handle from a crucible. The fabric - a rough pink core with some sand particles, and a smooth buff slip - is comparable with that of some of the Dunollie moulds. Parallels may be quoted from Helgo, Sweden, centred on the 6th century AD (Lamm 1980, fig 1); and even better ones, in terms of the size range, from Viking Age Ribe, Denmark (Brinch Madsen 1984, Type 2, fig 2 and passim). There are also slender crucible handles from Dunadd (Craw 1930; fig 8).

TUYERES (illus 18: 84)

84.* DH 114, SF 107. Outer end of a tuyere in a gritty pinkish-buff fabric. The outer surface is vitrified, the degree of vitrification increasing towards the exit of the nozzle.

85. DH 114, SF 159. Possible fragment from a tuyere. The fabric is comparable with No 84, and the outer curve of this sherd also matches that of No 84; but all the other surfaces are fractures.

MOULDS (illus 18: 86, 87, 90-93)

Where determinate, these are all from two-piece moulds, with parallels, for instance, at Dunadd (Craw 1930; Duncan 1982) and Brough of Birsay (Curle 1982).

86.* DH 305, SF 022. Mould for casting a nail headed pin and a narrow ring. At least two keying projections are visible round the edge. Buff fabric with fine grits.

87.* DH 308, SF 079. Fragment of a mould for casting two (or more) stick pins, of which the righthand one was ball headed. Pinkish fabric with very fine grits.

88,89. DH 114, SF 109; DH 111, SF 104. Fragments from two moulds for casting stick pins.

90.* DH 114, SF 110. Fragment of a mould for casting a curved ring, probably the hoop of a brooch.

91.* DH 114, SF 112A. Fragment of a mould as is shown clearly by the fabric. It is less clear what object was to be cast: apparently a flat disk, about 140 mm diameter and at least 5 mm thick.

92.* DH 110, SF 092. Very weathered mould fragment, apparently for casting a slightly convex disk, about 35 mm diameter.

93.* DH 117, SF 100. Part of the pouring gate and channel of a two-piece mould. A mould with a very similar gate and channel had been used at Dunadd for casting a penannular brooch of Class G (Duncan 1982, fig 46; Dickinson 1982). This falls short of proof, of course, that Dunollie No 93 had also been used to cast a brooch of this precise type.

94-97. Four indeterminate fragments of moulds: DH 117, SF 120; DH 113, SF 155; DH 110, SF 061; DH 107, SF 153.

CLAY PIPES

98. DH 202, SF 024. Bulbous bowl of clay pipe, with flat heel, and thin roulet/ed band immediately below the rim.

99-101 DH 201, SF 141. Three fragments of pipe stem, one with very rubbed traces of a cable design, and indecipherable

lettering.

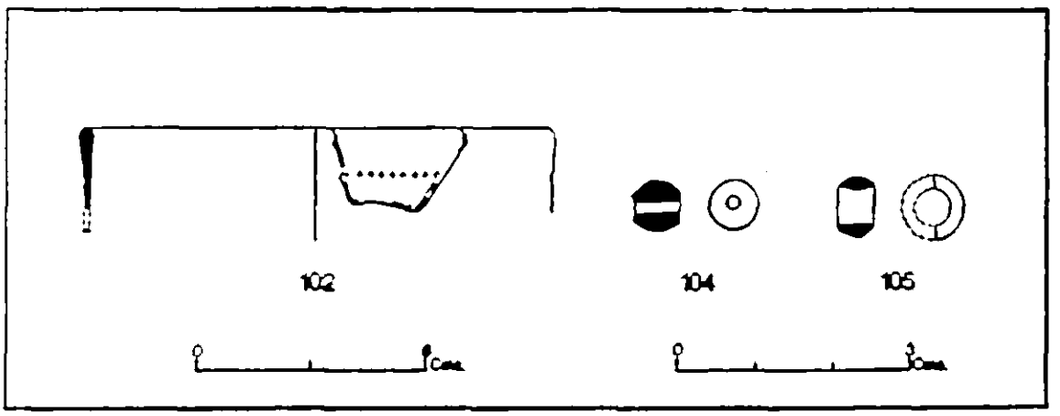
FIRED DAUB

Fragments of fired daub, often with wattle marks, were recognized and recovered from several layers in Cutting 101 - namely, 102, 103, 105, 106, 109, 111, 112, 113, 117 - but not at all in Cuttings 201, 301 or 401. They reveal the presence, already in Dunollie 1-3, of structures of clay-daubed wattle which had been subjected to considerable heat, such as oven or furnace domes, or flues. Less probably, they may come from fire-damaged buildings with wattle-and-daub walls. Given the intensity of firing, and consequent durability of these fragments, together with their observed stratification, it is highly likely that all the recovered daub originated in the industrial area of Dunollie Phase 1.

It has not been considered useful to describe or illustrate these fragments in detail. It is nonetheless worth mentioning that they demonstrate the use of wattle-rods commonly 15-12 mm diameter, occasionally 8-7 mm and exceptionally as little as 4 mm thick.

GLASS (illus 19: 102, 104, 105)

102.* DH 102, SF 001. Rim from a straight sided bowl of clear, colourless glass, with a slightly thickened, rounded rim, decorated with a row of enamelled dots. Partly melted and re-fused down the righthand side. This may also have altered the colour of the enamel, so that what now appears



ILLUS 19 Glass bowl-rim and beads.

white may originally have been blue or yellow.

The sherd has been seen by R J Charleston, D Charlesworth, D B Harden, J R Hunter and A J Price. I am most grateful to them all for their comments, which agree substantially that the vessel from which the sherd came was probably a bowl of Roman manufacture and 3rd century AD date, painted with scenes from the arena. Such vessels and undecorated ones of the same shape are found mainly outside, and sometimes far beyond, the imperial frontiers, and especially in Denmark (Wheeler 1954, 106 and pl 12A; Wilson 1970, 111 7). In Free Germany, their occurrence in princely or chiefly graves has sometimes been interpreted in terms of diplomatic gifts or bribes to potentially hostile barbarian princes. Given that the major concentration is in a zone between 400 and 800 km beyond the frontier, this seems unlikely, however; and it is more reasonable to suggest that they were deliberately obtained by the northern chiefs as part of a long-range exchange system with the Empire (Hedeager 1978).

Sherds of such vessels occur in northern Britain on Roman sites, for instance along Hadrian's Wall (Charlesworth 1959, 43-6). More relevant to the present case, they occur on 'native' (ie non-Roman) sites north of Hadrian's Wall, for instance at Traprain Law (East Lothian), Airlie and perhaps Kingoldrum (Angus), Westray (Orkney), and Clickhimin (Shetland) (Curle 1932, 291-4, figs 3-5; Robertson 1970).

This does not entirely explain the occurrence of the present piece at Dunollie, where it is separated by some

three or four centuries from the first evidence of occupation in Dunollie phase 1. Nor does the stratification help, since it came from high in DH 102 Upper Ditch Fill, by some process of dispersal which cannot now be ascertained. A possible explanation of its occurrence at Dunollie is attempted in the printed section of this report, p .

103. DH 204, SF 044. Small triangular sherd (L of side 10 mm) from a free-blown vessel with a very thin wall (less than 1 mm thick), in slightly yellowish glass. Under a hand-lens, as Dr David Sanderson informs me, the flow lines produced during blowing are visible, and also some small seeds. Most probably either Roman, in which case it poses the same problems as No 102; or Teutonic, introduced to the site as cullet, a common practice on Early Historic sites in western Britain (Harden 1956, 149-52 for a preliminary list which has not been brought up to date). For an analysis of the composition of this sherd, see Appendix 2.

104.* DH 104, SF 007. Small globular bead of opaque pale 'sky-blue' glass. Beads of this colour were especially popular in Britain in the first two or three centuries AD, but the colour was revived in Victorian and later times (Guido 1978, 18). Given the stratification, there is no certainty that this bead should be regarded as ancient.

105.* DH 108, SF 049. Small annular bead of opaque cobalt blue glass. Duncan cites parallels from Ballycatteen, Caherconnaun, Garrycluff and Lagore (1982, 89), a series of Irish ringforts and crannogs, which may be dated to the

later Ist millennium AD.

106-107 DH 303, SF 002, and DH 309, SF 065. Two sherds of window glass, respectively L 25 mm, W 15 mm; and L 22 mm, W 9 mm. Presumably these should be attributed to the tower house. SF 002 came from just below the surface of the Phase 3 bank, and should not be regarded as seriously stratified, while SF 065 came from a lens at the base of DH 305, that is from the Post-Dunollie 4 phase.

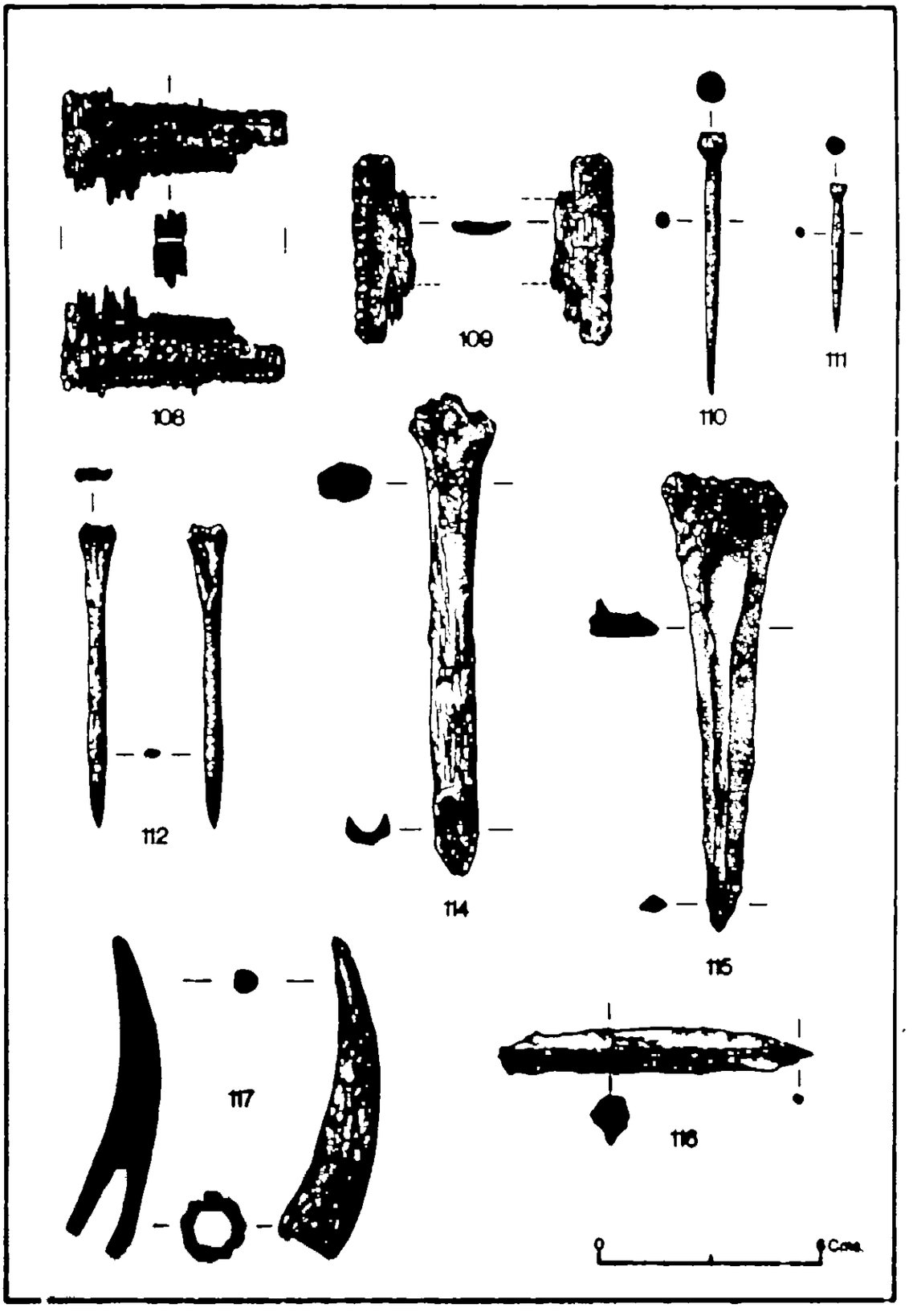
ANTLER & BONE (illus 20: 108-112, 114-117)

No attempt has been made to distinguish microscopically between these two substances, but it is likely that the two combs are of antler (MacGregor 1985) and that the pins are of bone.

108.* DH 119, SF 139. Substantial fragments of a double-sided composite comb. The fastening plates, which are secured by iron rivets, are decorated with dot-and-circle ornament with parallels, for instance, at Broch of Burrian (MacGregor 1974, fig 11), Buiston (Munro 1882, figs 217-9), Brough of Birsay (Curle 1982, illus 10) and Dinas Powys (Alcock 1963, pl viii; 1987a, illus 7.2).

109.* DH 209, SF 083. End tooth-plate from a double-sided composite comb. The edge bears decorative (ie non-functional) incisions, differing in number on each side. No parallels are offered for this.

110.* DH 117, SF 099. Ball-headed pin. The top is flat and slightly beaded and there is also a slight beading between the ball and the stem. The stem swells slightly, but not



Illus 20 Objects of antler and bone.

2 : E13

sufficiently to be described as hipped. Apart from the absence of hipping, there are parallels, for instance, from Broch of Burrian, Brough of Birsay and Buiston.

111.* DH 117, SF 127. Small, plain nail-headed pin. Again there are parallels at Buiston, Broch of Burrian and Brough of Birsay, often hipped, and occasionally with ornamental heads.

112.* DH 116, SF 126. Large, slightly hipped pin, made from a pig fibula: cf Buiston (Munro 1882, fig 204) and Broch of Burrian (MacGregor 1974, fig 7).

113. DH 118, SF 135. Fragment, L 32 mm, from the point end of a pin.

114.* DH 116, SF 097. Gouge, formed by slicing at an angle through the tibia of a sheep (Ovis) or goat (Capra). (This and other identifications by S T Driscoll). The form goes well back into the 1st millennium BC, so no parallels are cited here.

115.* DH 117, SF 136. Crude point, made by splitting the metatarsus of an ox (Bos) to produce a roughly triangular cross-section.

116.* DH 117, SF 114. Crude point, split from a very robust long bone, probably cattle (Bos), or possibly horse (Equus) or pig (Sus). One end has been trimmed to produce a sharp piercer.

117.* DH 118, SF 138. Handle, made by sawing off, and then hollowing out, an antler tine. The distal end of the tine is very heavily rubbed.

118. DH 117, SF 158 A, B & C. Three other fragments of sawn and cut antler tine, too fragmentary to determine their

intended function.

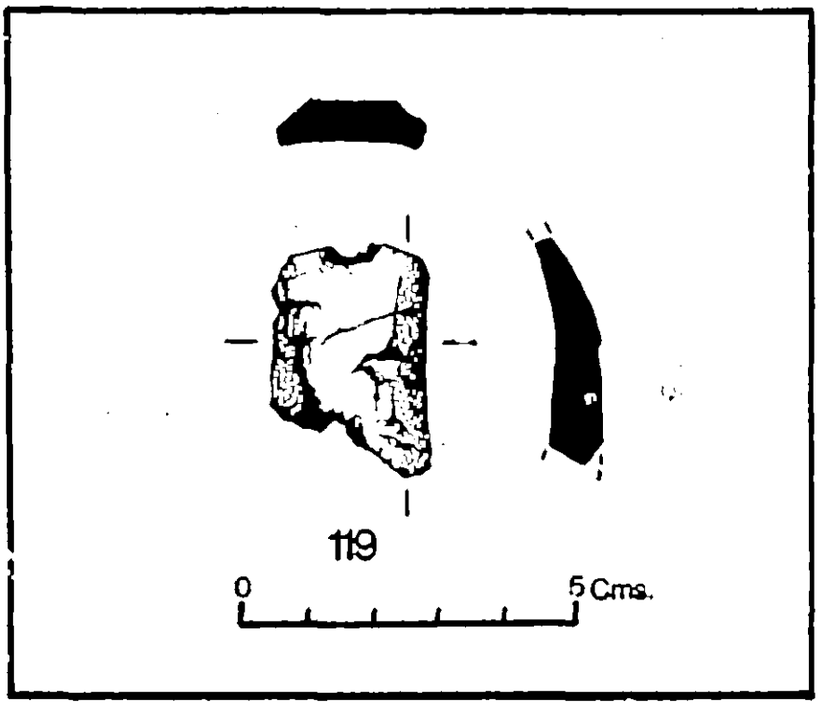
WOOD (illus 21)

119.* DH 109, SF 053. Carved fragment of yew (Taxus) wood, accidentally preserved by charring. The long section has a gentle curve and slight taper: the cross section appears to have bevelled edges, though this may partly be the result of damage. Moreover, the curve of the long section may result from heat distortion.

The use of yew, as Dr J H Dickson reminds me, suggests that this may be from a bow. A possible parallel comes from Ballinderry Crannog No 1 (Hencken 1936, fig 8D; better drawing in Clark 1963, fig 21:6). Alternatively,. our piece may be part of a handle for a wooden mug or bowl. The small size and damaged state make any firm conclusion impossible.

STONE (other than flint) (illus 22: 120-122)

Fragments of 4 rotary querns of West Highland type were recovered, but none was in a clearly stratified context, and all may come from a very late phase of the site's history. A further 13 pieces of worked or utilized stone were recognised. Some of these, such as perforated slates, are likely to be late; others, such as pebbles used as whetstones, hammer stones and rubbing stones, are not typologically diagnostic. The present account is restricted, therefore, to pieces which certainly came from phases 1-3. Illustrated accounts of all the stone objects may be found in



ILLUS 21 Carbonized wood.

Duncan 1982, 108-34.

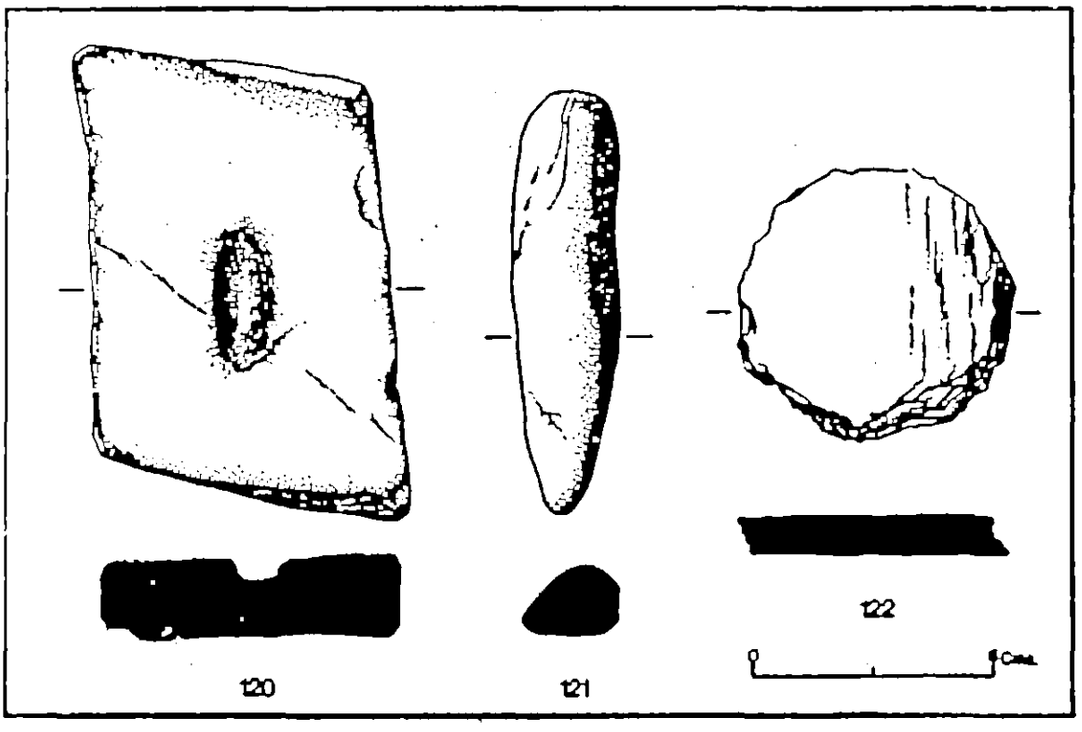
120.* DH 214, SF 117. Ingot mould for an elongated oval ingot, carved in a flat slab of sandstone; volume 1.25 ml.

121.* DH 110, SF 146. Whetstone/rubbing stone. An elongated beach pebble has slight dishing along its long axis, evidence for use as a whetstone. A longitudinal band of polish suggests that it had also been used as a polishing or rubbing stone.

122.* DH 111, SF 133. A roughly chipped disc of slate. There is a second slate disc with a central perforation, and a thicker disc of mica schist, but neither is closely stratified.

FLINT

Thirteen or fourteen fragments of flint were recovered from both trenches and from all phases of Dunollie. Mostly these were chips and irregular flakes, some of them clearly from beach pebbles, but a few may have been parts of blades or cores, one was a plano-convex knife or scraper, and another had delicate edge-retouch. Given the quantity from such a limited excavation, it seems that they must mark a flint-using occupation; but there is no reason to link this with activity in the 1st millennium AD or later. They are therefore not catalogued or illustrated here, but form the subject of a separate report.



ILLUS 22 Stone objects.

APPENDIX 1: THE ANIMAL BONES

Angela Jones and the late G W I Hodgson

SUMMARY

The animal remains are mostly those from unimproved domestic stock. The species present are cattle, sheep/goat, pig and horse. Fish are only poorly represented (2 vertebrae and 1 other bone; these are believed to be from a marine species).

Perhaps surprisingly, there is an absence of the bones of wild animals such as birds and fowl, deer and other game, and whale and small mammals. There is no evidence of dog or cat and the bones examined show no signs of having been gnawed. Shellfish are also absent.

The overall impression is of young animals, the bones of which were thoroughly exploited for the production of marrow.

1. METHODOLOGY

The animal remains were identified by direct comparison with bones obtained from modern animals.

Measurements were taken in accordance with the scheme proposed by Driesch (1976).

2. TOTAL NUMBER OF BONES IDENTIFIED

DH 112 (bone layer)	111
DH 117 (sub-slab burning)	196
Total	307

3. SPECIES PRESENT

Cattle, sheep and/or goat, pig and fish remains were present in both phases. Horse was present in DH 117 only.

Three fragments of red deer cast antler which lacked bone attachment were present in layer DH 117. These could have been carried onto the site from a distance and may have come from only one animal.

The bones of the mammals appear to have come from domestic animals.

4. RELATIVE FREQUENCIES OF SPECIES

The relative frequencies of species present were assessed by (a) minimum numbers, and (b) percentage of bones of each species present.

(a) Minimum numbers (based on a bone common to both layers)

	DH 112	DH117	Bone
Cattle	4	2	right astragalus
Sheep/goat	2	3	left scapula
Pig	2	2	left innominate
Fish	1	1	vertebra

(b) Percentages (excluding fish vertebrae)

	DH 112	DH 117
Cattle	79.1	54.6
Sheep/goat	12.7	20.1
Pig	8.2	24.7
Horse	-	0.5

5. AGES OF ANIMALS AT DEATH

Assessment of age at death was difficult because most mammalian teeth were loose and not attached to bone and the long bones were heavily eroded. Assessment of age, based on dental evidence, is given in Table 1.

6. SEX, SIZE AND TYPE OF ANIMALS

There is insufficient evidence to assess the sex of the animals, all of which appear to have been "run of the mill" unimproved domestic stock.

7. CARCASS ANALYSIS

Although these animals represent statistically a small sample, it is worth noting that different parts of the carcass of cattle and pigs are equally represented, i.e. there is no evidence of dispersal of different parts of the carcass, such as joints or low meat-yield bones. This suggests that all the animal remains, whether from carcass dressing or meals, are represented. A possible exception is the absence of sheep heads from layer DH 112. Possibly, sheep heads were removed and eaten as a delicacy elsewhere.

8. PATHOLOGY AND BUTCHERY

No signs of bone or periodontal disease were detected. The bones of cattle, sheep and pig have been heavily and repeatedly butchered as though for the maximum extraction of marrow or stock.

Table 1 Assessment of age of animals on dental evidence

DH 112

Species	Evidence	Age assessment
Cattle	23 unworn permanent molars and premolars and 2 unworn deciduous teeth	Juvenile cattle
Sheep/goat	10 unworn permanent molars and premolars and 4 deciduous teeth	Young sheep <18 months
Pig	1 mandible and 1 maxilla, each bearing a third molar not fully erupted	Young pig

DH 117

Species	Evidence	Age assessment
Cattle	Evidence of loose teeth suggests the presence of 3 cattle	a)mature animal (milking cow?) 4-5 years old (3rd molar worn) b)Young adult, 2½-3 years old (3rd molar erupted but not worn) c)calf or late embryo, deciduous teeth unworn
Sheep/goat	3 unworn molars, 1 half mandible bearing deciduous teeth + 1 mandible frag. w/o teeth	a)sheep 18 months-3 years old b)sheep <18 months
Pig	3 right maxillae, each bearing an unworn or uncrupted third molar	Adult pigs <3 years old
	+ 1 left mandible tooth	M2 not yet fully erupted 18-24 mths (Silver 1963)

9. ACKNOWLEDGEMENTS

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We are grateful to Mrs Rose Smith, Administrator of the Perth High Street Archaeological Excavation for help in the production of this paper.

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APPENDIX 2: ANALYTICAL RESULTS FROM TWO GLASS SHERDS FROM DUNOLLIE

D C W Sanderson

INTRODUCTION

Two samples of vessel glass from Dunollie (cat nos 102, 103), and a series of glass standards simulating early compositions (Newton 1977) were analysed using a CamScan series 4 scanning electron microscope with x-ray microprobe facilities, in the physics department of Paisley College of Technology. The results confirm that both samples are of the soda-lime-silica composition which occurs commonly in NW Europe throughout the first millennium AD. This does not exclude the possibility of the composition of medieval vessel glass from south of the Alps. The remarkable similarity of composition of both sherds suggests that either they come from the same vessel, or that they represent source material and product for a re-working operation.

THE SAMPLES

Cat no 102 is a rim sherd representing a 30° arc from a straight sided vessel with an inferred upper diameter of 120 mm, made from transparent and virtually colourless glass. The rim thickness of 3 mm narrows to 2 mm within the first 10 mm. The sherd is decorated by a row of nine applied and marvered dots of opaque and badly weathered white glass each 1.5mm in diameter with a mean spacing of 2.6 mm. The glass itself is highly durable

showing few visible signs of weathering. One edge has been partly remelted and fused; the other has a clean fracture and shows no evidence of unannealed flow lines from the original working. Only a few seeds of 1 mm or above are visible, although many of 100 microns or less can be seen under magnification. This suggests glass which had been well melted and worked at high temperatures.

Cat no 103 is a triangular body sherd some 10 mm x 10 mm x 10mm, wall thickness 1 mm, of transparent durable glass with few signs of weathering and a slight residual yellow/brown tint. There are few diagnostic features, although unannealed flow lines can be seen on the fractured edges. The seed pattern is very similar to no 102.

ANALYTICAL METHOD

Small fragments, some 1-2 mm across, were cut from the edges of the samples, mounted in resin blocks and lapped to a depth of several hundred microns to remove hydrated layers before optical polishing with a series of diamond coated wheels. The samples and standards, which were similarly prepared, were then coated with a thin film of evaporated carbon before presentation to the electron microscope. X ray spectra were acquired from approximately 1 square mm areas under a 20 kV 200μA electron beam for 300s each, having first confirmed that these analytical conditions did not result in depletion of Na signals unde

having first confirmed that these analytical conditions did not result in depletion of Na signals under prolonged exposure to the beam. The x ray detection system consisted of a Si(11) detector with a resolution of 160 eV at 5.9 keV coupled to a Link AN 10000

spectral processor and computer.

X ray intensities for the K alpha lines from Na, Mg, Al, Si, P, S, K, Ca, Ti, Mn, Fe, Cu, Zn and Sr, and for the Pb L alpha line were stripped from the spectra using elemental profiles from a virtual standard pack supplied by Link systems, and preliminary compositions calculated using the ZAF/4 FLS program. The results were expressed as stoichiometric oxide weight percentages normalised to 100%, and were broadly in agreement with the stated compositions from the standards. The Na contents of high sodium glasses however were significantly underestimated using the virtual standards approach, probably due to differences in analytical conditions between the Paisley system and that used by Link systems to produce the spectral profile for this element. This was satisfactorily corrected by rescaling the Na estimates and renormalising the results to account for the excess; a procedure which does not apparently invalidate the ZAF corrections for these samples.

RESULTS AND DISCUSSION

Table 1 shows the stated compositions of the ESP/Pilkingtons standards (Newton 1977) in comparison with the results obtained by the procedure outlined above. The overall agreement is impressive, particularly for the major elements. Although significant differences are noted for the Si, K and Ca contents of standards 760145 and 760148 they may be taken as indications of the effects of poor durability or heterogeneity in these cases and are not representative of the results from the other standards.

The minor elements are similarly acceptable, although the

concentrations are particularly lacking in precision, due to a combination of a low excitation efficiency under these analytical conditions and failure to resolve the spectral interference between AS K alpha and Pb L alpha lines. Reliable Pb determinations by energy dispersive XRF would be better based on the L beta line; however, this was not readily achievable in this case.

Having thus validated the method, the data from the archaeological samples, shown in Table 2, can be interpreted with confidence. Both samples are remarkably consistent compositionally and conform to the broad category of low-magnesium soda-lime-silica glasses originally identified by Sayre and Smith (1961) and shown for exmple by Sanderson and Hunter (1981, 1982), and by Dekowna (1980) to dominate domestic assemblages of window and vessel glass in Northern Europe in the 1st millenium AD. Replacement of soda glasses by potash glasses in NW Europe in the later medieval period provides a clear distinction from the type of composition observed here, although it should be noted that the soda lime silica tradition continued south of the Alps and most notably in Venice.

In comparison with 1st millennium AD glasses these two examples have rather high potassium contents. In only eight cases out of over 200 sherds analysed in Bradford between 1979 and 1982 (Sanderson et al, 1984) were the potash levels over 1.5% by weight, and these examples coming from Roman contexts at Binchester, and dark age and Saxon period layers at Spong Hill, Hamwih, Winchester, Helgö (Sweden) and Dorestadt (Netherlands). The titania and iron and alumina contents are also lower than most examples, and indicate a high quality sand. Furthermore the

soda contents, close to 20% by weight suggest no stress on supply of the alkali source (probably Mediterranean) used in these cases. The manganese and iron contents are reasonably closely matched and certainly in the case of no 102 have been melted under conditions which have de-coloured the glass. Taken together, the use of a high quality sand, the absence of sodium de-basement, and the successful use of manganese as a decolorant are tentative pointers to the first half of the first millennium AD.

The other notable feature is the remarkable similarity of composition between the two samples examined, which share the same minor deviations from the mean compositions of the period. The match is so close as almost to suggest that these are sherds from the same vessel. Against this however the thicker rim of no 102 would sit ill on the thin walled glass of no 103, and significant differences in working technique and colour were noted above.

The observation of distinct colours in lightly tinted glass fragments of similar composition reflects the interaction between the minor elements and the furnace conditions used. While the composition of glass reflects the raw materials and their original selection, the colour is clearly affected by technique. Given the important archaeological distinction between glassmaking and glassworking which may take place independently of each other in space and time, this interplay deserves further attention. A recent study of some aspects of this interaction (Sanderson and Hutchings, 1987) has shown that failure to achieve colour control when both manganese and iron are present is in fact common in glass from the dark ages, and that the yellow/brown tint observed here results from short melting times under oxidising conditions. With this in mind the possibility that sample no 103 represents a

sherd from a remelting operation using material from the body of the vessel of no 102 can be postulated.

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Table 1

Scanning electron microprobe results and stated compositions for the
EBF/Pilkingtons simulated medieval glass standards

Oxide	77C33	76C150	76C151	76C158	76C149	76C159	76C145	76C148
Na_2O								
Stated	21.7	9.5	5.0	(.1)	-	-	.1	.1
Observed	22.1	8.1	3.7	.02	-	-	.14	.05
MgO								
Stated	.05	6.6	3.2	.06	-	-	.05	.05
Observed	-	5.2	2.4	.03	-	-	.2	.1
Al_2O_3								
Stated	4.1	4.3	3.9	3.8	4.2	3.9	3.8	3.9
Observed	3.8	4.1	3.5	3.6	3.7	3.7	4.9	5.0
SiO_2								
Stated	48.7	55.4	56.9	42.6	56.8	44.0	40.7	53.8
Observed	48.4	55.6	53.3	41.4	55.3	42.6	49.0	60.9
P_2O_5								
Stated	-	-	3.9	-	-	-	-	-
Observed	0.06	0.06	5.0	-	-	.2	-	.05
SO								
Stated	-	-	-	-	-	-	-	-
Observed	.15	.06	.3	.12	.08	.16	.48	.54
K_2O								
Stated	-	1.5	7.2	24.2	14.3	14.5	24.9	14.6
Observed	.03	1.6	7.5	24.6	14.8	14.5	20.8	12.0
CaO								
Stated	22.6	21.9	19.2	28.4	21.5	34.9	29.4	25.9
Observed	25.1	24.6	20.0	29.5	22.2	36.5	24.1	20.7
TiO_2								
Stated	.1	-	.2	-	.2	.5	-	-
Observed	.2	-	.2	.06	.4	.55	-	.05
MnO								
Stated	.05	-	.5	.1	1.8	1.0	-	.2
Observed	.03	.09	.52	.07	2.1	1.1	.01	-
Fe_2O_3								
Stated	2.5	.3	.3	-	-	.1	-	.4
Observed	3.2	.31	.31	.01	.02	.1	.1	.13
CuO								
Stated	-	-	.1	-	.91	.5	-	.07
Observed	.05	.06	.13	-	1.08	.55	.04	.02
ZnO								
Stated	-	.1	-	.5	-	-	-	-
Observed	-	.2	.1	.6	.06	.1	5	-
BaO								
Stated	-	-	-	-	-	-	-	-
Observed	-	.4	.3	-	-	.1	-	.2
PbO								
Stated	-	-	.7	.02	0	.5	-	.9
Observed	.3	-	1.96	.1	.2	.35	.16	.14

Table 2

Results from samples DH102 and DH204

Oxide Wt %	DH102	DH204
Na_2O	19.6	21.3
MgO	1.4	1.79
Al_2O_3	1.6	1.9
SiO_2	67.0	67.2
P_2O_5	0.4	0.6
SO	0.17	0.22
K_2O	3.2	2.9
CaO	6.4	7.2
TiO_2	0.05	0.05
MnO	0.5	0.35
Fe_2O_3	0.79	0.55
CuO	0.08	-
ZnO	-	0.06
SrO	0.61	-
PbO	-	-

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CONTENTS