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Rhynie, A Powerful Place of Pictland

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Chapter 7:

THE FINDS FROM THE CRAW STANE COMPLEX, TAP O' NOTH AND CAIRN MORE

GEMMA CRUICKSHANKS

WITH CONTRIBUTIONS BY EWAN CAMPBELL, MARY DAVIS, LEANNE DEMAY, FRASER HUNTER, JAMES GERRARD, FIONA MCGIBBON, ANDREAS RAU AND ALISON SHERIDAN

7.1 Introduction

A remarkable assemblage of artefacts was recovered during excavation projects in the Upper Strathbogie valley, particularly at the Craw Stane complex, Rhynie where over 1,200 finds provide a wealth of evidence for craft production, wider contacts and daily life (Table 7.1). Metalworking evidence dominates the picture, revealing the production of jewellery and other items at all three sites, along with rare evidence of silver casting and complex precious metal refining at the Craw Stane complex. Imported items include Romano-British ceramic vessels, Late Roman amphorae and glass vessels from Mediterranean, Germanic and Atlantic trading networks, illustrating wide-ranging connections. Handmade pots, querns and gaming pieces add evidence of everyday activities to the more eye-catching finds.

Group	Craw Stane complex	Tap o' Noth	Cairn More
Ceramic moulds	380	22	3
Ceramic crucibles	350	4	4
Iron slag	140	6	-
Tuyères	26	-	-
Copper alloy	24	2	-
Ironwork	67	8	
Worked stone	67	10	-
Shale bangle	-	-	1
Amber beads	2	-	-
Glass bead	3	3	-
Glass working	4	1?	
Glass vessel	8	1	-
Handmade pottery	28	46	1
Imported pottery	90	36	-
Total	1,189	138	9

Table 7.1
Summary of the main artefact categories found at the Craw Stane complex, Tap o' Noth and Cairn More. Numbers refer to individual fragments. For minimum numbers of certain objects, like moulds and vessels, see separate reports

The first part of this chapter presents all the evidence for metalworking (Sections 7.2–8), followed by metalwork (Section 7.9), stone (Sections 7.10–12), glass (Section 7.13), handmade pottery (Section 7.14) and then imported material (Section 7.15 and 7.16). Catalogue entries for illustrated and diagnostic objects are within the text and a full catalogue is in the archive. The dimensions in all catalogue entries are in millimetres (mm). Abbreviations used: L length, W width, T thickness, H height, D diameter, SF small find number, C context, XRF X-ray Fluorescence analysis results.

7.2 Ceramic Moulds

7.2.1 Introduction

A large assemblage of non-ferrous metalworking moulds was recovered from the Craw Stane complex, comprising 380 ceramic and 12 stone fragments (see Section 7.3). A further 22 moulds were found at Tap o' Noth and three from Cairn More. The products of these moulds include unparalleled running boar and hound figurines and a range of jewellery, notably penannular brooches, barrel pins for penannular brooches, handpins, nail-headed pins and a spiral finger-ring (Table 7.2). A range of features such as elaborate decoration, reserved areas to hold enamel and varying construction techniques illustrate a high level of skill and artistry. The following report summarises the technical aspects of the moulds before discussing the products. Catalogue entries for illustrated moulds are provided; a full catalogue of all fragments is in the archive. Finds are all from the Craw Stane complex unless otherwise stated.

Group	Type	Fragments			MNO		
		CS	To'N	CM	CS	To'N	CM
Figurine	Boar	5	-	-	4	-	-
	Hound	8	-	-	6	-	-
	Bear?	1	-	-	1	-	-
	Unclear	2	-	-	-	-	-
Jewellery	Penannular brooch	4	-	1	4	-	1
	Brooch pin (barrel pin)	8	-	-	7	-	-
	Handpin	11	1	-	9	1	-
	Nail-headed pin	4	-	-	4	-	-
	Finger ring	2	-	-	1	-	-
	Ring/ hoop fragments	12	-	-	9	-	-
Mount/ fitting	Triple-disc mount	2	-	-	2	-	-
	'Axe'-shaped	7	-	-	7	-	-
	Bead fitting	-	-	1	-	-	1
	Decorated strip	5	-	-	4	-	-
	Cylinder/ collar	1	-	-	1	-	-
	Plate fragments	10	-	-	-	-	-
	Strip fragments	16	-	-	-	-	-
Bar/ rod fragments	Rod (round section)	60	-	-	-	-	-
	Bar (square section)	18	4	1	-	4	1
	Rod/ bar (unclear section)	14	-	-	-	-	-
Indeterminate	Complex	19	-	-	8	-	-
	Straight edge	31	-	-	-	-	-
	Curved edge	2	2	-	-	2	-
	Corner	8	-	-	-	-	-
	Ingate	14	-	-	-	-	-
	Keying	22	-	-	-	-	-
	Unclear	53	2	-	-	-	-
	Possible mould fragments	41	13	-	-	-	-
Total		380	22	3	67	7	3

Table 7.2
Summary of mould assemblages from the Craw Stane complex (CS), Tap o' Noth (To'N) and Cairn More (CM). Where possible, the minimum number of objects cast (MNO) was estimated for each site

7.2.2 Technology

Terminology

Metalworking moulds are complex objects with a similarly complex range of terminology associated with them. The terminology here follows that used by Ewan Campbell in his study of the large mould assemblage from Dunadd (Lane & Campbell 2000: 201–3). Individual sides of the mould are 'valves', and the funnel-shaped inlet for the liquid metal is the 'ingate' which connects to the object matrix or casting surface via a channel known as a 'runner'. A series of recesses on one valve correspond to matching projections on its pair, known as 'keying' to securely align the two valves. 'Upper' and 'lower' valve refer to the position of the valves when made and often relate to the back and front of the object being cast, though identification is not always straightforward.

Fabric

The ceramic moulds were made from fine silty clay with very few or any inclusions. Two main groups were identified, with Fabric A finer than slightly sandier Fabric B, but they are likely to represent two ends of a spectrum of natural variations within similar clay deposits. Indeed, the clay shares characteristics such as natural inclusions with the sandstones and siltstones used to make metalworking moulds and vessels, suggesting it was associated with the same local source (see Fiona McGibbon, Section 7.10). It was clearly an excellent choice given how well it has held some very intricate forms and decoration. The survival of large portions of moulds, including intact valves, also attests to how suitable this material was for withstanding the pressures of casting hot metal and cleanly removing the object.

Construction features

Identifying lower and upper valves is challenging. Few of the moulds have a recognisably flatter outer surface, as was identified in lower valves at Dunadd where this was interpreted as arising from being pressed against a flat stone during production (Lane & Campbell 2000: 202). This may indicate the metalworkers at the Craw Stane complex did not use a flat surface beneath the moulds, suggesting differing local practices. Keying mechanisms varied from neatly cut triangular notches to more ephemeral oval impressions, along with shallower, rounded-triangular depressions somewhere between the two. The Group D zoomorphic figures have intense levels of keying along the bottom edge, reflecting a great deal of concern over keeping the valves securely aligned during casting. One of the penannular brooch moulds (SF220; Illus 7.6 and 7.7) has a raised cross in the centre of the frame, a distinct keying technique also seen on penannular brooch moulds from Trusty's Hill and Clatchard Craig (Campbell 2017: 41; Close-Brooks 1986: illus 23: 51–2). SF220 is the only mould with such a distinct keying pattern; the range of triangular and oval mechanisms on the rest of the assemblage can be readily paralleled on many early medieval assemblages, including the aforementioned Dunadd and Clatchard Craig, and also Mote of Mark (Laing & Longley 2006: 39), Portmahomack (Spall 2016: D96) and Eilean Olabhat (Armit et al 2008).

Within the assemblage ingates are concave, with no obvious difference between upper and lower valves where distinguishable. The ingate on SF162153 preserves a fingerprint, suggesting they were shaped by hand rather than with a former. Runners have a rounded section, probably created using a rod as a former, though some moulds have no discernible runner between the ingate and the casting surface. Orientation is consistent within object types: pin tips, the centre of brooch frames and the backs of animals are all at the ingate. There is no evidence that multiple pins or brooches were cast using the same mould, as they were at Mote of Mark, for example (Laing & Longley 2006: 59, fig 23: 1130 and 62, fig 25); only single object impressions are present on valves. Where the back and front of an object is obvious, for example with the handpins, the back of the object tends to be on the lower valve (see Table 7.4).

7.2.3 Products

Zoomorphic figurines

The most remarkable group of moulds recovered from the Craw Stane complex were for casting small zoomorphic figures of running boars and hounds or wolves (Illus 7.1 and 7.2), and a possible bear or badger (Illus 7.3). A total of 16 moulds represent casting of at least four boars, five hounds and one bear. While they are a distinct and coherent group, variations in their details have allowed them to be categorised into four sub-groups (A–D). Two were too fragmentary to be categorised (SF162169, SF162131). All apart from the possible bear were retrieved from the same fill of the outer ditch (C162054/F15004), suggesting that the majority may have been from a single workshop, perhaps even part of a single event of casting.

Unusually, seven valves are intact with two more almost complete. All comprise an oval valve with the animal aligned horizontally and ingate with short runner leading to the animal's back. Keying comprised triangular notches and was extensive in some areas, particularly on the bottom edge of the mould where a double row of keying indicates there was a third part to these valves. Though the third part has not survived, it could be reconstructed from features of the outer valves and experimental casts from a 3-D printed replica of refitting pair SF162102 and SF162107. While the outer valves have a typical arrangement of positive keying on one side and negative on the other, the inner row of keying along the bottom is positive on both sides and would not have locked together without an additional piece. The inner component therefore must have had negative keying on both sides, and presumably created the gap between the animals' legs. It was notable that the experimental replicas emerged with no gap under or between the animals' legs, because the replica moulds did not include the missing third component of the mould. This detail has been a crucial factor in understanding how these figurines may have been used, discussed below.

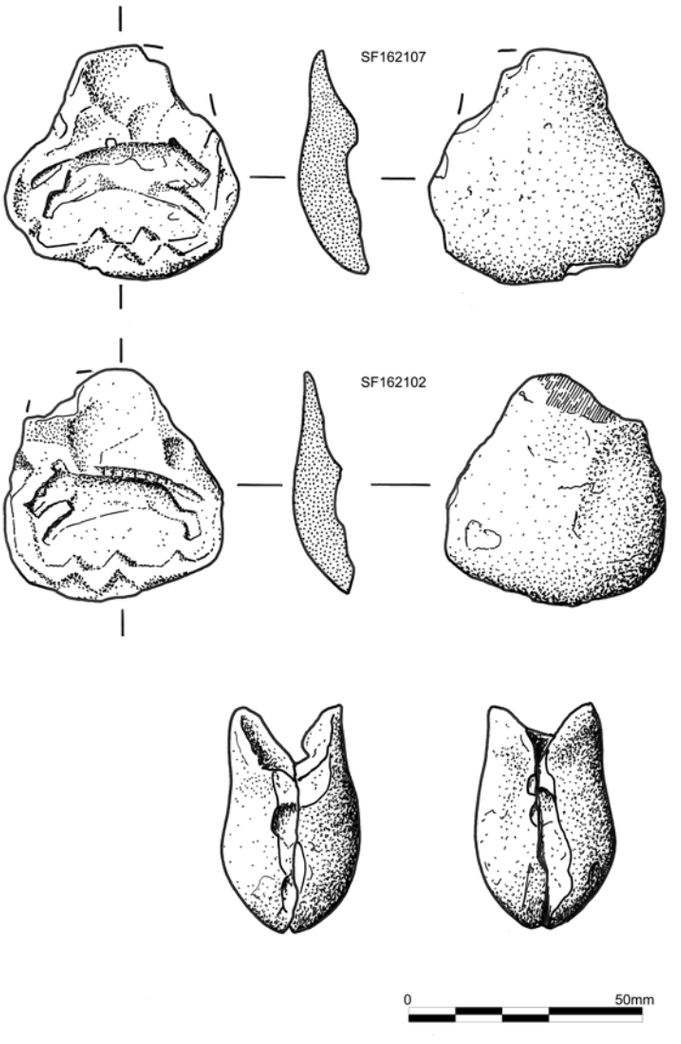
Find	Group	Facing	Keying	Valve
162102	A	L	-	lower
162107	A	R	+	upper
162164	A	L	-	?
162073	B	L	-	lower
162117	B	L	-	lower
162044	C	L	-	?
162072	C	L	-	lower
162076	C	L	-	lower
162083	C	L	-	lower
162095	C	R	-	?
162121	C	L	-	lower
162069	D	L	-	lower
162162	D	R	+	upper
162131	-	R	?	?
162169	-	?	+	?

Table 7.3
Summary of zoomorphic moulds, comparing the direction the beasts face with nature of keying and whether the valve is upper or lower

Of the 14 moulds complete enough to determine which direction the animal was facing, 10 face left and four face right (Table 7.3). All the left-facing animals have negative keying and all but one of these was a lower valve, where determinable. In general, lower valves are thought to survive more readily as they tend to be more robust, and the upper valve was more likely to be broken when extracting the object (Lane & Campbell 2000: 202, table 5.1). The pattern here is consistent with that. Most of the animals here, therefore, seem to have been cast in the same orientation – facing left on the lower valve.

Groups A and B: boars (A: SF162107, SF162102, SF162164; B SF162073, SF162117)

Group A comprises three valves, including the rare find of an intact refitting pair (SF162102 and SF162107; Illus 7.1 and 7.4). They are characterised by down-turned tails, ears represented by holes (which would create projecting ears) and squared snouts, clearly distinguishing them as boars. Some of the better-preserved moulds also display



Illus 7.1
Illustration of refitting pair of moulds (SF162102 and SF162107) for casting a boar figurine

traces of a crest along the boar's head and back. The two Group B valves are intact and both face left, indicating they were from separate pairs. They share the same ear and snout shape as Group A, distinguishing them as boars, but have no obvious tail and more outstretched front legs. Group B also have more keying along the bottom edge. The Group A and B moulds provide evidence of at least four boars cast, in two subtly different forms.

Group A

- SF162102 Almost intact (a flake missing) left-facing running boar with down-turned, pointed tail and small hole to create pointed ear. Partner of SF162107. Negative triangular keying around edge. Valve 47 x 48 x 14. Beast L 37, H 19. C162054. Illus 7.1
- SF162107 Almost intact (flake missing) right-facing running boar – partner of 162102. Valve 51 x 48.5 x 13.5. Beast L 36, H 18. C162054. Illus 7.1
- SF162164 Rear end of a left-facing running boar with down-turned tail. Negative keying. Valve 36 x 28 x 13mm. C162054. Illus 7.2

Group B

- SF162073 Intact left-running boar mould with hole for ear, no tail. Negative keying. Valve 52 x 43 x 13. Beast L 35, H 15. C162054. Illus 7.2
- SF162117 Intact left-facing running boar mould hole for ear. Negative keying. Valve 50 x 48 x 19. Beast L 37, H 16. C162054. Illus 7.2

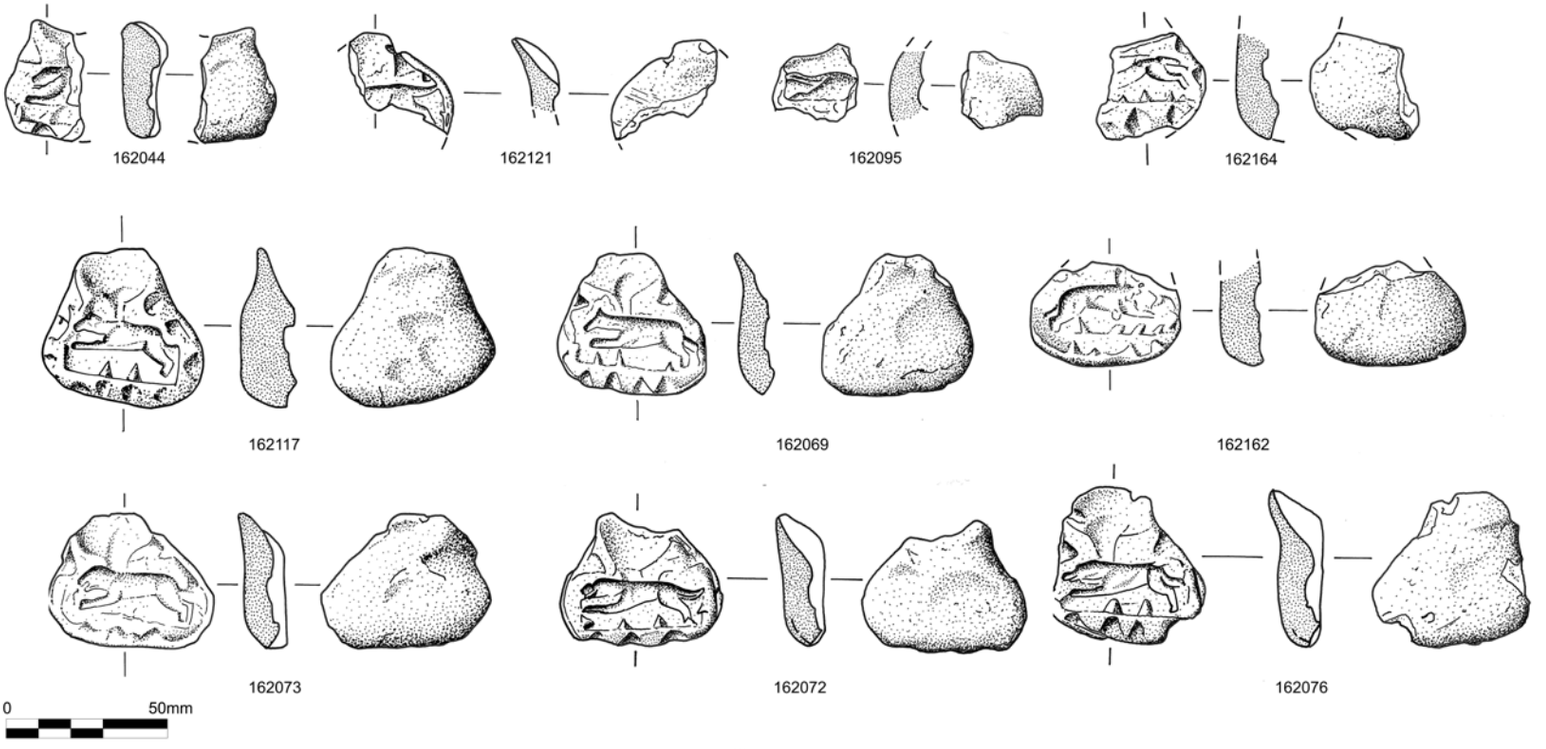
Groups C and D: hounds or wolves (C: SF162076, SF162072, SF162095, SF162083, SF162121, SF162044; D: SF162069, SF162162)

The six moulds in Group C have upturned tails and triangular ears which lie back against the beast's head, giving the appearance of a hound or wolf (Illus 7.2). They also have narrower snouts and appear to have their mouths partly open. All the valves show hounds running to the left, apart from SF162095 which is facing right, indicating at least five hounds were made.

Two Group D valve fragments share some characteristics with Group C, suggesting they are hounds, but are distinguishable by more frequent and sharper triangular keying. Protruding ears instead of flat ears on Group D perhaps gives them a more cat- or pine marten-like appearance, but the overall form is so similar to the hounds they are more likely to be a variation of those. They are likely to be a refitting pair but not quite enough survives to confirm.

Group C

- SF162044 Fragment showing head of a left-facing running beast with ear flat to head. Valve 23 x 35 x 14mm. Negative keying around edge. C162054. Illus 7.2
- SF162072 Intact left-facing running hound with slightly upturned tail (but lower than 162076). Negative triangular keying around edge and two positive keys under the beast's stomach. Outer surface fairly flat. Valve 49.5 x 49 x 12mm. Beast L 37, H 15. C162054. Illus 7.2
- SF162076 Intact valve showing left-facing running hound with upturned tail, flattened ear and mouth slightly open.



Illus 7.2
Illustration of moulds for casting zoomorphic figurines. Alan Braby

Wide triangular notched keying along outer edge, and further row of positive triangular keying inside that. Outer surface flat. Valve 51 x 39 x 12mm. Beast L 39, H 15. C162054. Illus 7.2

- SF162083 Fragment from the rear end of a left-facing beast with upturned tail. Negative triangular keying on edge. Valve 32.5 x 28 x 13mm. C162054.
- SF162095 Fragment showing the rear end of a right-facing running beast with upturned tail. Valve 26 x 24 x 10mm. C162054. Illus 7.2
- SF162121 Fragment comprising rear end of a left-facing running beast with upturned tail. Single negative notch to the right of the ingate. Valve 29 x 43 x 13mm. C162054. Illus 7.2

Group D

- SF162069 Almost intact left-facing running hound. Head end damaged. Negative keying. Possible partner of 162162. Valve 47 x 44 x 13. Beast L 36, H 14. C162054. Illus 7.2
- SF162162 Right-facing running hound on rectangular plate. Positive keying. Possible partner of 162069. Valve 47 x 31 x 12.5. Beast L 20, H 13. C162054. Illus 7.2

A further two fragments (SF162169, SF162131) are too small to distinguish which of groups A–D they belong to.

Bear

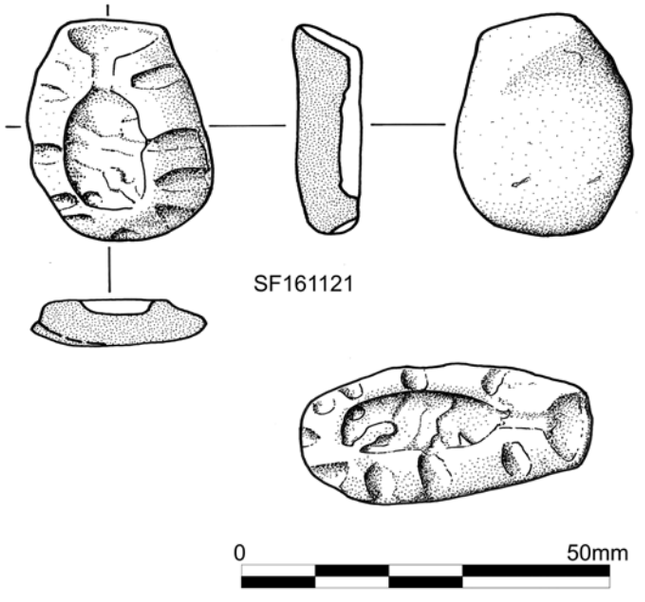
A smaller intact mould valve (SF161121; Illus 7.3) resembles a bear (or perhaps a badger). The bear is standing but unlike the other zoomorphic moulds it is not obviously running and is around half the size. It is aligned vertically with the ingate leading to its rear rather than back. It is also from a different context, though still within the outer ditch (C161003/ F15004).

- SF161121 Intact oval mould with impression resembling a bear (or badger?) facing left. Ingate leads to rear. Eight small oval negative keys around edge. Valve 39 x 23 x 9. Beast L 21, H 10.5. C161003. Illus 7.3

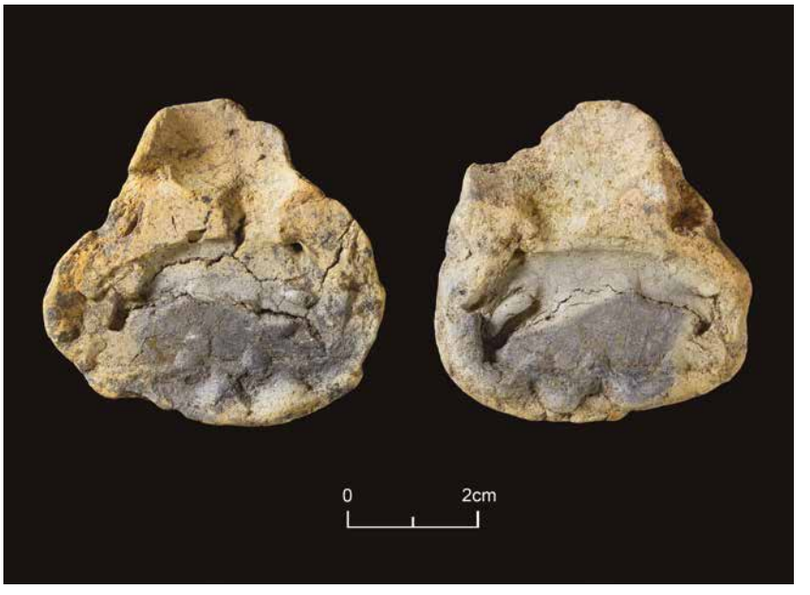
Zoomorphic moulds: discussion

Animal figurines, particularly of boars, are not uncommon in the Iron Age, Roman and early medieval periods (eg Durham 2012: 3.35.1 and 3; Foster 1977), but certain features of this assemblage set them apart. A refitting intact pair of moulds (SF162102 and SF162107; Illus 7.1, 7.4 and 7.5) confirms they were three-dimensional figures rather than one-sided plates which could have been attached as mounts. An obvious parallel for such figures can be found in boar mounts for early medieval helmets, like the example from Benty Grange in Derbyshire (Bruce-Mitford & Luscombe 1974). Similar boar figurines along with other characteristic mounts from Uppåkra in Sweden were also interpreted as helmet fittings (Larsson 2007). However, no means of attachment are apparent for the animals here, such as an underlying plate (as at Benty Grange) or rivet holes at the feet. The style of the Craw Stane complex animals is also quite different. They are in a running pose with outstretched legs, and possess a remarkable naturalistic quality compared to the static and more naive appearance of many of the examples mentioned above, which tend to be sitting or standing. The boars cast at the Craw Stane would have been less than half the size of the Benty Grange boar which, along with their outstretched pose, suggests they would have been too subtle for a showy function like a helmet crest.

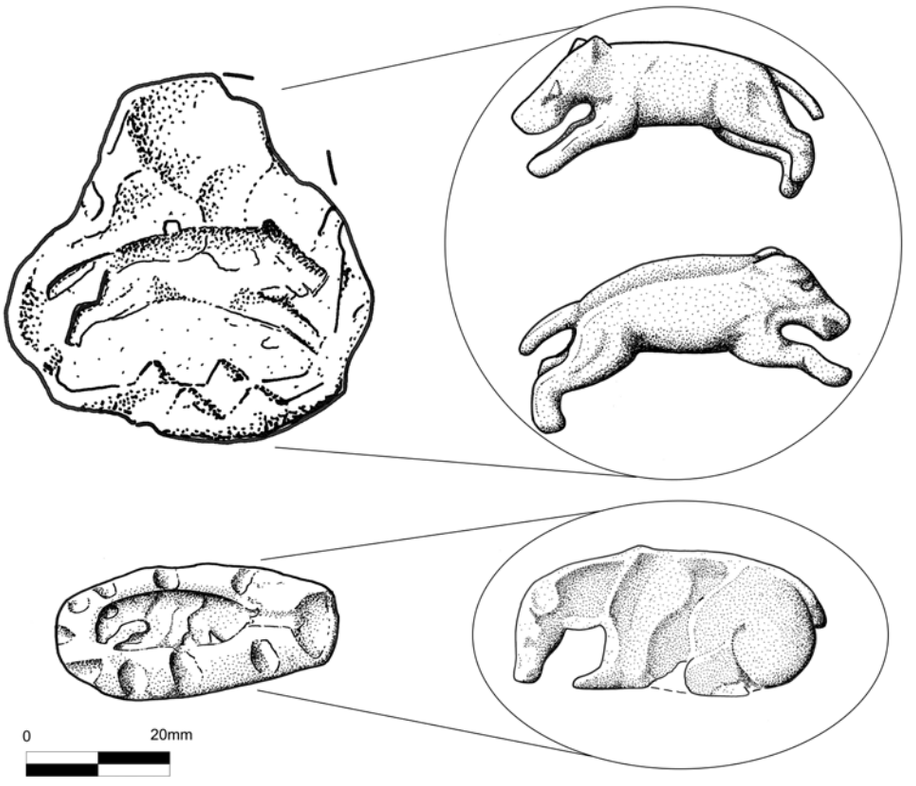
The refitting pair of moulds (SF162102 and SF162107) were 3-D printed by artist Dr Jennifer Gray of Edinburgh College of Art in 2019, allowing a replica boar to be cast which was a useful process for a number of reasons. It can be difficult to visualise



Illus 7.3
Illustration of a ceramic mould (SF161121) for casting a bear figurine



Illus 7.4
Photograph of refitting pair of moulds (SF162102 and SF162107) for casting a boar figurine. Leanne Demay/National Museums Scotland



Illus 7.5
Reconstruction drawings of boar and bear figurines, based on moulds SF162102, SF162107 and SF161121. Alan Braby

what cast objects looked like when we only have the negative, often fragmentary, impressions remaining. The cast replica shows more details of the beast than are apparent on the mould. For example, a tusk on the lower jaw can be seen, extending over the upper jaw. The muscular detail is also more visible. Such small details highlight how accurate and naturalistic these animals were. The craftworker/s who created these were clearly very familiar with the form of such animals and incredibly skilled at replicating their likeness in miniature.

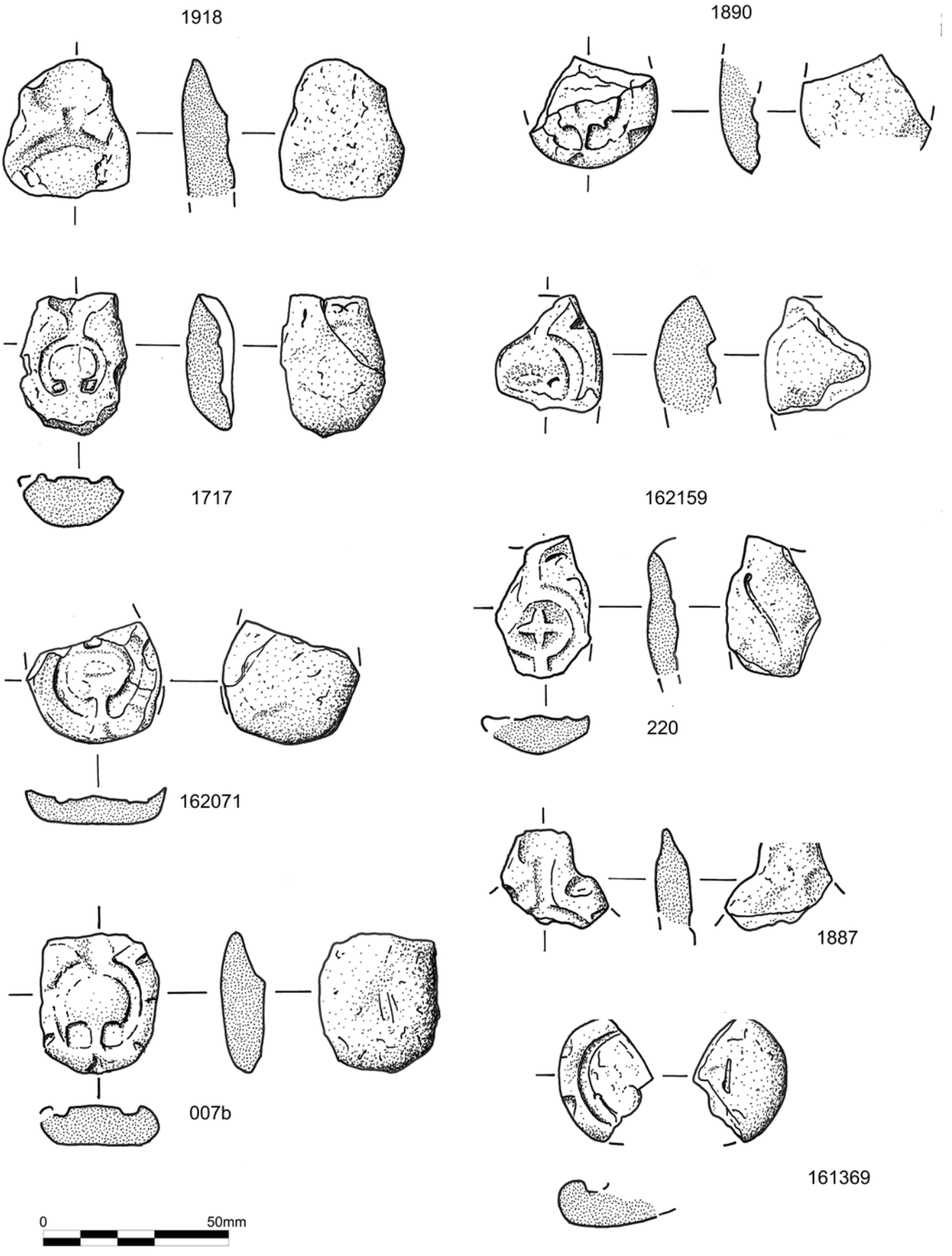
As noted above, casting the replicas also confirmed that the inner row of keying on the mould valves must have secured a third, inner mould component. This third part would have separated the animals' legs, possibly allowing them to stand up by themselves. Crucially, no indication of any means of fitting the animals to anything else is evident, making any role as a fitting attached to a helmet or other object less likely. As standalone figurines, their exact function remains elusive. The choice of animals suggests a hunting theme and while their creation in a set could suggest a gaming role, no parallels are known. Votives or toys are also possible, but the lack of surviving parallels leave this open for interpretation.

In a local context, depictions of animals including boars, wolves and bears, are known on Pictish carved stones of this period. For example, boars are carved on the Knocknagael and Dores stones, wolves or dogs on stones from Ardross and Golspie and a bear on a stone found at Old Scatness in Shetland (Fraser 2008: nos 113, 108, 118.1, 140 and 198.1 respectively). However, their forms differ in two main ways. Firstly, the animals cast here are in an active, running pose, whereas those carved on stones tend to be in a stationary or walking position and only the bear mirrors that pose. Second, the carved stone versions are usually adorned with spirals, lending them a more abstract appearance (though their overall form is still natural, and decoration may have been added to the cast objects later).

Jewellery

Penannular brooches

Five moulds for small penannular brooches were identified (four from the Craw Stane complex and one from Cairn More), all different forms (Illus 7.6 and 7.7). The smallest of the group (SF1717) is only 18mm in external diameter and would have had diamond-shaped recesses on its terminals. A mould for a slightly larger (23mm external diameter) but similar brooch with diamond terminals was found at Cairn More (SF007b). A comparable brooch (21mm D) known from Castlehill, Ayrshire was made from copper alloy with surface tinning, presumably to mimic silver (Blackwell et al 2017: 110: fig 9.6). The type is not well attested, though the terminal motifs bear similarities to more elaborate forms, including the lozenges on some of the Type G



Illus 7.6
Illustration of ceramic moulds for casting penannular brooches and selected rings/hoops. Alan Braby

Illus 7.7
Photograph of ceramic moulds for casting penannular brooches (clockwise from top: SF220, SF1717, SF162071, SF1890). Leanne Demay/ National Museums Scotland

(Graham-Campbell 1976: 279; Fowler 1963) brooch terminals from Dunadd (Lane & Campbell 2000: 110, illus 4.12: 840).

Brooch SF220 was a plain form with straight-ended, expanded flat terminals, consistent with Fowler's Type H (1963). This valve was recovered from the fill of a post hole which had been burnt in situ then removed (C237). The feature is notable for also producing a deliberately broken set of iron metalworking tongs (Section 7.9; Illus 7.38; SF207; see also Chapter 5) and clustered groups of animal bone, suggesting it was a structured deposit. This recognisable brooch mould is therefore likely to be part of the suite of objects chosen for deposition. Both brooch forms SF1890 and SF162071 have knobbed terminals, with SF1890 also collared. Neither are easily ascribed to a known type. Closely identifying brooch types from mould fragments is particularly challenging when one side can be different from the other.

It is noteworthy that the five valve fragments for small penannular brooches are all different forms. They also display a range of keying techniques, including the unusual raised cross on SF220 which can be paralleled on single examples from Clatchard Craig and Trusty's Hill (Campbell 2017: 41; Close-Brooks 1986: Illus 23: 51–2), but in general is not a technique widely known. SF162071 has a raised oval key in the centre, probably created from a finger impression on the lower valve. Such a technique was employed on some of the brooch moulds at Dunadd (Lane & Campbell 2000: 202). The small brooch mould assemblage therefore shows great variety in form and manufacture.

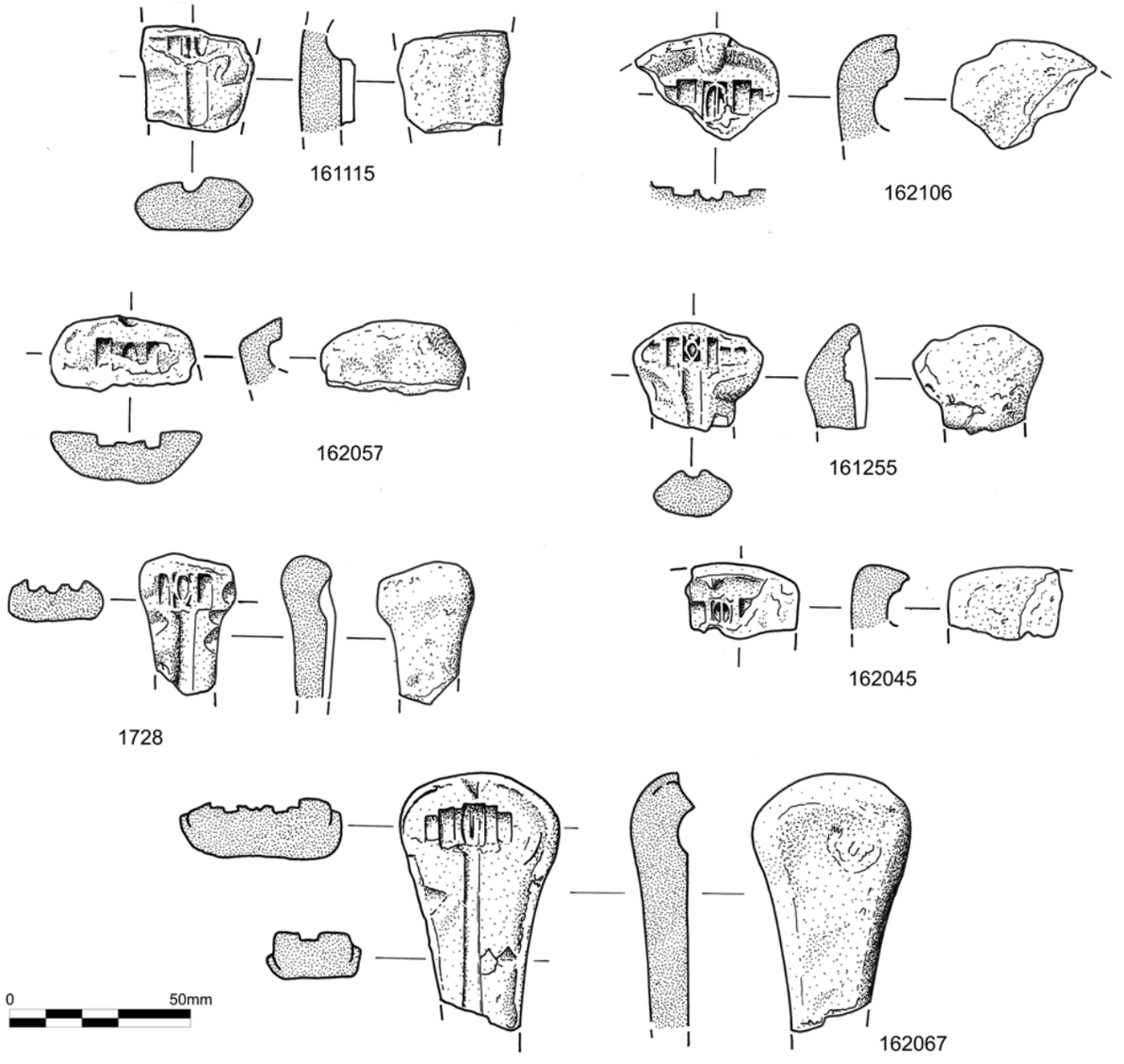
- SF220 Part of a plano-convex upper valve for a small penannular brooch mould with part of ingate and runner. Most of the hoop is preserved, with two flattened, plain terminals with straight ends. Fowler's type H (1963). In the centre of the brooch is a raised cross-shaped key. Valve 38 x 25 x 9mm. Hoop external D 23, T 2; terminal W 4. C237. Illus 7.6
- SF1717 Almost intact?upper valve for a small penannular brooch with expanded terminals bearing diamond-shapes. Valve 35.5 x 27 x 15mm. Hoop D 18, T 1; terminals W 3. C1702. Illus 7.6
- SF1890 Part of a penannular brooch mould, showing expanded, collared terminals. Missing ingate end. Negative triangular keying around the edge. Valve 36.5 x 29 x 11mm. Hoop D 26; T 2, terminal W 5. C1704. Illus 7.6
- SF162071 Most of the upper valve of a penannular brooch mould, missing top of hoop and pouring gate. Knobbed terminals, an oval positive key in the middle and some faint triangular keying around the edge. Valve 36 x 32 x 10mm. Hoop D 26, T 4; terminal W 6. C162054. Illus 7.6
- Cairn More SF007b Intact lower ceramic mould valve for a small penannular brooch. Dished ingate leads directly to the middle of the brooch frame, with diamond-shaped terminals. Fine triangular notches as negative keying around the edge and the underside is fairly flat (though the valve is fairly thin, which is more typical of an upper valve). Valve 36 x 31 x 12; brooch ext D 23, hoop T 3.5; terminal 6 x 7. C309. Illus 7.6

It is evident from the barrel pin moulds that larger, more elaborate penannular brooches were being cast too, though no definite moulds for such brooches were identified. There is, however, part of a failed casting for the terminal of a zoomorphic penannular brooch (Section 7.9; SF161211), confirming their manufacture here, and one mould fragment (SF161150, not illustrated) bears some resemblance to a similar sized brooch terminal but is too fragmentary to be certain. Given that only a small percentage of the Craw Stane complex has been excavated, there may well be more larger brooch moulds remaining to be found there.

Brooch pins (barrel pins)

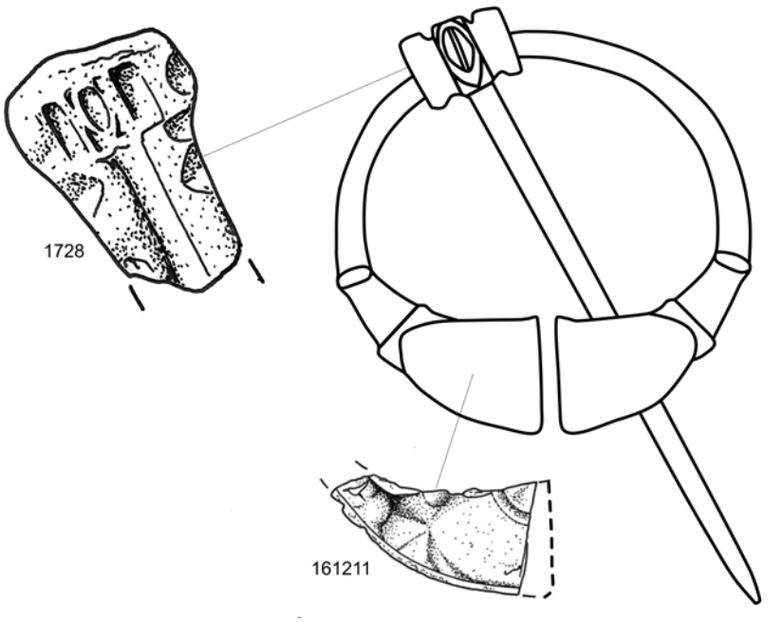
Eight moulds for the production of ornate 'barrel pins' were identified (SF236, 1728, SF161115, SF161255, SF162045, SF162057, SF162067 and SF162106; Illus 7.8 and Illus 7.9). Such pins were attached to large penannular brooches, for example Fowler's types H, G and F (1960; 1963). All of the barrels comprise three elements. The outer two elements are discs with a rectangular section, while the central element is more complex and varied but tends to be a similar disc decorated with a raised oval boss, sometimes embellished with a longitudinal rib (SF162045 and SF162106). SF162057 appears to have an entirely oval central element, while a recessed diamond shape was added to SF161255. They differ in size too. The five complete barrels vary in width between 13 and 26.5mm. The varying forms and sizes indicate at least seven are from different barrel pins.

Four of these pin moulds display negative keying (SF236, SF1728, SF161115 and SF161255) and three are positive (SF162045, SF162057 and SF162106). No ingates are present, indicating they were located at the tip of the pin. Only mould SF162067



Illus 7.8
Illustration of ceramic moulds for casting barrel pins. Alan Braby

Illus 7.9
Photograph of ceramic moulds for casting barrel pins (L–R: SF1728, SF162067). Leanne Demay/National Museums Scotland



Illus 7.10
Reconstruction of the type of penannular brooch the barrel pins could have been attached to

has a substantial length (55mm) of pin present, which is rectangular in section, suggesting that some of the mould fragments for slender bars were from barrel pin moulds. Finished pins tend to transform from rectangular to round section soon after the barrel, implying the pins were rounded off after manufacturing (a similar pattern was noted at Gurness (Close-Brooks 1987: 27)).

Three have narrow, rounded indents either side of the barrel pin. It seems likely this held a short rod during casting to create the hole through the centre of the barrel, or perhaps a thin wedge to create a split in the side of the barrel to allow attachment to the brooch frame.

Evidence for the production of barrel pins is rare. The only other evidence from Scotland is a single mould from Gurness, Orkney (Hedges 1987: 159, fig 2.85: 827), which has a head width of 16mm and a central barrel element embellished with a lentoid motif. Such pins would have fastened some of the larger varieties of penannular brooches which often had elaborately decorated terminals, sometimes zoomorphic in form (Fowler 1963: 105–6; Kilbride-Jones 1936: 126). Various dates for such brooches have been proposed, between the late 2nd century AD (Kilbride-Jones 1936: 133) and 5th to 7th centuries AD (Close-Brooks 1987: 304). This group was retrieved from upper fills of the outer ditch, with dates ranging from cal AD 260–540, providing a valuable new date for their manufacture.

- SF236 Mould fragment with traces of barrel pin head visible but mostly obscured by spalling. Valve 95 x 27 x 17. Pin L 85, shank T 4, head W 16. C161048.
- SF1728 Barrel pin mould valve with negative triangular notched keying along the edges. Tip and ingate missing. The barrel has two rectangular-sectioned discs either side of a central disc embellished with an oval boss. Rectangular-sectioned pin. Valve 38 x 26.5 x 11mm. Pin L 34.5, T 3; barrel W 4. C1703. Illus 7.8
- SF161115 Mould displaying part of the shank and barrel from brooch pin. The barrel comprises three discs, the central one embellished with an oval boss. Traces of oval negative keying on one edge. Valve 31.5 x 29 x 14mm. Pin D 4; barrel W 16. C161003. Illus 7.8
- SF161255 Mould preserving the head and part of the rectangular-sectioned pin of a barrel pin. Barrel comprises three rectangular-sectioned discs, the central one decorated with a diamond. Narrower grooves either side of the barrel would have held a rod to create the hole through the barrel. Negative keying, rounded notches. Valve 36 x 28 x 18mm. Shank D 3.5; barrel W 13. C161048. Illus 7.8
- SF162045 Mould valve preserving part of the casting surface for the head of a barrel pin. Central disc of barrel is decorated with an oval boss bisected by a longitudinal line. Valve 31 x 23 x 14mm. C162054. Illus 7.8
- SF162057 Abraded, spalled mould fragment with end of a barrel visible. Rectangular-sectioned discs either side of a central oval impression, probably from an oval boss on a disc if similar to the others. One positive key on the end (possibly oval, but spalled). Valve 40 x 20 x 15mm. Barrel W 16. C162054. Illus 7.8
- SF162067 Well-preserved barrel pin mould, missing the pin tip and ingate. Barrel comprises three discs with slight gaps between faces and a raised oval with central line on the centre disc. Narrower notches either side of the barrel held a

rod to create the hole through the barrel when cast. Three triangular notches around the edge of the valve were keying. Luting survives around the edge. Single negative key on end. Valve 71 x 44 x 18mm. Pin L 55, W 5; barrel W 18, D 11. C162054. Illus 7.8

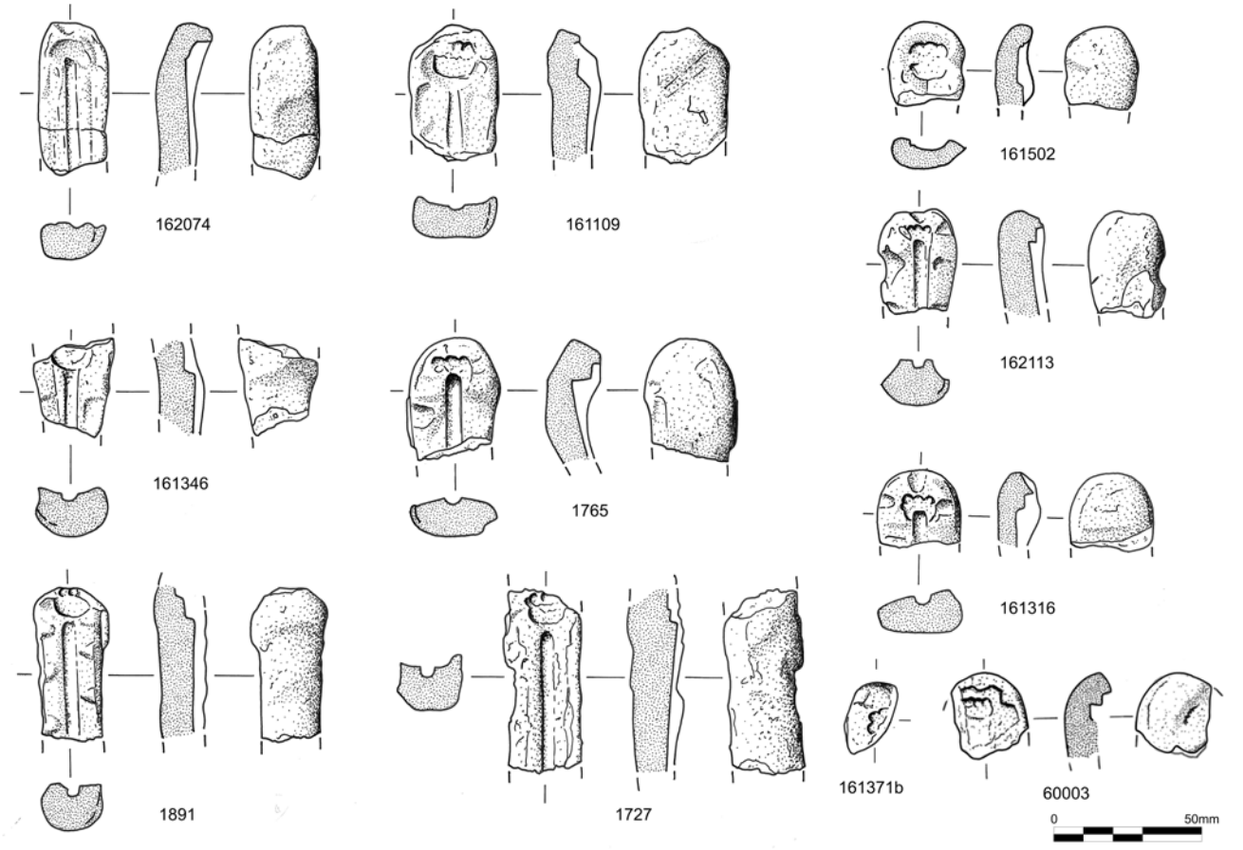
- SF162106 Mould showing part of the head of a barrel pin comprising three rectangular-sectioned discs, the central one decorated with an oval boss bisected with a vertical line. Notches either side of the barrel held a rod during casting. Positive oval key on the end. Valve 41 x 29 x 16mm. Pin L 26.5, barrel W 10.5. C162054. Illus 7.8

Handpins

A group of 11 moulds from the Craw Stane complex and one from Tap o' Noth were for casting handpins, including both three- and four-fingered types (Illus 7.11 and 7.12). None of the valves are intact; all are missing their tips and several are also missing part of their heads. Six were for casting the back of handpins and six for the front, with differing numbers of fingers and head-widths indicating they represent a minimum of nine individual pins from Craw Stane and another one at Tap o' Noth. Heads vary in size with the smallest only 8.5mm wide and largest 15mm. Their construction is consistent, with valves for the backs of pins always showing negative keying on a convex surface and positive keying on a concave surface for the fronts (Table 7.4). The forms therefore suggest the back of pins were on the lower valves.

Find	Context	Object	Fingers	Head W	Keying	Surface
1727	1703	Front	3	12	-	Concave
1765	1703	Back	3	13	Negative	Convex?
1891	1704	Front	?4	13	Positive	Concave
161109	161037	Front	?4	15	Positive	Concave
161163	161003	Back	3	13.5	Negative	Convex
161316	161048	Back	3	10	Negative	Convex
161346	161048	Front	-	12	Positive?	Concave
161371b	161048	Back?	?	?	Negative	Convex
161502	161062	Front	3	11.5	-	Concave?
162074	162054	Back	-	12	-	Convex
162113	162058	Back	3	8.5	Negative	Convex
To'N 60003	6012	Front	3+	9+	Positive	Concave

Table 7.4
Summary of key features of handpin moulds from the Craw Stane complex and Tap o' Noth



Illus 7.11
Illustration of handpin moulds from the Craw Stane complex and Tap o' Noth (SF60003). Alan Braby

Illus 7.12
Photograph of handpin moulds (L–R: SF161163; SF1727; SF1765).
Leanne Demay/National Museums Scotland

Handpins are an iconic artefact of early medieval Britain and Ireland with a sparse but widespread distribution. Examples are known in copper alloy and silver and they usually display intricate decoration, including enamelling, on the palm and sometimes the fingers, edges and even the shank. No decoration is visible on the moulds here, suggesting this was achieved after casting the basic form. Notable handpins from Scotland include silver examples from the Gaulcross and Norrie's Law hoards (Stevenson & Emery 1964; Noble et al 2016b; Graham-Campbell 1991).

Despite their widespread distribution, manufacturing evidence is relatively scarce and currently restricted to Scotland. Including the 12 here, 22 moulds for handpins are known from eight sites (Table 7.5), though some are less certain than others. The Craw Stane complex has produced the largest assemblage of handpin moulds, with half of the known examples. Tap o' Noth and Clatchard Craig are the only other mainland sites to produce handpin moulds, though identification of the latter is not certain (Close-Brooks 1987: 160 and illus 24: 87).

Site	ID	Fingers	Head W (mm)
Berie, Lewis	1184	4	20
	1294	?	16
	1622	?	17
Clatchard Craig, Fife	87	3	10
Eilean Olabhat, North Uist	165	4	14
	166	?	8
Gurness, Orkney	819	3	10
Scatness, Shetland	23713	3	12
	23779/ 23783	3	11
Scalloway, Shetland	5454	3	10

Table 7.5
Summary of other handpin moulds from Scotland and their basic features. ID refers to find or catalogue number used in respective publications (Heald 2005: 298, fig 27; Close-Brooks 1987: 160 and illus 24: 87; Armit et al 2008: 83; Hedges 1987: 158, fig 2.84: 819; McDonnell & Milns 2015: 412, pl 7.11.14–16; Campbell 1998: 171).

Where determinable, the other handpin moulds from Scotland have a similar range of forms and sizes to this assemblage. Most are three-fingered, with only two moulds for four-fingered pins known from Eilean Olabhat and Berie (Armit et al 2008: 83, illus 31; Heald 2005: 298, fig 27) and head-widths range between 8 and 20mm.

Handpin moulds from recent excavations vary in date. Fragments from two substantially intact moulds from Scatness, Shetland (McDonnell & Milns 2015: 412, pl 7.11.14–16) were recovered from Structure 21 which was in use during the first four centuries AD (Dockrill et al 2015: 123). Two from Eilean Olabhat on North Uist were from a structure dating to between the 5th and 7th centuries AD (Armit et al 2008), while one from Scalloway in Shetland was residual but was suggested to be 5th–6th centuries AD in date based on stylistic features and the dating of other fine metalworking evidence on the site (Campbell 1998: 171). The moulds here were retrieved from various fills of the outer ditch, with a range of radiocarbon dates spanning the late 4th to 6th centuries AD. The evidence presents a concentration of evidence around the 4th to 5th centuries AD, though a longer period of manufacture is likely. There is no clear chronological difference to the number of fingers or width of head. Decorative elements and variations in form on finished pins may be more informative in this respect, but such details are not evident from the moulds.

- SF1727 Mould for the front of a three-fingered handpin, missing part of fingers and pin tip. Round-sectioned shank. No keying visible. Valve 60.5 x 26 x 18. Pin L 58, shank D 3, Head W 12. C1703. Illus 7.11
- SF1765 Mould for the back of a three-fingered handpin, missing lower half of round-sectioned pin shank. One oval negative key on edge. Valve 36 x 30 x 17. Pin L 28, shank D 4, head W 13. C1703. Illus 7.11
- SF1891 Mould for the front of a handpin with sub-square-sectioned shank. Only two fingers survive, but their placement suggests there were once four. Neat, evenly spaced positive triangular keying along both edges. Valve 50 x 26 x 19. Pin L 50, shank D 2.5. C1704. Illus 7.11
- SF161109 Mould for the front of a handpin mould. Only one finger survives, its position suggesting there were originally four. Shallow, round-sectioned shank. Faint raised triangular keying on both edges. Valve 44 x 31 x 18.5. Pin L 36, head W 15, shank D 4.5. C161037. Illus 7.11
- SF161163 Mould for the back of a handpin with three fingers. Shank impression is sub-square. Ephemeral negative keying. Valve 52 x 27 x 20. Pin L 39, shank D 3, head W 13.5. C161003. Illus 7.12
- SF161316 Mould for the back of a three-fingered handpin, with small head. Negative oval keys on edge. Valve 26 x 28 x 15. Pin L 17, shank D 3, head W 10. C161048. Illus 7.11
- SF161346 Mould for the front of a probable handpin with both ends, including fingers, missing. Faint positive keying on edge. Round-sectioned shank. Valve 33 x 26 x 15. Shank D 4, head W 12. C161048. Illus 7.11

- SF161371b Rounded end of mould valve with small part of lobed impression, probably representing two fingers and top corner of palm of a handpin. Single triangular negative key. Valve 26 x 13 x 15mm. Casting surface W 9. C161048. Illus 7.11
- SF161502 Mould for the front of the head of a three-fingered handpin. No keying visible and shank missing. Valve 27 x 24 x 11.5. Head W 11.5, H 12. C161062. Illus 7.11
- SF162074 Mould for the back of a projecting-headed pin, most likely a handpin (though fingers are missing). Shank impression is shallow but appears round-sectioned. Some clay luting from sealing the valves survives around the edge. No keying visible. Valve 51 x 24 x 14. Pin L 42, head W 12, shank T 4. C162054. Illus 7.11
- SF162113 Mould for the back of a three-fingered handpin with sub-square-sectioned shank, smaller than others. Triangular negative keying on edges. Valve 35 x 26 x 14. Pin L 27, shank W 4, head W 8.5. C162058. Illus 7.11
- To'N SF60003 Mould fragment with part of the head of a handpin, preserving 3 'fingers' in a straight line (may have been more). Casting surface is flat, with raised, positive keying around the edge. Shank and 'palm' are missing, but probably the front of the pin (given lack of shank impression). Exterior is convex. Pale orange fine clay. Valve 29.5 x 27.5 x 11mm; 'hand' W at least 9mm. Illus 7.11

Nail-headed pins

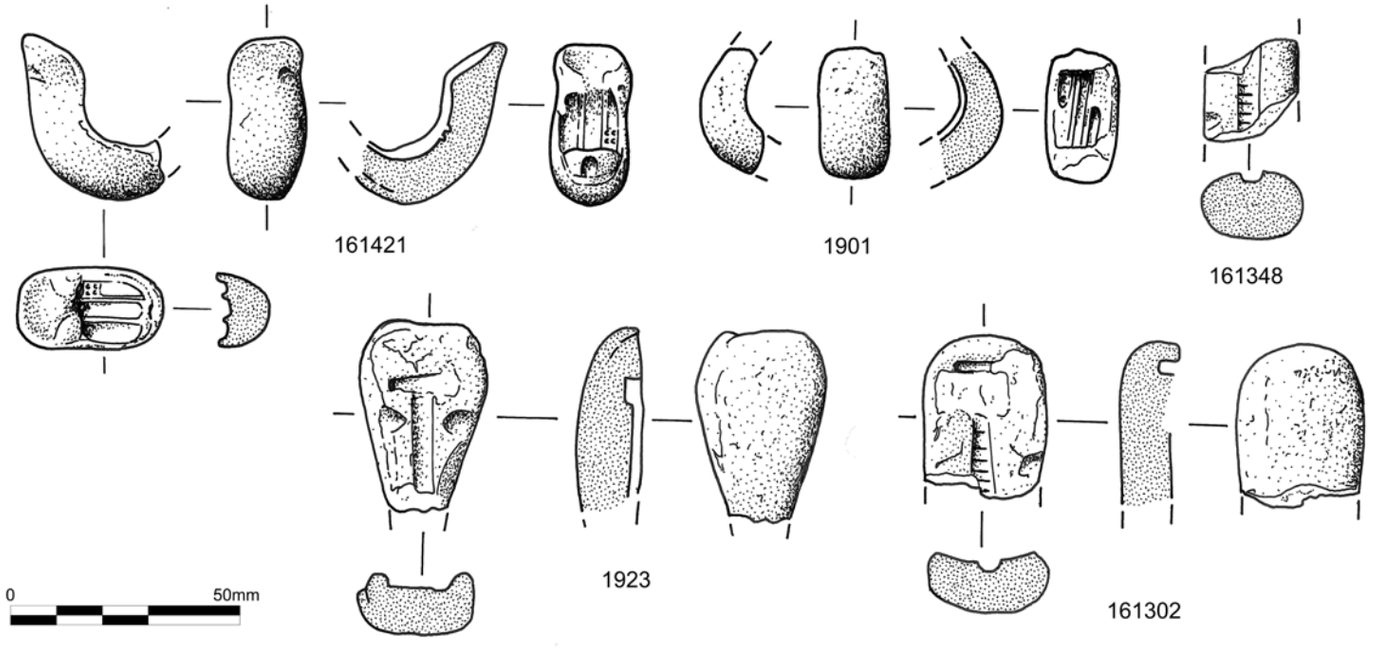
Two moulds were for casting nail-headed pins (SF1923 and SF161302; Illus 7.13) and two mould fragments showing corrugated shanks may be from the same type of pin (SF161348 and SF162114). The presence of corrugation on SF161302 indicates this form of decoration was cast in, rather than incised later (as it was on pin SF15018; Illus 7.30 and 7.32). Nail-headed pins are discussed in more detail in the metalwork report (Section 7.9).

- SF1923 Showing flat head and part of plain shank of a nail-headed pin mould. One oval and one triangular negative key on each side. Convex outer surface. Valve 41 x 26 x 14. Shank L 23. C1714. Illus 7.13
- SF161302 Nail-headed pin mould showing part of flat head and corrugated shank with spalling in between. Flat exterior surface and one possible negative key. Valve 34 x 28 x 18. Pin L 26, shank D 3, head W 6.5. C161048. Illus 7.13
- SF161348 Corrugated pin shank, broken at both ends. Six grooves visible. One small negative key on edge, both faces convex. Valve 17.5 x 22 x 13. Shank L 16, D 4. C161048. Illus 7.13
- SF162114 Pin shank mould, broken at both ends. Two ridges towards one broken end suggest part of the shank was corrugated. Valve 33 x 24 x 16. Shank L 23, D 5. C162054.

Finger-ring

Two mould fragments are probably from producing one decorated spiral ring (SF1901 and SF161421; Illus 7.13), though the pieces do not refit. The ring would have given the impression of being a wound band, appearing as three joined parallel bands from one side, or showing the 'terminals' on the other side. It was clearly the metalworker's intention to give the impression of a spiral, rather than a ring with three parallel bands all the way round. The mould would have been a complex one and must have required a central portion and ends as well as the curved outer.

The internal diameter of this ring would have been 19mm – consistent with that of a finger-ring. Spiral finger-rings as a basic form have a long history (Clarke 1971: 26) including notable early



Illus 7.13
Illustration of moulds for finger-rings and nail-headed pins. Alan Braby

medieval silver examples from the Norrie's Law and Gaulcross hoards (Stevenson & Emery 1964; Noble et al 2016b; Graham-Campbell 1991). However, examination of many of them suggest they were forged to shape, usually from a cast preform (Jenna Martin & Fraser Hunter pers comm). Was this an experiment using a mould made from an impression of a wound spiral ring? It potentially provides a glimpse of metalworking innovation and experimentation at the Craw Stane complex.

- SF1901 Part of a curved mould for a spiral strip, showing central band with (one rounded, one tapered) on each side from opposite directions. Decorated with an incised line along the edge in places. Valve 27 x 16 x 11; total T 8.4, band T 3. C1704. Illus 7.13
- SF161421 Part of a complex mould comprising ingate, curved outer edge and concave casting surface for three parallel convex bands decorated with lines beside their edges and a group of four dots on one of the outer bands. Valve 43.5 x 18 x 12mm. Internal D of cast ring 19; band T 4; total T 13. C161048. Illus 7.13

Ring/hoop fragments

A group of 12 mould fragments were for rings or hoops of some sort. Some may have been penannular brooches, but plain rings could have been used in a range of other fittings. Six fragments preserve the ingate but are missing the opposite side where brooch terminals would be. The others are more fragmentary. The original diameter could only be estimated for three: 24mm, 27mm and 30mm (SF1887, SF1888 and SF1918; Illus 7.6), with hoop thickness between 2mm and 4mm. This is consistent with the three penannular brooch moulds with known diameters of 23mm to 26mm and hoops between 2mm and 4mm thick. Two of the group appear to be from larger hoops (SF1741 and SF161164) but are too fragmentary to elucidate further details. All were from fills throughout the outer ditch.

Catalogue of illustrated examples (others are in the archive):

- SF1887 Mould fragment with ingate, runner and top of casting surface for a hoop. A negative triangular key either side of ingate. Valve 26 x 28 x 11.5mm. Hoop estimated external D 24, T 2. C1704. Illus 7.6
- SF1918 Mould fragment with ingate, runner and top of hoop casting surface. Possible negative key on edge of face. Valve 36 x 34 x 15.5mm. Hoop estimated external diameter 30, T 3. C1726. Illus 7.6
- SF161369 Part of discoidal mould fragment with two negative triangular keys on edge of face and part of the casting surface for a hoop. Centre has spalled. Valve 33 x 24 x 14. Hoop T 2. C161048. Illus 7.6
- SF162159 Abraded mould fragment with part of ingate and casting surface for hoop. Small triangular negative key next to ingate. Valve 11.5 x 29 x 27. Hoop T 3. C162054. Illus 7.6

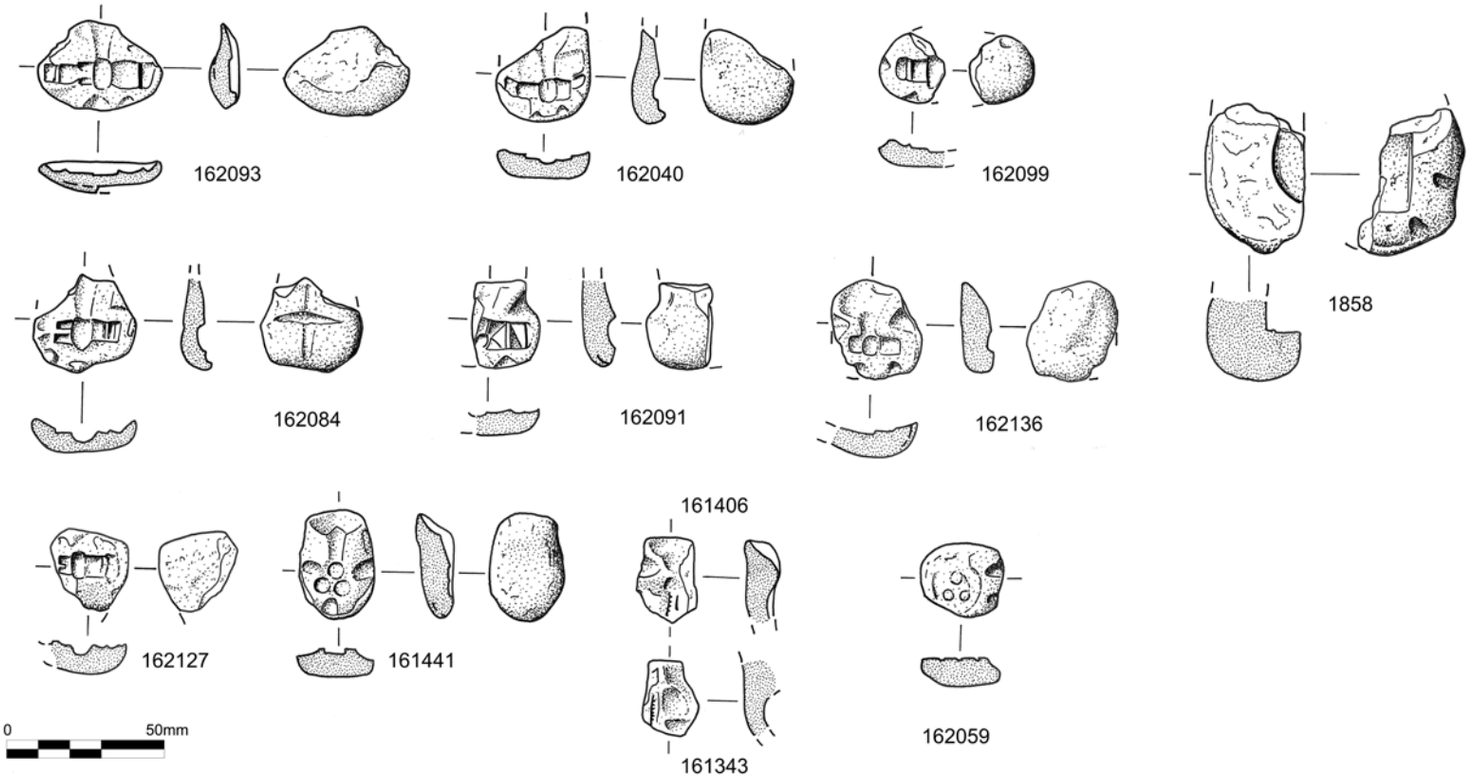
Mounts and fittings

This category comprises 41 moulds for objects which appear to be components of larger items or fragments of flat sheet or strips which seem likely to be mounts. A few groups are discussed below but many are too fragmentary to categorise them more closely. Parallels for the objects produced with these moulds remain particularly elusive, exacerbated by their probable function as small parts of larger composite objects.

'Axe' mounts

Seven moulds are termed 'axe-mounts' because of their resemblance to axe heads, but not all their features are consistent with such a theme. Four of the moulds are complete or almost complete (SF162040, SF162084, SF162093, SF162136; Illus 7.14), confirming that there were no other components, such as a pin shaft, attached during casting. They were all undecorated (when cast) and all comprise an oval central element with blade-like projection on the right, but the left side varies. Two have a pair of short prongs on the left (SF162084 and SF162127), three have a narrower and/or shorter 'blade' (SF162040, SF162099, SF162136), one seems to have both a narrower blade and prongs on the left (SF162093) and one is missing the left side (SF162091). The cast objects would have varied in length between 13mm and 26mm. The prongs are unusual and suggest those ends may have been driven into another material or were perhaps tightened around something like a leather strap. Axe-headed pins are known, such as the fine iron example from the Craw Stane complex (Illus 7.30–1), though there are no indications on these moulds that the 'axes' were attached to a shank. For example, one would expect evidence of a rod fitting beneath the oval boss to create a socket during casting (as with the barrel pins). Although they seem to be variations of the same thing, they all differ in detail and size and all seven are likely to be from different mould pairs. All were recovered from the same fill of the outer ditch (C162054), suggesting a single casting event. The outer surface of mould valve SF162084 was clearly marked with a knife-cut cross, the only mould in the assemblage to be marked in this way.

- SF162040 Almost intact mould, missing part of the ingate. Casting surface comprises a central oval boss with asymmetric blade-like projections on either side. Positive keying along bottom edge. Valve 30.5 x 9 x 10; casting surface L 17, W 8. C162054. Illus 7.14
- SF162084 Almost intact mould with part of runner but ingate missing. Casting surface comprises a central oval boss with blade-like projection on the right, and two prongs on the left. Semicircular positive keying around edge. There is an incised 'X' on the outer surface of the mould. Valve 32 x 29 x 9. Casting surface L 20, W 8. C162054. Illus 7.14
- SF162091 Part of the ingate and right side of valve with trace of oval centre and ?facetted blade to the right. Valve 27 x 19.5 x 10. Casting surface L 16.5, W 6. C162054. Illus 7.14
- SF162093 An intact valve with ingate leading to casting surface comprising central oval boss with convex sided blade-like projection on the right and two short prongs leading to a narrower 'blade' on the left. Negative triangular keying along the bottom edge and two notches either side of the 'axe' which are likely to be keys. Valve 40 x 28 x 9.5. Casting surface L 25, W 10. C162054. Illus 7.14
- SF162099 Part of the left side of a mount similar to the others in this group, showing part of the central oval boss and blade with a negative key on the end of the blade and along



Illus 7.14
Illustration of ceramic moulds for mounts and fittings. Alan Braby

the bottom edge. Valve 22 x 20 x 10; Casting surface L 13 x 6.5. C162054. Illus 7.14

- SF162127 Part of a valve preserving a central oval boss with blade on the right and two short prongs on the left. Possible positive triangular key on the edge. Valve 26 x 25 x 2. Casting surface L 19, W 6. C162054. Illus 7.14
- SF162136 Almost intact valve with ingate and short runner leading to central oval boss with asymmetric 'blades' either side. Neat triangular keying either side of ingate and along bottom edge. Valve 30.5 x 28 x 12. Casting surface L 15.5, W 5. C162054. Illus 7.14

Bead fitting

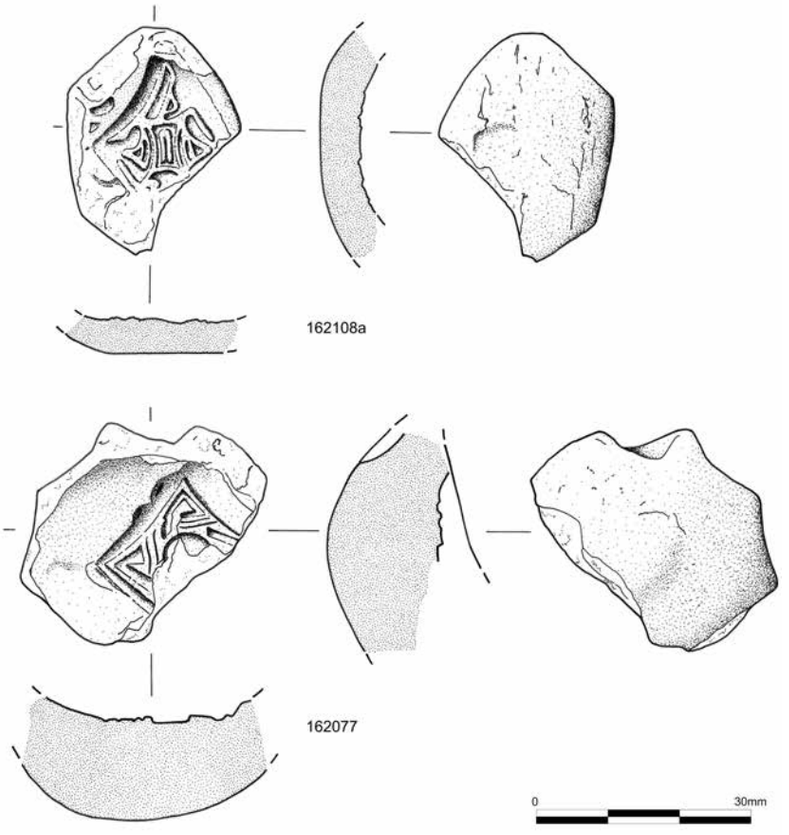
An intact mould valve from Cairn More (SF014; Illus 7.17) preserves a concave oval impression with protrusions either side suggesting a rod was placed there to create a perforation. Only one side of this object is visible due to the presence of only one valve but if the object was symmetrical it was a bead-shaped object, probably a bead fitting rather than the type of bead strung on a necklace. One possibility is that it was a type of pommel fitted onto the end of a knife or dagger tang, though a range of other uses are possible.

- SF014 An intact ceramic mould valve, oval in shape with plano-convex section. Concave ingate at one end with short cylindrical channel leading to the casting surface for an oval object. Two short cylindrical protrusions on either side of the oval may have held a rod to create a perforation through the oval, suggesting it was some sort of bead fitting. Negative keying around the edge in the form of triangular notches. Valve L 41, W 34, T 15; oval object 15 x 11.5 x 7mm. C309. Illus 7.17

Triple-disc mounts

Moulds SF161441 and SF162059 are variations on a theme: both are for probable mounts with three small discs arranged in a triangle (Illus 7.14). SF161441 is an intact mould which would have produced a small trilobate object, presumably to attach to some other item. The three discs on SF162059 are within a larger disc and the rest of the mould is missing, suggesting it could have had another component present, such as a pin shank. On both objects the triple discs are raised on the mould, indicating they would have left recessed discs on the metal object – perhaps to fill with enamel inlay? Similar motifs are known on Pictish stones, such as on the Rothiebrisbane stone, Aberdeenshire, Balneilan stone, Moray (Fraser 2008: 41, 44 and 103: 149) and on the terminal of a silver chain from Parkhill, Aberdeenshire (Henderson & Henderson 2004: 87, illus 109).

- SF161441 Intact oval mould valve with three small, joined recessed discs arranged in a triangle. Ingate, runner and three negative keys present. Valve 33 x 23 x 12. Casting surface 11 x 11. C161048. Illus 7.14
- SF162059 Sub-circular mould valve with casting surface showing three central circular depressions arranged in a



Illus 7.15
Illustration of moulds for decorated mounts. Alan Braby

Illus 7.16
Photograph of moulds for decorated mounts (SF162108 and SF162077). Leanne Demay/National Museums Scotland

triangle, within a disc. No ingate or runner preserved and therefore may have had other component, eg a pin shank. Two negative keys on one side of disc. Valve 26 x 23 x 10. Disc D 15, small discs 3.5. C162047. Illus 7.14

Decorated strip and plate fragments

Two moulds in the assemblage stand out for their elaborate decoration, though remain a challenge to parallel (SF162077 and 162108a; Illus 7.15 and 7.16). Both are from the end of decorated strips with a slightly convex section and one (SF162108a) is angled. The curved profile suggests they are not decorated penannular brooch terminals but some sort of decorative mount which was fitted onto a curved object such as a vessel. For example, intricately decorated mounts are known on hanging bowls such as the example from Lullingstone, Kent (Goldberg 2015: 170, fig 162) and similar function can be envisaged here. The decoration is difficult to discern and does not fall within known early medieval decorative styles, such as interlace. Neither mould preserves the ingate or edges, further inhibiting closer identification.

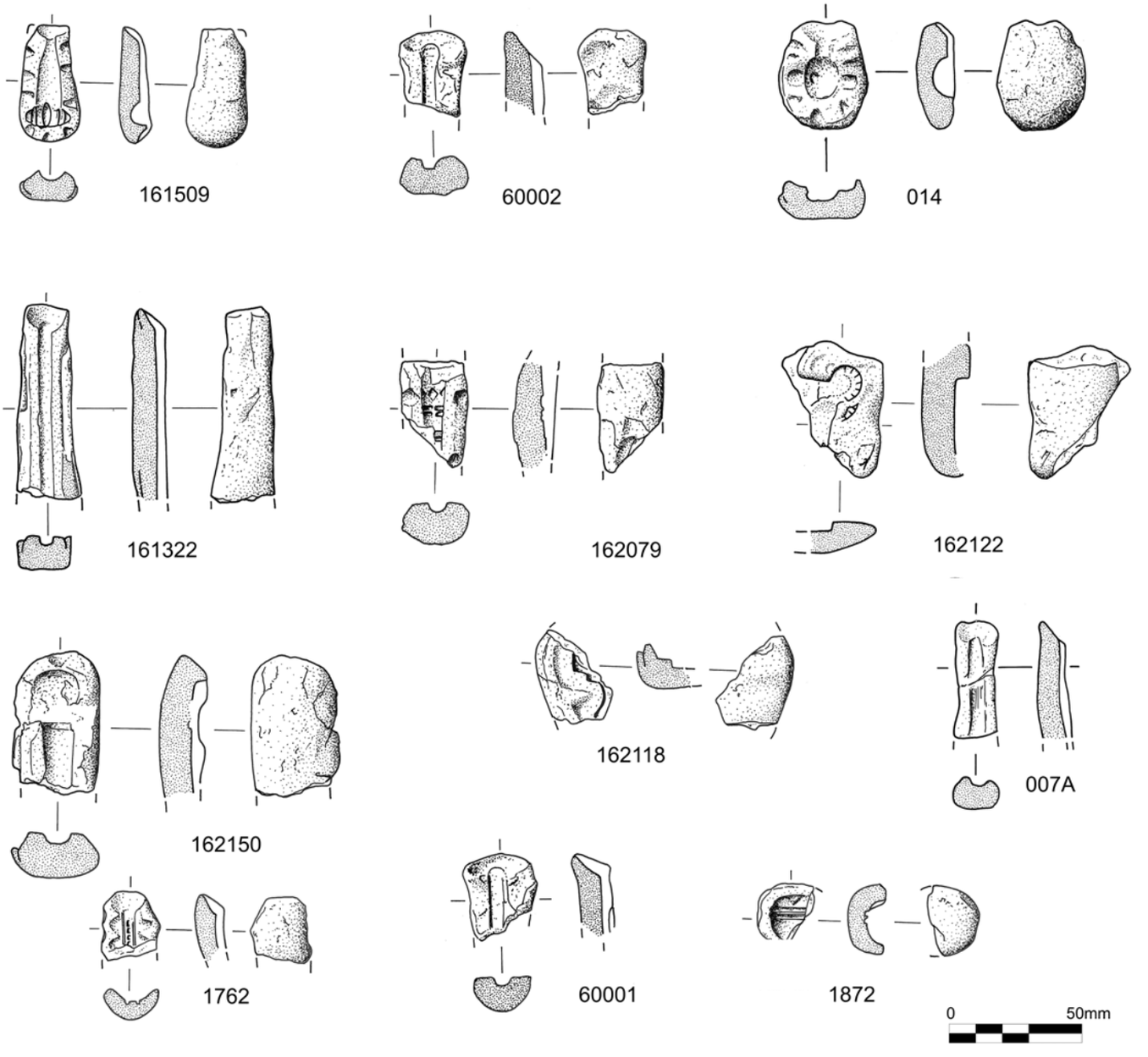
- SF162077 Mould fragment with casting surface for the terminal of an intricately decorated, slightly convex strip terminal. The decoration comprises angular lines, with open triangles in the corners and the edge of possible circular boss on the broken edge. Valve 29 x 22 x 16.5. Casting surface 14 x 12. C162054. Illus 7.15
- SF162108a Casting surface shows the angled end of a decorated strip which would have been slightly convex. Decoration is not very coherent but creates a series of small rectangular and triangular cells. Valve 30 x 21 x 12. Casting surface 15 x 12. C152054. Illus 7.15

Three other moulds were for producing fine strips with simple decoration comprising a line of raised dots (SF1762 and SF161343; Illus 7.14), one also with incised lines parallel to the edges (SF161406). Their function remains unclear.

- SF1762 Ingate and part of mould for a fine strip decorated with ridges along both edges and raised dots down middle. Positive triangular (almost scalloped) keying around the edge. Valve 24 x 24 x 13. Casting surface 11 x 3. C1703. Illus 7.17
- SF161343 Fractured mould fragment with part of casting surface for a thin strip decorated with a line of raised dots. Possible positive keying. Valve 23 x 18 x 11. C161048. Illus 7.14
- SF161406 Fragment of ingate and start of casting surface for thin strip decorated with a line of small raised dots. Negative sub-triangular key to side of ingate. Valve 27 x 17 x 11. Strip W 2. C161047.

Cylinder

A single mould (SF1858; Illus 7.14) was for producing some sort of cylinder or collar. The valve is not intact, and there may have been more complex components present.



Illus 7.17
Illustration of various moulds from the Craw Stane complex, Tap o' Noth and Cairn More. Alan Braby

➢ SF1858 Robust mould fragment with edge of cylindrical impression. Valve 46.5 x 33 x 27. Estimated D of cylinder 28-30, depth 9. C1702. Illus 7.14

Plate and strip fragments

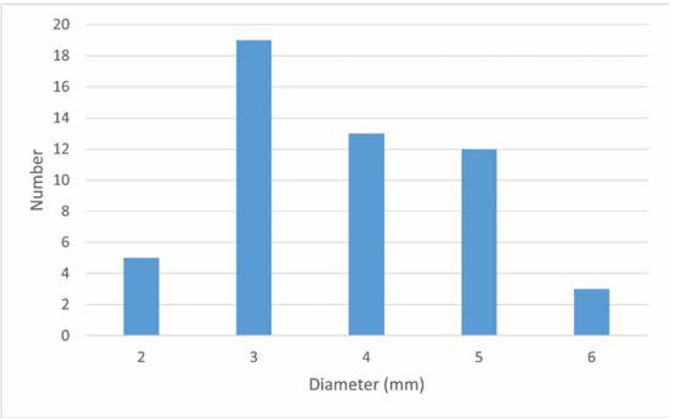
Some fragments could only be identified as part of plates (10) or strips (16). Seven plate fragments have curved edges, two preserve a corner and one was unclear. Of the strips, nine have parallel edges, six taper in width and one is unclear. All were undecorated but could be from the back of decorated mounts. Eleven moulds in this group preserved keying: five positive and six negative. Catalogue entries are in the archive.

Bar/rod fragments

Some 92 mould fragments show only traces of rods (round section) or bars (square/rectangular section) but cannot be categorised further (summarised in Illus 7.18 and Table 7.6 with full catalogue entries in the archive). Two-thirds (60/92) of these are for rods (all from the Craw Stane complex), varying in diameter between 2mm and 6mm with an average of 3.75mm. Most (42/60) are missing both ends. The other 18 fragments preserve one end, always the ingate. This is consistent with the handpin and nail-headed pin moulds where in all cases the heads were at the bottom of the mould. The handpin and nail-headed pin moulds recovered here have diameters ranging between 2mm and 5mm, with an

average of 3.5mm, consistent with the rod moulds. It is therefore likely that most of these rod moulds were shanks for pins with decorated heads. The two intact nail-headed pins in the assemblage have lengths of 103mm and 130mm, while the handpins from Norrie's Law and Gaulcross hoard have lengths of 80–150mm (Laing 1993: 77–8). If we assume an average of 115mm for a pin shank, the combined lengths of the Craw Stane rod moulds (1363.5mm) could represent 12 complete pin shank valves or 6 finished pins. This is obviously a very rough estimate but provides some idea of the scale of production. While 60 rod mould fragments seem a lot, most could potentially be from the same moulds we have identified pin heads from.

Two refitting pairs were identified. SF1873 and SF1893 are matching lower and upper valves respectively, comprising the ingate and part of a rod before breaking. SF1875 and SF1892 preserve the ingate and part of a rod from the same valve. While SF1875 and SF1892 were retrieved from the same fill of the outer ditch (C1704, F15004), SF1873 and SF1893 were from different fills (C1703 and C1704 respectively), illustrating some of the redeposition which created the complex ditch fills.



Illus 7.18
Summary of 60 rod mould diameters (mm) from the Craw Stane complex

The 23 fragments of moulds for bars vary more in size than the rods, with maximum widths ranging between 3mm to 10mm with an average of 4.8mm. Of these moulds 18 are from the Craw Stane complex, four from Tap o' Noth and one from Cairn More. Four taper in width while the others have parallel edges. The most intact preserves the ingate and a bar impression 63mm in length and 4.5mm in width (SF161322; Illus 7.17). All four from Tap o' Noth have the ingate present and none refit, indicating at least four different objects were cast with these. Some, particularly those with parallel sides, could be from casting ingots like SF161035 (Section 7.9), though there would be no need for ingot moulds to be bivalve, as the one-piece stone ingot moulds attest. The most intact barrel pin mould (SF162067, above) shows they were cast with rectangular-sectioned shanks, and some of the more slender bar mould fragments are likely to be from those or similar objects.

Find	Context	Dimensions (mm)
211	202	32 x 5 x 5
1835	1702	20 x 5 x 3
1855	1702	14 x 3 x 1.5
1917	1726	23 x 10
161148	161003	14 x 3 x 1.5
161177	161037	27 x 3 x 2.5
161193	161037	25 x 8
161213	161003	19 x 3
161322	161048	63 x 4.5
161372	161048	22 x 4
161422	161048	31 x 4
161433	161048	33 x 4
161442	161048	33 x 4 x 3
162112	162058	15 x 4.5 x 1.5
161238 x 2	161037	unclear
161288 x 2	161003	14 x 6
To'N60001	6012	21.5 x 4 x 1.5
To'N60002	6013	22 x 3 x 2
To'N60006a	6012	8 x 2
To'N60008a	6014	14 x 3
CM007b	309	36 x 6

Table 7.6
Summary of moulds for bars from the Craw Stane complex, Tap o' Noth and Cairn More. Dimensions = length x width x thickness of bar impression, where measurable

Illustrated bar moulds:

- SF161322 Long tapering mould for a square-sectioned bar with intact pouring gate at one end, the other broken. Ingot or large brooch pin mould. Some of the clay luting from the upper valve remains around the edge. Valve 73 x 24 x 14; object L 63, T 4.5mm. C161048. Illus 7.17
- To'N 60001 Top end, preserving the concave ingate, leading to a narrow, rectangular-sectioned casting surface for a slim bar, other end missing. A groove running parallel to the main casting surface suggests it was impressed twice or misaligned? The mould surface is concave, with sub-triangular positive keying around the edge. The exterior is convex and smooth. Probably an upper valve. Very fine pale orange clay. Valve 29.5 x 27 x 15; bar L 21.5, T 4 x 1.5mm. C6012. Illus 7.17
- To'N 60002 Top end of a ceramic mould valve preserving a flat ingate, leading to a narrow, rectangular-sectioned casting surface for a slim bar, other end missing. The mould surface is convex, with sub-triangular negative keying around the edge. The exterior is fairly flat and smooth. Probably a lower valve. Very fine pale orange clay. Valve 32 x 26 x 15; bar L 22, T 3 x 2mm. C6013. Illus 7.17
- CM 007a One end of a narrow ceramic mould valve with

slightly dished pouring gate at one end leading to a sub-rectangular-sectioned matrix, for a pin or ingot. Other end missing. Fine orange micaceous fabric. No obvious keying, but some luting survives around the edge. Outer face is flat, suggesting it is more likely to be a lower valve. L 43, W 14, T 11; bar L 36, W 6mm. C309. Illus 7.17

A further 14 bar or rod mould fragments did not preserve clear sections to enable further categorisation.

Indeterminate

A significant portion of the assemblage comprises fragmented pieces which are a challenge to identify. Some only preserve part of a straight (31) or curved (2) edge, or a corner (8), while others have just an ingate (14) or keying (22). Some 53 fragments are indeterminate but show enough form to indicate moulds, and a small number (41) are similar in fabric to the moulds but preserve no shaping and can only be classified as 'possible mould fragments'.

Amongst these are some which were evidently for more complex items, though their function remains unclear. A selection of these have been illustrated to aid future comparison and identification. Even though SF161509 (Illus 7.17) appears to be an intact valve, the object it cast is unknown. The channel leading to the bossed 'head' seems too wide to be a runner and therefore must be part of the object. Perhaps there was a central component making it a hollow conical form with ornate terminal? Others are more fragmentary. SF161150 (Illus 7.19) is included here because it displays a tantalising resemblance to a large flat penannular brooch terminal, similar to those from Norrie's Law, but not enough survives (such as the inner edge) to be certain.

- SF1872 Circular mould valve with concave impression for domed or spherical object decorated with two ridges around centre. Unclear if the triangle on the side of the dome is part of decoration or was keying to hold a central component of the mould. Valve 25 x 21 x 14; Dome D 18mm. C1703. Illus 7.17

Illus 7.19
Photograph of a mould for casting a flat curved object, possibly a penannular brooch terminal (SF161150). Leanne Demay/National Museums Scotland

- SF161150 Mould showing part of a flat object impression. Gently curved edge turning straight at corner. Positive keying. Valve 37 x 26 x 15mm. Casting surface 27 x 10.5mm. C1702. Illus 7.19
- SF161509 Almost intact mould for conical object with decorative expanded head with protruding oval bosses. Positive keying around the edge. Valve 45 x 23.5 x 12.5; object L 31, max W 17mm. C161062. Illus 7.17
- SF162079 Tapering circular-sectioned rod impression displaying two bands of double ridges and some possible raised bosses. Valve 39 x 25 x 17; object L 26, D 5–7. C162054. Illus 7.17
- SF162118 Curved edge of a mould with stepped corner impression. Positive triangular key. Valve 38 x 25 x 18.5mm. C162054. Illus 7.17
- SF162122 Small mould fragment showing part of possible lobed object. Positive keying. Valve 28 x 18 x 9; object 15 x 6mm. C162054. Illus 7.17
- SF162150 Part of a mould for a rectangular-sectioned bar with expanded discoidal terminal, partly damaged by spalling. Substantial quantities of clay luting survive around the edge. Other end and ingate missing. Valve 54 x 34 x 19; object L 44, T 10; 'head' D 15mm. C162054. Illus 7.17

7.2.4 XRF RESULTS

A sample of 20 moulds was analysed with qualitative surface XRF (Table 7.7). Unlike crucibles, moulds rarely retain metal droplets or residues and XRF results are often poor. Only minor levels of metal were detected on the moulds. All produced zinc, usually with lead and/or copper also present. While the results here suggest most of the moulds were used to cast copper alloys, there are

Find	Type	Cu	Zn	Pb
220	Penannular brooch		x	x
1759	Rod	x	x	x
161150	Penannular brooch	x	x	x
161255	Barrel pin	x	x	x
161291	Rod	x	x	x
161311	Indeterminate	x	x	x
161315	Rod	x	x	x
161316	Handpin	x	x	x
161387	Rod/bar	x	x	
161416	Curved plate		x	x
161421	Finger ring		x	x
161509	Indeterminate	x	x	
162046	Plate/sheet		x	x
162059	Mount		x	x
162073	Zoomorphic	x	x	x
162076	Zoomorphic	x	x	x
162077	Ornate strip		x	x
162093	'Axe' mount	x	x	
162102	Zoomorphic	x	x	x
162106	Barrel pin	x	x	x

Table 7.7
Summary of mould XRF results

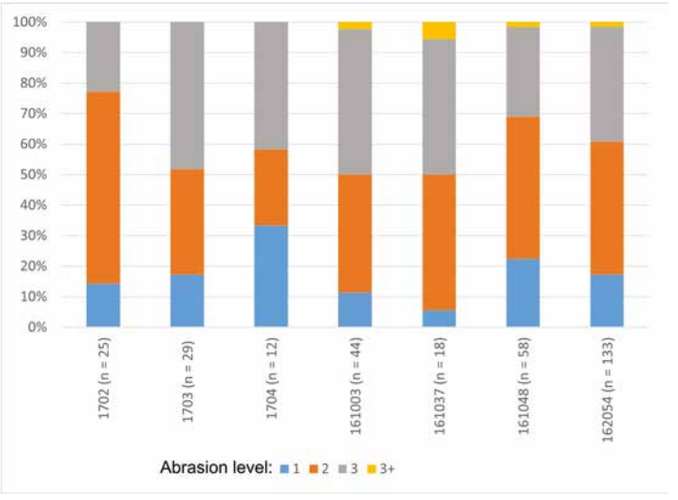
often small quantities of base metals present in silver too. Studies have shown how interpreting such low readings, particularly on moulds, is fraught with difficulties (eg Barnes 1983; Dungworth 2000; Kearns et al 2010). These results are therefore best seen as inconclusive.

7.2.5 Taphonomy and Distribution

Craw Stane

The overwhelming majority of mould fragments from the Craw Stane complex (368/383) were retrieved from fills within the outer ditch (F15004). Three moulds were from the inner ditch (F203), two from post holes (C161009 and SF162058) and ten were unstratified.

Around a third of the moulds (136), including all the zoomorphic figurines and 'axe' mounts, were recovered from one of the fills (C162054) around the mid-levels of the outer ditch. The radiocarbon dates from this fill are some of the older (*c* AD 340–540), indicating the fill is a redeposited dump of earlier material and that non-ferrous metalworking took place in the early phases of the site's use. In contrast, only eight of the 372 crucibles were found in this fill, suggesting the different types of debris were discarded separately.



Illus 7.20
Summary of mould fragment abrasion in different ditch fills at the Craw Stane complex

The broad level of abrasion on each fragment was recorded in order to examine deposits which may have moved around more compared to primary deposits of metalworking debris, with 1 being unabraded and 3+ being very abraded. Most fragments show low (158) or medium (147) levels of abrasion and only nine are very abraded. When examined across contexts producing ten or more mould fragments (almost all upper fills, apart from C1704, a mid-fill), there is not a great deal of difference, even in contexts which are known to be redeposited based on radiocarbon dating (C161003 and C162054) (Illus 7.20). This suggests there was limited movement of the debris after its initial deposition and a similar level of redeposition between fills.

Tap o' Noth

Twenty-two mould fragments were recovered from Tap o' Noth: two (SF1109a and b) from the Trench 11 platform and the others (and four crucible sherds – see Section 7.4.4) from the Trench 6 platform. The Trench 11 pieces (SF1109a and b) were found in the vicinity of a hearth in an upper floor layer (C11002) interpreted as the final use of that platform. In Trench 6, the handpin mould (SF60003), three thin bar moulds (SF60001, SF60002 and SF60006A) and an unidentified fragment (SF60006B) were recovered from the upper fill of Hearth 1 [C6012; F6015], while fragments of moulds for a thin bar (SF60008A), curved object (SF60008B) and unidentified fragments (SF60008C) were found in the fill of Hearth 2 [C6014; F6013]. Five unidentified mould fragments (SF60012) were retrieved from the upper floor layer (C6003) associated with the use of Hearths 1 and 2. Both platforms also produced a small quantity of ironworking debris (Section 7.6).

Cairn More

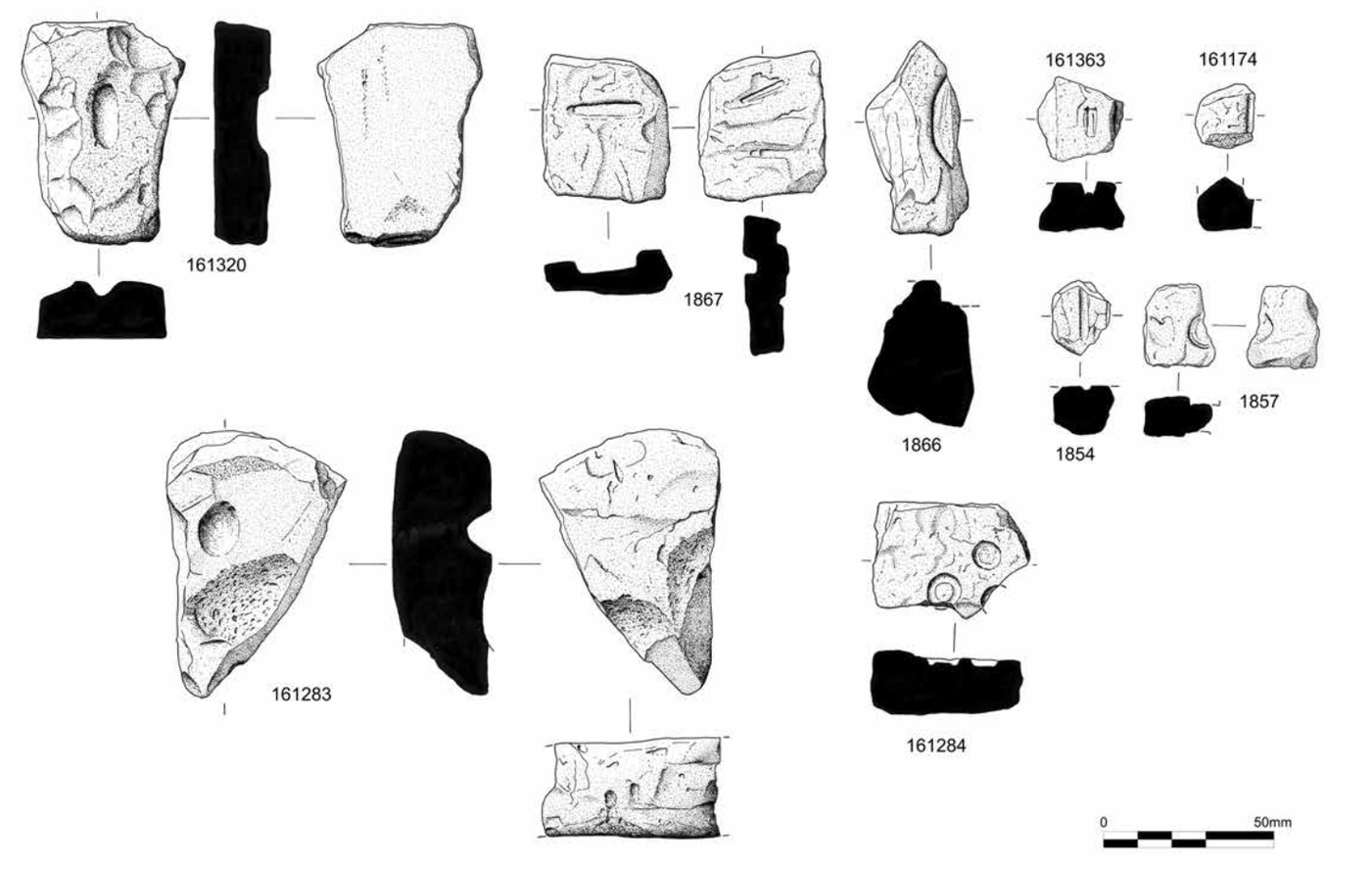
The three mould fragments were from Murray Cook's excavation at Cairn More (Cook et al 2010), all found in the fill of a cut feature (C309) outwith the main fort area along with four refitting crucible sherds (Section 7.4.5). The fragments were scattered, not in a discrete deposit, but their good condition suggest a primary deposit. The absence of non-ferrous metalworking debris in any of the other trenches suggests the craft was undertaken on a much smaller scale than at the Craw Stane and largely outwith the enclosures, or at least at the periphery. However, if the debris was concentrated in a small area, this could easily have been missed given only a portion of the interior was targeted for excavation.

➢ See Section 7.8 for broader metalworking discussion.

7.3 Stone Moulds

A group of 12 objects are one-piece open moulds (Illus 7.21 and 7.22), unlike most of the ceramic moulds, which were bivalve in form. Five have bar-shaped recesses carved into them, implying they were ingot moulds (SF1854, SF1867, SF161174, SF161199, SF161363). Only four of the ingot recesses are preserved in their entirety. Two on SF1867 are 28.5mm and 40mm long, while two very similar but short recesses on SF161199 are 9mm in length. Widths across all the ingots varies between 4mm and 8mm and all tend to have rectangular sections and rounded ends. Some, like SF1867, have neatly carved ingot shapes while others are cruder, particularly SF161363 which has an uneven interior, suggesting it was unfinished. The two intact bar moulds would have produced ingots weighing 7.3g and 30.4g of silver or 6.2g and 25.5g of bronze.

Other mould forms include disc (SF1857), half-disc (SF1866), conical (SF161283), oval (SF161320), convex/dish and ring (both SF161320). Three moulds appear to be unfinished, suggesting they were being manufactured on site. Two display the start of a circular shape (SF1904, SF161283), and another is unclear (SF1723). Therefore, apart from the bar ingots (which themselves vary), no two stone mould shapes are the same. Two moulds had additional functions, with SF161320 also having a whetted facet



Illus 7.21
Illustration of stone moulds from the Craw Stane complex. Alan Braby

Illus 7.22
Photograph of stone moulds from the Craw Stane complex (SF161284, SF1867, SF161363). Leanne Demay/National Museums Scotland

from use as a whetstone, and SF1904 (Illus 7.48) displaying scratches consistent with use as a working surface. It is unclear on both examples which function came first.

Nine of the moulds were manufactured from fine-grained Devonian sandstone, one is siltstone, one gritstone and one microgranite. All were available locally. Aside from the mould recesses the stones were unmodified, apart from a possible chiselled edge on SF161283, suggesting it had been detached from a larger block before carving the mould.

Ingot moulds are a common form of non-ferrous metalworking evidence in Scotland from the Early Iron Age through the early medieval period (Heald 2005: 71). This is in contrast to areas south of the border where stone examples are scarce before the second half of the first millennium AD (Bayley 1991: 118; Webley et al 2020: 25). From Scotland, stone ingot moulds have been recovered from a range of sites, including Traprain Law, East Lothian (Cree 1924: 275), Whithorn, Dumfries and Galloway (Hill 1997: 402), Brough of Birsay, Orkney (Curle 1982: 46) and Dunadd, Argyll (Craw 1930: 120; Lane & Campbell 2000: 192). Only Dunadd with 19 examples and Traprain with 15 have produced more stone ingot moulds than the Craw Stane complex, with the scale of excavations there arguably much smaller-scale than either of these two sites.

All the stone moulds were recovered from the outer ditch [15004]: eight from the upper fill (C1702, C1703, C161003, C161037), three from the layer beneath that (C161048) and one from a mid-level fill (C1704). This concentration of stone moulds in the upper fills of the outer ditch mirrors the distribution of the other metalworking debris.

- SF1723 Unfinished mould? Gritstone pebble with one edge missing and rounded notch extending from the broken face. Edge of this notch is faintly, regularly stepped, suggesting it was carved. Probably broke during manufacturing. 61 x 48 x 32. C1703.
- SF1854 Ingot mould. Fragment of heat-affected, fine-grained arkosic sandstone with all original edges and base missing. Flat upper surface is bisected by a rectangular-sectioned groove, ends missing. L 45, W 36, T 29; groove L 31, W 5, depth 3. C1702. Illus 7.21
- SF1857 Unfinished mould – disc. Flat, sub-square, fine-grained arkosic sandstone fragment broken through a fairly neatly disc-shaped depression on one face. The disc has vertical sides, a flat base, and is deeper at the edges, which would have created a disc with lip around one face (or it wasn't finished). Depression D 20.5, depth 6; 47 x 42 x 24. C1702. Illus 7.21
- SF1866 Mould – half-disc. Fragment of fractured, pale pelitic schist with the edge of an irregular carved, half-disc. L 115, W 87, T 56; L 62, depth 15. C1702. Illus 7.21
- SF1867 Ingot mould. Sub-rectangular, flat, fine-grained arkosic sandstone fragment used on both faces. One face has a neat bar-shaped depression (40 x 8 x 9) with rounded ends, vertical sides and a flat base. The other has a more crudely-executed thin bar-shaped depression (28.5 x 4 x 6) and part of a second similar depression running into a spalled area (which possibly happened during creation). 84 x 75 x 19. C1702. Illus 7.21
- SF1904 Unfinished mould (circular) and sharpener. Fragment of fine-grained arkosic sandstone slab with several parallel scratches across the centre of one face from use as a sharpening stone. The same face shows the edge of a pecked circular depression on broken edge – possibly intended as a mould? 81 x 76 x 31; bowl depth c.7mm; estimated original diameter of bowl (if circular) 100mm. C1704. Illus 7.48
- SF161174 Ingot mould, probably. Small, worn fragment of heat-affected, fine-grained arkosic sandstone with all edges broken. Edge of a carved linear, flat-based recess on one broken edge. 34 x 33 x 32; groove L 22, W 6, depth 3. C161037. Illus 7.21
- SF161199 Ingot mould. Fragment of heat-affected, fine-grained sandstone with two small round-ended linear depressions. 46 x 36 x 40; L 9, W 5, depth 6; L 9, W 5, depth 5. C161003.
- SF161283 Mould – conical and?unfinished. A sub-triangular fine-grained sandstone slab fragment with two broken edges and one curved (possibly shaped by chiselling). Upper surface is flat and smooth with a deep, smooth conical depression worn into it. Alongside this is a shallow pecked depression extending off both broken edges. 155 x 102 x 58; hollow D 28, depth 15. C161048. Illus 7.21
- SF161284 Mould – dish and ring. Sub-rectangular fine-grained sandstone fragment with two depressions worked onto one face (plus possible edge of a third on broken edge): a neat circular dish (D 15.5, depth 4.5) and a recessed ring (ext D 19, T 4.5, depth 4.5) with edge partly missing. 92 x 66 x 35. C161003. Illus 7.21
- SF161320 Mould – oval and whetstone. Sub-rectangular, fine-grained arkosic sandstone fragment with smooth elongated oval depression on one side (40 x 25 x 7). The other side is very smooth and slightly concave from use as a whetstone. 130 x 96 x 33. C161048. Illus 7.21
- SF161363 Mould – ingot, unfinished. Sub-square siltstone fragment with a small rectangular depression carved onto one face (17.5 x 8 x 4). Deeper at the edges, which would have created a small bar with lip/ ridge around one face or, more likely, unfinished. 50 x 49.5 x 29. C161048. Illus 7.21

7.4 Ceramic Crucibles

7.4.1 Summary

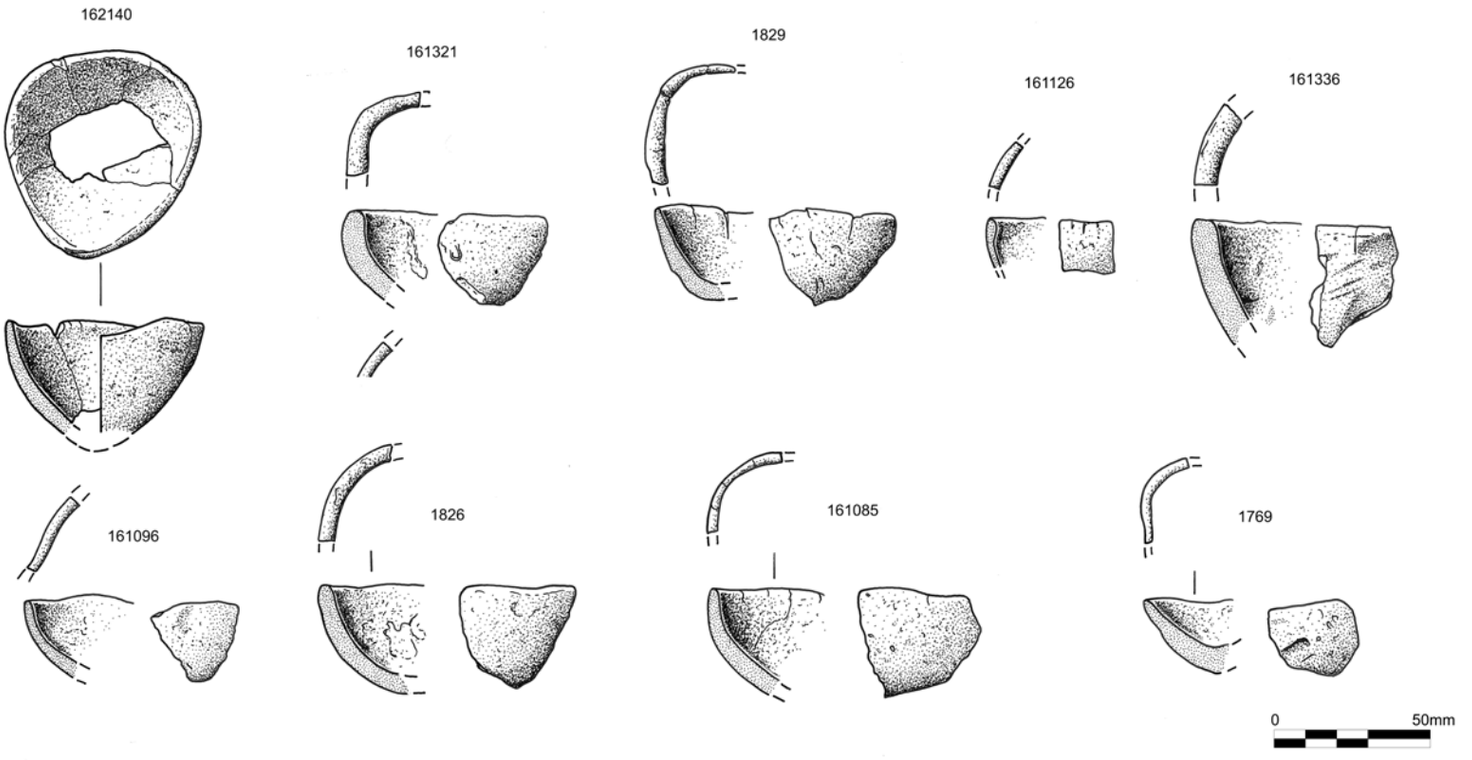
A large assemblage of crucibles was recovered at the Craw Stane complex, comprising 246 sherds and 104 fragments (under 10mm with no surviving diagnostic features), weighing a total of 942g. Tap o' Noth and Cairn More produced four crucible sherds each. Plain round and triangular crucible forms are present in a range of sizes and fabrics. X-ray fluorescence (XRF) analysis of a sample of 69 sherds indicates copper alloys were predominantly being cast; a single sherd adds to the evidence of silver casting on site. While the Craw Stane crucibles had been dumped and then redeposited, mainly in the upper fills of the outer ditch, the Tap o' Noth sherds were found around a probable metalworking hearth and the refitting sherds from Cairn More suggest a primary deposit.

7.4.2 The Craw Stane complex Crucibles

Forms

Of the 246 crucible sherds, 146 have rims, six are bases and 94 are body sherds. Identifying crucible form is challenging with such fragmentary material, especially as many now display heat-distortion. Only one crucible is complete enough to preserve its full original profile; it was triangular in form (SF162140; Illus 7.23). A further ten rim sherds have tightly curved corners and 28 rim sherds are straight in plan, suggesting they too were from triangular crucible forms. Forty-two rims sherds are curved and 21 slightly curved, suggestive of crucibles which were round in plan. Many were too small or distorted to be certain, and often only represented between 5–10% of the crucible's original circumference.

Wall thickness varies (3–16mm with an average of 6mm) with both smaller, fine walled crucibles or more robust examples found in triangular and round forms. Wall and rim forms range across a spectrum from parallel-sided walls with rounded rims, to walls which taper in thickness from base to rim. Again, no correlation can be seen between vessel form in plan and the wall/rim form. Only two sherds had slightly flattened rims, one with a parallel wall (SF161338, Illus 7.23) and the other with a tapering



Illus 7.23
Illustration of crucible sherds from the Craw Stane complex. Alan Braby

wall (SF15007), both from triangular crucibles. Such subtle variations in wall and rim form suggest the involvement of multiple different craftworkers and the variety here may suggest several hands created them.

The lack of spouts, lids and handles on the forms of crucibles used at the Craw Stane complex is striking compared to slightly later assemblages such as at Dunadd (Lane & Campbell 2000: 134–47). This absence of distinctive features, coupled with the large assemblage and small sherd size, makes estimating the original number of crucibles very challenging. That they were recovered mainly from excavating a relatively small portion of a large feature (the outer ditch at the Craw Stane complex) also makes such an exercise impossible.

Fabric

Four main fabric groups (A, B, C and D) were identified, with four sub-groups (Ai, Bi–iii), by examining the composition of each sherd under magnification. Many groups were clearly distinct from each other, but some sherds had features of more than one sub-group and were more difficult to assign. It is possible the sub-groups could represent the extreme ends of natural variation within the clay source. Metalworking ceramics such as crucibles and moulds had to be expertly made in order to conduct heat, but not crack, and it is likely that visible natural variations in their clay source would have been taken into account.

- Fabric A: A very fine clay lacking any grit inclusions. Sub-group Ai is a distinct dark grey colour.
- Fabric B: Sandier clay than A, with frequent quartz grit inclusions. Three sub-groups were noted: Bi has notably finer grits, Bii is paler in colour, and Biii is paler and has more frequent quartz inclusions.
- Fabric C: Fine clay with a wider range of darker rock particles than B
- Fabric D: Fine sandy clay, notably more micaceous than the other groups. Frequent quartz inclusions.

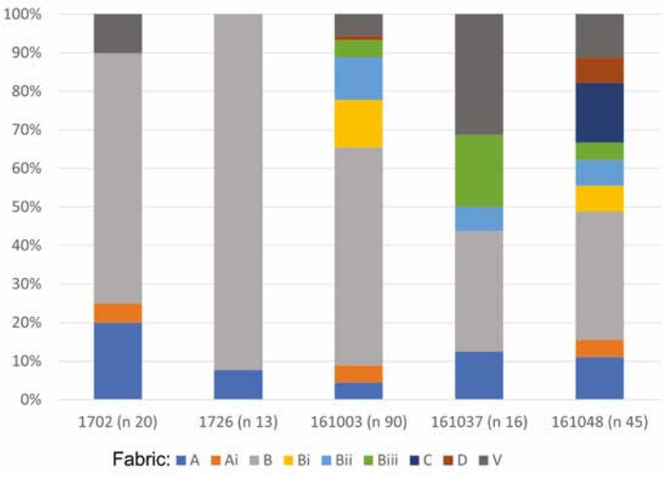
A fifth group, V, represents sherds where the fabric is too vitrified to determine which of the four main groups they belong to.

Table 7.8 shows the distribution of crucible fabrics across the main site contexts at the Craw Stane complex. The vast majority were recovered from the upper fill of the outer ditch and much smaller quantities from other ditch fills or features elsewhere on site. A closer look at contexts within the upper ditch fills (Illus 7.24) shows some minor variations in fabric types present, though the broader range of fabrics in C161003 and C161048 may simply be a reflection of the larger number of crucibles found in those contexts. There are hints of patterns which suggest dumps of debris from separate crafting events; for instance all nine sherds in fabric C were recovered from outer ditch upper fill C161048. However, the nine sherds of Fabric D were retrieved across three different contexts in the outer ditch upper fills (C161003, C161037 and C161048). Recutting and redeposition within the ditches therefore makes identifying dumps of material relating to separate events challenging.

Fabric group	Context						Total
	Outer ditch			Inner ditch	Other	Unstrat	
	Upper fills	Mid fills	Lower fills				
A	16		4			1	21
Ai	7						7
A/B	6	1	1				8
B	90	2	11			1	104
Bi	14	1					15
Bii	19						19
Biii	9						9
C	9						9
D	4				1		5
V	22	6		25	1	2	56
Indeterminate	93	1	3		1		98
Total	289	11	19	25	3	4	351

Table 7.8
Distribution of crucible fabric groups by context group from the Craw Stane complex. (Those with indeterminate fabric are almost all small fragments rather than sherds)

Some 28 sherds have fine impressions visible on one or both faces, indicating the clay was occasionally tempered with hair. These sherds are in fabric groups A, B and C; it is not a technique associated with a specific fabric. All stratified instances were recovered from the upper fills of the outer ditch (mainly C161003 and C161048, but also C1702, C1704, C161037, C161062 and C162001). Where dated, these deposits (C161003 and C161062) appear to be redeposited from earlier activity, suggesting hair impressions are restricted to this earlier phase of metalworking ceramics. Only one other crucible shows evidence of organic tempering (SF161420), with grass or straw impressions on the surface.



Illus 7.24
Fabric composition in outer ditch upper fills (contexts with over 10 crucible sherds only)

Function

Non-destructive surface X-ray fluorescence was undertaken on a sample of 69 crucibles to identify which metal alloys were being cast (details of XRF methodology and full results are in the archive). The flattest area of the object's surface was analysed, to allow better focusing of the X-ray beam. The crucibles were analysed on areas with visible residues in the first instance; on those without such residues the inside surface was analysed. Small fragments (<10mm) had one analysis, larger fragments two or more. Variations in the thermodynamic properties of different metals means the results give only a broad indication of casting alloys used (Barnes 1983; Dungworth 2000).

A range of metallic elements was detected: copper, tin, lead, zinc and silver. Crucibles could have been used more than once, with different metals each time (though the limited evidence of relining here suggests this may not have been common). The XRF results may therefore represent an amalgam of metals rather than a single alloy. Copper alloys dominate, with varying quantities of lead and zinc present. Lead and zinc are particularly volatile elements (Dungworth 2000; Kearns et al 2010) which leads to their over-representation in the spectra, but they were clearly regular components of the alloys being cast. Several crucibles produced very large lead peaks compared to other elements (eg SF237, SF1782, SF1826), all of which display distinct pale-yellow/toffee-coloured residues, not the red residues so often associated with copper-alloy casting. This suggests quite a different alloy or process was being undertaken in these crucibles, though they do not differ in size or form. It is unclear exactly what the ceramic crucibles with high lead signatures were used for, but a role in metal cleaning or refining, as discussed for the stone metalworking vessels (Section 7.5), seems likely.

Traces of silver were detected on four crucible sherds (SF161156, SF161274, SF161394 and SF151407) and a more notable peak on SF161347 (which was also the only sherd where XRF detected bromine traces consistent with silver corrosion). Traces of silver can inadvertently be present in ores or recycled metals, but the larger quantity on SF161347, along with a fragment of silver-casting waste (SF1823), indicates some silver was being cast at the Craw Stane complex.

Four sherds have tong impressions: SF1747, SF1769, SF1833 and SF1915 (all from upper ditch fills C1702, C1703 and C1726, apart from SF1915, which was from the lower fill (C1726) of a pit [1725] cut into the ditch). This confirms the crucibles were removed from the hearth using metal tongs, which left their imprint in the hot, malleable crucible fabric. A set of iron tongs was actually recovered from the site (Section 7.9; Illus 7.38) but it is unfortunately missing the jaws, meaning we cannot compare them with the marks found on the crucibles.

Reuse, repair and failure

A small number of sherds show evidence of likely failure in use (34 sherds) in the form of deep cracks through the crucible walls (10), residues coating broken edges (10), and intensely vitrified, porous and/or distorted fabric (16). That only *c* 14% of crucibles were used to destruction could suggest the smiths were skilled at controlling hearth temperature, the crucibles were expertly made or there was no shortage of new crucibles, meaning they seldom needed to be used repeatedly. All possibilities suggest a high level of skill and/or production.

Some 21 sherds show clear evidence of relining, with 16 possible further examples obscured by residues or with only a small patch surviving. Relining is a feature regularly identified on crucible assemblages though it remains unclear if additional linings were simply repairs or for some other function, such as reducing thermal shock (Hunter 2021a, 106). That such a small number of crucibles were relined here further suggests crucibles were not in short supply.

Catalogue of illustrated crucibles from the Craw Stane complex

- SF1769 Crucible sherd with tapered rim, expanding towards broken base. Fabric V. W 31, H 34, T 10mm; 7g. XRF: Zn. C1703. Illus 7.23
- SF1826 Rounded rim sherd with even wall thickness and curved plan suggesting a rounded form. Yellow/toffee-coloured residues inside and patches of red on exterior. Some residues over broken edge suggest failure in use. Fabric A, with some fine hair impressions on exterior. W 39, H 42, T 7mm; 11g. XRF: Cu, Zn, Sn, Pb. C1726. Illus 7.23
- SF1829 Crucible sherd with tapered tip, even wall thickness and curved plan. Some deep cracks in fabric suggest failure in use. Fabric Ai. W 44, H 36, T 6mm; 10g. C1702. Illus 7.23
- SF161085 Rounded rim sherd with wall thickness expanding towards base. Tight curve suggests it's the corner of a triangular crucible. Red and yellow residues coat most of the exterior. Fabric Bii W 40, H 39, T 3mm; 11g. XRF: Zn, Cu, Pb. C161003. Illus 7.23
- SF161096 Heat-distorted, rounded rim sherd with wall thickness expanding towards base. Rusty residues adhere to the exterior. Fabric Bi. W 30, H 29, T 4mm; 4g. C161003. Illus 7.23
- SF161126 Rounded rim sherd with even wall thickness and slightly curved plan. Hair impressions on fabric. Fabric A/B. W 17, H16, T 3mm; 1g. C161003. Illus 7.23
- SF161321 Rounded rim sherd with even wall thickness and fairly tight curve in plan, suggesting it could be the corner of a triangular crucible. Dull yellow residues adhere to the interior and part of the exterior, with hair impressions visible on the bare ceramic. Fabric A. W 35, H 31, T 7mm; 9g. C161048. Illus 7.23
- SF161336 Rounded rim sherd with even wall thickness and curved plan. Fabric D. W 28, H 43, T 9mm; 11g. XRF: Zn, Cu, Pb. C161048. Illus 7.23
- SF162140 Refitting sherds forming an almost complete triangular crucible with tapered rim and parallel-sided walls. Small portion of base missing. Brown residues in patches across all surfaces could be post-depositional. Fabric V. W 60, H 40, T 4mm; 37g. XRF: Zn, Pb, Cu. C162054. Illus 7.23

7.4.3 Taphonomy

The level of abrasion of each sherd was noted in order to examine how much the sherds may have moved around post-deposition (this was only recorded for sherds, not fragments). Three levels of abrasion were recorded, with most of the assemblage showing very little:

	Context						
	Outer ditch			Inner ditch	Other	Unstrat	Total
Abrasion	Upper fills	Mid fills	Lower fills				
1	158	8	9	1	1	2	179
2	40	1	7				48
3		1					1
Total	198	10	16	1	1	2	228

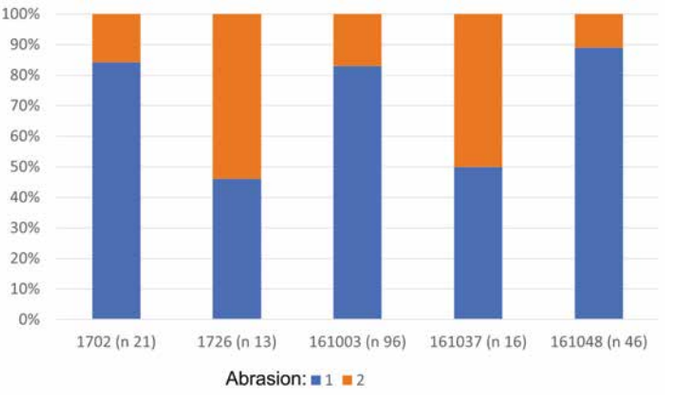
Table 7.9
Level of abrasion by context group

- Level 1: Broken edges still sharp with only occasional rounding or abrasion to faces (179 sherds)
- Level 2: Most edges slightly rounded with abrasion to faces (48 sherds)
- Level 3: Very worn with rounded edges and extensive surface abrasion (1 sherd)

While radiocarbon dating of the ditch sequences indicates significant quantities of metalworking debris were redeposited into later ditch fills from earlier activities (eg C161003 and C162054), the minimal degree of abrasion on most sherds suggests they are not likely to have been moved multiple times after initial deposition and were likely to have been used in a workshop area close to the ditch.

Table 7.9 shows the distribution of different abrasion levels between different context groups with Illus 7.25 presenting the outer ditch upper fills in more detail. The quantity of crucible sherds from C1726 and C161037 is small compared to C161003, but the sherds are generally more abraded. This suggests the sherds within C1726 and C161037 have been moved around more and represent a background scatter of material rather than a deliberate dump.

Refit analysis was undertaken for crucible sherds within each fabric group. Finding definite refitting sherds is challenging with crucibles as they often became distorted by the intense heat of the hearth and, particularly if they failed during use, edges can also become



Illus 7.25
Level of abrasion within outer ditch upper fill deposits (contexts with over ten sherds present)

obscured by residues. Only one definite refitting pair was identified (SF161083B and SF161155), both from the upper fill of the outer ditch (C161003). Another pair of sherds (SF161075 and SF162008) are so similar they are very likely to be from the same crucible, though they do not refit. Both are from the upper fills of the outer ditch (C161003 and C162001). The lack of refitting sherds suggests the assemblage is a small portion of a large dump of metalworking deposits, reflecting its excavation from slots through the ditch and perhaps truncation of the uppermost deposits through ploughing.

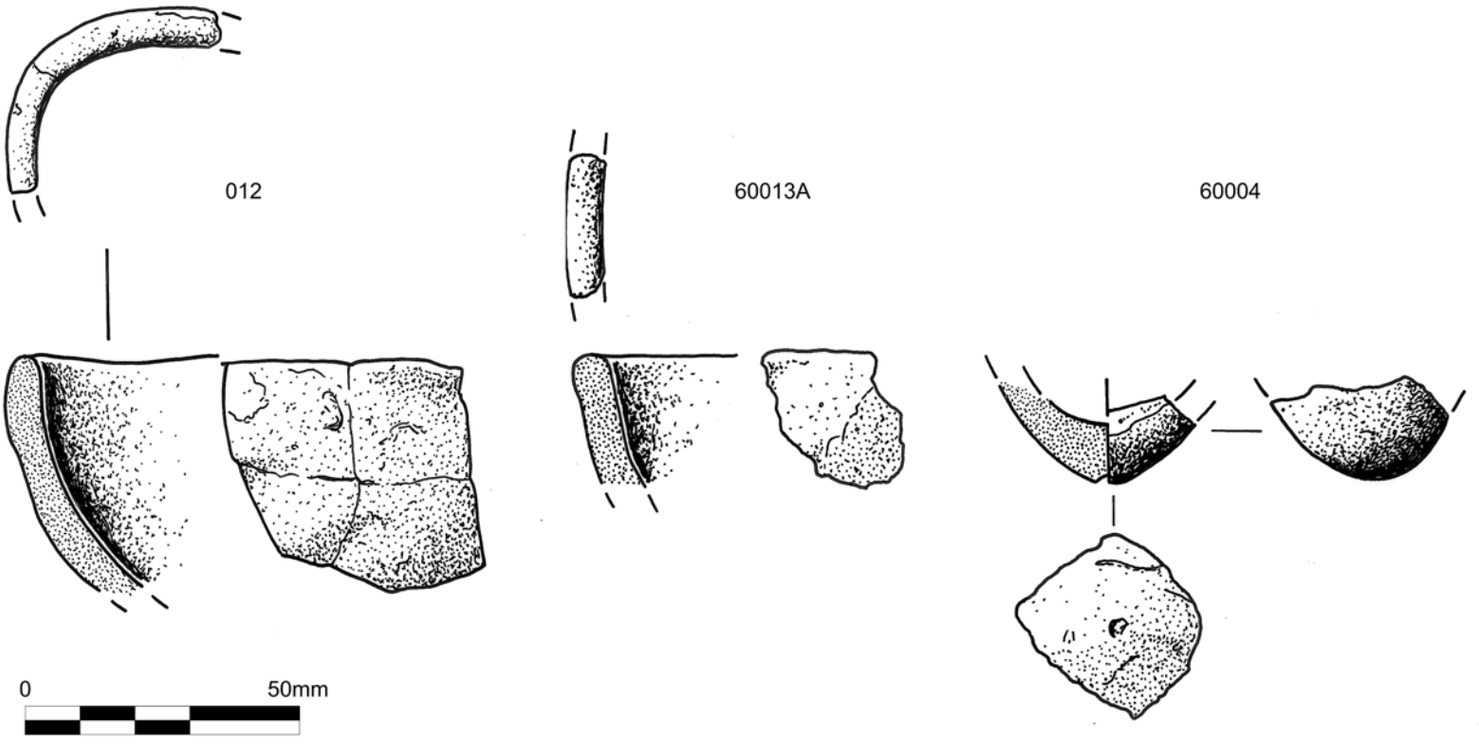
7.4.4 The Tap o' Noth Crucibles

Four crucible sherds were found on Tap o' Noth, representing a minimum of two vessels: one fairly thin-walled triangular form (SF60013A) and the other a more robust, round form (SF604, SF60004 and SF60013B), though the sherds do not refit on the latter and could therefore represent three separate similar crucibles. The sherds were all retrieved from the Trench 6 platform in association with other metalworking debris, including moulds and ironworking slag. Two (SF604, SF60004) were recovered from the upper fill of Hearth 1 [C6012; F6015] and the other two (SF60013A and B) from the upper floor layer (C6003) associated with the use of Hearths 1 and 2.

- SF604 Ceramic crucible rim sherd, curved in plan, thickening to the base, with rounded rim. Not enough of the rim survives to determine if round or circular. Grey fabric, with paler interior. No visible residues. Fine organic hair-like impressions on exterior. XRF: Zn, Pb. H 35, W 23, T 7mm. C6012
- SF60004 Rounded base of a ceramic crucible. Grey/brown fabric, darker on the exterior. Interior has mainly spalled. Some cracking and distortion of fabric, but no residues adhering. W 30 x 26.5, T 7mm. XRF: Zn, Cu. C6012. Illus 7.26
- SF60013A Ceramic crucible rim sherd with straight wall, almost no curve (suggesting it was triangular in plan) and a slightly flattened rim. Fine grey/brown fabric with a few fine hair-like impressions on the exterior. No visible residues. Some cracking next to broken edge suggests it may have failed. H 22.5, W 20, T 5.5mm. XRF: Zn, Pb. C6003. Illus 7.26
- SF60013B Ceramic crucible rim sherd with curved wall (in plan and profile), suggesting it was a medium-sized circular form, with rounded rim. Grey/brown fabric, darker on exterior than interior. No residues adhering. Some minor cracking around the rim but no signs of failure. H 25, W 23.5, T 6mm. XRF: Cu, Zn, Pb. C6003

7.4.5 The Cairn More Crucible

Four refitting sherds from a triangular crucible (SF012; Illus 7.26) were found during Cook's excavation at Cairn More, in the fill of a feature outwith the main fort area (C309, Trench 3) which also produced three moulds. They were found spread across the trench rather than in a discrete deposit (Cook et al 2010: 13), though their condition (and that of the moulds, two of which are intact valves) strongly suggests this is a primary deposit.



Illus 7.26
Illustration of crucible sherds from Tap o' Noth (SF60013A and SF60004) and Cairn More (SF012). Alan Braby

- SF012 Four refitting sherds from a medium-sized triangular crucible with sloped walls and rounded rim. Fabric is not particularly highly fired and no residues adhere, suggesting it was not heavily used, perhaps not at all. Thin layer of fine redder clay over around half of interior and a small area of the exterior. Fabric is fine pale brown-grey with occasional very fine linear impressions, probably hair. H 43, W 46, T 6mm. XRF: Cu, Zn. C309. Illus 7.26

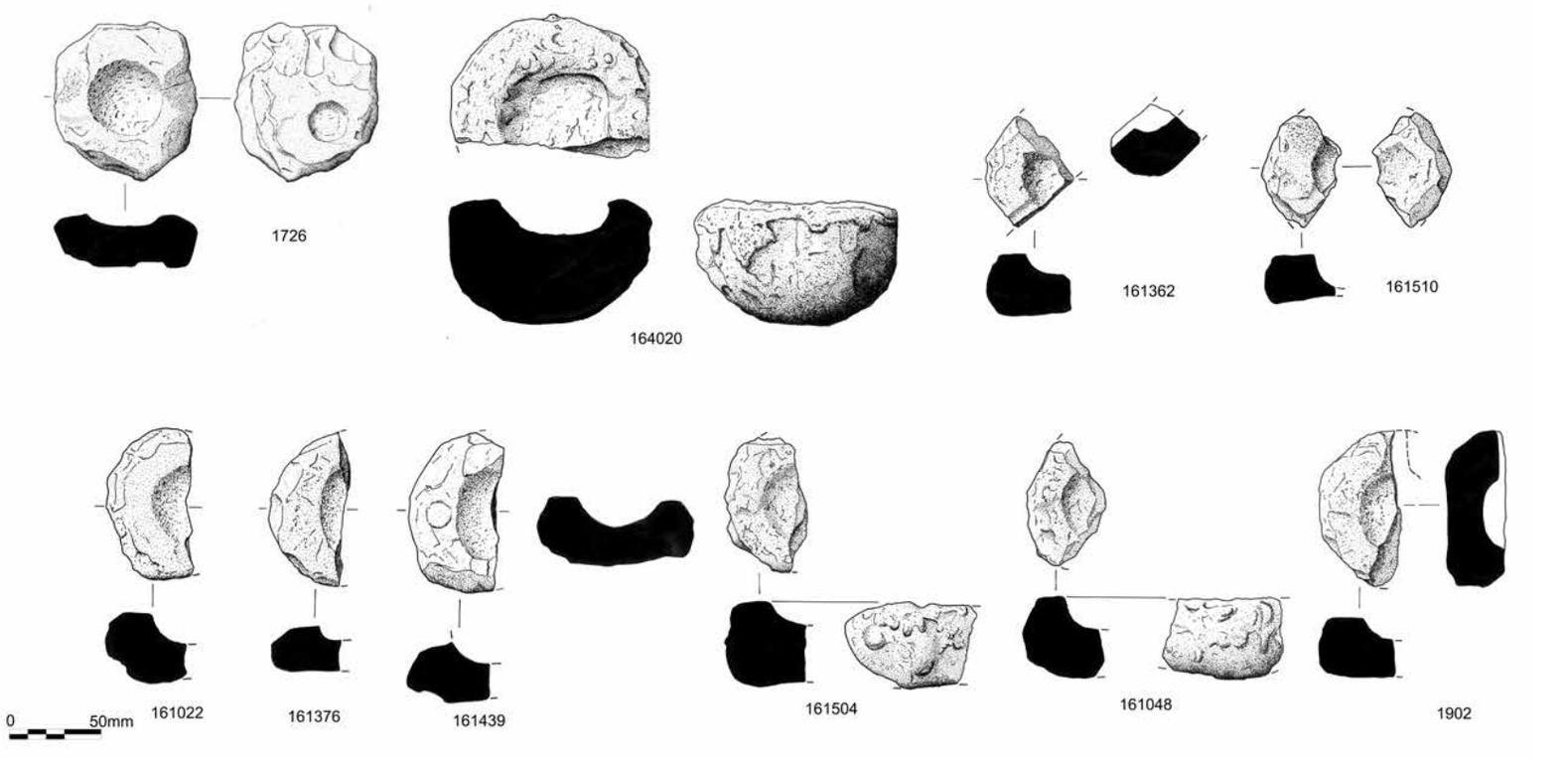
7.4.6 Crucibles Discussion

Round and triangular crucibles have a lengthy history. Various forms of triangular or pyramidal crucible were common throughout the Iron Age, but most commonly with V-shaped sections (eg Tylecote 1986: 99 Type 2). The use of triangular crucibles continues into the 7th century AD too, on sites such as Dunadd where they were used with lids (eg Lane & Campbell 2000: 135, illus 4.40 Type C). Simple rounded crucibles, often with a conical profile but sometimes shallower and more bowl-like, are similarly long-lived (eg Tylecote 1986: 99 Type B3; Lane & Campbell 2000: 135 illus 4.40 Type E). The seemingly basic forms found at the Craw Stane complex, Tap o' Noth and Cairn More, with a lack of complex features such as lids, spouts and handles, are in stark contrast to the complex objects being cast, as seen from the mould assemblage and the presence of silver-casting debris. This raises wider questions about the transition between the 5th- to 6th-century AD non-ferrous metalworking crucibles discussed here and those seen in the 7th century at sites like Dunadd (Lane & Campbell 2000: 135). Is the elaboration of crucibles related to a change in technology (eg different heating techniques requiring the metal to be covered), or was it for performative or aesthetic reasons? Spouts are common on round crucibles throughout the Iron Age (it would have been difficult to pour without a spout or corner) and handles also occasionally attested. The plainness of the crucibles here is perhaps their most striking feature.

While these plain crucible forms give the impression of a relatively homogeneous assemblage, the small details reveal more. Minor differences in fabric, temper and shape may seem insignificant, but reflect deliberate decisions based on the experience and preferences of the craftworker. Other details, such as whether the crucible walls taper or run parallel to rounded tapered rims, may almost have been subconscious acts, created by the muscle-memories of craftworkers trained in different workshop traditions. The Tap o' Noth and Cairn More crucible sherds would not have stood out in any way within the Craw Stane assemblage. However, while similar in overall form, their contexts differ. The Craw Stane crucibles were found dumped in the upper fills of the outer ditch and are likely to have been redeposited once or several times after that. In contrast, the Tap o' Noth sherds were found around hearths, probably where they were used, and the Cairn More sherds all refit, suggesting they too are in a primary deposit.

7.5 Stone Metalworking Vessels

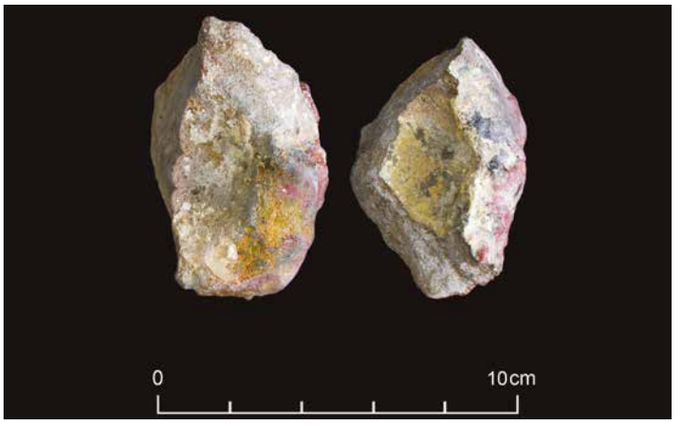
Some 23 fragments of simple sandstone vessels were discovered at the Craw Stane complex, most of which were heavily coated in metalworking residues (Illus 7.27). Two pairs of refitting fragments are present, leaving a maximum number of 21 vessels, all



Illus 7.27
Illustration of stone metalworking vessels from the Craw Stane complex. Alan Braby

SF	C	% surviving/ fragment dimensions (mm)	Key dimensions (mm)				Residues		Refits	Illus	XRF
			D	H	BD	BDe	Colour	Position			
1726	1703	100	115	44	60	11	None – unused		-	y	-
1794	1703	Fragment (24 x 23 x 14)					Red glassy		-	-	y
1847	1703	<25		43	>20		Chalky pale yellow and dark red/grey glassy	Chalky yellow in bowl. Dark red/grey on rim, edge and part of base	-	-	y
1902	1704	50	86	34	41	12	None - unused		161362	y	-
161022	161003	50	85	39	43	14	None - unused		-	y	-
161048	161003	25	100	45			Chalky pale yellow and dark red/black glassy	Yellow in bowl and on rim; red/black on rim, edge and patches on base	-	y	y
161054	161003	Fragment (42 x 26 x 24)					Black, red and cream		-	-	y
161080	161037	20	95	40		24	Chalky pale yellow and dark red glassy	Yellow in bowl and on rim; red on rim, edge and patches on base	-	-	y
161087	161003	Fragment (37 x 27 x 18)					Brown-dark red glassy		-	-	y
161194		Fragment (35 x 26 x 13)					Black and red	Black on rim, red on edge	-	-	y
161323	161048	20	90	41	12	11	Red, yellow and dark green	Variously over interior, rim and exterior	-	-	y
161349	161048	Fragment (34 x 26 x 16)					Dark red and pale brown/yellow		-	-	y
161359	161048	*c* 5-10		19			Black and dark red glassy	Black on interior and rim; Dark red exterior	-	-	y
161362	161048	25	90	37	30	12	None – unused		1902	y	y
161376	161047	50	86	33	40	13	None – unused		-	y	y
161383	161048	Fragment (21 x 15 x 7)					Red/black glassy		-	-	y
161411	161048	20		33		10	Multicoloured: red, green yellow, cream	Variously over interior, rim, exterior and part of base	161504	-	y
161439	161048	50	90	38	48	16	None – unused		-	y	-
161447	161048	20	90	30		14	Chalky cream and dark red enamel with copper-rich droplets	Cream on interior and rim, red and copper exterior and base	-	-	y
161504	161062	50	100	46		8.5	Chalky cream and dark red	Cream on interior. Rim exterior and base are dark red	161411	y	y
161510	161062	25	100	38		18	White/yellow chalky and red and clear glassy	White/yellow on interior and rim. Red/ clear on base and exterior	-	y	y
161516	161049	50	100	47	35	9	Cream-orange	Interior	-	-	y
164020	161042	50	115	65	62	17	Pale yellow chalky	Upper and sides	-	y	-

Table 7.10
Summary of metalworking vessels key features. Full catalogue entries are in the archive. BD bowl diameter, BDe bowl depth. Illustrated examples are on Illus 7.27



Illus 7.28
Photograph of stone metalworking vessels (L–R: SF161504 and SF161048). Leanne Demay/National Museums Scotland

very similar in size and form. All were manufactured from blocks of fine- or medium-grained arkosic (Devonian) sandstone which were roughly flaked around the circumference to give a vertical or bifacial edge, mainly leaving the naturally cleaved flat surfaces on the 'rim' and base. A shallow circular dish was pecked into the upper surface. It was possible to estimate the original vessel diameter of 14 fragments, giving an average of 96mm within a range of 85mm to 115mm. Vessel heights vary between 34mm and 65mm. As they all have the same basic description, their key features are presented in Table 7.10, and full catalogue entries are in the archive.

Six fragments from five vessels (SF1726, SF161022/SF1902, SF161362, SF161376, SF161439) lack vitrified residues but are the same stone type and form, indicating they are unused examples. Fiona McGibbon noted during examination of the worked stone assemblage that one of the unused vessels (SF161376) had bands of

fine- and coarse-grained sandstone, making it a less consistent matrix than the others and providing a possible reason for its abandonment.

Even small fragments can be included in this group with some certainty owing to the thick colourful residues coating most of their surface. A distinct pattern of residues was noted on most, with chalky pale-yellow residues in the bowl and around the rim, and dark red/black enamel-like residues on the rim, around the sides and often extending in patches onto the base. One vessel (SF161447) also has copper-rich droplets adhering to the sides and base. Qualitative surface X-ray fluorescence (XRF) analysis was undertaken on 18 fragments (Table 7.11). The most striking feature of the results is the consistently high levels of lead (Pb) across all analyses but marginally more so on the chalky yellow residues in the interior compared to the glassy red/black residues on the exterior. Copper (Cu) is also present in varying levels, along with minor levels of zinc (Zn) and tin (Sn). One vessel (SF161516) also showed the presence of silver (Ag). Other elements were also present on unused vessels and are therefore likely to be present in the stone itself.

Though a role in non-ferrous metalworking was assumed from the residues, understanding the exact function of these vessels has proved challenging and further investigation will continue beyond the work for this monograph. It is unlikely they were stands for ceramic crucibles, since they display significantly more (and different) residues than the ceramic crucibles themselves. Their capacity does not vary significantly from the largest ceramic crucibles, making it improbable they are simply larger versions of the ceramic crucibles for melting greater volumes. They were also heated from above and show little or no evidence of heat on the base, unlike ceramic crucibles which were heated from beneath or fully enclosed in the hearth, adding further evidence to their differing function.

The chalky yellow residues are visually and analytically consistent with lead oxide or litharge, produced during cupellation. The cupellation process involved precious metals being refined by mixing with a controlled quantity of base metal, usually lead. There are several different types of cupellation depending on whether metals were being refined from ores or debased alloys (Dungworth et al 2022: 96–7). During cupellation the added lead, under oxidising conditions, converts to lead oxide and then acts as an oxidising agent, transforming any remaining base metals within the silver to oxides and leaving the silver unaltered (Tylecote 1986: 60). Successful completion leaves a nodule of silver once all the oxidised base metals have been removed. The discarded/leftover oxides are also known as litharge and could be removed in a range of ways, including as plano-convex lumps called 'litharge cakes', skimmed off while in a hot liquid state (oxides float above silver) or volatalising at high temperatures, leaving little trace (Bayley 1992: 46). Distinguishing between the debris of primary and secondary cupellation primarily relies on the presence of copper in the litharge, which is present in secondary cupellation, but not primary owing to the presence of copper (and other metals) in debased silver alloys.

		Element								
SF	C	Pb	Cu	Zn	Sn	Ag	Fe	Ti	Zr	Sr
1794 exterior (red)	1703	xxxx	xx	x	x		x	x	x	x
1847 interior	1703	xxxx	xx				x			
1847 exterior	1703	xxxx	xxx	x	xx		x	x	x	x
161048 exterior (red)	161003	xxxx	xx	x	x		x	x	x	
161048 interior	161003	xxxx	x		x		x			
161054	161003	xxxx	x	x	x		x		x	x
161080 upper (red)	161037	xxxx	xx	x	x		x	x	x	x
161080 interior (yellow)	161037	xxxx	x		x		x		x	
161087	161003	xxxx	xx	x	x		x	x	x	
161194		xxxx	xxx	x	x		x			
161323 upper (coppery)	161048	xxxx	xx		x		x		x	
161349	161048	xxxx	x	x	x		x			x
161359 upper (red)	161048	xxxx	x	x	x		x			
161362 (unused)	161048						xx	x	x	x
161376 (unused)	161047						x	x	x	
161383	161048	xxxx	xxx	x	x		x		x	
161411 upper surface	161048	xxxx	x		x		x		x	x
161447	161048	xxxx	xxx		x		x		x	
161504	161062	xxxx	x		x		x		x	
161510	161062	xxxx	x	x	x		x		x	
161516 interior	161049	xxxx	xxx	xx	xx	xx	x	x	x	

Table 7.11
Summary of qualitative XRF analysis of stone vessels. xxxx = very high, xxx = high, xx = low, x = minor

The composition of the residues here is consistent with secondary cupellation, suggesting the vessels might have been cupels. If so, the extensive residues over the top and down the sides of the vessels imply the base metal oxides were skimmed from the top. No exact parallels have been found for the use of stone vessels as cupels. In England during the Roman period, cupellation hearths tended to be used, with a shift to ceramic cupels in the Saxon period (Bayley 1992: 50). By the post-medieval period, cupels were specifically manufactured from combinations of bone or plant ash, which would absorb the base metal oxides (Bayley 1992: 53). The equipment involved in cupellation has therefore changed through time and the fine-grained sandstone vessels here seem like a variation on the ceramic cupels found in southern Britain.

However, research and experimental work by Stephen Merkel has cast doubt on the effectiveness of such open vessels, referred to as 'heating trays', for true cupellation and suggests another form of small-scale metal refining or cleaning is more plausible (Merkel 2016 and pers comm). Rather than solely used as an oxidising agent, lead could have been added as a flux or lubricant to help remove silicates such as sand, clay or ash from precious metals, known as 'cleaning' rather than refining (Merkel 2016: 219). This enabled the reuse of small scraps of casting debris. However, this process could still (perhaps inadvertently) remove small amounts of base metals too, thus refining as well as cleaning. Untangling the range of different non-ferrous metalworking processes from such remains is clearly challenging, partly because the processes were highly complex, sometimes overlapped and probably varied between workshops but also because of the range of terminologies used by different specialists. We can be certain the stone vessels here were not used simply for melting metal as most of the ceramic crucibles were. Some form of precious metal refining or cleaning is probable, but the exact nature remains unclear.

Evidence of cupellation, parting and other forms of precious metal refining in early medieval Scotland is scarce, probably in part due to how challenging it can be to recognise the debris. Some of the larger ceramic crucibles, including 'dog dish' forms, from Mote of Mark, Kirkudbright, were interpreted as possible cupels or parting vessels (Laing & Longley 2006: 26). If that was indeed their function, such ceramic forms would be challenging to distinguish amongst a large fragmentary assemblage of varying forms of crucibles and moulds without a thorough programme of XRF analysis.

Seven of the vessels survive as half, while a further three represent a quarter, all broken through the middle. Only one, unused, is intact (SF1726). While examining the lithology of the stone assemblage, Fiona McGibbon noted that there were no signs of heat-cracking or discoloration to the stone matrix despite the thick layers of metalworking residues coating the surface, and that the stones had broken through the layer of residues after cooling. Only one (SF161510) has residues overlying some spalling on the vessel's base, suggesting it may have been damaged during (or before) use. Perhaps they would no longer have functioned with such a thick layer of residues and were deliberately 'decommissioned'. Deliberate fragmentation and structured deposition of artefacts is a well-known tradition in later prehistory, as is the ritualised treatment of metalworking residues (Webley et al 2020: 185–6). The treatment of these vessels may represent a continuation of that practice.

7.6 Ironworking Debris

7.6.1 Overview

Just over 3kg of ironworking debris was recovered during excavations at the Craw Stane complex, Rhynie and 179g from Tap o' Noth (summarised in Table 7.12). Evidence of both smelting and blacksmithing was present at the Craw Stane along with possible fragments of bog iron ore, while fragments of bloom and undiagnostic iron slag were recovered from both sites. The ironworking debris from Craw Stane was mainly redeposited in fills of the outer ditch, whereas at Tap o' Noth the debris was found in floor and hearth deposits on platforms in Trenches 6 and 11, indicating the location of ironworking activity there. Early medieval ironworking, especially during the 4th to 6th centuries AD, as here, is poorly understood. Smelting evidence is particularly elusive, making the fragments of smelting slag from Craw Stane a significant addition to our understanding of the craft during this period.

		Weight (g)	
Process	**Slag type**	**Craw Stane**	**Tap o' Noth**
Iron smelting	Smelting slag	1610.6	
	Bog ore, possible	282.2	
Bloom processing?	Bloom, possible	20.8	52.2
Blacksmithing	Smithing hearth base	998.3	
Undiagnostic iron slag	Undiagnostic iron slag	215.8	120.1
Total (g)		3127.7	172.3

Table 7.12
Summary of ironworking debris assemblage

7.6.2 The Assemblage

The material was washed, visually examined and catalogued using common terminology (eg Crew & Rehren 2002; McDonnell & Milns 2015; Paynter 2002; Spearman 1997) based on characteristics such as density, surface morphology and inclusions. A summary of the categories follows and a full catalogue is in the archive.

Smelting slag

Around 1.6kg of smelting slag was recovered from the Craw Stane complex. The fragments are typically large with frequent voids and charcoal inclusions/impressions throughout. Most fragments are typically amorphous in form but one fragment (C037) could be part of a larger, dense plano-convex accumulation of iron slag known as a 'furnace bottom'.

Bog ore

Three fragments of possible bog ore were recovered (SF15066, 161354B and PLX47) from the Craw Stane complex. The granular texture is very similar to bog ore but the colour is pinker than usual, leaving its identification uncertain. Bog iron ores form from accumulating iron minerals in areas of slow-moving water, such as bogs, and are likely to have been readily available across Scotland. Such ores were the primary ore sources exploited for ironworking throughout the Iron Age in Scotland and remained

an important resource well into the medieval period (Cruickshanks 2017: 261; Hall & Photos Jones 1998: 54).

Bloom

Three fragments of dense, magnetic, corroded iron-rich slag (Craw Stane SF1841 and Tap o' Noth SF1106) are probably fragments of bloom. Bloom was the desired product of iron smelting and would undergo further refining before being a suitable quality for blacksmithing.

Smithing hearth base

Four smithing hearth base fragments (SF1710, 161303, 161347 and 161347) were all from the Craw Stane complex. Smithing hearth bases form from accumulating slag and iron particles dislodged as hot iron is moved in and out of a blacksmith's hearth. SF161347 is intact and SF161351 is almost intact, weighing 395g and 367g respectively, while the other two are fragments.

An unfinished iron object (SF161402) and iron offcut (SF161289) (Section 7.9), both recovered from the outer ditch (C161048) add to this evidence of blacksmithing.

Undiagnostic iron slag

As is usually the case, many fragments are too small or fractured to determine which stage of the ironworking process they are derived from. Thirteen fragments weighing a total of 215.8g were recovered from the Craw Stane complex and four fragments weighing 120.1g from Tap o' Noth.

7.6.3 Discussion

Most of the ironworking debris from the Craw Stane complex was recovered from fills of the outer ditch (2.5kg) with smaller quantities retrieved from the upper fill of the palisade slot (C15007) (72g), post-hole fills (C15094 and C15009) (185g), ring ditch (C015) (29g), beam slot (C239) (180g) and topsoil (120g). The assemblage is therefore entirely redeposited; no certain ironworking features (eg smelting furnaces or smithing hearths) were noted, possibly because of plough truncation across the site and potentially due to recutting of the ditch profiles, though a lot more redeposited ironworking debris may have been expected if there had been a substantial amount of ironworking activity on the site. A burnt feature within the ditch was interpreted as a possible furnace (see Chapter 5), but no ironworking debris was retrieved from it, leaving its function unclear. Identifying exactly where the ironworking activity took place is therefore challenging. Conversely, the fragments from Tap o' Noth were found in floor deposits and hearths, providing a clearer picture of where the craft took place. One of the fragments of undiagnostic iron slag (SF60007) was found in Trench 6, Hearth 1 (C6012), while others were from deposits associated with the upper platform's hearth in Trench 11 (C11002, C11004 and C11005). At both sites the ironworking debris was associated with non-ferrous metalworking debris too.

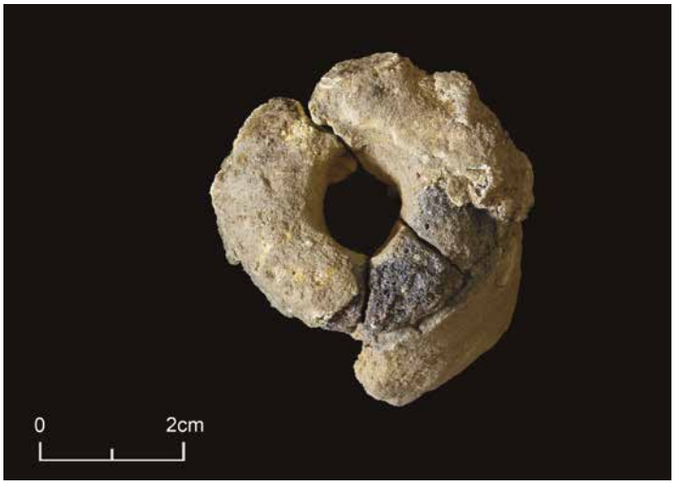
Understanding the scale of any craft is essential if we are to gain an insight into more detailed aspects of the site's function and connections. For example, there is a great difference between repairing personal tools and manufacturing sophisticated status objects or producing large quantities beyond the needs of the settlement. Ascertaining this is not straightforward, especially where the debris is found scattered in secondary deposits and only a small sample of a site has been excavated, as with both sites under discussion here. Even taking those caveats into account, however, the quantities of ironworking debris here are small, especially in contrast to the non-ferrous metalworking assemblage from the same excavated area. This implies ironworking was not a major activity within the boundaries of the Craw Stane complex and is likely to have only been undertaken sporadically at a low scale; perhaps mostly to produce and repair tools for non-ferrous metalworking.

Nonetheless, these small assemblages are highly significant additions to our understanding of early medieval ironworking in Scotland. Sites of this date are rare and, as a consequence, so is ironworking evidence. The current picture of ironworking in Scotland shows a peak of production centred on roundhouse settlements in the Moray Firth area between the 4th century BC and first two centuries AD followed by a gap before large-scale ironworking reappears, mainly on ecclesiastical settlements from the 7th century AD onwards (Cruickshanks 2017; 2018, 2019). When ironworking does reappear, smelting is much rarer than blacksmithing, suggesting the earlier stages of the process had moved elsewhere, probably away from settlements and closer to ore and fuel sources, where we are less likely to discover them (Stirling & Cruickshanks forthcoming). Both sites, but the smelting evidence from the Craw Stane complex in particular, therefore begin to fill some of this gap in our evidence and reveal a continuation of the association between ironworking and wealthy sites seen in the Roman Iron Age, such as Birnie and Clarkly Hill, both Moray, and Culduthel, Inverness (Hunter in prep a; b; Hatherley & Murray 2021).

7.7 Tuyères

GEMMA CRUICKSHANKS

A group of 26 fragments (total 616.6g) of ceramic tuyère were recovered from fills of the outer ditch (C1703, C161003, C161048, C161062 and C164032 with 13, 6, 5, 1 and 1 fragments respectively) at the Craw Stane complex (Illus 7.29). Tuyères were objects made to protect bellows tips from the intense heat of a metalworking hearth and were typically made of stone or ceramic in a range



Illus 7.29
Photograph of tuyère fragment SF161201. Leanne Demay/National Museums Scotland

of disc or cylindrical forms. All the examples here are ceramic, most displaying glassy and/or bubbled vitrification on the end which was closest to the fire.

The perforations tend to be cylindrical, though some are now oval (eg SF161201), probably distorted by heat. Where enough of the perforation survives to estimate original diameter, this ranges between 18mm and 25mm. Most are small fragments, but a few preserve enough of the outer edge to establish they were cylindrical forms, usually with a sub-square section. On some, eg SF1701 and SF1744, the outer edge steps in after the vitrified zone on the end, illustrating where it slotted into the hearth's wall. Four fragments in SF161201 refit to form the complete end, creating a rather narrow, tube-like tuyère, or perhaps the narrower end of a wedge-shaped form.

Tuyères were used in both ironworking and non-ferrous metalworking, and probably other crafts where bellows were required to reach higher temperatures. Three (SF1701, SF1744 and SF161100) are coated in red glassy residues, suggesting they were used in a non-ferrous metalworking hearth. They are fairly common finds amongst metalworking debris, though small fragments are easily missed. It has been noted on other sites that tuyères often have extra quartz temper added to the fabric to withstand the intense heat in what is the hottest part of a hearth, for example at Dunadd (Lane & Campbell 2000: 147) and Birnie (Cruickshanks & Dungworth in prep). This feature was not noted here, suggesting the clay was good enough to withstand such temperatures without additions.

Selected catalogue (full catalogue in the archive)

- SF1701 Two refitting fragments of cylindrical ceramic tuyère with red glassy vitrification on exterior, showing slight step in where it slotted into the hearth wall. Edge of perforation on opposite face. 36.5 x 25 x 18mm; 14.1g. C1703
- SF1744 Eleven fragments of vitrified ceramic tuyère comprising orange fired clay with convex red/grey porous outer edge, showing slight step in where it would have slotted into hearth wall (additional layer of clay adhering there may be from hearth wall). Three fragments preserve the concave edge of a cylindrical perforation (estimated 18mm diameter). Total 42.4g. C1703
- SF161201 The end of cylindrical tuyère with three of four fragments refitting to form the complete tip. Orange-brown friable ceramic. L 35, ext D 35, internal D of perforation 15 x 11mm. 32.8g. C161003. Illus 7.29
- SF161235 Fragment of orange ceramic, transitioning to grey towards the outer face which is coated in red-grey glassy vitrification. Likely to be part of the outer edge of a cylindrical tuyère. 41 x 37 x 21mm. 26.9g. C161003
- SF161279 Part of the edge of a cylindrical tuyère embedded within a mass of vitrified ceramic. Probably square sectioned with rounded corners, perhaps showing part of blocked hole but very distorted. 446g. C161048
- SF161309 Small fragment of fired orange clay with glassy vitrification on one face and the edge of a rounded concave rim on one edge, suggesting a cylindrical tuyère. 24 x 20 x 13mm. 4.5g. C161309
- SF164013 Reddish-orange fired clay tuyère with one face coated in glassy black vitrification and the edge of a perforation (originally around 25mm D). No outer edges survive. 23.8g. C164032

7.8 Metalworking Discussion

This large, rich metalworking assemblage holds a wealth of information about the range of skills and resources the metalworkers at the Craw Stane complex, Tap o' Noth and Cairn More possessed, providing an insight into the craft of metalworking in 4th to 6th centuries AD in north-east Scotland for the first time. Understanding the nature and scale of the craft, particularly at the Craw Stane complex, is key to understanding the function and status of these sites and interrelations between them.

7.8.1 Resources

Access to a wide range of resources is demonstrated by the metalworking evidence. While the few fragments of bog iron ore could have been locally sourced for ironworking, non-ferrous metal sources were more complex to obtain. XRF analysis of crucibles and casting debris illustrates a range of copper alloys and silver were being worked while analysis of the stone metalworking vessels demonstrates that alloys were probably being cleaned or refined on site by heating with small quantities of lead.

The presence of zinc (Zn) in crucible residues and casting debris indicates the melting of metals which included recycled Roman alloys, such as gunmetals (Cu, Zn, Sn) and leaded gunmetals (Cu, Zn, Sn, Pb). These alloys were dominant in northern Britain during the Roman Iron Age, though they can vary in composition owing to the repeated recycling of older metalwork (Dungworth 1997). By the period the Craw Stane metalworkers were operating, recycled Roman metalwork would have been part of the general pool of metal sources available.

Lead was required for the cleaning or refining processes undertaken in the stone vessels (Section 7.5). There is no local source of lead, indicating this resource had to be brought from further afield. Lead isotope analysis of residues on the stone vessels could pinpoint the lead source and would be a useful avenue for future research.

A regular source of fuel, probably wood charcoal, would have underpinned all metalworking activity in the past but we know very little about the charcoal industry during this period. Recent analysis of wood charcoal from ironworking furnaces at Culduthel has demonstrated the wider impact this activity had on local woodland during the Iron Age (Marinoni 2023). Though non-ferrous metalworking would require far less charcoal than an iron smelting furnace, the scale of activity at the Craw Stane would still have required a regular supply and environmental evidence suggests a range of woodland resources would have been available in the local environs (Chapter 8).

In addition to metals and fuel, local sources of suitable clay and stone were exploited to create moulds, crucibles, tuyères, hearth and furnace linings. Although locally sourced, these materials would still have been carefully selected though the details are complex and vary between sites. For example, research by Daniel Sahlén (2013) on later prehistoric ceramic technology in Scotland

showed that although local clays were selected, on some sites, such as Traprain, different local sources were used for the production of crucibles compared with other ceramic objects, but on other sites the same source was used, perhaps revealing varying levels of skill or knowledge of this resource. A wide range of tools and equipment would have been required, like the iron tongs (SF207; Illus 7.38) found at the Craw Stane complex, along with other metalworking accoutrements like iron hammers and punches, bellows made from hides, and bone or wooden modelling tools for fashioning moulds.

An in-depth knowledge of a wide range of raw materials, whether locally sourced or acquired through longer-distance trading, was therefore required for metalworking to take place, particularly at the level of skill and production demonstrated at the Craw Stane complex. Access to these resources would also have had to be consistent to maintain the scale of production demonstrated here.

7.8.2 Products

Copper-alloy objects were being produced at all three sites, iron was being worked at the Craw Stane complex and Tap o' Noth and silver items also at the former. The well-preserved moulds, particularly at the Craw Stane complex, provide the best insight into the metalworkers' products. Naturalistic animal figurines, elaborately decorated mounts and a range of ornate jewellery, including different types of penannular brooches, handpins, nail-headed pins and finger-rings were being created, illustrating the technical skill and artistry of these metalworkers. As well as finished objects, ingots were being cast as stock for metalworkers, either for use there or to trade.

XRF analysis of a selection of moulds proved inconclusive, leaving uncertainty over which items were made of copper alloy and which with silver, though handpins and spiral rings are possible candidates for silver based on known examples. An unfinished penannular brooch terminal indicates at least some were copper alloy.

It is always more challenging to know what ironworkers were making since, unlike non-ferrous metal casting, iron forging did not involve the use of moulds. Only rare offcuts and unfinished items provide clues. In this case a possible unfinished key and an offcut are the only glimpses of the blacksmith's work. While remarkable examples of ironworking are present among the finished iron objects, not least a pattern-welded knife and the intricate axe-headed pin, we cannot be certain where they were made. However, given the level of metalworking skill shown at the Craw Stane complex local production is a distinct possibility.

7.8.3 Scale of Production

Nearly 1,000 fragments of metalworking debris were recovered at the Craw Stane complex, mostly from the outer ditch fills, of which only around 10–15% was excavated. The site is also plough truncated, and the true scale of metalworking was likely to be far greater than this assemblage. The ceramic moulds give the most accurate indication of how many objects were produced, since they were only used once and minor variations can help determine the minimum number of objects cast. A minimum of 67 objects were produced from the Craw Stane mould assemblage with a further seven from Tap o' Noth and three from Cairn More. We cannot be certain that the same concentration of debris would be found around the whole ditch, and even if so, a proportion of fragments could be from the same moulds already represented, but a conservative estimate suggests production of between 500 and 600 individual objects at the Craw Stane complex.

Estimating a minimum number of crucibles was far more challenging, given the homogeneous nature of the assemblage. The 246 sherds recovered at the Craw Stane complex is comparable to 263 found at Dunadd, which were estimated to be from a minimum of around 60 vessels (Lane & Campbell 2000: 205, Table 5.3). If we assume a similar correlation at the Craw Stane, then the *c* 60 crucibles closely match the estimated 67 moulds (though crucibles could have been used more than once).

Production of high-status objects on such a scale would have placed the Craw Stane complex in a powerful position, with the ability to display wealth and trade with, or perhaps bribe, others when desired. Craft production on a large scale is a common feature of high-status sites of all ages; production created wealth, and those who were in control must have been in a very influential position.

It is more difficult to estimate the scale of production at Tap o' Noth and Cairn More, which produced more typical assemblages of a few scattered pieces. Based on the snapshots we have from excavated areas, production was at a much smaller scale, though the objects being cast were just as fine, with a handpin mould from Tap o' Noth and a penannular brooch and bead-fitting mould from Cairn More. However, while a large area of Tap o' Noth has now been investigated, the sample of platforms (fewer than 20) versus the estimated total (more than 800) emphasises we have a very small proportion of the surviving assemblage from such a vast hillfort settlement.

While non-ferrous metal production was demonstrably on a large scale, particularly at the Craw Stane complex, the ironworking evidence is much more sparse. This is in stark contrast to slightly earlier, but similarly high-status, craft-production sites in the Moray Firth area which have produced large iron slag assemblages of several hundred kilogrammes, as at Culduthel and Birnie (McLaren & Dungworth 2021; Cruickshanks & Dungworth in prep). A broader study of ironworking evidence from Scotland revealed a shift away from intensive production on settlements at some point in the early medieval period (Cruickshanks 2017), with a recently discovered isolated bloomery dating to the 7th century–8th century AD at Glenlee in Dumfries and Galloway providing the first clear evidence of this (Stirling & Cruickshanks forthcoming). The lack of extensive iron smelting evidence at the Craw Stane complex may imply that part of the process had already moved away from settlements by the 4th century AD. Given the former presence of a bog near Rhynie village, it could be that more intensive ironworking was situated somewhere near the bog ore source.

7.8.4 Context and distribution

Most of the metalworking debris (94%: 827/878 fragments) was recovered from fills of the outer ditch [15004] of the Craw Stane complex, particularly fills C161003, C161048 and C162054 (240, 153 and 144 fragments, respectively). When diagnostic fragments are examined across the different fills a few patterns are notable.

Group	Type	Outer ditch fill								
		1702	1703	1704	1726	161003	161037	161048	161049	162054
Iron	Smelting slag	1	3			1		6	3	
	Blacksmithing debris		1			2	2	3	1	
	Undiagnostic		4			5	1	4	3	
Non-ferrous	Crucibles	24	10	2	17	165	30	63	5	8
	Cupels		3	1		4	1	9	1	
	Casting debris		1			11		2		1
	Casting debris (silver)				1					
	Stone ingot mould	4	1					3		
	Mould – handpin		2	1		1	1	3		1
	Mould – barrel pin		1			1		1		3
	Mould – zoomorphic					1				15
	Mould – 'axe' mount									7
	Mould – all other	35	26	13	8	41	16	54	6	107

Table 7.13
Summary of diagnostic metalworking debris (number of fragments), including main categories of diagnostic moulds, from outer ditch fills (only those producing over 10 fragments of metalworking debris are shown here)

Table 7.13 shows that while these three fills have produced the largest quantities of metalworking debris, their assemblages vary in composition. C161003 produced far more crucible sherds than C162054, which had a much higher proportion of moulds while C161048 had a wider range of all debris. Stratigraphically, C161003 is the latest fill, but the radiocarbon dates have shown it to have some of the earliest dates (AD 260–540, AD 330–540), implying this material was redeposited from an earlier dump. C162054 was located in the middle to later levels of the ditch and showed similarly early dates (AD 340–540). Therefore the ditch fills are complex, and the metalworking debris had clearly been redeposited, probably more than once, making it very challenging to now untangle and identify potentially separate metalworking events.

There are hints of separate events when the main categories of mould are examined across different fills. For example, all the moulds for boar and hound zoomorphic figures and the 'axe'-shaped mounts come from C161054, while handpin and barrel pin moulds were more dispersed. Perhaps this implies the zoomorphic and 'axe' moulds were from one distinct metalworking event (or even for a specific composite object?), while pins and brooches were being cast more regularly over a longer period. It also suggests that although the dating for C161054 has shown it to be redeposited, it may be less disturbed than other fills.

The differing characters of the metalworking debris assemblages from fills C161003 and C162054 point towards some control over where certain types of debris were deposited. Crucibles and moulds would have been used together but were separated for deposition here. A similar pattern has been noted recently by the author when examining non-ferrous metalworking assemblages from Upper Largie in Argyll (2nd–1st centuries BC) and at Berst Ness on Westray, Orkney (dating yet to be confirmed but probably in the first half of the first millennium AD) (Cruickshanks & Hunter 2023; Hunter & Cruickshanks 2014). Such control over where debris is placed hints at more than practical concerns, for there seems no logical reason to dump the fragments separately. Metalworking, metalworkers and metalworking debris were associated with a range of superstitions and beliefs even in recent history (eg Stewart 1890: 393–4) and several studies have explored such links in prehistory too (eg Budd & Taylor 1995; Giles 2007; Haaland 2004; Halkon 2013; Hingley 1997). The glimpses of controlled deposition at the Craw Stane complex may well reflect some of these opaque traditions relating to metalworking which we know frustratingly little about.

7.8.5 Parallels

In short, no other site of this date in Scotland has produced a metalworking assemblage of the same scale and character as that from the Craw Stane complex. Contextualising this remarkable assemblage is therefore a challenge and requires casting the net a bit further, both geographically and chronologically. But first we can start close to home with Tap o' Noth and Cairn More. Both sites have produced much smaller metalworking assemblages, but with many similarities. The crucible forms, mould construction features, fabrics and types of objects being cast at the three sites are consistent as a group and could easily pass as a single assemblage. There is no reason to believe that this material could not have been produced by the same craftworkers, or at least within the same local workshop traditions. These assemblages provide a rare opportunity to examine how craftworkers between three contemporary, but different, neighbouring sites may have interacted and how production was organised.

The Craw Stane complex certainly seems to have been the focus for metalworking activity. Were the craftworkers permanently based there though? Or did they live at Tap o' Noth, with its extensive settlement evidence, visiting the Craw Stane complex for metalworking events? Or perhaps the metalworkers were permanently based at the Craw Stane and only occasionally

visited the other sites for smaller bouts of metalworking. The metalworking at each site need not be contemporary but it is difficult to untangle the relative chronology of metalworking at the three sites in finer detail at present.

There are so many variables involved in understanding how the craft could have been organised, including whether the metalworkers were engaged permanently or seasonally, or what nature of arrangement there was between masters and apprentices. The specifics remain unclear, but what we do know is that there was a common workshop tradition, implying sharing and collaboration between these three sites (see Chapter 12 for discussion on the inter-relatedness of the three sites).

While other large-scale metalworking sites are unknown in 4th- to 6th-century AD Scotland, some smaller assemblages are known, particularly from the later part of that period. A structure dating to between the 5th and 7th centuries AD at Eilean Olabhat, an island promontory site on North Uist, produced an assemblage of 86 mould fragments, including a handpin mould and 120 crucible fragments from an estimated minimum of 13 vessels (Armit et al 2008). XRF analysis discovered silver was being cast in at least five of the crucibles (Armit et al 2008: 83). As at the Craw Stane complex, the crucibles here were predominantly fairly plain triangular forms. The structure was interpreted as a domestic structure, probably occupied by a single family, then used as a metalworking area after abandonment for a short time.

Possible contemporary assemblages from the Northern Isles, such as at Gurness broch on Orkney, and Scatness and Scalloway brochs on Shetland, are complicated by how challenging it is to date material closely from long-lived broch villages. Four mould fragments, including a handpin mould, eight crucibles and a 'heating tray' from Scalloway were thought to date to between the 5th and 6th centuries AD based on stylistic features and associated finds (Campbell 1998: 171). One of the crucibles was used for casting silver. Around 115 moulds, including handpins and penannular brooches found in a discrete dump, and 24 crucible fragments were found at Scatness (McDonnell & Milns 2015: 411), but can only be narrowed down to the first four centuries AD in date. Gurness broch produced around 20 moulds, including one for a penannular brooch barrel pin and eight crucibles (Close-Brooks 1987). Dating these finds is challenging, as is interpreting the nature or status of those sites at the time they were used for metalworking. It seems likely that some of this metalworking is contemporary with the Craw Stane complex, but the sites are otherwise difficult to compare. Parallels between the Northern Isles sites and Tap o' Noth are a little easier to envisage, with their smaller assemblages from later phases of structures within a larger settlement presenting a similar image of activity which was not the central focus of the site, as it seemed to be at the Craw Stane complex.

More numerous parallels emerge in the two centuries after the Craw Stane complex was abandoned, with elite secular centres like Clatchard Craig, Dunadd and Mote of Mark producing a range of non-ferrous metalworking evidence and fairly large assemblages (Close-Brooks 1987; Lane & Campbell 2000; Laing & Longley 2006). Clatchard Craig (Fife) in particular shares many similarities with the Craw Stane complex's metalworking assemblage. Around 60 mould fragments (mainly for penannular brooches, where diagnostic), three crucible sherds and a silver ingot were retrieved (Close-Brooks 1986). Recent re-dating of the site indicates a short-lived occupation in the 7th century AD (Noble et al 2022). Interestingly, one of the crucibles recovered was a shallow, round open form and XRF analysis detected high levels of lead on the surface (Noble et al 2022: 165: SF107), suggesting it could be a refining or cleaning vessel like the stone vessels from the Craw Stane complex. Though later in date, the quality of the moulds, the presence of silver-working evidence and a possible refining vessel are a close parallel to the Craw Stane complex.

At the same time, monastic centres such as Iona, Whithorn and Portmahomack all began producing metalwork, often on a large scale, from the 7th century onwards (Campbell & Maldonado 2016: 90; 2017; Cruickshanks 2018; Hill 1997; Carver et al 2016: D6.5, D92–6, D108–9). Recent excavation and rediscovery of St Moluag's monastery on Lismore has also produced a non-ferrous metalworking assemblage of similar size to the Craw Stane complex from a fairly small excavated area, including penannular brooch moulds and evidence of silver and gold casting (Ellis 2019; Cruickshanks in prep).

Further afield, closer parallels can be found in Ireland, for example at the early medieval settlement of Garranes, particularly Lisnacaheragh ringfort, constructed in the 5th century AD (O'Brien and Hogan 2021; Ó Ríordáin 1942). During excavations in 1937 (Ó Ríordáin 1942) a large assemblage of over 2,500 crucible fragments was found, along with around 30 moulds, mostly concentrated in Area D which was interpreted as a specialist metalworking area. The moulds included stone forms for casting bar ingots and semi-spherical objects and ceramic moulds for casting personal ornaments, including penannular brooches and ringed pins (Comber 2004: 33–7); a far smaller mould assemblage than the Craw Stane's but closely similar in function. The crucibles provide a very close comparison, with two main forms present: relatively small, plain triangular ceramic vessels and larger, semi-spherical open forms made of stone (Ó Ríordáin 1942: figs 24–5). The stone crucibles are the closest parallel yet found for the stone metalworking vessels from the Craw Stane. As at the Craw Stane complex, Lisnacaheragh's stone vessels were also heated from above (whereas the ceramic forms had been heated from below and around the sides).

Like at the Craw Stane complex, only one ceramic crucible produced XRF results showing silver as a main element, while several others contained traces of silver (O'Brien and Hogan 2021: 274). The presence of high levels of lead in red enamel-like residues on several crucibles (unclear which type) was interpreted as evidence for enamel or glass production, though it was noted that it was not possible to determine if this was 'accidental or intentional' since such residues can also be produced as a byproduct of non-ferrous metallurgy.

Though one should be cautious when comparing geographically distant sites, the date, scale and nature of metalworking evidence from Lisnacaheragh provides an intriguingly close parallel to the Craw Stane complex. Our understanding of sites like Lisnacaheragh has benefitted from surviving early texts in Ireland which outline many aspects of life in the early medieval period. For example, early Irish texts note that metalworkers, specifically blacksmiths, coppersmiths and silversmiths, were an essential

component of higher-status settlements (Kelly 1988: 62–3). The metalworkers themselves could be high-status individuals, particularly master-smiths, with examples known to have worked directly for kings or were even kings' sons (Scott 1990: 187). Other early texts mention groups referred to as *Cerdridge*, thought to refer to communities of bronzeworkers operating within a specific area (O'Brien and Hogan 2021: 306). Added to the archaeological evidence, these references illustrate just how powerful metalworkers could be at the elite end of the scale.

This selective summary highlights how few other sites with non-ferrous metalworking in Scotland can be dated to the 4th and 5th centuries AD in particular. While a connection between large non-ferrous metalworking assemblages and wealthy, powerful, even royal sites is a common theme, sites with smaller assemblages are more challenging to interpret and the nuances in scale, skill level and status hard to untangle. In conclusion, the scale and range of the non-ferrous metalworking assemblage from the Craw Stane complex, along with other evidence such as imported vessels, decorative metalwork and sculptured stones, clearly demonstrate this was a major craftworking site, whose assemblage finds clear parallels with high-status hillforts of the 7th century AD or later and also with Irish royal centres such as Garranes. The evidence from Tap o' Noth and Cairn More was probably produced from the same workshop tradition, though the status and scale of activity on those sites is less clear.

		Craw Stane complex			Tap o' Noth		
Group	**Type**	**Iron**	**Copper alloy**	**Silver**	**Iron**	**Copper alloy**	**TOTAL**
Personal (12)	Pin	2	2			1?	5
	Buckle	4					4
	Belt fitting	1					1
	Toilet instrument		2				2
Weaponry (1)	Pommel		1				1
Tool (15)	Tongs	1					1
	Knife	3			1		4
	Fine tool	3			1?		4
	Handles	4					4
	Unidentified tool				2		2
Mounts (7)		4	2			1	7
Fittings (12)	Nails	4			1		5
	Rove	1					1
	Tack	1					1
	Wall anchor?	1					1
	Collar	1					1
	Looped fitting	3					3
Metalworking evidence (19)	Part-worked bar		2				2
	Casting debris		13	1			14
	Failed casting		1				1
	Unfinished key	1					1
	Offcut	1					1
Fragments (35)	Bar	16			1		17
	Rod	7					7
	Strip	6			2		8
	Sheet	1					1
	Unidentifiable	2					2
Other (2)	Amulet?		1				1
	Plate with textiles	1					1
Total		68	24	1	8	2	103

Table 7.14
Summary of metalwork assemblages from the Craw Stane complex and Tap o' Noth

7.9 Metalwork

GEMMA CRUICKSHANKS AND EWAN CAMPBELL, WITH THE POMMEL CAP BY ANDREAS RAU

7.9.1 Introduction

An assemblage of 93 metal artefacts was recovered from the Craw Stane complex, comprising 68 wrought iron, 24 copper alloy and one silver object, with a further 8 iron and two copper-alloy objects from Tap o' Noth (Table 7.14). Several exceptional finds are present, including a sheet copper-alloy mount decorated with a face, an intact iron axe-headed pin and a pattern-welded iron knife. Two nail-headed pins and a rare iron projecting disc-headed pin with evidence of enamelling broaden the evidence for personal ornaments. Fragments of casting debris, including a rare piece of silver-casting debris and the failed casting of a zoomorphic penannular brooch terminal add to the evidence of metalworking here. While most of the metalwork was retrieved from the outer ditch fills, notable exceptions include both nail-headed pins and the axe-headed pin from the palisade, a fine set of iron tongs deliberately deposited in a post hole and two buckles from an external floor layer, hinting at patterns of deliberate deposition less evident in artefacts of other materials.

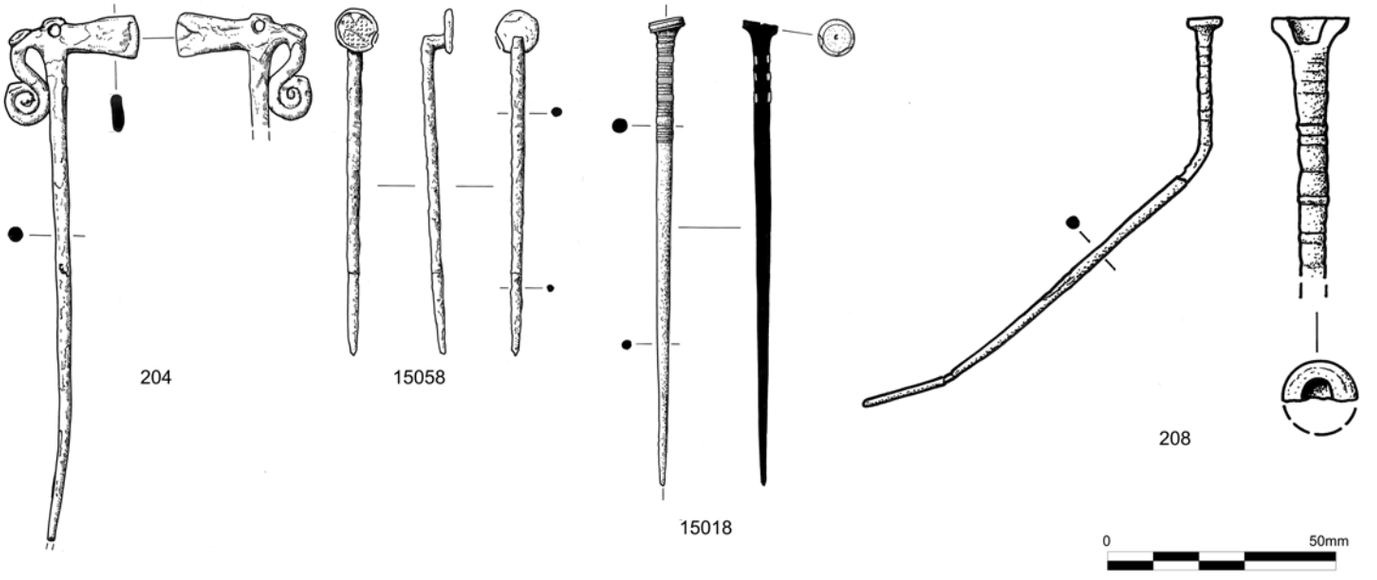
All the metal objects underwent X-radiography and conservation, including cleaning of corroded iron objects, which aided identification. Non-ferrous metal objects were analysed with X-ray fluorescence (XRF) to determine their alloy. Catalogue entries for most of the assemblage are included below. Certain items, such as bar and rod fragments or casting debris, are summarised with full catalogue entries in the archive.

7.9.2 The Assemblage

Personal items

Pins: iron axe-headed pin

A finely made iron axe-headed pin (SF204; Illus 7.30 and 7.31) is one of the most striking finds in the assemblage and is unique in early medieval Scotland. While clearly emulating an axe in shape, it is embellished with a fine S-spiral with coiled terminal on one side and a small loop at the top. X-radiography shows the spiral was formed separately then welded on (or was re-joined after breaking). While the loop may suggest this object was suspended,



Illus 7.30
Illustration of iron (SF204 and SF15058) and copper-alloy (SF208 and SF15018) pins from the Craw Stane complex. Alan Braby

perhaps as a pendant, it is worth noting that many forms of dress pin in the Iron Age and early medieval periods have ring-heads or perforated heads. This feature was probably functional, allowing a securing cord to be attached at tip and head (eg Wilson 1983: 347 and fig 146) or for the attachment of a chain between a pair of pins (eg Rogers 2009: 62, fig 1.26: 552, 556 and 558).

Miniature versions of axes have a very long history, from examples used in Bronze Age children's burials (McLaren 2016) to axe-shaped hairpins from Late Roman sites, particularly temples (Cool 1990: 168, fig 11.2). A range of model axes are known from Iron Age, Romano-British and continental contexts, continuing in popularity into the early medieval period (Kiernan 2009; Meaney 1981: 148–59; Williams et al 2014: 173, fig 13). An obvious parallel for this object is the 'Rhynie Man' Pictish stone, featuring a carved figure carrying an axe with long thin shaft and slender blade closely similar to this one (Illus 12.3). The thin shaft bears similarities to iron-hafted axes of the Anglo-Saxon period, including a famous example from the royal ship burial at Sutton Hoo (Bruce-Mitford 1983: 833–43, fig 597). The type has been interpreted as a form of poleaxe used to sacrifice bulls in pagan royal rituals (Dobat 2006) (See discussion in Chapter 12). The Craw Stane axe pin is therefore likely to have been an object with symbolic significance and its placement in the fill of the palisade was perhaps a deliberate deposit.

- SF204 Finely made iron axe-headed pin, intact apart from its very tip. The circular-sectioned shank tapers gradually with a slight curve. Its head comprises a flat, expanding axe blade on one side and fine 'S'-curve with spiral terminal on the other. There is a small loop at the top (2mm D), in line with the shank. Total L 118; shank D 2.5–3.5; blade L 16, W 6–10; spiral L 20.5, T max 2.5; 7.7g. C218. Illus 7.30

Pins: Iron projecting disc-headed pin

A second iron pin is just as unusual, though not as visually striking at first glance. SF15058 (Illus 7.30) has a projecting disc head. Careful conservation revealed a fine grid-like pattern of raised dots, reserved triangles and a thin raised border around the disc. The raised dots may have been intended as keying for enamel, which would have covered the area between the border and reserved triangles. No traces of enamel survive and the shank is not entirely rounded in section, suggesting it might not have been finished. Unlike the two nail-headed pins and the axe pin, which

Illus 7.31
Photograph of axe-headed pin (SF204)

were clearly finished objects and were all retrieved from the palisade, this pin was found in the upper fills of the outer ditch, where most of the craft debris was recovered.

Its unfinished state adds to its significance, as this implies it was made, or at least partly made, at the Craw Stane complex. Whether it was completed or not, it adds to the evidence for innovative and experimental metalworking here.

- SF15058 Mostly intact iron pin with projecting disc head. The disc head has a raised border, within which is a grid of raised dots with two possible reserved triangles protruding from the edge. The tapering shank has a square section, with corner aligned with head, giving the impression of a diamond-shaped section. Total L 77; shank T 3; head D 9; 2.2g. C15194. Illus 7.30

Both the iron pins are exquisite examples of early medieval blacksmithing. It would have been far simpler to cast such forms in non-ferrous metal in ceramic moulds. Iron could not be cast at this date; it could only be heated enough to soften it, allowing it to be forged into shape through careful hammering, twisting and punching. The disc-headed pin combines intricate smithing with the unusual combination of enamelling on iron.

Such decorative iron personal ornaments are rare, but not wholly unknown in early medieval Scotland. An iron thistle-headed pin from 5th- to 7th-century AD deposits at Trusty's Hill, Dumfries and Galloway, has fine copper-alloy inlay on the shank (Cruickshanks & Hunter 2017: 47) and a disc-headed pin with copper-alloy elements to the head and shank was found in deposits dating to between the 4th and 7th centuries AD at Howe, Orkney (Ballin Smith 1994: 217–8, fig 130). It is worth noting how easily such pins could be dismissed as corroded iron nails or similar without X-radiography and conservation. Even taking this into account, they are rare – indeed rarer than silver pins. While these ornate iron pins display an exceptional level of metalworking skill, it is difficult to know how they were viewed more generally, particularly in comparison to the wealth of elaborate non-ferrous decorative metalwork present in the early medieval period. Perhaps their value was more symbolic, particularly with the axe-headed pin, while others are more a display of skill or the result of experimentation.

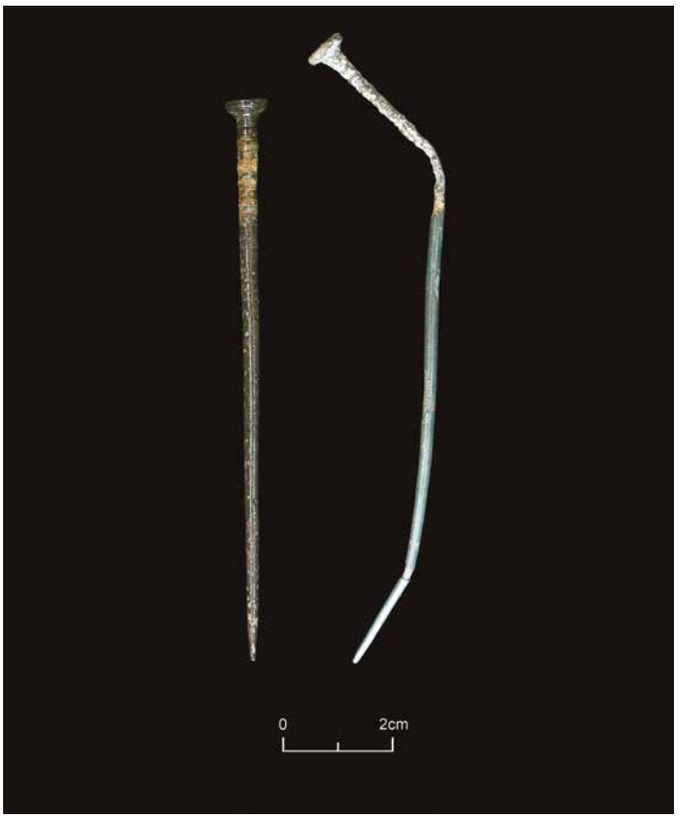
Pins: copper-alloy nail-headed pins

Two copper-alloy nail-headed pins are the same 'type' but reveal differences in form and construction. SF208 is longer than SF15018 (Illus 7.30 and 7.32) (130mm and 103mm respectively) but they both share the basic nail-headed form and have decorative corrugation on the top portion of their shanks. However, this decoration has been achieved in quite different ways, with incised lines and inlaid silver strips on SF1508 and cast-in corrugation on SF208; two different metalworking techniques to achieve a similar aesthetic. A very fine circumferential line with faint, tiny central dot on the head of SF15018 was probably compass drawn. The head of SF208 is now damaged but contains a hollow coated in lead solder (confirmed with XRF) which is likely to have once secured an inlaid stud, perhaps of glass, garnet or amber. These relatively simple forms of pin were therefore embellished in different ways which would have stood out, whether by the shine of silver inlay or the sparkle of a glass stud.

SF208 is notably less well preserved than SF15018, though both were found in the upper fills of the palisade slot (C218 and C15007). The longer shank of SF208 was bent in two places prior to deposition and a chunk out of the side of the head is missing – perhaps damaged while prising out the inlaid stud? SF15018 was deposited in as-new condition with complete, straight shank and fine glossy patina. In contrast, the pitted, corroded surface of damaged and bent SF208 suggests it could be redeposited or have lain exposed longer than SF15018. The two pins have very different biographies.

Nail-headed pins are a well-known early medieval pin form in metal and bone and are widely believed to have roots in the Late Roman world (Stevenson 1955b: 286; Laing & Longley 2006: 145). Many are from poorly-dated contexts, but with a notable concentration around the 7th to 9th centuries AD (Foster 1989: 99), including a decorated example from Buiston crannog, Ayrshire, with a blue glass inset in its head (Laing 1993: 80, 136). The Craw Stane examples, and associated production evidence, provide an important secure date between the 4th and 6th centuries AD for the type – earlier than the traditional floruit. This earlier dating is consistent with the lack of hipping on the shanks.

Production evidence is scarcer than the pins, with only four other sites producing mould fragments: Dunadd and Dunollie in Argyll (Lane & Campbell 2000: 125; Alcock & Alcock 1987: 140, illus 9: 86) and Mote of Mark and Whithorn in Dumfries and Galloway (Laing & Longley 2006: 62, illus fig 25; Hill 1997: 401,



Illus 7.32:
Photograph of nail-headed pins (SF208 and SF15018). Leanne Demay/ National Museums Scotland

illus 10.84). The Craw Stane complex is therefore the first site outwith this western cluster to produce evidence of manufacturing metal nail-headed pins and the only site to produce moulds with evidence of cast-in decoration (Section 7.2.3).

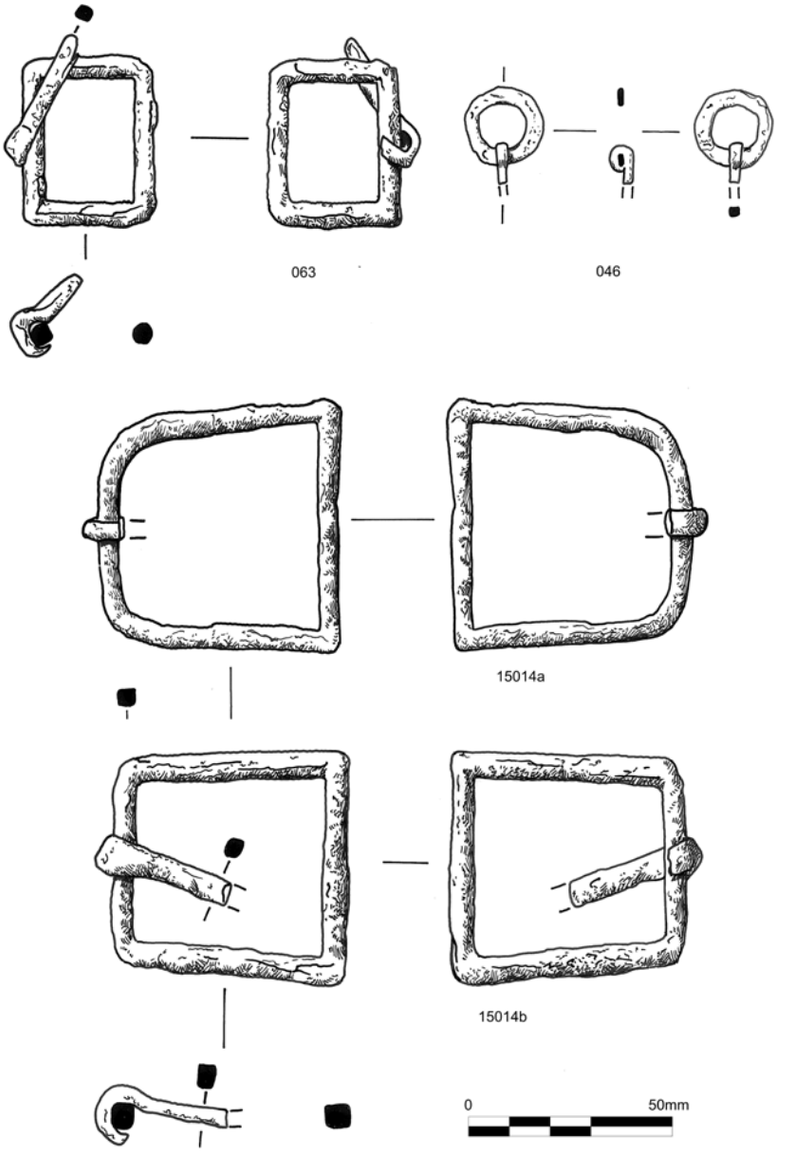
- SF208 A mostly intact, decorated copper-alloy nail-headed pin with long shank now bent in two places and part of head missing. The head has a circular hollow in the top which most likely held an inlaid stud. The upper part of the shaft is pitted with corrosion, but there are traces of cast-in corrugation decorating extending around 20mm from the head. Original (straight) length *c* 130mm; head D 8 max shaft D 4, 3.9g. XRF shank: Cu, Pb, Sn, trace Zn and Ag; XRF head inset Pb, with Cu, Sn. C218. Illus 7.30
- SF15018 An intact, decorated copper-alloy nail-headed pin with straight, tapering, circular-sectioned shank and flat, disc head. The head has two fine incised lines around the edge, creating the illusion of being lipped, and a faint incised line near the edge on the upper surface. A tiny indent in the centre of the top suggests the circumferential line was compass drawn. The upper portion of the shank (24mm) is decorated with groups of finely incised concentric lines which surround three bands of paler inlaid metal. each *c* 2mm wide. Total L 103; head D 8, max shank D 4. 6.2g. XRF shank Cu, Pb, Sn, trace Zn; XRF inlay, Cu, Pb, Ag, Sn. C15007. Illus 7.30

One possible pin fragment (SF518) was recovered from Tap o' Noth, resembling part of a projecting ring-headed pin of some sort but is too fragmentary to identify further. Recent synthesis of the type has shown plain projecting ring-headed pins were in use from between the 4th to 2nd centuries BC until the first few centuries AD, with more decorative forms developing around then (Hunter 2020a: 133–7). This possible example was found in a floor layer of T5 platform structure.

- SF518 Small corroded fragment of copper alloy resembling the beginning of a projecting ring-head and very top of shank. Closer identification is not possible. 12 x 7 x 4mm. XRF: Cu, Pb, Sn. C5101

Buckles

Three rectangular iron buckles (SF63, SF15014a and SF15014b) and a possible annular buckle (SF46) were discovered (Illus 7.33).



Illus 7.33
Illustration of iron buckles from the Craw Stane complex. Alan Braby

SF15014a and b are notably large, a feature which is often used to suggest a role in fastening straps on horse gear rather than personal use (Clark 2004: 55). They are slightly different in shape and size but were found together and are similar enough to be considered a pair. No traces of mineralised leather survive on the iron, suggesting they were not still attached to a leather strap, and both pins were broken. The buckles were recovered from the floor layer of exterior Structure 4 (C15112), and were radiocarbon dated to between the early 5th and mid-6th centuries AD. SF63 is a smaller rectangular buckle and SF46 comprises a flat, annular hoop with looped-around iron pin, both have broken pins. The smaller sizes of SF46 and SF63 makes them most likely to have been personal belt buckles, though other uses are possible.

Buckles are rare in early medieval Scotland compared to England with rectangular forms even rarer (Marzinik 2003: 25, type I.6b). At least one of the square iron buckles from Whithorn is from an early medieval phase (Hill 1997: illus 10.99: 44.4). Such buckles are known in the Roman period (Manning 1995: 146) and in the Late Roman period they were strongly associated with male military identity. The inspiration for these examples could have come from the Roman world as readily as the Anglo-Saxon one, but the rarity of buckles and related belt fittings in an early Insular context suggests the habit did not really catch on.

- SF46 Flat rectangular-sectioned iron ring with part of a sub-square-sectioned pin looped around before breaking.

Ring D 23; W 5, T 2.5; shank loop D 8, T 3. C025. Illus 7.33

- SF63 Intact rectangular buckle frame with looped-over, broken pin, both with sub-round section. L 41, W 33, T 5. Pin L 35. C026. Illus 7.33
- SF15014a Large square iron buckle frame with neat corners at the wider end, rounded at the other, creating a wide D-shape. The frame has a circular section. Rounded end preserved the loop of a square-sectioned pin, now lost. L 62, W 65, T 5.5; loop D 12.5, T 5. C15112. Illus 7.33
- SF15014b A slightly smaller, squarer version of (a). More survives of the pin (around half). L 57, W 57, T 6; loop D 13 x 8. C15112. Illus 7.33

Belt Hook?

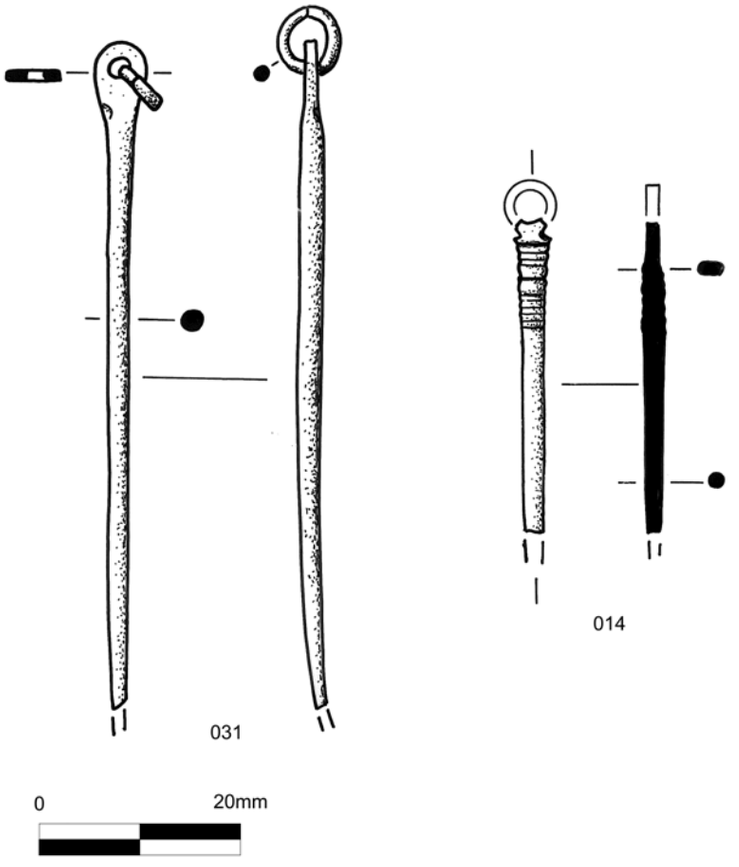
A small iron strip (SF162013) with neatly rounded and bent end is reminiscent of a type of simple belt hook recognised on Roman Iron Age sites in Scotland (Hunter 2021b: 180–1). These hooks had one end (missing here) clenched into a leather strap, while the other acted as a hooked fastener. The traces of mineralised organic material, probably leather, support this identification. It was recovered from an upper fill in the outer ditch (C162001).

- SF162013 Short iron strip with one rounded end bent at 90°, the other missing. Traces of pale-yellow mineralised organic material on both sides. L 22, W 10. C162001

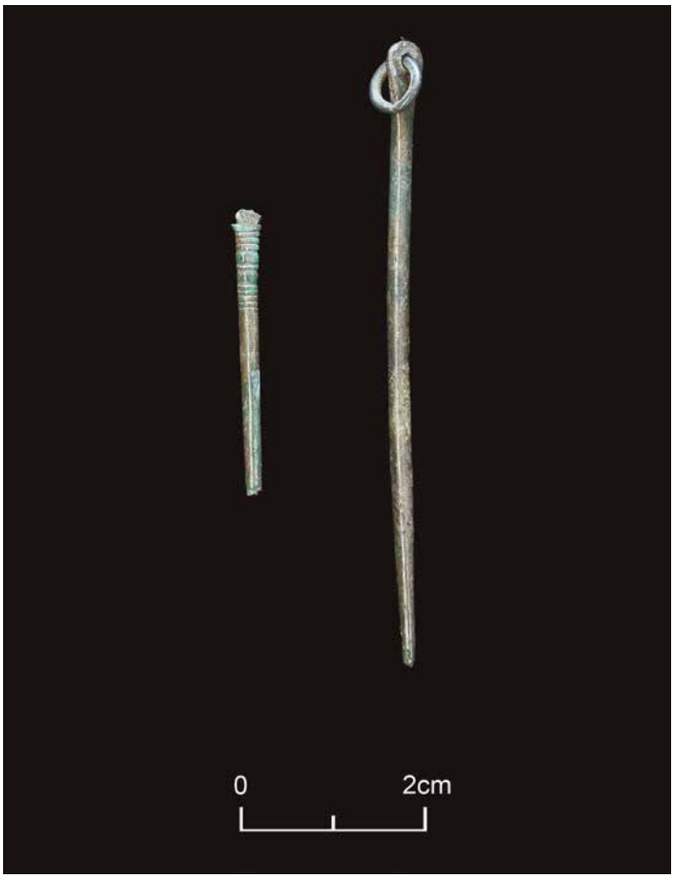
Toilet Instruments/pins

Two similar pins (SF14 and SF31; Illus 7.34 and 7.35) were recovered from a destruction layer (C025) within the upper fills of the outer ditch. SF31 is a simple, tapering, undecorated form with small loose ring through its perforated head, while what remains of SF14 bears decoration around the top of its shank. There are two main possibilities for their function and origins: toilet instruments or Anglo-Saxon dress pins.

A cautious approach is required when searching for parallels for an object as simple in form as SF31. Similar items have been found in association with other personal ornaments in early Anglo-Saxon graves and are thought to be dress pins dating to the late 5th/early 6th century AD (eg Ross 1991: 193 and fig 5.14 b: Type XV.ii). However, two very similar objects from Sculptor's Cave, Moray, were interpreted as probable nail picks based on their association with a range of other toilet instruments and lack of similar pins in the Roman Iron Age (Hunter 2020a: 144–5, illus 5.46: 749 and 751). Missing its loop, it could also be easily mistaken for a sewing needle. Without associated artefacts, this form is therefore a challenge to interpret.



Illus 7.34
Illustration of toilet instruments or pins. Alan Braby



Illus 7.35
Photograph of toilet instruments or pins (SF014 and SF031). Leanne Demay/ National Museums Scotland

SF14 was found in the same context (C025) and shares several similarities with SF31, namely its condition, size and perforated head, though SF14 is incomplete. It differs in bearing decorative grooves around the top of its shank and notches at the base of its head. This form also has parallels in Anglo-Saxon pins (eg Cook & Dacre 1985: 24; MacGregor & Bolick 1993: 218; Ross 1991: fig 5.8 b–d), though this is less certain with the top of its head missing. That SF14 and SF31 were found in the same context and have perforated heads may suggest they were part of a set. If Anglo-Saxon – and this interpretation remains tentative – this would be the first such set from Scotland, providing further evidence of the wide range of contacts the occupants of the Craw Stane complex had.

- SF14 Copper-alloy pin with grooved decoration around the top of the shaft, comprising two wider bands with a band of five narrower circumferential grooves below and four above. The top of the shank flattens before two notches demarking the head, now broken. Traces of patina on the broken edge suggest the head broke over the base of a perforation. The lower part of the shank is also missing. Length 31mm, thickness 1.5–2.5mm. 0.6g. XRF: Cu with Pb, Sn, Zn, trace Ag. C25, slot 6. Illus 7.34
- SF31 Copper-alloy pin with plain, circular-sectioned shank tapering to broken tip. The flattened head is pierced and holds a small loose ring. L 69, D 2; head W 5, ring D 7mm. 2.1g. XRF: Cu with Pb, Sn, Zn, trace Ag. C025, slot 6. Illus 7.34

Weaponry: pommel cap

ANDREAS RAU

The only certain evidence of weaponry here is a pommel cap, probably from a sword (SF161184; Illus 7.36 and 7.37). Originally thought to be silver (Noble & Evans 2022: 119 fig 3.20), XRF analysis confirmed it is copper alloy. A pommel cap's function was to secure the upper guard to the tang on the end of a sword or dagger handle.

The pommel cap belongs to a group of early medieval pyramidal sword pommel caps that W. Menghin (1983: 308–9 list 2.a.) summarised as the Chessell Down-Friedrichsthal type. These generally hollow pieces cast from copper alloy do not have external rivet eyes on the narrow sides (like Menghin's Brighthampton-Ciply type), but paired or single rivet holes, which are located on the narrow sides in the base of the pyramidal pommels.

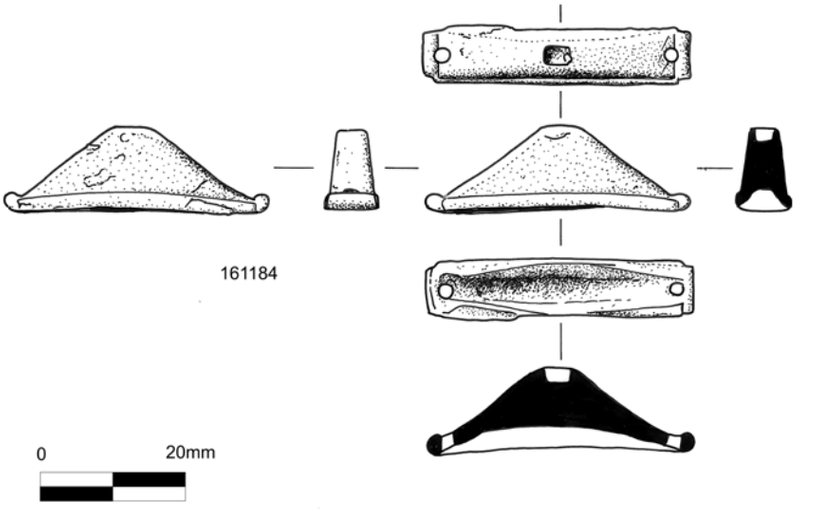
The lengths of the specimens listed by Menghin are between 35–57mm, mostly between 40–50mm. With a length of 36.5mm, the Rhynie pommel cap is at the lower end of this range. Still, there is nothing to suggest that it cannot be categorised as a sword pommel cap, especially as similarly small, riveted pommels (ie, riveted to the tang) are known from contexts of the late 5th and 6th centuries with lengths between 20–35mm (Menghin 1983: 76).

Menghin's dating to the 'first half of the 6th century' (Menghin 1983: 64) has not yet been altered (cf Miks 2007: 156). Such pommels are lacking in Scandinavia from the deposits of military equipment from Kragehul, Nydam IV and Porskær, which have yielded substantial material from the second half of the 5th century and also contain other forms of simple small pyramidal pommels (cf Nørgård Jørgensen 2008: 169–70). However, at Skedemosse on Öland, there are at least two pommel caps (lengths 43 and 45mm) from the first half of the 6th century, probably from a deposit contemporary with the Norwegian Snartemo group (Bemmann 1994). They are readily comparable with SF161184 and are joined by a smaller pommel (length 39mm) with a very similar shape riveted onto the tang (Hagberg 1967: 65; Pl 9 [upper row]). The eponymous depot find from Friedrichsthal also points to a date in the 6th century due to the combination of a silver sword pommel of the Brighthampton-Ciply type, three silver and three bronze scabbard chapes of the Snartemo-Fairford type and a golden cloisonné-decorated mouth plate (cf Eggers & Stary 2001: 144; Pl 378).

Dating corresponding pieces from early Anglo-Saxon Britain is difficult, particularly as in comparison with the simple pyramidal pommels with central perforation or pyramidal pieces with external rivet eyes no secure context is available for the Chessell Down-Friedrichsthal type (cf Høilund Nielsen 2013: 183).

How the small square recess of 3 x 3mm on the top of pommel cap SF161184 is to be interpreted remains uncertain. This could have been a socket for an inlay (eg red enamel), but this would be a unique element on the otherwise undecorated piece. Perhaps the mould was originally intended to produce a similarly shaped pommel with central perforation, which was supposed to be riveted on the tang, but it was decided in a later step (maybe after much mass was poured into the mould during casting?) to rivet the piece laterally onto the upper hilt plate instead. This, however, remains speculative.

It cannot be determined whether the holes at the edges were already created in the mould or were drilled afterwards. Furthermore, although the piece gives the impression of having been finished, there are no traces of use-wear such as signs of rivet heads at the rivet holes (Fraser Hunter pers comm). It therefore remains possible that this piece indicates the production of such pommel caps on site.



Illus 7.36
Illustration of pommel cap. Alan Braby

Illus 7.37
Photograph of pommel cap (SF161184). Leanne Demay/National Museums Scotland

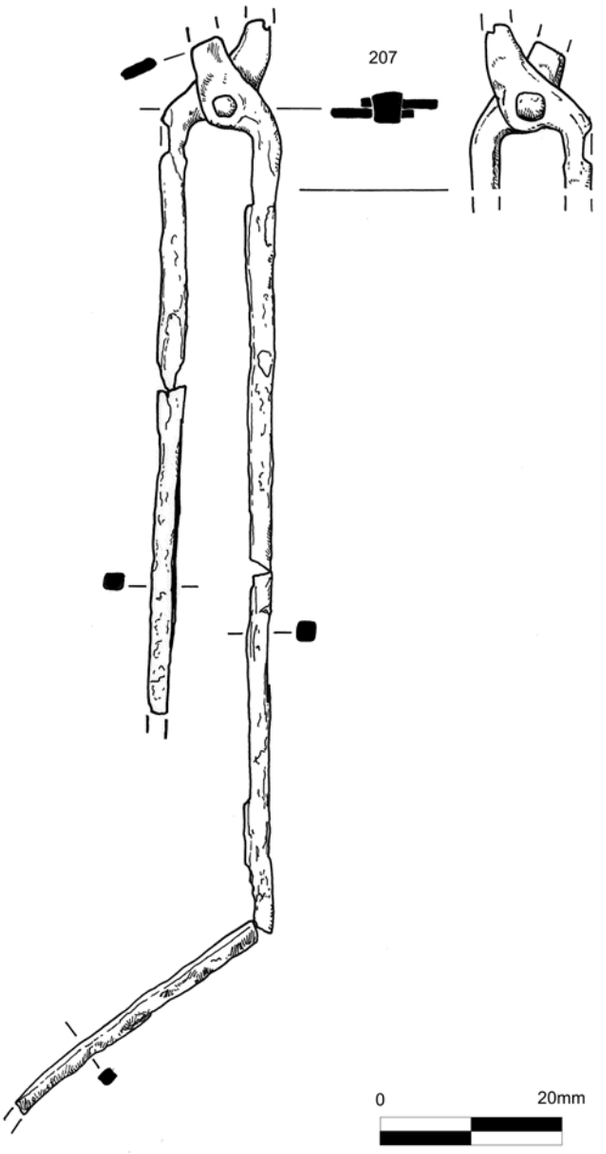
- SF161184 Copper-alloy pommel cap. Broadly triangular with flattened sides. The bottom edge has a decorative lip and rounded projections on the corners. A square socket in apex (3 x 3mm) may have held an inset. There are two small perforations – one on each bottom corner (D 2mm) and a concave longitudinal groove in the underside. Fine patina across surface. H 11.5, W 36.5, T 8; 9.5g. XRF: Cu with Pb, Sn, trace Zn, Ag. C161003. Illus 7.36

Tools

Tongs

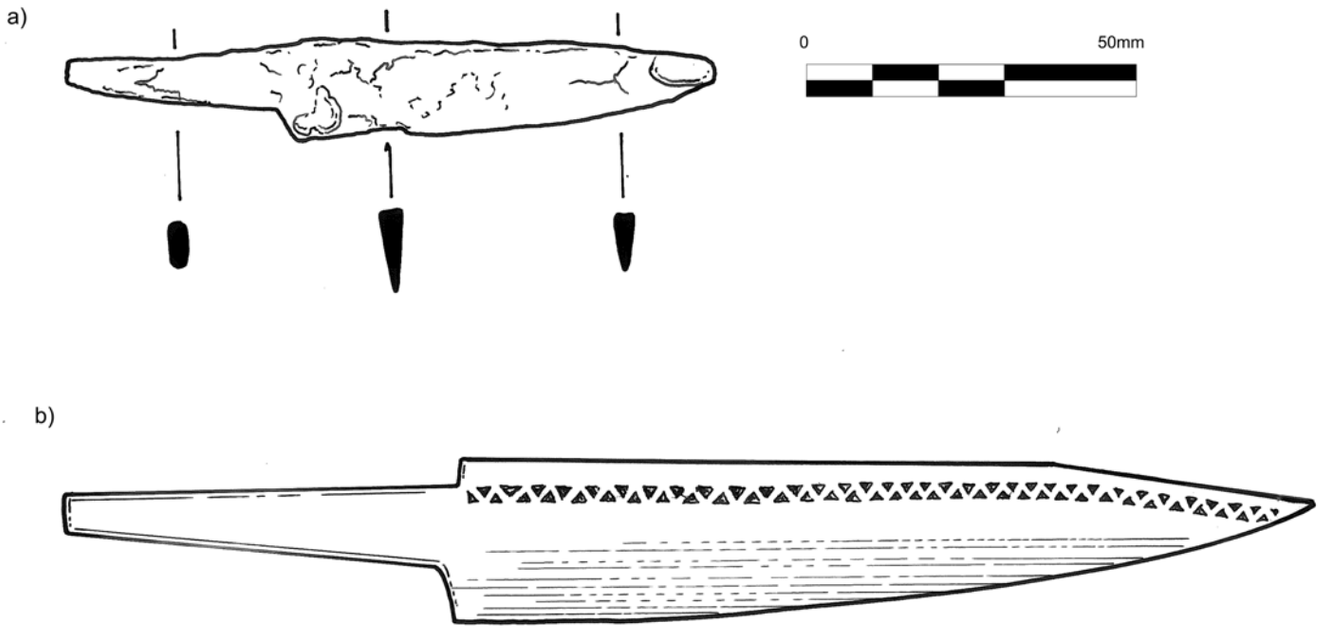
A fine set of tongs like SF207 (Illus 7.38) would have been an essential tool for a metalworker. The size of these suggests they were used for tasks such as moving crucibles in and out of the hearth and when pouring liquid metal into moulds. Longer, more robust sets would have been required during iron production. Several of the crucibles here retain marks from being gripped by such tongs (Section 7.4), though since the tips of the jaw are missing we cannot compare their size with the marks. Both pincers and part of one handle had been broken off and the other bent, both in antiquity and most likely deliberately. The tongs were then placed in a post hole (C237) along with a group of animal bone after the burnt post had been removed. This combination of deliberate damage and careful placement strongly suggests the tongs were part of a structured deposit. It is easy to envisage how a pair of tongs, symbolic of metalworking even today, were chosen for deposition in this manner on a site where metalworking played such a major role.

Despite their essential role tongs are not particularly common finds, though tong marks are noted in large crucible assemblages, such as at Dunadd (Lane & Campbell 2000: 205), providing a useful proxy for how common they once were. Their form is functional and changes little from their development to the present day (eg see Manning 1989: 6–8 and plates 2–4; and Goodall 2011: 7–8 and fig 2.4, for similar Roman and medieval forms). Of particular note are similar Roman tong sets within the Waltham Abbey hoard, all of which had been broken and bent prior to deposition as the Craw Stane set were (Manning 1989: 7).



Illus 7.38
Illustration of iron tongs. Alan Braby

- SF207 Mostly intact pair of fine iron tongs, missing part of one rectangular-sectioned handle, the other in two parts and bent. Head is fastened with a circular rivet and tips were broken off. Maximum L 200; handles W 4–6, T 3; rivet head D 5; perforation D 2mm. C237. Illus 7.38



Illus 7.39
Illustration of patter-welded knife (SF161506) with detail of pattern welding from X-radiograph (b). Alan Braby

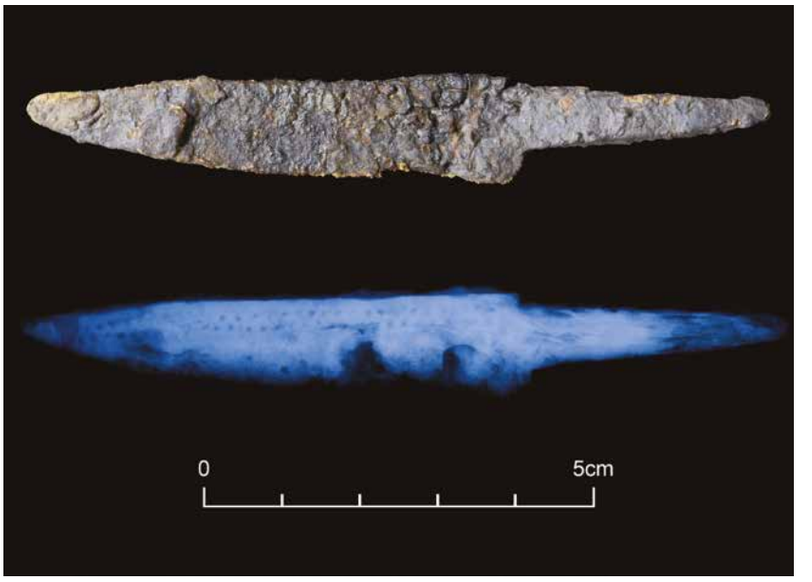
Knives

Three knives were recovered from the Craw Stane complex, including a remarkable example with pattern-welded blade (SF161506; Illus 7.39 and 7.40) retrieved from a fill in the outer ditch (C161054). The change in angle on the blade's back categorises it as an 'angle-backed' knife (Ottaway 1992: 561: Type A). Such knives are typical of the early medieval period, with distinct versions of the form known as '*seax*', after the old English word for 'knife'. While *seax* and larger *scramaseax* are icons of the Anglo-Saxon world, the general angle-backed form is more widespread and should be seen as broadly characteristic of the period rather than a culturally specific form.

The knife appears undecorated. It was only through X-radiography that a fine, decorative zig-zag pattern along the blade's back could be seen. Even after careful conservation, this is no longer visible on the blade itself. The zig-zag shows on the X-ray as a similar density to the blade, but lies within a band of lower-density iron. The decorative use of different iron alloys in blades like this is known as pattern welding, a highly skilled technique.

Pattern welding has not been identified in early medieval Scotland before, making this challenging to contextualise. Since the pattern is only visible on X-rays, it is possible other examples have been missed, especially from earlier excavations. Metallographic analysis of the knife could help determine whether it was likely to be made locally (by comparing the composition of slag inclusions in the iron with local iron slag), but such analysis is currently destructive and is not warranted with such a rare intact object.

Pattern welding is attested on blades elsewhere around this time. The technique appears in Europe around the middle of the first millennium BC, primarily in long swords, then peaks in complexity between AD 450 and AD 650 where it was also used on other forms of blades, such as knives and spearheads (Gilmour 2017). Pattern-welded blades demonstrated the pinnacle of the blacksmith's craft; a very high level of skill was required to produce the different alloys and successfully work them together.

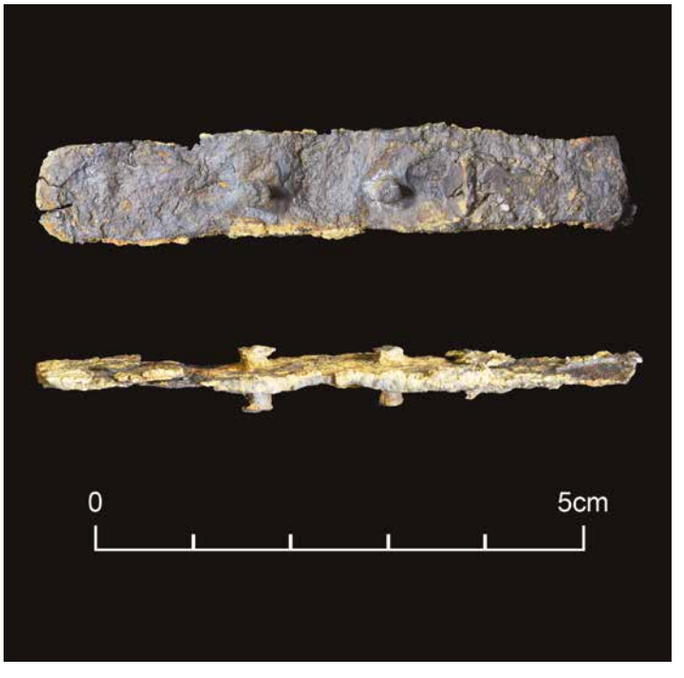


Illus 7.40
Photograph of knife (SF161506) and X-radiograph. Leanne Demay/National Museums Scotland

Opinions vary over whether pattern welding was employed to improve a blade's strength or solely for display purposes (eg Birch 2013: 128; Gilmour 2015), but a combination of both seems likely. The decoration would have been subtle, particularly on a small knife like this, and would not have been noticeable from a distance, suggesting its display was for people close to the owner. Pattern-welded blades are primarily known from Anglo-Saxon burials (eg Lang 2015; Parkhouse & Smith 1994) and large votive weaponry deposits such as that at Nydam, Demark, where over 100 swords, most of which were pattern welded, were found in a bog (Williams 2012: 63). Settlement finds are scarce, making the Craw Stane knife all the more remarkable. The broader context of pattern-welded blades, in burials and votive deposits, along with the degree of skill required to make such an item, suggest this was not just a tool but also a powerful, high-status object.

A fragmentary scale-tang knife (SF6) was also found in an upper fill of the outer ditch (C025). Protruding rivets and mineralised organic traces on the flat tang indicate there were organic plates fastened to either side to form the handle. Almost all the blade is missing, just enough survives to identify the classic V-sectioned blade section. Two other knife fragments were recovered, one from the Craw Stane complex (SF162055) and one from Tap o' Noth (SF1107). Both are too fragmentary to identify their original form.

- SF6 Iron blade-like strip with two iron rivets (burred on both ends and standing *c* 1mm proud of either side), broken at slightly narrower end, rounded at the other. Mineralised organic material adhering to one side suggests the rivets held organic plates on either side. The narrower end is more blade-like in section, suggesting this is a scale-tang handle of a small knife. Handle 42 x 10, T 3; total L 68; rivets D1.5, L 5 and 6mm; 4.1g. C025. Illus 7.41
- SF161506 Small, intact iron knife with rectangular-sectioned, tapering tang and slight angle-backed blade. Blade edge is mostly convex (slight concavity may be recent damage), therefore not extensively used. A few small patches of mineralised organics adhering to the blade indicate it may have been sheathed when deposited. A fine, pattern-welded band with zig-zag within can be seen on X-rays but no trace of this can be seen on the object. Total L 99; shank L 32, H 8.5–3.5, T 3; blade L 67, H 15, T 3.5; 10.8g. C161054. Illus 7.39
- SF162055 Very small, corroded iron fragment showing narrow 'V' section on broken edge. Possible knife blade fragment. H 15, L 14. C162056
- To'N SF1107 Part of an iron blade with triangular-section, narrowing into a rectangular-sectioned tang at one end before breaking. Tip also missing. Blade back is straight and edge is damaged. In two refitting pieces (old break). L 82; blade H 15, T max 3; tang 8 x 6. C11002



Illus 7.41
Photograph of scale-tang knife (SF6)

Fine tools

A range of fine hand-tools are likely to have been in use given the craft-rich nature of the assemblage, but few survive. Awls, punches, chisels and others would have been used to pierce, shape and decorate a range of materials. SF162062 was probably such a tool, though its missing tip prevents closer categorisation, whereas only a possible wedge tip of SF1713 survives. SF1706 is an unusual pronged strip. Some sort of tool seems likely. All three are notably fragmentary and were retrieved from the fill of the outer ditch (C1702, C1706 and C162047), where most of the craft debris was also recovered.

Two other possible fine hand-tools were found on Tap o' Noth (SF513 and SF520), both from T5 platform deposits. Both are fragmentary and missing their working ends, leaving their function unclear.

- SF1713 Neatly made wedge fragment of sheet iron. The narrow end is probably broken, suggesting it could be the end of a fine chaser or chisel. L 25; max W 14, T 3; 1.9g. C1702
- SF1706 Fine iron strip, tapering to a rounded tip at one end and to two sharp prongs at the other. Could be a needle broken over a perforation, but unusually flat section for a needle. More likely a fine pronged tool. L 46, max W 4.5, T 1; 0.9g. C1702
- SF162062 Small, square-sectioned iron bar, tapering to broken tip at one end, mineralised wood coating the other. L 49; handle L 21; T 6 x 5mm. C162047
- To'N SF513 Rectangular-sectioned iron bar, slightly shouldered at one end before narrowing to a broken rectangular-sectioned?tang. L 61, W 18–11, T 5. C5101
- To'N SF520 A portion of round-sectioned iron rod, with one blunt end original, the other (working end) broken. Probably a tool. L 53, D 7. C5111

Punch?

An iron spike (SF15003) from Trench 15 at Tap o' Noth is burred on one end from being struck, suggesting it was likely to be a tool. Its robust form suggests it could have been a blacksmith's tool, possibly a punch for piercing holes in hot iron during forging (eg Manning 1985: 9 and plate 5: A23–25).

- To'N SF15003 A robust iron spike, roughly circular in section (though the iron has now split and laminated extensively), tip missing but slightly rounded head seems original and is possibly burred. L 89, D 15–30. C15011

Handles

Four fragments are iron tangs from knives or other tools (SF1881, SF152010, SF162011 and SF162023) and would once have been covered by organic handles, as indicated by the mineralised wood traces on SF162023. SF162010 and SF162011 have the same dimensions and were from the same context, implying they are two fragments of the same tang. The breaks are old, and the tang was bent at the break where the blade once was, suggesting deliberate breakage prior to deposition within a pit or post hole in the outer ditch (C162008).

- SF1881 Rectangular-sectioned iron tang, tapering to a tip at one end, broken at wide end. L 28, W 6, T 4; 1.9g. C1703
- SF162010 Rectangular-sectioned iron tang fragment, broken at both ends, one of which bends before break. L 39, W 6 x 3mm. C162008
- SF162011 Rectangular-sectioned iron tang, pointed at one end, broken at the other (old break). L 25, W 6 x 3mm. C162008
- SF162023 Narrow, rectangular-sectioned iron tang coated in mineralised wood, both ends broken. Wood grain is perpendicular to shank. L 15, T 4 x 2mm. C162001

Mounts

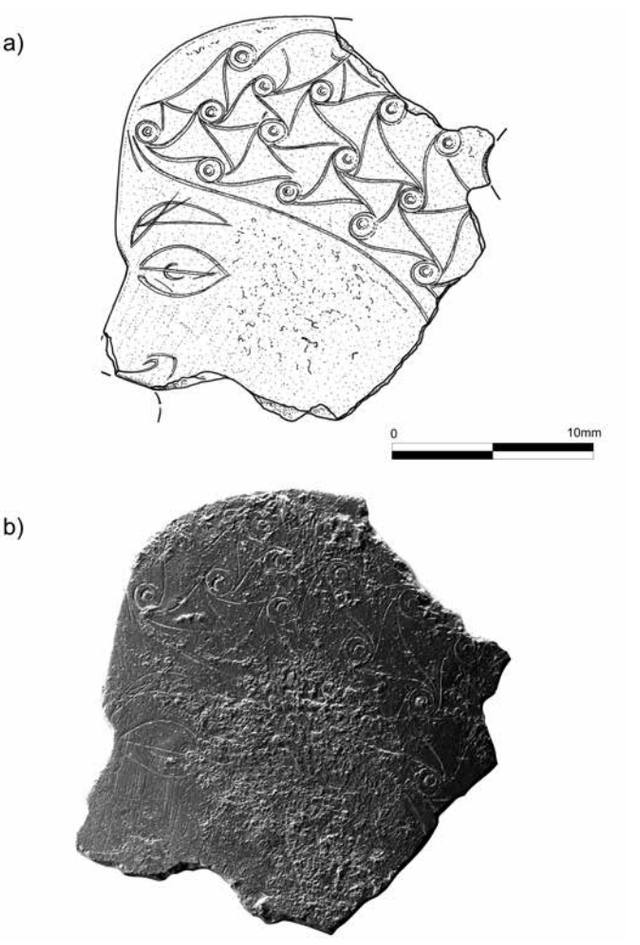
Six objects from the Craw Stane complex and one from Tap o' Noth share common characteristics of being formed from sheet metal and preserving traces of once having been attached to something else, suggesting they were mounts. Amongst these is perhaps the most striking find from the site; a small copper-alloy sheet fragment finely engraved with a face (SF15068; Illus 7.42).

The sheet fragment preserves the shape of a human face in profile, with the nose, brow ridge and front of head surviving. The jaw, neck, and back of head are missing, leaving it unclear whether it was originally a full figure. Surface corrosion obscures the central area but very fine engraved decoration is visible around the margins, clearly portraying a face with elaborate hair, a crescentic eyebrow, lentoid eye and the edge of a curved nostril. The other side is undecorated.

The decorative hair was created using two main techniques: punching and engraving. First, three rows of small circles were punched into the sheet metal, with two rows neatly following the engraved hairline and a third, less-even row added near the top of the head, presumably slightly squashed to fit the available space. These punch marks are noticeably deeper on the left of the circle in all cases, suggesting an asymmetric tool top or possibly the craftworker's handling technique. The small punch marks are surrounded by larger punched circles, with varying distances from the smaller marks suggesting they were created by a separate tool and not by a single punch with double-ringed tip.

The punched circles were then skilfully joined by engraved loose S-scrolls, creating the illusion of swirling triskeles. The pattern is more regular on the right side, at the back of the head, and slightly more crowded and uneven on the left. The eyebrow, eye and nostril are represented by a few simple but carefully placed curved engraved lines.

It was found amongst the metalworking debris in one of the middle fills (C15192) of the outer ditch, perhaps suggesting it was craft-related. Its broken state may suggest it was destined for repair or recycling. Another possibility is that it was a trial or motif piece used by a craftworker to test or demonstrate a new design or skill. However, a possible broken perforation on the damaged edge at the back of the head suggests the face was originally a mount affixed to another object, perhaps of wood, such as a box or shield. The decoration is so fine it is only visible from a very short distance and in favourable light. It is hard to imagine anyone noticing the engraved face from more than half a metre away, probably less, suggesting this was a personal object to be examined as closely as possible.

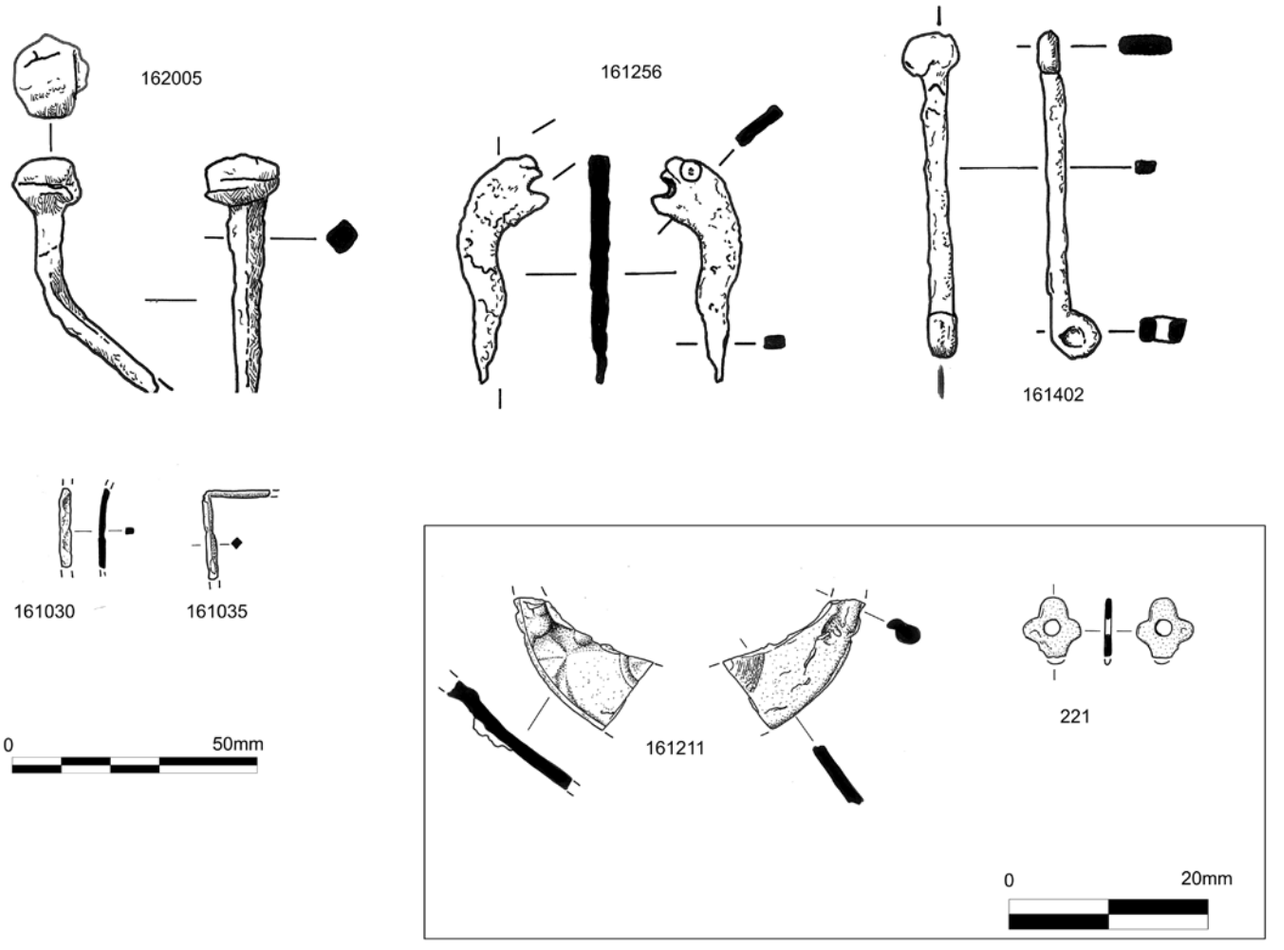


Illus 7.42
Illustration of a thin copper-alloy sheet engraved with a face (SF15068). Alan Braby

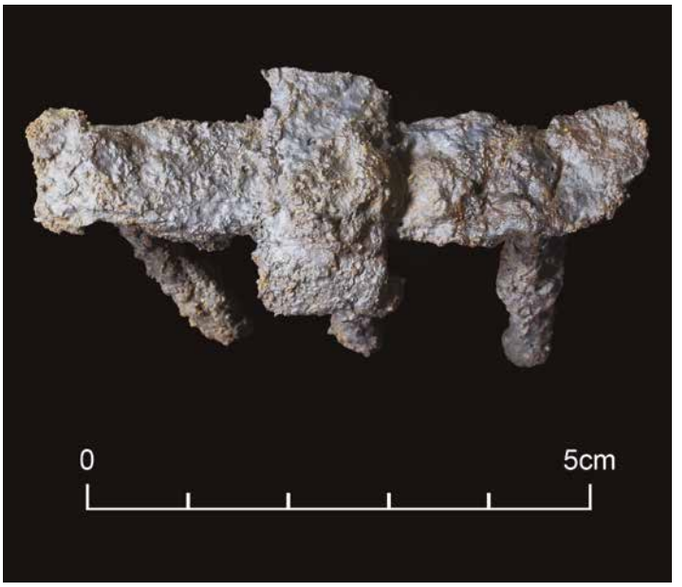
This tiny face is a remarkable survival, providing a rare glimpse of a Pictish face on a small portable object. No other figures or faces are known on metalwork in this period from Scotland, making it difficult to contextualise, though individual aspects have parallels. Carved figures on Pictish stones are perhaps the most obvious comparison, including the famous 'Rhynie Man' himself (Illus 12.3). Many such figures have defined hair lines, often helmet-like in form but lacking any decoration. With the back of this example's head missing, it is unknown if it shared the same helmet-like form over the back of the neck. The exact technique of punch marks joined by engraved scrolls is also hard to parallel, probably because such a technique is best suited to metalwork.

- SF15068 A sub-oval sheet metal fragment in the shape of a silhouette of a left-facing head. Back of head, jaw and neck missing. Engraved and punched decoration create the impression of triskeles over the hair, using circular punch marks joined by loose S-scrolls. A crescentic eyebrow, lentoid eye with lid and pupil, and curled nostril were all engraved with simple curved lines. Corrosion obscures the central area and the back is plain. H 21, W 20.5, T 1; 0.8g. XRF: Cu, Pb, Sn and trace Zn. C15192. Illus 7.42

Other mounts from the Craw Stane complex include small lobed copper-alloy washer (SF221; Illus 7.43) which resembles a flower and may have decorated something like a leather strap. Similar small strap-mounts are common in the late medieval period, but this particular example remains unparalleled in the early medieval period. The four other mounts are iron. SF161259 is a small fragment with uncertain form, but the mineralised leather adhering to its surface suggest it was probably a part of a mount attached to a leather object. The broken perforation on SF020 suggests it was part of a strip mount, possibly something like SF15014d, which comprises two crossed iron strips with three iron rivets in situ. The other is a pointed, sinuous terminal from an iron strip (SF161256; Illus 7.43), broken across a perforation. A small fragment of sheet copper alloy from Tap o' Noth (SF1701) has regularly spaced copper-alloy rivets along the surviving curved edge. These mounts could have been attached to a range of objects, such as wooden boxes or furniture.



Illus 7.43
Illustration of mounts, fittings and an unfinished brooch terminal. Alan Braby



Illus 7.44
Photograph of iron strip mount SF15014d

- SF020 Sub-rectangular iron sheet fragment with one straight edge, the other long edge broken over a possible perforation. L 32.5, W 11, T 1.5; 1.9g. C025
- SF221 Decorative copper-alloy washer/small mount, intact. Quadrilobate with three rounded lobes and one square or cut. 11 x 11mm, T 1mm, hole D 3mm. 0.5g. XRF: Cu with Pb, Sn, trace Zn. C218. Illus 7.43
- SF15014d Two rectangular strips, crossed in the middle. The longest strip is perforated by three circular-sectioned rivets, the middle of which secures the perpendicular strip. Two other strip fragments in the bag (30 x 11 x 1.5; 26.5 x 10 x 2mm) have one rounded end (one of which is perforated) and the other broken. They may well have been attached to one of the four broken ends on the crossed strips, but no longer refit. The rods are all missing their tips at the same distance from the strip – perhaps they did not have points. Main strip L 61.5, W 14, T 2; rods L 24–7, D 5.5; short strip L 25 x 11.5 x 2mm; 17.3g. C15112. Illus 7.44
- SF161256 Sinuous, tapering iron strip, pointed at one end and broken across a perforation at the wide end. L 47.5, W 11, T 4; perforation 3; 4.3g. C161003. Illus 7.43
- SF161259 Thin triangular sheet fragment coated in mineralised? leather. Broken at wide end. Too flat to be a knife tip. L 25, W 10, T 2. C161049.
- To'N SF1701 Small fragment of sheet copper alloy with one curved original edge, the others broken. The curved edge has traces of three regularly spaced rivets around 2mm in from the edge. 25.5 x 16.5 x 1mm. XRF: Cu, Pb, Sn. C17003

Fittings

The remains of a range of small fittings were identified. Only three of the four nails still have their head. Two from the Craw Stane complex (SF15057 and SF162005, Illus 7.43) are disc-shaped and one from Tap o 'Noth (SF1125) has a flat, square head – all are common forms. SF162005 has a curved shank, suggesting it had been removed from wood before deposition in the upper fill of the outer ditch (C162001). In contrast, the shank on SF15057 is clenched, indicating it was still through wood 12mm thick, probably a plank. Two other nails (SF209 and SF210) survive only as small shank fragments. A rectangular washer (SF206) is likely to have been on the end of a clench-bolt, a type of fitting used to secure two planks of wood on doors, boats and other plank-built constructions. A small iron tack (SF058) resembles a hobnail, but such small tacks could be used on a wide range of objects.

A right-angled bar with two points (SF1749) resembles a wall anchor or wall hook, though is not exactly like either. A similar sort of wall fitting seems likely though. The exact function of a half-cylinder object (SF161378) is also unclear, though a collar fitting seems likely, perhaps to protect the end of a wooden pole.

Three fragments are all forms of looped fitting. Two (SF1712 and SF15003) are bent double, creating a loop at the folded end, one of which (SF15003) retains a small copper-alloy ring. Both were likely to have been fittings for straps, with the fine ring on SF15003 adding a slightly decorative element. SF15014c breaks after starting to loop around, leaving its character less clear.

The use of iron for items like nails and bolts and other small fittings increases significantly throughout the first millennium AD, reflecting greater availability of iron for items other than tools and weapons (Cruickshanks 2017: 272). However, the relatively small numbers here imply the use of iron for fixtures and fittings was still fairly restricted between the 4th and 6th centuries AD.

- SF058 Small iron tack with disc head and short pointed shank. Head D 11; shank L 6; 2.3g. C025
- SF206 Discoidal washer, secured to rivet by domed head, other end broken. Head 20 x 25. L 25mm. C201
- SF209 Nail shank, square-sectioned. L 45, W 6. C218
- SF210 Bent nail shank, square tapering to rectangular section. 42 x 5 x 3mm. C218.
- SF1712 Looped fitting. Iron strip bent to form a neat teardrop-shaped loop at one end, the two sides then fusing together (with corrosion) before splaying out then breaking. L 47; loop W 18, T 8.5; strip T 4; 5.7g. C1702
- SF1749 Timber fitting. Rectangular-sectioned iron bar, tapering to points at both ends (one broken) and bent at 90° at the thickest part in the middle. L 41, W 6, T 3; 3.4g. C1703
- SF15003 Looped fitting. Rectangular iron strip, looped double with small copper-alloy ring in the looped end. The ring has a butt-join. The other end of the strip is broken just after an iron rivet, presumably to fasten it around a thin strap of sort. L 31, W 6, T 3; Ring D 19.5, T 1.5mm; 2.2g. C15112
- SF15014c Looped fitting. Rectangular-sectioned bar, tapering to a tip at one end, narrowing and curving before breaking at the other. L 97.5, W 5; 8.24g. C15112
- SF15057 Fragmentary iron nail with small disc head and clenched shank. Would have clenched wood 12mm thick. L 23.5; head D 11; 4.3g.
- SF161378 Part of a hollow iron cylinder formed from sheet metal, ?cut or split longitudinally. May have been a collar/cover fitting for the end of a wooden rod, for example. L 29.5, W 15, T 1; 3.2g. C161047

- SF162005 (and SF162009) Disc-headed iron nail, in two refitting fragments, with curved, square-sectioned shank, missing tip. Traces of mineralised organic material at top of shank. L 54, head D 16, shank T 6mm. C162001. Illus 7.43
- To'N SF1125 Square nail head and part of square-sectioned shank. Head W 9 x 9mm; shank T 8.5mm. C11009

Metalworking evidence

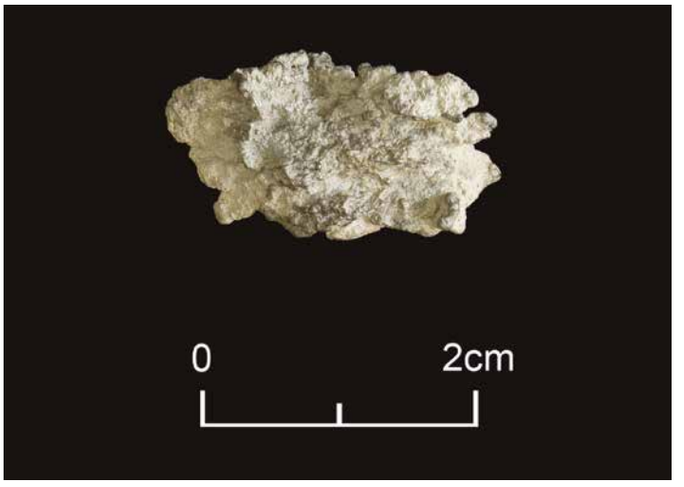
Part-worked bar

Two partly-shaped bars add to the evidence of copper-alloy working here (SF161030 and SF161035; Illus 7.43). The bars are likely to have been cast in moulds like the stone ingot moulds in this assemblage (Section 7.3) (though these bars are narrower than any of the moulds recovered). Surface indents are visible under magnification on SF161035, and there are traces left from a smith's hammer on the bevelled edges of SF161030. The bevelling on the long edges of SF161030 hints at an attempt to create a rounder section. The unfinished iron pin (SF15058) and key (SF161402) provide further evidence of metalworking.

- SF161030 Slender, rectangular-sectioned copper-alloy bar. Broken at one end, tapering at the other. Two long edges are bevelled, showing initial shaping. 32 x 4 x 3mm, 1.5g. XRF: Cu with Pb and Sn, and trace Zn and Ag. C161003. Illus 7.43
- SF161035 Tapering square-sectioned copper-alloy bar, bent at a right angle in the middle. Ends are damaged but length is probably near complete. Undulations in the surface indicate some initial hammering had taken place. Original L *c* 60; W 4.5–3; T 2–3mm. 2.8g. XRF: Cu with Pb and Sn, and trace Zn. C161003. Illus 7.43

Casting debris

Fourteen droplets and small nodular fragments of metal, weighing 29.9g, are spills from metal casting. All fragments analysed with XRF are copper alloy apart from SF1823 which is silver (Illus 7.45) (the unanalysed fragments are likely to be copper alloy based on appearance) (Table 7.15). The identification of silver-casting debris is of great significance. Silver-casting waste is rare in early medieval Scotland, though silver has been found on a small number of crucibles from sites around Scotland. This fragment adds to other evidence of silver working at the Craw Stane complex, including silver within at least one of the crucibles (Section 7.4). All the casting debris was recovered from the outer ditch.



Illus 7.45
Photograph of silver-casting waste (SF1823). Leanne Demay/National Museums Scotland

				XRF results				
Find	**Context**	**No**	**Weight (g)**	**Cu**	**Zn**	**Pb**	**Sn**	**Ag**
1823	1726	1	3.0	x	x	x	x	xxxx
1839	1703	1	1.3	xxx	x	x	xx	
161007	161003	1	3.5	xxx	xx	xx	xx	
161178	161003	6	3.7					
161215	161003	1	1.0	xxx	x	xx	xx	
161312	161048	1	1.1					
161446	161048	1	4.3	xxx	x	xx	xx	
162024	162047	1	1.9	xxx	x	x	xx	
162078	162054	1	1.1	xxx	x	x	xx	

Table 7.15
Summary of casting debris. XRF results: xxxx = high, xxx = medium, xx = low, x = minor. SF161178 and SF161312 were not analysed

Failed casting

A small fragment of penannular brooch terminal (SF161211) still displays flashes – ridges of metal around the edge of the object where metal seeped into the join between two mould valves. Flashes were smoothed off on finished objects, indicating this brooch terminal was unfinished, in all likelihood a failed casting. Traces of moulded decoration where the flat terminal narrows into the brooch hoop suggest this was a zoomorphic penannular brooch though the details are distorted, leaving identification to an exact type out of reach. No definite moulds for brooches of this form were identified, though eight moulds for casting barrel pins of a form found on such brooches are present (Section 7.2).

- SF161211 Failed casting of a flat, expanded penannular brooch terminal, both ends broken. Flashes are still present along both edges along with irregular ridges on one face where the metal seeped into cracks in the mould. The upper surface was decorated with opposing cast-in triangles (like a bow-tie) at the junction between the terminal and the hoop. There are distorted traces of further possible moulded decoration where the hoop joins. L 30, max W 17, T terminal 3, T hoop 5; estimated original D 70mm. 5.6g. XRF: Cu with Sn, Pb, trace Zn and Ag. C161003. Illus 7.43

Unfinished padlock key?

While SF161402 (Illus 7.43) resembles a large buckle pin, the flat oval plate on its terminal would make it impossible for the pin to pierce a leather strap. The form also bears similarities to early barrel padlock keys, though the plate would normally be

perforated and at a 90° angle to the shank (it is on the same alignment here). The unperforated terminal suggests it is unfinished. That the plate is still aligned with the shank implies it would have been bent to 90° after it was perforated. An unfinished key indicates the blacksmiths here understood locks: a complex technology, providing further evidence of the range of skills present amongst the metalworkers here.

Locks of this form are common in the Roman and early medieval periods, with examples known in both iron and copper alloy. A copper-alloy key and padlock bolt were recovered from Sculptor's Cave, Covesea in association with Roman Iron Age finds (Hunter 2020a: 138, illus 5.50: SF779) while early medieval examples are known from Dunadd and Whithorn (Lane & Campbell 2000: 165, illus 4.77: 1422; Hill 1997: 416, illus 10.95: 34.5, 34.10 and 34.14).

➢ SF161402 Rectangular-sectioned iron shank with one end curved around into a small loop, the other expanding out into a small flat oval plate terminal. L 66, W 4 x 3; loop D 8; plate 11 x 7 x 3.5. C161048. Illus 7.43

Offcut

One of the iron bar fragments has a cut end (SF161289), suggesting it is a blacksmith's offcut. While offcuts must have been common on sites where blacksmithing was taking place, such fragments are challenging to identify without careful X-radiography and cleaning. Offcuts could also have been recycled, leaving them less likely to be discarded.

➢ SF161289 Rectangular-sectioned bar fragment, rounded at one end and possibly cut straight at the other end. L 19, W 4, T 2mm. C161048

Fragments

Thirty-six iron fragments could only be identified as pieces of bars, rods or strips, with a further two unidentifiable (summarised in Table 7.16 with full catalogue in the archive). Seventeen fragments have square or rectangular sections classifying them as bars, most of which are missing both ends. Smaller bar fragments may have been part of nail shanks or tool tangs, particularly those with tapering ends. The rod fragments are thin enough (2–4mm in diameter) to have been part of pin shanks, but could also be from fine tools such as awls.

While many of these fragments may be broken fragments of finished artefacts, it is also likely there were fragments of stock iron in the form of bars and rods on a site with blacksmithing activity.

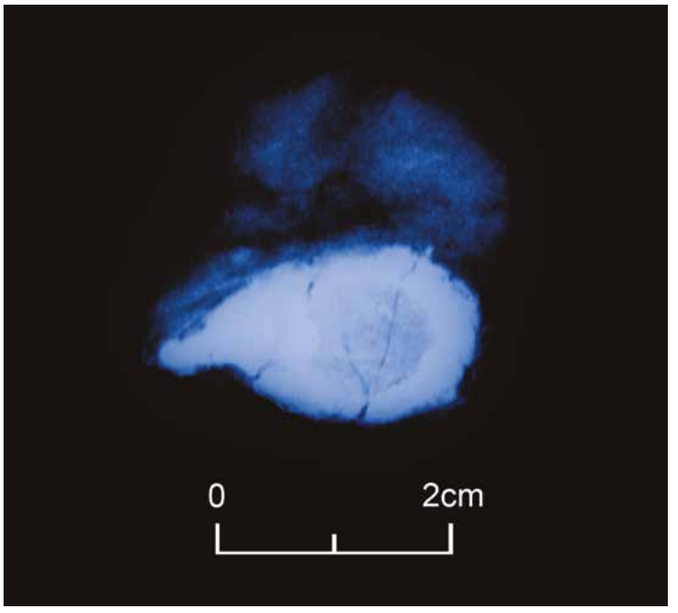
Other

A totally decayed object (SF24; Illus 7.46) remains a puzzle. It comprised a nut-shaped copper-alloy object with hollow centre, possibly containing organic material. It is difficult to find parallels, but Meaney (1981: 183, V.ll.6) illustrates a Frankish 'amulet-capsule' from the Rhineland of approximately this size and shape. A more decayed example from Flixborough had an amber inset and was interpreted as a necklace pendant (Evans & Loveluck 2009: fig 1.11, no 212).

Find	Context	Type	Section	Sides	L (mm)	Max T/ D
8	19	Strip	Flat	Parallel	28	2
9	25	Bar	Rectangular	Tapering	35	7
15	25	Bar	Rectangular	Tapering	72	6
16	25	Bar	Rectangular	Parallel	37	5
21	25	Strip	Flat	Parallel	20	16.5
22	25	Strip	Flat	Tapering	25	7
25	25	Sheet	Flat	Parallel	18	3
29	25	Rod	Round	Tapering	30	2
53	42	Bar	Square	Parallel	26	3
61	26	Strip	Rectangular	Parallel	20	10
61	26	Strip	Flat	Parallel	17.5	1
209	218	Bar	Square	Parallel	34	4
210	218	Bar	Rectangular	Tapering	43	5
1768	1703	Bar	Rectangular	Parallel	45	7
1807	1726	Rod/ bar	Irregular	Irregular	47	3.5
15004	15007	Strip	Flat	Parallel	33	1.5
15058.2	15007	Bar	Square	Tapering	42.5	3
161104	161003	Fragment	Irregular	Irregular	12.5	7
161219	161003	Rod	Round	Parallel	24	3
161260	161003	Bar	Rectangular	Parallel	24	6
161277	161049	Bar	Rectangular	Tapering	24.5	11
161298	161048	Rod	Round	Parallel	21	2
161377	161047	Rod	Round	Parallel	25	4
162007	162001	Bar	Rectangular	Parallel	25	5
162020	162001	Bar	Rectangular	Parallel	35	6
162027	162047	Bar	Square	Tapering	31	10
162039	162054	Bar	Rectangular	Parallel	16	7
162065	162054	Fragment	Irregular	Irregular	11	8
162076	162054	Bar	Rectangular	Parallel	23	14
162111	162054	Rod	Round	Parallel	26	3
162161	162054	Bar	Square	Tapering	25	3
162172	162054	Strip	Flat	Tapering	31	7.5
164009	164002	Fine rod/ wire	Round	Parallel	43	2
To'N 519	5101	Strip	Rectangular	?Tapering	50	3
To'N 1129	11005	Strip	Rectangular	Parallel	37	2.5
To'N 15001	15005	Bar	Rectangular	Parallel	59	7

Table 7.16
Summary of iron fragments. L length, T thickness, D diameter (mm)

➢ SF24 A corroded mass of copper-alloy and organic remains, no metal remaining. The metal object was a hollow, nut-shaped object measuring about 20 x 30 x 10mm. The X-rays show an extension at one end. It is not clear if the organic remains are related to the metal object or not. A small thread within the structure may be a root or a hair, and the interior is coated with a white substance. Originally 20 x 30 x 10mm. C25. Illus 7.46



Illus 7.46
Photograph of X-radiograph of possible amulet SF24

SF1766 is mostly obscured by mineralised textile remains, indicating it was wrapped in cloth of some sort when deposited (Illus 7.47). It was a sub-square iron plate with copper-alloy rim, broken in places but roughly its original size. No means of attachment to anything survives to indicate it was a mount and its function remains unknown. It was found amongst craft debris in the outer ditch (C1703), suggesting it could have been deposited as scrap, though the textile remains are unusual.

Illus 7.47
Photograph of mineralised textiles on metal plate (SF1766).

- SF1766 Part of a thin, sub-square iron plate with rounded corners and a fine, tubular copper-alloy rim mount around the edge, now missing in places. The faces on both sides are coated in mineralised organic material preserving a coarsely-woven textile (woven with Z-spun, single-ply yarn). The fine rim suggests this was a decorative item. Textiles on both sides suggest it was in a pouch? W 32 x 31; T 10.5 (including textiles, 1mm without); rim W 2mm; 4mm. C1703. Illus 7.47

7.9.4 Distribution and wider discussion

Like most of the assemblage, many of the metal artefacts (62/93) from the Craw Stane complex were recovered from fills of the outer ditch. Notable exceptions include 12 objects from palisade fills, including both nail-headed pins and the axe-headed pin, a small decorative mount, two nails and knife fragment, and the set of tongs which were pushed into a palisade post hole. The tongs and pins are likely to have been deliberately deposited.

It is more difficult to identify individual deliberate deposits within the complex outer ditch fills but the two possible Anglo-Saxon pins from C025 may be an example. The potential amulet and small round iron buckle were from the same deposit.

All the metal objects related to metalworking were retrieved from the outer ditch, where so much other craft debris was deposited. So too were all the iron bar and rod fragments, suggesting many of those could be scrap or stock. A small concentration of casting debris plus both part-worked copper-alloy bars came from C161003, which produced the most metal items (16) in general.

The metalwork assemblage includes several remarkable objects, notably the sheet metal face, axe pin and pattern-welded knife. Several items find easier parallels amongst Anglo-Saxon assemblages: two possible pins, a pommel cap, the pattern-welded knife and possibly the rectangular buckles. While it is tempting to use this as evidence of direct contact between the Craw Stane complex and Anglo-Saxon communities, we know so little about Pictish assemblages of this period that local metalworking traditions are currently poorly known. These objects are perhaps best seen as influenced by Anglo-Saxon material culture. However, the imported finds on the site clearly do show a wide range of contacts and direct links are not unlikely.

Other metal finds are easier to contextualise; the nail-headed pins and penannular brooch terminal are types known from other sites in Scotland, including production evidence here and on other sites. The large proportion of small iron fittings is indicative of iron being more available by this period, and no longer restricted to items like tools and weapons.

7.10 Worked Stone Artefacts

GEMMA CRUICKSHANKS, LEANNE DEMAY AND FRASER HUNTER, WITH GEOLOGICAL IDENTIFICATION BY FIONA MCGIBBON

7.10.1 Summary

Excavations at the Craw Stane complex produced an assemblage of 66 worked stone artefacts with a further ten from Tap o' Noth and one from Cairn More (Table 7.17). Metalworking tools and equipment dominate the Craw Stane complex assemblage, particularly a

Group	Type	CS	To'N	CM	Total
Metalworking	Mould	12			12
	Cupel	23			23
	Sharpener	2			2
	Whetstone	1			1
Craft tools	Spindle whorl	2			2
	Pumice	2			2
	Hide-rubber	2			2
	Working surface	1			1
Jewellery	Amber beads	2			2
	Shale ring			1	1
Cobble tools	Pounder	1			1
	Hide-rubber	1	1		2
	Hide-rubber/ grinder		1		1
Rotary quern		5			5
Polished stone discs		1	2		3
Gaming	Counters	6			6
	Ball		1		1
	Unworked pebbles		5		5
Other		5			5
TOTAL		66	10	1	77

Table 7.17
Summary of worked stone from the Craw Stane complex (CS), Tap o' Noth (To'N) and Cairn More (CM)

group of stone moulds for casting metal ingots (Section 7.3) and an unusual form of stone metalworking vessel, probably used for refining precious metals (Section 7.5). A small number of other craft tools, including a spindle whorl, pumice fragments and possible hide-rubbers, attest to a range of organic crafts. Three polished stone discs may have been used as palettes for preparing medicines or cosmetics. Typical domestic tools are in the minority, with the notable exception of an intact rotary quern with unusual handle and a small number of cobble tools. Gaming is well represented, with a small group of shaped counters, a ball and a small group of pebbles from the Craw Stane complex and Tap o' Noth providing evidence of this pastime.

There are separate reports on the stone moulds (Section 7.3), stone metalworking vessels (Section 7.5) and amber beads (Section 7.12) from the Craw Stane complex and the shale bangle from Cairn More (Section 7.11).

7.10.2 Stone resources at the Craw Stane complex

FIONA MCGIBBON

The village of Rhynie is located in an area of sedimentary rocks of the Devonian period. The village itself is on the Dryden Flags Formation with the Quarry Hill Sandstone Formation just to the south and fringing deposits attributed to the Tillybrachty Sandstone Formation to the north and south. These formations are subdivisions of the Devonian age deposits that are all fluvial in character and range from conglomerates to mudstones but are dominated by sandstones and siltstones. These relatively young sedimentary rocks are deposited on top of much older metamorphic rocks of the Dalradian which are lithologically diverse and also form extensive exposures across the region. There are also large intrusions of igneous rock in the area, such as granite, diorite and norite (a close relative of gabbro). Glaciation will have left thick deposits of loose material that has been abraded by transport, and that material will have been reworked by glacial outwash systems as well as the modern rivers that fringe the village. Cobbles and pebbles of erosion-resistant rock types would be readily available. Sandstone, being less likely to survive ice transport, is unlikely to be common in the glacial deposits and this lithology was more likely harvested from outcrops where it could be easily prised off and would break along natural bedding planes to provide fairly uniform slabs from which items could be fashioned.

The most common lithology in the Craw Stane complex assemblage is red sandstone, most often arkosic, which was used to manufacture the metalworking vessels. The lithological variation within this category is consistent with what would be found in an outcrop of such material where the original deposition process resulted in layers of slightly different grainsize and composition. Most of the vessels are remarkably consistent in the material chosen: fine-grained arkosic sandstone with minimal layering and good cementation, producing robust blocks. The items are blocky but have parallel planar top and bottom surfaces, representing bedding surfaces and suggesting harvest of the material from outcrop. Few used vessels show signs of breakage due to thermal shock, highlighting how suitable this stone type is. The vessels are often broken, with breakage surfaces cutting through the glassy surface deposits, but these breaks do not appear to be heat related as there is very little discoloration or heat-cracking present.

Many ingot moulds (eg SF1857, SF1867 and SF161363; Illus 7.21) seem to have been intentionally made from finer-grained, more clay-rich siltstones characterised by mica-rich bedding surfaces. Siltstone horizons are very likely in the same outcrops of Devonian sandstone. The finer grain size and higher clay content makes the material easier to carve, more likely to survive the casting process, and would allow the item cast to be more cleanly removed, free of rock debris.

Brief examination of the clay moulds from the Craw Stane complex shows them also to be reddish and muscovite-bearing, suggesting that the clay used is local and likely to be collected from deposits associated with the weathering of the red sandstones and siltstones described above. Such deposits are likely to be available in river beds as well as in pockets of glacial clay in the area.

A number of items are of staurolite schist – a metamorphic rock type of distinctive character. Similarity in appearance and mineralogy suggests a source of this lithology nearby or harvesting of pieces from a larger item, such as a large quern stone for which such a lithology would be ideal. It is not possible to provenance that lithology specifically, but it would be typical of the Dalradian rocks of the area and could occur also in the drift although it is unlikely to survive long transit in the surface environment due to its friability. The other objects in the assemblage represent drift-sourced pebbles, often of Dalradian lithologies, which would be abundant in the area due to glaciation. The only material bias seems to be to choose schists to make discs as this

lithology has a strong planar fabric. It is also suitable as it is mica-rich, a mineral with good refractory properties making it able to withstand heat. A few objects which are water-worn pebbles and cobbles are of typical erosion-resistant lithologies such as quartzite and rhyolite, which would be abundant in the local environment.

The only items from the Craw Stane assemblage that are definitely not made from local stone are the blocks of basaltic pumice and fragments of slate. Basaltic pumice is a rare find on west coast beaches, rafted naturally from Iceland after explosive eruptions cast it in the direction of Scotland. These are not found inland or on the east coast, suggesting this material has been imported to the site and its utility was well understood. Slate is not found this far north in the Highlands and the closest sources of such true slate are near the Highland Boundary Fault which runs NE/SW from Stonehaven to Bute.

The Tap o' Noth assemblage also included a few items made from stone not local to the hill. A jasper pebble, a flint pebble and grey schist disc (see gaming counters below) were all brought from elsewhere. In situ bedrock sources of jasper are found in the Highland Border Complex which lies along the Highland Boundary Fault from Stonehaven to Bute, and pebbles are known from the coast, for example on Stonehaven beach (though this will not be the only source). Similar schists to the disc are known from near Portsoy, while flint pebbles may have been found on the coast or in buried cobble beach deposits, such as at the Den of Boddam.

7.10.3 The Assemblages

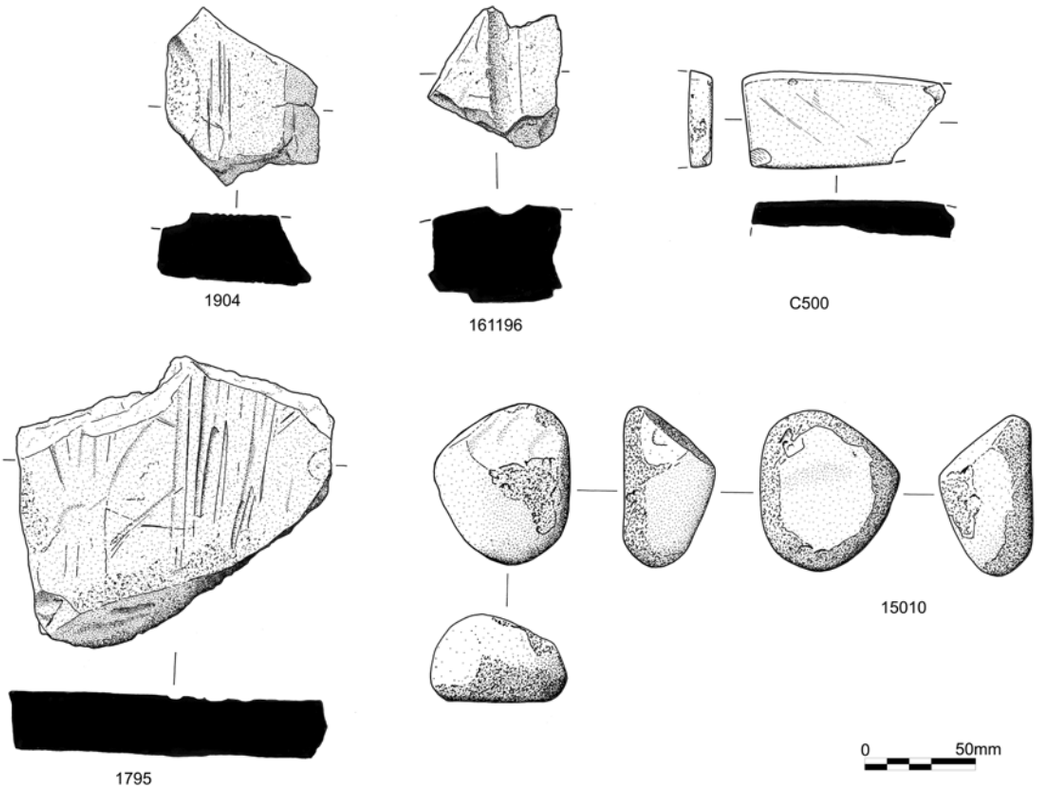
Measurements in catalogue entries are in mm. Abbreviations: L length, W width, T thickness, H height, D diameter, C context. Geological identifications by Fiona McGibbon.

Craft Tools

Sharpeners/smoothers

Two objects are categorised as sharpeners or smoothers (SF1795 and SF161196; Illus 7.48). They both present one or more shallow smoothed grooves across one face, varying in width between 6.5mm and 15mm. These would have been used to smooth the rough edges off freshly cast or forged metal items. The flat base on the grooves, rather than a rounded or V-shaped section, suggests use to finish bar-like objects. Mould SF1904 also saw additional use as a sharpener, displaying a group of parallel scratches across the centre of one face, implying it may have been used to sharpen points (eg on pins).

- SF1795 An irregular siltstone slab fragment with three shallow, smoothed grooves across one face, varying between 6.5mm and 11mm in width, with a flat base. 152 x 107 x 27. C1713. Illus 7.48
- SF161196 Fine-grained sandstone slab fragment with a wide, shallow groove across one surface. Too shallow for a mould (though could be part-made), suggesting it was a sharpener/smoother. L 60, W 57, T 44; groove L 53, W 15, depth 3. C161003. Illus 7.48



Illus 7.48
Illustration of stone tools from the Craw Stane complex. Alan Braby

Whetstone

A single whetstone (C500; Illus 7.48) had been finely shaped into a bar from fine-grained siltstone. Such fine-grained stone was best suited for the maintenance of finished blades; to resharpen them when blunt through use. The fine shaping of this tool suggests it was a valued item which was probably carried around to sharpen a small personal knife. One of the stone moulds (SF161320; Illus 7.21) had also been used as a whetstone, with its large, smoothed facet (*c* 130 x 95mm) implying use to sharpen larger blades, such as axes or sickles. In contrast to the bar whetstone (C500), this larger example is more likely to have been based in a workshop rather than carried around as a personal object.

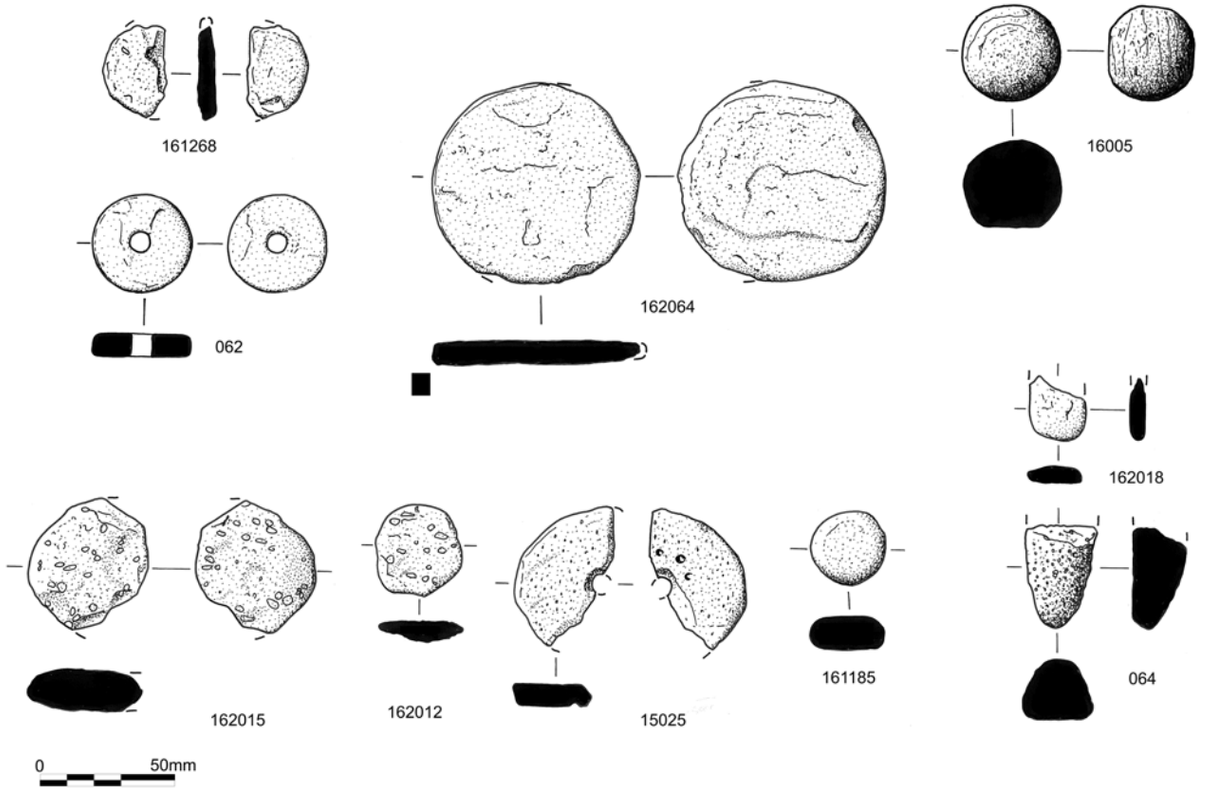
- C500 Whetstone. Neatly shaped, fine-grained siltstone bar, missing one face and one end. Surviving edges and face are finely smoothed and convex, with only very slight dishing on the face. L 91, W 43, T 19. C500. Illus 7.48

Other Craft Tools

A small group of tools represent other craft activities. The only certain evidence of textile manufacturing is a spindle whorl (SF62; Illus 7.49 and 7.50) and a possible whorl (SF15025), used for twisting animal or plant fibres into yarn. Whorls are usually categorised by weight and perforation diameter (Walton-Rogers 2007; Forster 2015: 370–1). Iron Age and Roman Iron Age examples tend to have a perforation diameter of 4–8mm, whereas early medieval whorl perforations span 6–9mm (Walton-Rogers 2007: 23–4). This example fits in both categories with a perforation of 7mm. A study of whorls from early ecclesiastical sites in Dumfries and Galloway found diameters to vary between 38mm and 52mm, and weigh between 26g and 50g (Williams 1966: 149–51). At 36mm in diameter and 21g in weight, SF62 is a small, light example, suggesting the production of yarn at the finer end of the spectrum.

Perforated disc fragment SF15025 (Illus 7.49) is made from an attractive shimmering stone type (phyllite) and ornamented with dots, making it the only decorated stone object here. Its original diameter and weight would have been around 60mm and 40g respectively, placing it at the large end of the spectrum for a spindle whorl. Such a function is possible though it is not a typical form. Other possible functions include a pendant, though it seems too large, or a weight, for which is unnecessarily decorative and not particularly heavy.

Two pieces of basaltic pumice (SF64 and SF507) are present, and although only one is possibly worked (SF64; Illus 7.49), both must have been brought to site after collection on the coast. Pumice could have been used in a range of crafts to scrape, abrade and smooth materials such as leather, wood and bone, in the same manner as coarse sandpaper. The exact function of a small stone bar fragment (SF161410) with red staining on one side is unclear, but likely to be craft-related. One possibility is as a form of hide-rubber, used to rub preservatives into the hide during processing. SF30 may have had a similar role but lacks the red staining. Two cobble tools from Tap o' Noth (SF1204 and SF1601)



Illus 7.49
Illustration of craft tools and gaming pieces. Alan Braby

had also been used as hide-rubbers (catalogues under cobble tools). Evidence from elsewhere in Scotland shows hide-processing was a widespread, everyday task taking place on most Iron Age/Roman Iron Age sites (Hunter 2015, 228).

Part of a sandstone slab (SF164019) with scattered scratches on one surface was probably a worksurface and could have been used during a variety of tasks, not necessarily restricted to crafts. After use as a worksurface it was reused as post-hole packing (C164038).

- SF30 Rubber? Flat, triangular :ragment of phyllite, broken at wider end, with traces of polish on edges. L 36, W 21, T 8. C28
- SF62 Spindle whorl. Neatly shaped psammitic schist disc with central, cylindrical perforation and finely smoothed outer edge. Faces were probably smoothed too, now spalled in places. D 36, T 9; perf D 7; 21g. C75. Illus 7.49
- SF64 Pumice: part of an elongated ovoid pebble with one end missing. Surface rounded but could be water-worn. One flatter face may indicate use to abrade a flat object. 35 x 25 x 22. C26. Illus 7.49
- SF507 Pumice: fractured fragment of basaltic pumice. 3.3g. C501
- SF15025 Possible whorl? Around half of a decorated disc, broken through central perforation. Stone (phyllite) has attractive speckled appearance is likely to have been chosen for its decorative qualities. Three drilled dots are present around the perforation on one side. The edge is fairly roughly shaped, which seems odd for a decorative object, suggesting it may not have been finished. Original diameter may have been around 60mm. L 54, W 29, T 8.5; perf D 7; 19.3g. C15022. Illus 7.49

Illus 7.50
Photograph of spindle whorl (SF062) from the Craw Stane complex. Leanne Demay/National Museums Scotland

- SF161410 Rubber, stained. Small rectangular quartzite bar with rounded corners. Not obviously shaped, but red staining on one face suggests it was utilised 32 x 24 x 12. C161048
- SF164019 Working surface. Fragment of fine-grained arkosic sandstone slab with uneven base, broken edges and faint scratches in various directions on the flat upper surface, suggesting light use as a worksurface. 132 x 102 x 62. C164038

Cobble tools

Only four cobble tools were recovered: pounder SF15010 (Illus 7.48) and possible rubber SF162014 from the Craw Stane complex and a combination grinder/rubber (SF1204) and hide-rubber (SF1601). The lack of cobble tools is partly a reflection of the site's date and specialist craft function. Cobble tools are ubiquitous on prehistoric sites. However, their presence generally decreases with the increase in the availability of metal tools throughout the first millennium AD.

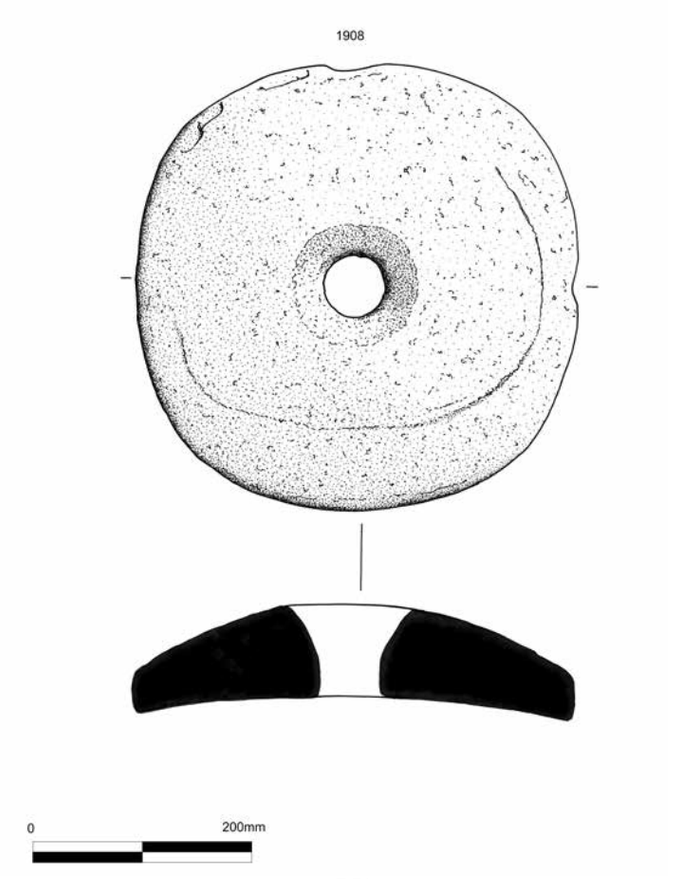
- SF15010 Irregular sub-round quartzite cobble with pitted areas around edges, suggesting use as a pounder. L 72, W 62, T 44. C15006. Illus 7.48
- SF162014 Fragment of rhyolite water-worn cobble with one smooth, flat face from possible use as a rubber. 63 x 59 x 60. C162039
- To'N 1204 Hide-rubber/grinder. Flat ovoid cobble with small light grinding facets at each rounded end and very light circumferential grinding along one edge. Lightly polished all over with a sub-circular patch of dark staining and polishing on one face and lighter staining concentrated along one edge on the other face. The primary function was a hide-rubber/smoother, later used for light grinding. L 106mm; W 70mm; T 31mm; Wgt 335.3g. Tr 12, C12003
- To'N 1601 Flattened ovoid cobble, slightly plano-convex in section. Smoothed with a slight sheen all over; one edge is slightly more abraded/polished. A distinctive patchy reddish stain is present across the flatter surface and around the edges. L 74; W 72; T 30. C16004

Rotary querns

One intact rotary quern (SF1908) and four probable fragments (SF1730, SF1879, SF1906 and SF162170) were retrieved, all from different fills of the outer ditch at the Craw Stane complex. The intact upper stone SF1908 (Illus 7.51) is an unusual quern. Its finely shaped convex upper surface with wide biconical hopper indicate it is an upper stone, but no traces of a handle socket survive, either as a horizontal socket or slot in the edge or vertical socket in the upper surface. Polished circumferential wear on its grinding surface confirms it was used and is not an unfinished example. The only damage to the stone are two adjacent flake scars on the edge, leaving the possibility that the quern once had a protruding handle which broke off. Part of a rotary quern upper stone from a 7th-century AD context at Dunadd preserved a small projecting knob as the only evidence of a handle, which may have had a rope or string attached in order to operate it (Lane & Campbell 2000: 185–6: illus 4.96). This is an unusual form but provides a plausible example of how SF1908 could have been turned. Alternatively, a strap with handle could have been fastened around the edge.

The four possible quern pieces (SF1730, SF1879, SF1906 and SF162170) are all poorly preserved, fractured fragments but hints of curved edges, shaped upper surfaces and traces of wear suggest they were once rotary quern fragments. No features such as handle sockets survive and it was not possible to estimate their original size. They are all made from locally available Dalradian schists, which were commonly utilised to manufacture querns.

This small group of querns comprise some of the few artefacts in this assemblage which relate to typical domestic activity (grinding grain to make flour for food) rather than craft production. This makes it all the more intriguing that SF1908 did not have a typical quern handle and although a handle had potentially broken off, it would have been a relatively simple task to add a handle socket in the upper surface to continue using the quern. The deposition of SF1908 in the lower fill of the outer ditch (C1731) therefore reflects a deliberate choice to no longer use it. The symbolic significance of querns and their deposition has seen regular discussion in a prehistoric context (eg Brück 2001: 152–3; Heslop 2008: 73–80; Peacock 2013: 162–73), but this has not tended to extend to the early medieval period and later, despite similar patterns of deposition existing. The deposition of this intriguing quern seems likely to have been symbolically charged.



Illus 7.51
Illustration of intact rotary quern (SF1908) from the Craw Stane complex. Alan Braby

- SF1730 Fragment of biotite schist slab with convex upper, irregular, flat lower face and part of one slightly curved edge (other edges broken). Shape of the upper surface and type of stone suggests this was probably part of a rotary quern, but no features such as handle socket, central perforation or grinding surface survive. L 102, W 104, T 51. C1703
- SF1879 Sub-square slab of amphibole biotite schist with slightly convex upper surface curving down surviving edge. Flat lower surface has hints of smoothing from use as a rotary quern but much of the original grinding surface has eroded. No handle socket or central perforation surviving. Too fragmentary to determine original diameter or type, but thickness would suggest disc-type. L 18.5, W 107, T 50.05. C1704
- SF1906 Fragment of staurolite schist with one flat face, other face possibly shaped convex (now eroded) and all edges broken. Stone type and shape suggests this is likely to have been part of a discoidal rotary quern. L 109, W 72, T 44. C1703
- SF1908 Intact rotary quern upper stone of coarse-grained arkosic gritstone with central biconical hopper/ feeder pipe (wider at hopper). The neatly shaped vertical edge then rises to the centre, creating a shallow bun-shaped profile. Concave grinding surface displays concentric wear. The lack of any handle socket or slot is very unusual and it is uncertain how this quern would have been turned. A few flake scars on the edge. D 420, H 105, hopper max D 105, feed pipe D 55. C1731. Illus 7.51
- SF162170 Flat fragment of phyllite with part of rounded edge surviving. No traces of working on either face and seems too thin to have been a rotary quern (though stone type is typical for a quern). Could be a spall from a quern or a disc of some sort. L 110, W 90, D 21. C162054

Polished stone discs

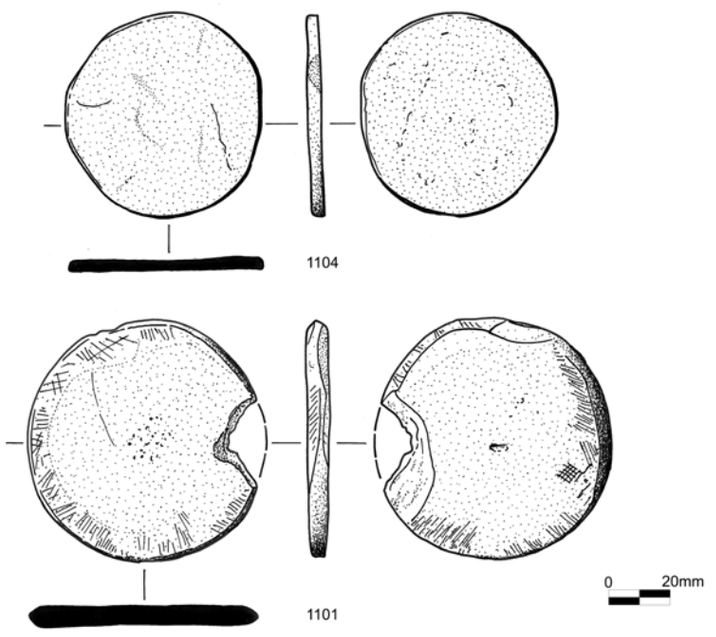
Two polished stone discs (SF1101 and SF1104; Illus 7.52) of slate were recovered from the upper floor deposit (C11002) of a hut platform located in T11 on the north-west shoulder of Tap o' Noth. A similarly sized psammitic schist disc (SF162064; Illus 7.49 and 7.53) was found at the Craw Stane complex in a lower fill of the outer ditch (C162059). SF1104 was abandoned unfinished, probably as it became too thin to use, but the careful shaping and smoothed surfaces of SF1101 link it to a type found across Scotland, though hitherto sparse in Aberdeenshire (Graham-Campbell & Hunter 2021: 233–7). The surfaces of the Craw Stane complex disc have eroded, but just enough of the finely shaped edge survives to place it in this category too. Few are well dated, but patterns of contextual association point to a broadly Roman Iron Age floruit (Graham-Campbell & Hunter 2021: 234).

The function of such discs has been extensively debated (summarised in Goldberg & Hunter 2019: 115–17; Graham-Campbell & Hunter 2021: 234–7), the most plausible interpretations involving use as a palette for processing special substances. SF1101 shows use-traces consistent with this; both faces have been smoothed and show central pecked areas, with one having plausible fine cut marks as well.

- To'N1101 Thin sub-circular polished disc of slate. Faces polished very smooth but with some residual abrasion traces from shaping as it tapers slightly towards the edge. The edge

itself is slightly irregular: some areas are ground flat, others faceted with fine vertical abrasion. Curved chip lost from edge; one other area of flake damage. Small hollowed pecked area (5.5mm x 3.2mm) near-central on one face, and an irregular scatter of fine lines; many are residual abrasion marks but a few finer ones may represent use. The other face shows a scatter of fine peckmarks over an area of 15 x 12mm and some residual abrasion scars. D 72.3mm T 5.2mm; 62.6g. C11002. Illus 7.52

- To'N1104 Sub-circular slate disc, retaining an irregularity from its natural form though the outline saw some flaking to modify it, given the presence of some residual flake scars. One face is flat apart from a thin, spalled area, the spalling pre-dating the finishing of the edge. The other is more irregular, with very thin laminar spalls creating a rather irregular surface; again, the spalls pre-date the edge-finishing. No use-wear or polish; a few random scratches are probably post-depositional. The lack of polish or use-traces indicate it is unfinished. It sits at the very lower end of such discs in terms of thickness and may have been abandoned because it became too thin to be functional. L 60.7; W 57.1; T 3.4mm; 25.2g. C11002. Illus 7.52
- SF162064 Thin, circular psammitic schist disc with a neatly smoothed vertical edge surviving around a quarter of the circumference, the rest eroded. Both faces also eroded, thus not preserving working traces. D 75, T 9.5mm. C162059. Illus 7.49 and 7.53

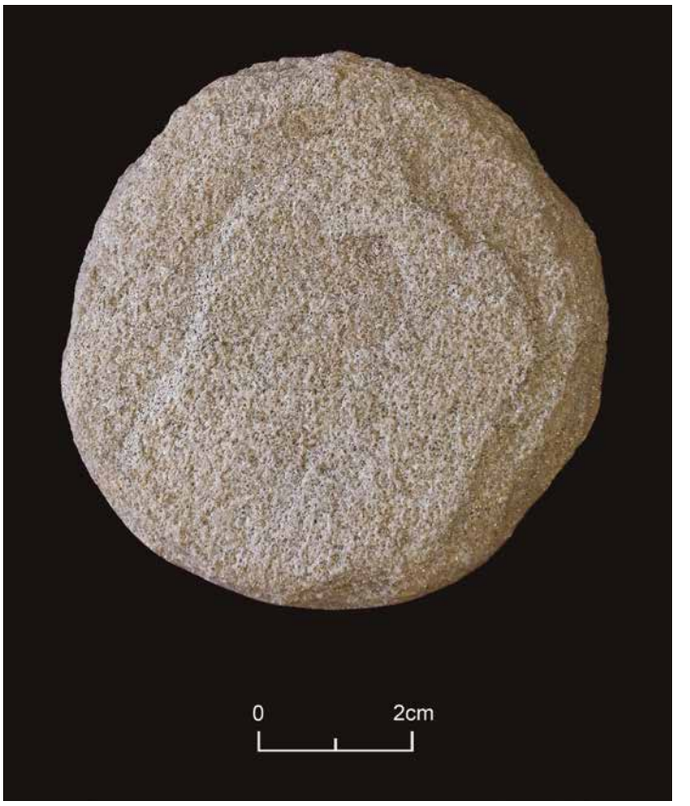


Illus 7.52
Illustration of polished stone discs from Tap o' Noth. Alan Braby

Gaming Pieces (or charms?)

A range of objects from the Craw Stane complex and Tap o' Noth are possible gaming counters. From the former, six stone discs have diameters varying between 22mm–46mm. Four retain traces of abrasion facets or regular flaking from shaping (SF15045, SF162012, SF162015 and SF161268; Illus 7.49 and 7.54) while two with no working traces (SF161273 and SF161185) are included because their size and shape is so consistent with the other discs. A group of stone gaming counters from Sculptor's Cave, Moray, have a similar range of diameters (23 and 37mm) (Cruickshanks 2020a: 114–15) to the Craw Stane complex group and while it is possible such discs could be roughouts for beads or pendants, gaming counters seem more likely.

Board games were introduced to Scotland during the Roman period (Hall & Forsyth 2011) and gaming pieces are relatively common finds on wealthy sites thereafter. Hall has noted that gaming piece forms, sizes and materials can vary widely, as demonstrated by the range of pieces in glass and different stone types found in two sets within burials at Waulkmill, Aberdeenshire (2016: 50). With this in mind, five natural pebbles (SF1103 and SF1105a–d; Illus 7.55) and a stone ball (SF16005; Illus 7.49 & 7.55) from Tap o' Noth are also considered to be gaming pieces. Interpreting unworked pebbles is a challenge, but these were concentrated around two hearths in the centre of Platform 11's upper floor layer (C11002), and two are in stone types (jasper and flint) unlikely to be found on the hill, suggesting they were brought there and held some significance. The stone ball (SF16005; Illus 7.49) has very unusual lithology and is also likely to be non-local in origins though its exact nature remains unclear (Fiona McGibbon pers comm)



Illus 7.53
Photograph of polished stone disc from the Craw Stane complex (SF162064). Leanne Demay/National Museums Scotland

Another possible function for the Tap o' Noth pebbles was as charms or 'curing stones', perhaps involving the collection of attractive stones from a river to be carried around or placed in homes as talismans. Such customs were undertaken in Scotland up to the modern era (Black 1893: 516). Special treatment of pebbles is demonstrated by their inclusion in a large assemblage of mixed material from Monquhitter, described by Stevenson (1967) as a 'Roman-period cache of charms' found to contain over 50 attractively coloured natural pebbles, some of which were highly polished.

- SF15045 Two refitting phyllite fragments forming a rounded edge. Fairly worn, but facets from shaping are still visible on the edge. Estimated original diameter 40mm. L 19, W 20, T 10. C15007
- SF161185 Small sandstone disc. Surface eroded so working traces are unclear, but its shape is very regular. D27, T 12. C161044. Illus 7.49
- SF161268 Around half of a slate disc with regularly flaked edge, broken through the middle. Burnt black, almost vitrified in places. Original diameter *c* 30–40mm. L 32, W 22, T 7.5. C161003. Illus 7.49
- SF161273 Small, irregular schist disc. Erosion has obscured any shaping. D 19 x 22; T 7. C161003
- SF162012 Garnet mica schist disc with edge flaked to shape. D 32, T 5. C162046. Illus 7.49
- SF162015 Staurolite schist pebble, roughly discoidal, with part of edge possibly smoothed to shape, the other flaked/broken. L 46, W 39, T 13.5. C162001. Illus 7.49
- To'N 1105 (A) Small flat ovoid schist pebble, unworked. L 29.2, W 26, T 7. (B) Small rounded red sub-triangular jasper pebble, unworked. L 25.5, W 14, T 15.9. (C) Small oblong/rounded flint pebble, unworked. L 29.4, W 20.9, T 17.6 (D) Small irregular/rounded-triangular shaped grey andesite pebble, unworked. L 25.7, W 25.1, T 16. C11002. Illus 7.55
- To'N 1103 Small oval white quartzite pebble with a flat side and a slightly domed side, unworked. L 26.4, W 20.5, T 15.3mm. C11002. Illus 7.55

Illus 7.54
Photograph of gaming counters from the Craw Stane complex. L-R: SF162015, SF162012, SF161185, SF161268. Leanne Demay/National Museums Scotland

Illus 7.55
Photograph of possible gaming pieces from Tap o' Noth (SF1103, SF1105 and SF16005). Leanne Demay/National Museums Scotland

- To'N 16005 Stone ball. Striking geological characteristics, consisting of a creamy white clay-like matrix with black, possibly metalliferous, veins. Spherical in shape with lightly chipped facet forming a base, suggesting use as a gaming counter. D 35mm. C16005. Illus 7.49 & 7.55

Other

Five worked stone objects have an unclear function. Two fragments of slate (SF52) are not a local stone type and must have been brought to the Craw Stane complex. This and SF1905, a sandstone fragment with possible carved edge, may have broken during manufacturing. SF162018 (Illus 7.49) survives as the end of a shaped oval or bar-shaped object; too little remains to determine its original nature. A fragment of heat-affected cobble with bubbled residues (SF164008B) may not have been used as such, but was simply in the vicinity of one of the high-temperature processes taking place on site.

- SF52 Two fragments of slate; one a spall, the other sub-rectangular with edges flaked to shape. Could be a large flake from a sturdier slate bar. No use-wear. Function unclear. Largest fragment 105 x 75 x 9.5. C62
- SF162018 Fragment of staurolite schist broken from oval or bar-shaped object. Surviving rounded edge is smoothed but no obvious use-wear. L 26, W 17, T 6. C162002. Illus 7.49
- SF1905 Fragment of sandstone with most surfaces missing. Large notch in one edge has slight regular stepping on one edge, suggesting it may have been carved, but the rest of this surface is spalled. Perhaps broken during manufacture? 78 x 57 x 33. C1704
- SF164008B Fragment of heat-affected, fire-cracked quartzite cobble with black, bubbled residues on one of the broken faces. 69 x 48 x 45. C164013

7.10.4 Discussion

Over half of the worked stone assemblage from the Craw Stane complex comprises metalworking accoutrements (38 of 67), reflecting other extensive evidence for non-ferrous metalworking there. A further six, possibly seven, items provide evidence of fine textile production (spindle whorl) and probable hide-processing (pumice and hide-rubbers). The stone assemblage also supplies rare evidence of non-craft activities on site, namely food production (rotary querns) and leisure activities (gaming pieces). The careful positioning of the intact rotary quern in one of the lowest ditch fills and the seemingly deliberate fragmentation of the metalworking vessels prior to deposition (Section 7.5) give us hints of ritual traditions echoing an earlier period.

The stone assemblage from Tap o' Noth, though smaller, has quite a different character. Two polished stone discs suggest the preparation of special substances, perhaps medicinal or cosmetic. A group of pebbles and a stone ball were probably gaming pieces. Both groups illustrate activities associated with higher-status sites. Two cobble tools are less evocative but provide evidence of the everyday activities taking place amongst more elite pastimes.

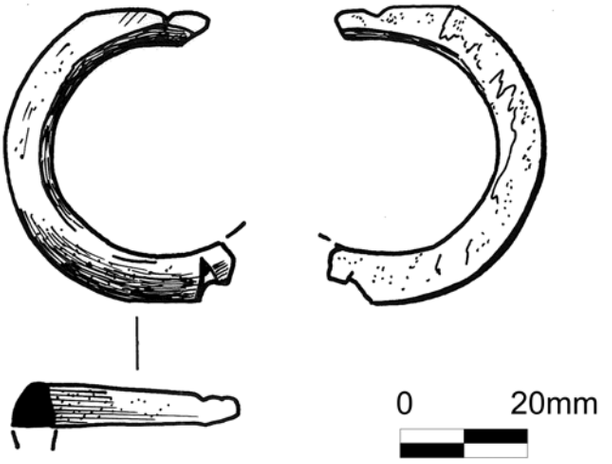
Locally available stone types dominate at the Craw Stane complex, with only three fragments of worked slate and two pieces of pumice brought in from further afield, most likely western Scotland. The stone moulds (Section 7.3) were manufactured from a finer-grained sandstone than the metalworking vessels (Section 7.5), but both probably from the same outcrop, indicating an in-depth knowledge of stone properties and careful selection. Unfinished ingot moulds and metalworking vessels which may have broken during manufacture indicate they were made on site. The presence of these unfinished objects in the same contexts as the dumps of used moulds and cupels suggests they were manufactured in a common workshop area. The part-worked polished stone disc abandoned at Tap o' Noth implies stone items were made there too.

Most of the stone objects at the Craw Stane complex were recovered from the outer ditch (51 of 64) and mainly from the upper fills, mirroring the overall assemblage's distribution. Exceptions to this include a hide-rubber (SF30), pounder (SF15010), probable gaming counter (SF15045) and shaped bar (SF162018) from palisade fills [027] [15506], working surface (SF164019) and residue-coated stone (SF164008b) from post-hole fills [162012] [164008], the spindle whorl (SF62) from a possible floor surface (C75) and decorated, perforated disc (SF15025) from stone socket [15359]. The remaining five objects were unstratified. It is noteworthy that none of the many metalworking-related stone items were recovered from contexts other than the outer ditch; only items relating to other activities were found in other features across the site. That the metalworking debris was not dispersed in this way suggests careful control of the debris to prevent this happening, or that it took place in the later stages of the site's use, limiting opportunity for its spread.

7.11 The Shale Bangle from Cairn More

FRASER HUNTER

The excavations uncovered a well-preserved and notably small bangle of oil shale (Illus 7.56). At only 34.5mm in internal diameter, it is the smallest bangle recorded by the writer from Scotland: in a sample of 378 bangles recorded so far, only six fall into the 35–40mm diameter category. The section (with flattened inner face) is consistent with use as a bangle, but at this size it would most likely have been for a child. It was clearly a valued item, showing extensive use-wear, as considerable efforts were made to repair it after breakage: much of its circumference survived, and the ends were trimmed to create notches, suggesting it was intended to fasten it to the broken piece or to another material. This reflects the local rarity of such items: a recent review by the writer (in McGalliard & Wilson 2021: 23–4, where references may be found) identified only seven pieces of organic-rich stone jewellery from Aberdeenshire of likely later prehistoric or early medieval date. From settlements there is only a bangle from Thainstone and an unfinished bead or pendant from Maiden Castle, Bennachie. Three further instances came from deliberate deposits in hoards or on older sites: gaming pieces from Bruce's Camp, Kintore, a ring-pendant from Cairnhill, Monquhitter, and a bangle fragment from Old Keig recumbent stone circle. In addition, two stray finds may be relevant: a ring-pendant from Huntly Castle and an unfinished bead from West Wrangham, Culsalmond.



Illus 7.56
Illustration of the shale bangle from Cairn More. Alan Braby

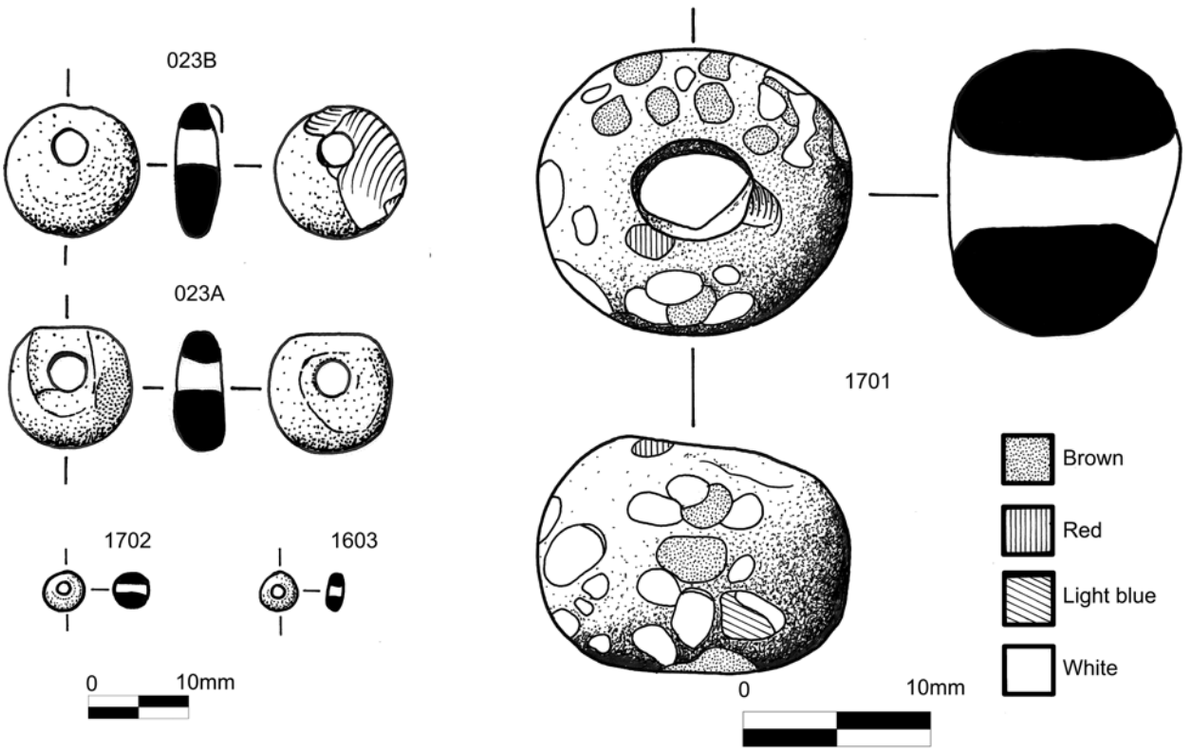
In this area, far from ready access to the relevant raw materials, such imports had considerable rarity value. They are more common along the Moray Firth coast, where the oil shale and cannel-coal deposits at Brora were more readily accessible (Gibson 1922: 32–6).

- Small bangle, D-sectioned with well-rounded exterior surface and gently convex faces turning sharply into the slightly convex interior. Well finished internally, with only faint circumferential abrasion marks; exterior well finished to a medium lustre, with extensive use-abrasion. Modified after it split and broke, leaving around two-thirds of the circumference intact. One end was tapered by trimming, and both had partly encircling notches cut around them (clearly extending onto the split surface, thus post-dating this). These were presumably intended to allow the other part of the bangle to be re-attached or to allow it to be fastened to a replacement or alternative material. The grooves show no significant use-wear, indicating this repair was not long-lived. Internal diameter 34.5mm (65% surviving), external diameter 47.5mm; W max 7.3m, H 6.8mm (originally *c* 10mm). Material: dark grey with laminar fracture; oil shale. CM20 Tr 17. Illus 7.56

7.12 Amber Beads from the Craw Stane complex

GEMMA CRUICKSHANKS AND EWAN CAMPBELL

Two annular amber beads (SF023A and B; Illus 7.57 and 7.58) were found in destruction deposits within the upper fills of the outer ditch C025. Both show polish within and around their perforations from being strung, probably as a necklace. In a local context, amber is notably rare in north-east Scotland during the Iron Age (Hunter 2020b: 159) and continues to be scarce during the early medieval period with no other examples known to the authors in this area. Baltic amber would have washed up on the east coast of Scotland, though the beads themselves may have

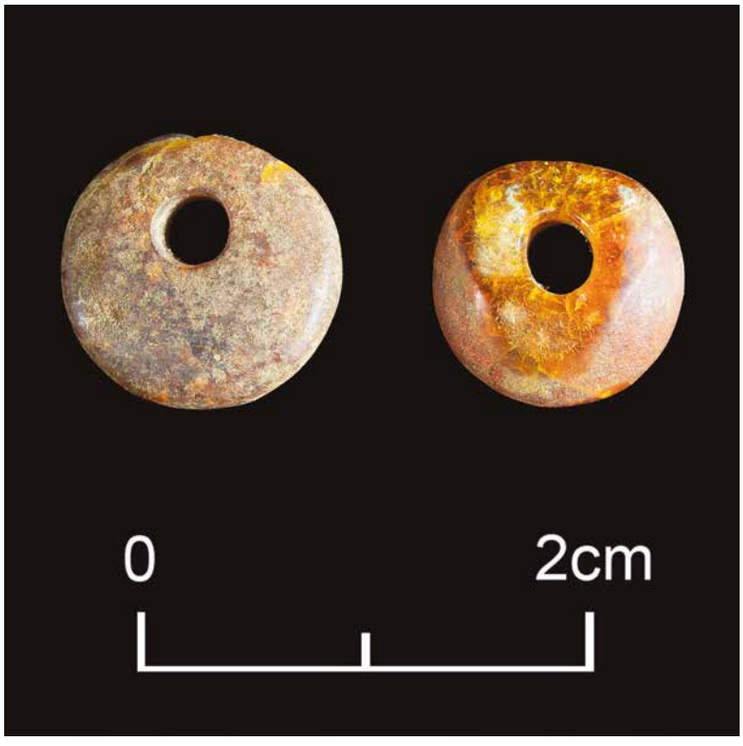


Illus 7.57
Illustration of amber beads from the Craw Stane complex and glass beads from Tap o' Noth. Alan Braby

come from further afield; they are not sufficiently diagnostic to determine this.

In southern Britain, amber beads are characteristic of Anglo-Saxon pagan female burials and are by far the commonest bead type, accounting for more than half of all beads in Brugmann's large sample (Brugmann 2004: 115). Though amber beads are not particularly chronologically diagnostic, Brugmann (2004: 47) puts many in her A2 Group of the 6th century. The two beads from the Craw Stane were not associated with a burial, but this wider context along with their local rarity would have made them valued objects.

- SF023A An intact irregular, annular amber bead with tapering oval section and off-centre drilled cylindrical perforation, now worn into an oval opening on one side. Both faces have abraded, fairly flat facets around the perforation and the rounded outer edges are duller from wear. The amber is red-orange with frequent cracking throughout. D 11, perf D 3.5, max t 6; 0.4g. Illus 7.57
- SF023B An annular amber bead with both ancient and recent spalls missing from one face. The neatly drilled cylindrical perforation is off-centre but the overall shape of this bead is much more regular than SF023A, with a circular plan and oval section. The amber is red-orange with frequent cracking and the whole surface is dulled from wear, with notable polish around the edge of the perforation. D 12.5, perf D 3.5, max T 5; 0.3g. Illus 7.57



Illus 7.58
Photograph of amber beads (SF023A and SF023B) from the Craw Stane complex. Leanne Demay/National Museums Scotland

7.13 Glass from the Craw Stane complex and Tap o' Noth

7.13.1 Glass beads and block from Tap o' Noth

LEANNE DEMAY

SUMMARY
Three beads and a block of raw material were recovered from house platforms on Tap o' Noth. Whilst the two smaller beads (SF1603 and SF1702) are a common long-lived type, the 'crumb' bead (SF1701) is rare in a Scottish context. Crumb decorated beads from Anglo-Saxon and continental burials are mostly dated to the 5th–6th centuries AD. The block of green glass (SF1124), probably a Roman tessera, is an unusual find, but one that can be paralleled on a few other Scottish sites of Late Roman Iron Age and early medieval date. Scientific analysis by Mary Davis (Appendix 1) has shown the beads and block have compositions typical of Roman glass. The emerging pattern of distribution of these objects indicates a relationship between such raw material and the production of decorative metalwork at high-status sites.

Glass beads from Tap o' Noth

A translucent dark blue bead with irregular mottled surface decoration in red, white and light blue (SF1701; Illus 7.59) was recovered from the upper floor layer (C17002), Trench 17 and is almost certainly associated with the early 5th- to mid-6th-century AD phase of occupation of House 4. It conforms to Guido's 'crumb bead' type (1999: 27, 53) comprising globular beads with random and irregular speckled decoration. The decoration varies widely and can consist of speckles of the same colour or multicoloured on different coloured bases.

Examples from Scotland are rare. Blackwell's (2018) study of Anglo-Saxon finds from Scotland only confidently identified one other example from Traprain Law conforming to the type. This bead (Blackwell 2018: 246; illus 7.7) bears striking similarity in terms of size and form, but the base bead colour and colours of the 'crumb' decoration differ. The bead from Tap o' Noth conforms to Guido's Schedule 6xi group (1999: 53, 269; map 19), 'blue beads with coloured specks' dated mainly to the 5th–6th centuries in England. This is a variant of the Schedule 2xi group, 'black globular beads with coloured specs' (Guido 1999: 27; plate 3) to which the bead from Traprain Law belongs. Guido (1999: 27) identified a clear 6th-century AD horizon for the 2xi group in England but compared them to a group from eastern Europe common in the Iron Age which continued into the 5th century AD. Blackwell (2018: 251) suggests a late 5th- to early 6th-century AD origin for the Traprain Law example. Three beads from Coulter, Lanarkshire (Blackwell 2018: 247; illus 7.7) are decorated with large white and grey irregular spots, but their date is uncertain.

Following Guido's 1999 compilation, several pivotal studies of beads from burials in England, Ireland and continental cemeteries have been crucial for refining aspects of chronology and distribution (eg Siegmund 1995; Brugmann 2004; Mannion 2015; van Tongeren 2023). In her study of glass beads from early Anglo-Saxon graves, Brugmann (2004) identified a wide distribution of translucent, dark blue globular beads with small irregular dots applied in various colours associated with the Early or 'Migration'

Period. Termed 'mottled' beads, the decoration usually consists of at least two colours, mostly white and red. Sixty-eight are known from England, but require more detailed analysis on provenance, distribution and dating (Brugmann 2004; Table 10; plate 149). In Ireland (Mannion 2015), beads resembling Guido's 'crumb' group are known from the early medieval royal residences at Lagore (Hencken 1950: 145; fig 68D), Garranes (Ó Ríordáin 1942: 16; fig 14 321 and fig 16 337a), and from Ballinderry Crannog 2 (Hencken 1942: 51; fig 21 440). The 'crumb' form of decoration is popular across Merovingian Europe, for example, present in 5th- to 8th-century AD graves of females on the Lower Rhine (Siegmund 1995: 45; illus 2.15) and 6th- to 7th-century AD burials in the Netherlands (van Tongeren 2023: 389–90; plate 14).

Glass beads are bespoke crafted items, demonstrating highly individual characteristics with shared traits and manufacturing techniques (Mannion 2015: 18). The variance in base and speck colours on crumb beads suggest they were decorated on an *ad hoc* basis by creative artisans. Of all the decorated glass beads, this form of decoration would have been the easiest to produce (Guido 1999: 27). Beads are easily transported and probably travelled widely with other desirable goods of the period. With the lack of a burial tradition in Scotland, there is a paucity of contextual information to suggest who wore the beads and how they were worn and most beads of the period have little to no provenance or context information (Blackwell 2018: 220). Anglo-Saxon grave studies (eg Hirst & Biek 1981; Brugmann 2004; Hines & Bayliss 2013: 520) have been instrumental in facilitating discussion beyond their value as chronological indicators and objects of decoration and burial costume (predominantly associated with female burials), going further to explore their social role in projecting an individual's position in society. Rather than just being common decorative objects, they could have held a deep, complex role within society as carefully curated heirlooms embodying individual and communal identities and beliefs.

A tiny translucent green bead SF1702 (Illus 7.57) was found in the same context as the crumb bead and a tiny blue bead SF1603 (Illus 7.57) came from another floor layer (C16005) in Trench 16. These conform to Guido's Group 7iii (medium and small green translucent and opaque globular beads) and Group 7iv (medium and small blue translucent and opaque globular beads; Guido 1978: 70). Common on sites in Britain and the continent, small annular beads persisted for a long time and are considered culturally and chronologically undiagnostic. Green and dark blue are the most common colours, along with the typical opaque yellow found on many Iron Age sites. Similar tiny blue beads have been found in both Iron Age and Pictish phases at Old Scatness, Shetland (Brown 2010: 348; Plate 6.13.2; Brown 2015: 431; Plate 7.12.10–11). This type of bead also conforms to Mannion's Class 15a – miniature globular beads which were current throughout the early medieval period in Ireland from the late 5th to late 9th centuries (Mannion 2015: 28–9).

- SF1701 Globular translucent dark blue bead with irregular dots in red, white and light blue. Asymmetrical, probably from irregular heating. Chipped around the perforation on both sides. D 16.6; perforation D 4.4; T 9.7–12.8; 3.9g. Trench 17; C17002; upper floor layer. Illus 7.57 and 7.59
- SF1702 Small semi-translucent green globular bead. D 4.6mm; W 4mm; perforation D 1.6mm; 0.1g. T17; C17002; upper floor layer. Illus 7.57
- SF1603 Small translucent annular blue bead with rounded edges, chipped on one side. D 4.6; W 2.4, perforation D 1.9mm; 0.1g. T 16; C16005; upper floor layer. Illus 7.57

Glass block

A small, angular block of opaque green glass (SF1124; Illus 7.60) was recovered from the upper floor layer (C11002) of a house platform in Trench 11. Its shape, composition and weight suggest it could be a piece of Roman tessera (James 2017: 27). This unusual find can be paralleled on a few other Scottish sites of Late Roman Iron Age and early medieval date, for example, at Brough of Birsay, Orkney (Curle 1982: 47); Dunadd, Argyll (Lane & Campbell 2000: 173); Sculptor's Cave, Moray (Hunter & Davis 2020: 163; Illus 5.58); Mote of Mark, Kirkcudbrightshire (Campbell 2006: 102); and Whithorn, Wigtownshire (Hill 1997: 296; Campbell 2008: 93–4).

There are no indications that raw glass was produced in northern Europe before the end of the 8th century AD (Barfod et al 2022: 179) and for most of the first millennium AD, glass was produced on a large scale at a relatively small number of specialised sites (Paynter & Jackson 2016). Objects like tesserae, produced in the Mediterranean, would have been exchanged or reused as small ingots for recycling into beads or enamelling metalwork. Compositional analysis of glass from the period shows widespread and prolonged recycling of Roman glass for this purpose (eg Freestone 2015a; Paynter & Jackson 2016). Analysis of SF1124 by Mary Davis has confirmed that its composition it consistent with Roman glass (Appendix 1). During the Late Antique period, small glass blocks, probably scavenged from floor and wall mosaics travelled across northern Europe to satisfy the thriving glass bead industries (eg Barfod et al 2022; Henderson et al 2019; Crocco et al 2021).

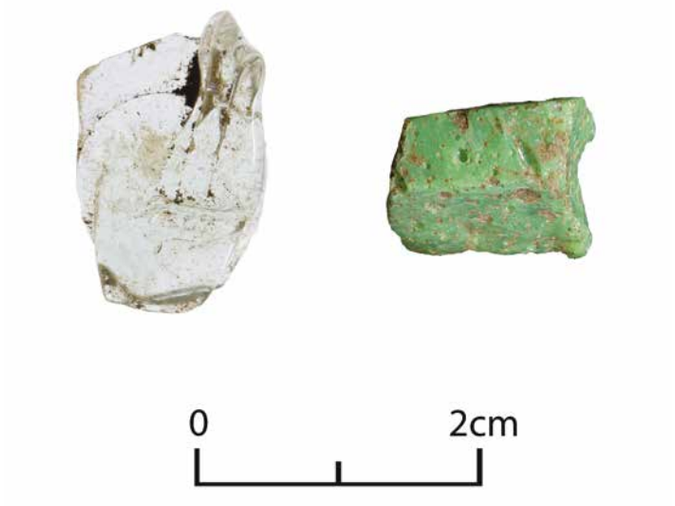
SF1124 was recovered from a floor deposit (C11002) containing Late Roman pottery, and radiocarbon dates indicate a 3rd- to 4th-century AD phase of occupation. An early appearance for this type of object that can be paralleled at another site in the north-east of Scotland, Sculptor's Cave (Hunter & Davis 2020: 163; Illus 5.58). Mould fragments from the same floor layer (C11002) support the emerging pattern of a relationship between such raw material and the production of decorative metalwork at high-status sites, for example, Dunadd, Brough of Birsay and Whithorn (Table 7.18). The relationship between glass and jewellery manufacture is clear at the Iron Age craftworking centre of Culduthel (Hunter 2021c: 201). Evidence for glass working and enamelling in Scotland remains scarce (Hunter 2015: 235), but the distribution of one glass ingot (Dunagoil, Bute; Hunter et al 2018: 213) and tesserae (Table 7.18) hints the craft was specialised but widespread (see Hunter 2015: 235).

Exactly how this block of Roman glass made its way to a house on Tap o' Noth is a complex question to answer, but the site's inhabitants clearly had long-distance contacts and access to valuable raw material. It was probably intended to be reworked, but comparable finds from other sites reveal a deeper meaning: for example, the tessera from Sculptor's Cave, Moray was interpreted as a votive token embodying a craftworking process or specially selected for its colour symbolism (Hunter & Davis 2020: 163).

Site	Site type	Date	Description/reference
Tap o' Noth, Aberdeenshire	Hillfort	3rd–6th century	Block of opaque green glass
Dunagoil, Bute	Hillfort	Iron Age	Opaque yellow glass ingot (Hunter et al 2018, 213)
Dunadd, Argyll	Hillfort	7th century	SF1309 Tessera of greenish yellow glass with gold leaf (Lane & Campbell 2000, 173)
Sculptor's Cave, Morayshire	Cave	Roman Iron Age	SF871 Small block of opaque red glass (Hunter & Davis 2020, 163)
Mote of Mark, Dumfries & Galloway	Hillfort	Unstratified	SF3102 Irregular cuboidal fragment of pale aquamarine glass (Campbell 2006, 102)
Brough of Birsay, Orkney	Craftworking settlement	Pictish horizon	SF 645 Opaque light blue cube (Curle 1982, 47)
Fey Field, Whithorn, Dumfries & Galloway	Monastic town	Undetermined	93/SF02100 Opaque yellow glass tessera (Campbell 2008, 93–4)
Glebe Field, Whithorn, Dumfries & Galloway	Monastic town	*c* 12th–13th century	Twelve tesserae, ten blue, one yellow, and one red (Period IV) (Hill 1997, 296)
Glebe Field, Whithorn, Dumfries & Galloway	Grave	*c* 7th century	Dark blue glass tessera (Period 1/4) (Hill 1997, 296)

Table 7.18
Finds of glass blocks/ingots from non-Roman sites in Scotland

Illus 7.59
Photograph of crumb bead from Tap o' Noth (SF1701). Leanne Demay/ National Museums Scotland



Illus 7.60
Photograph of Roman vessel glass (SF15008) and glass block (SF1124) from Tap o' Noth. Leanne Demay/National Museums Scotland

Plenty evidence exists to show Roman glass objects were often reused without being re-melted (see Paynter & Jackson 2016) and this small colourful block of glass may have been curated as a well-travelled object imbued with meaning beyond its physical characteristics.

➢ SF1124 Small block of opaque bubbly green glass. The edges are sharp with no abrasion. One surface is very flat and chipped at the corner (perhaps removed intentionally?). L 13.1mm; W 9.5mm; T 7.2mm; 1.3mm. T11; C1102; upper floor layer. Illus 7.60

7.13.2 Roman Vessel Glass from Tap o' Noth

FRASER HUNTER

Small sub-oval fragment of Roman glass (SF15008; Illus 7.60), preserving the attachment point for the base of a fine strap handle just above the curved shoulder of the vessel. It is of good-quality glass, almost clear and slightly bubbly, and a 1st- to 2nd-century date is likely. The surviving shoulder and slim handle suggest it derives from a fine jug or small amphorisk. A wide range of possible forms could have such features (eg Fünfschilling 2015: Formtafel 2 no A112, Formtafel 5 nos 164–5, 176–77). The fragment is too small to identify with certainty, but both small jugs and small amphorisk forms are already attested on Iron Age sites in Scotland (Ingemark 2014: 40–3 [though known Scottish examples are decorated], 117–9). High-quality Roman glass is already known from Aberdeenshire, both as complete vessels and as heavily reused fragments (Ingemark 2014: 251–3); the Tap o' Noth fragment sits between these extremes, being broken but showing little wear to suggest an extended life as a fragment.

➢ SF15008 Almost clear, slightly green-tinged fine glass sherd, some bubbles, from the shoulder of a vessel, preserving the neat drop where the base of a handle was attached just above the shoulder. The remains of a narrow strap handle (some 6mm wide, slightly concave) survive. A separate decorative trail, doubled back on itself, projects the line of the handle slightly down the body of the vessel. The broken edges

show no sign of wear. L 21.5mm, W 12.5mm, max T 4.5mm, wall T 1–1.5mm, m 1.8g. TAP 22; T15; C15015. Illus 7.60

7.13.4 Glass from the Craw Stane complex

EWAN CAMPBELL

Early medieval vessel glass

There is only a handful of early medieval vessel glass sherds from the site, but they are important as they include representatives of the main groups of imports found in Britain in the early medieval period: the Mediterranean, Germanic and Atlantic Groups (Campbell 2007). Imported glass has been found on around 60 Insular sites outside of Anglo-Saxon areas, but only four other sites have this range of types – Tintagel, Whithorn, Dinas Powys and Cadbury Congresbury (Campbell 2007: 54–73, fig 39). These are all important high-status sites which, like the Craw Stane complex, also have much imported Mediterranean pottery and evidence of fine metalworking. Tintagel and Dinas Powys also have possible royal connections. All the sherds from the Craw Stane complex are small, but several have enough features preserved to identify the type of vessel and its probable origin. The assemblage includes material that is conventionally dated to the later 5th to early 7th centuries, the period when two successive trading systems were bringing material (mainly ceramics) from the Mediterranean and the western continent to Insular sites by the western sea route (Campbell 2007), but the radiocarbon dates from the Craw Stane complex suggest these vessels were in use no later than the mid-6th century. A separate trading system brought material from Anglo-Saxon England and the north continent up the eastern coast of Scotland (Campbell 2009), from the 6th to 8th centuries. The Craw Stane complex appears to have been tied into both of these trading networks, and is one of very few sites in Pictland which received imports from the western sea routes, the others being Clatchard Craig, Craig Phadrig and Dundurn hillforts. Although the date of the Craw Stane complex glass vessels cannot be closely established, all could fit comfortably in with the late 5th- to mid-6th-century date of the Mediterranean amphorae found on the site.

Small undecorated sherds can be very difficult to separate from modern pre-industrial glass, but at least five of the vessels described here can be confidently assigned to the early medieval period. All of the vessels imported at this period were drinking vessels, and were high-value items brought alongside the larger pottery containers described above. Given the relatively large areas of the site excavated, the small number and size of the sherds suggests that the glass sherds from broken vessels were carefully collected for recycling. There is evidence for this glass working in the non-vessel material described below, and this recycling process has been shown to have taken place at sites such as Dinas Powys (Campbell 2007: 92–6).

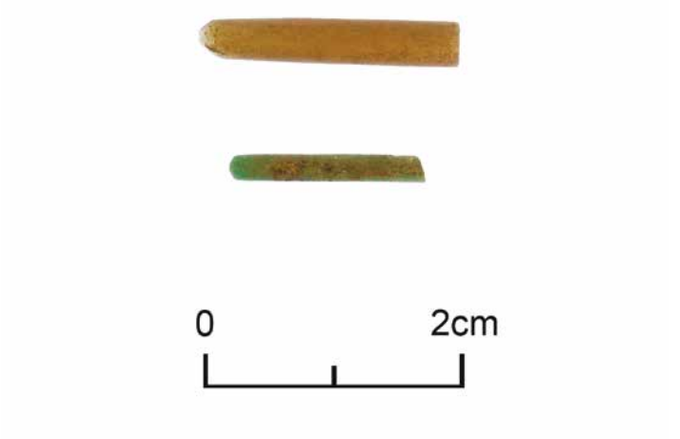
Vessel 1 belongs to the Group C decorated Atlantic tradition (Campbell 2007: 64–9). The marvered opaque white trails are characteristic of this group of vessels. The vessel was probably a bowl rather than the commoner cone beaker form. These vessels were imported from south-western France, Bordeaux region, in the 6th and 7th centuries, initially alongside the early 6th-century Mediterranean package of ceramics, but later in larger quantities in the 6th and 7th centuries alongside DSPA and E Ware, also produced in western France. This vessel is probably 6th century in date.

Vessel 2 (Illus 7.61) is of very fine quality decolourised glass. If it is ancient, which is not certain as it has no distinguishing features, it is probably from a conical beaker or flask of the Group A Mediterranean tradition. Given that it was stratified with certain early medieval material in the palisade trench, there is no reason to doubt that it is contemporary with that material.

Vessel 3 is from a vessel of the Group B Germanic tradition, with complex decoration, possibly a claw beaker. The brown colour is similar to that of 5th-/6th-century Anglo-Saxon glass, and at least some of the vessels of this form were probably manufactured in south-east England (Evison 2000: 63–5). Claw beakers are rare outside Anglo-Saxon areas, with finds only from Dinas Powys, Whithorn and Dunnyneil Islands (Campbell 2007: 60, fig 41).

Although Vessel 4 (Illus 7.61) is only represented by a tiny fragment, it shows the typical wheel-abraded scroll and letter decoration of Group A Mediterranean tradition glass (Campbell 2007: 56–8, fig 40). These decorated vessels are also very rare in Insular contexts, and have been found at Tintagel, Traprain Law and Whithorn, as well as in a few Anglo-Saxon graves, in 5th- to 6th-century contexts (Price 2000: 24–6).

Illus 7.61
Photograph of early medieval vessel glass from the Craw Stane complex (SF162002, SF222 and SF161210). Leanne Demay/National Museums Scotland



Illus 7.62
Photograph of glass rods from the Craw Stane complex. SF1884 (above) and SF161507 (below). Leanne Demay/National Museums Scotland

Vessels 5 (not illustrated) and 6 (Illus 7.61) are similar in colour and decoration, but are different vessels belonging to the Group B Germanic tradition of the 5th/6th centuries. The upright rim of Vessel 6, and its diameter, are indicative of a conical beaker (cf Evison 2008: 50, fig 4, no 28, from Faversham), though other forms are possible. The regular spacing of the trails on Vessel 5 might suggest it comes from a Kempston type beaker (Evison 2000: 62, fig 2, Group 26) of the 5th or early 6th century.

Bead

A disintegrated translucent yellow glass bead (SF161034) was recorded in the upper fill of the outer ditch, but its form is no longer discernible. Beads of this colour are known from Anglo-Saxon contexts, but there many unpublished beads of similar colour from Culbin Sands (Christie 2014: NMS Reg No. BIB59), perhaps indicating local manufacture. A residual fragment of Early Bronze Age faience bead (SF219) was also recovered from an outer ditch fill (C297), probably from a grave which predates (and was possibly destroyed by) the early medieval site. The faience bead report by Alison Sheridan is in Appendix 2.

Glass-working debris

WITH GEMMA CRUICKSHANKS

There are a few other items of glass, including important evidence of glass working on the site. Raw materials are represented by two glass rods (SF1884 and SF161507; Illus 7.62) and two lumps of glass (SF238 and SF161337). The glass rods, one white and one green, both display facets on one end suggesting they were rubbed against something. Such rods may have been used to apply decorative trails to glass objects such as beads, implying such objects were being made at the Craw Stane complex. Analysis of their composition by Mary Davis has demonstrated they are all typical of reused Roman glass (Appendix 1). These were all found in the same section of the outer ditch, suggesting glass working was taking place in this sector of the site.

Glass rods like these are not common and their presence suggests specialised glass working was taking place. Three similar rods were found amongst other glass-working waste dating to the 5th and 6th centuries AD at Lisnacaheragh ringfort in Ireland (O'Brien & Hogan 2021: 311). Facetted, plain rods like SF1884 and SF161507 are hard to parallel, though other forms of specialist glass-working evidence are known, such as two rods comprising multicoloured strands, interpreted as evidence of millefiori production from Lisnacahera (O'Brien & Hogan 2021), a multicoloured glass tube fragment from Dunadd, also understood to be from creating millefiori and a twisted blue and white glass rod from Culduthel which was thought to have been for an inlay (Lane & Campbell 2000: 173: SF874; Hunter 2021c: 203: illus 6.74). Other evidence in the form of blocks or ingots is outlined by Leanne Demay (Table 7.18). The evidence of specialist glass working is sparse, but usually found in association with extensive metalworking evidence, as here, indicating a close relationship between the crafts.

Vessel 1 SF048 Body sherd with two opaque white marvered horizontal trails. From below rim of?bowl. Almost colourless glass, excellent quality. Size 19 x 11 mm, T 1mm. C025, upper fill of outer ditch.

Vessel 2 SF222 Large bodysherd of conical vessel. De-colourised glass, very fine, few bubbles. Size 27 x 22mm, T 0.07mm. Estimated diameter 60mm. C218, palisade trench. Illus 7.61
SF164002 Small body sherd of colourless glass, good quality. Similar to SF222, possibly same vessel. Size 20 x 12 x 1mm. 164000. Cleaning, Trench 4

Vessel 3 SF1788 Irregular body sherd. Glass brown, good quality. The wall is distorted by attachment of a self-coloured blob, or possibly a claw. Size 17 x 7mm, T 1–1.5mm. C1707. Fill of outer ditch

Vessel 4 SF161210 Tiny sliver of glass vessel with a patch of wheel-abraded decoration, perhaps part of a letter. Glass light yellow, good quality. Size 10 x 3 mm, T 1mm. C161003. Fill of outer ditch, Trench 1. Illus 7.61

Vessel 5 SF161077 Body sherd from just below the rim of a conical vessel. Decorated with four evenly spaced unmarvered self-coloured horizontal trails. Glass very light green, good quality but full of tiny bubbles. Estimated diameter 80mm, T 1mm, size 12 x 15mm. C161037. Fill of outer ditch, Trench 1

Vessel 6 SF162002 Rim sherd. Glass very light green, good quality, a few horizontal bubbles. Rim fire-rounded, upright not everted or thickened. Below the rim are two wide irregular unmarvered horizontal self-coloured trails with drop point; below is a fragment of another drop point or?a vertical looped trail. Estimated rim diameter 90mm, T 1–1.5mm, size 25 x 15mm. C162002. Upper fill of palisade, Trench 2. Illus 7.61

Possible Vessel SF1787 Tiny fragment of light green vessel glass. Good quality, large bubbles. Size 9 x 8mm, T 1mm. C1707. Fill of outer ditch

Bead SF161034 Fragments of a bead of unknown form, completely disintegrated. Light yellow glass. C161037: fill of outer ditch

Glass-working waste SF238 Irregular lump of opaque yellow glassy material. Pale sulphur yellow, with columnar structure. 10 x 10 x 7 mm. C329

- SF1884 A piece of tapering glass rod, broken at one end, worn to a blunt point at the other. Opaque white glass, bubbly. Length 20mm, diameter 3mm. C1703, fill of outer ditch. Illus 7.62
- SF161337 Irregular lump of opaque yellow glass. Very abraded. 9 x 8 x7mm. C161048. Fill of outer ditch
- SF161507 A piece of glass rod, broken at one end, worn to a blunt point at the other. Opaque light green. Length 15mm, diameter 2mm. C161062. Fill of outer ditch. Illus 7.62

7.14 Handmade Pottery from the Craw Stane complex, Tap o' Noth and Cairn More

GEMMA CRUICKSHANKS AND LEANNE DEMAY

Summary

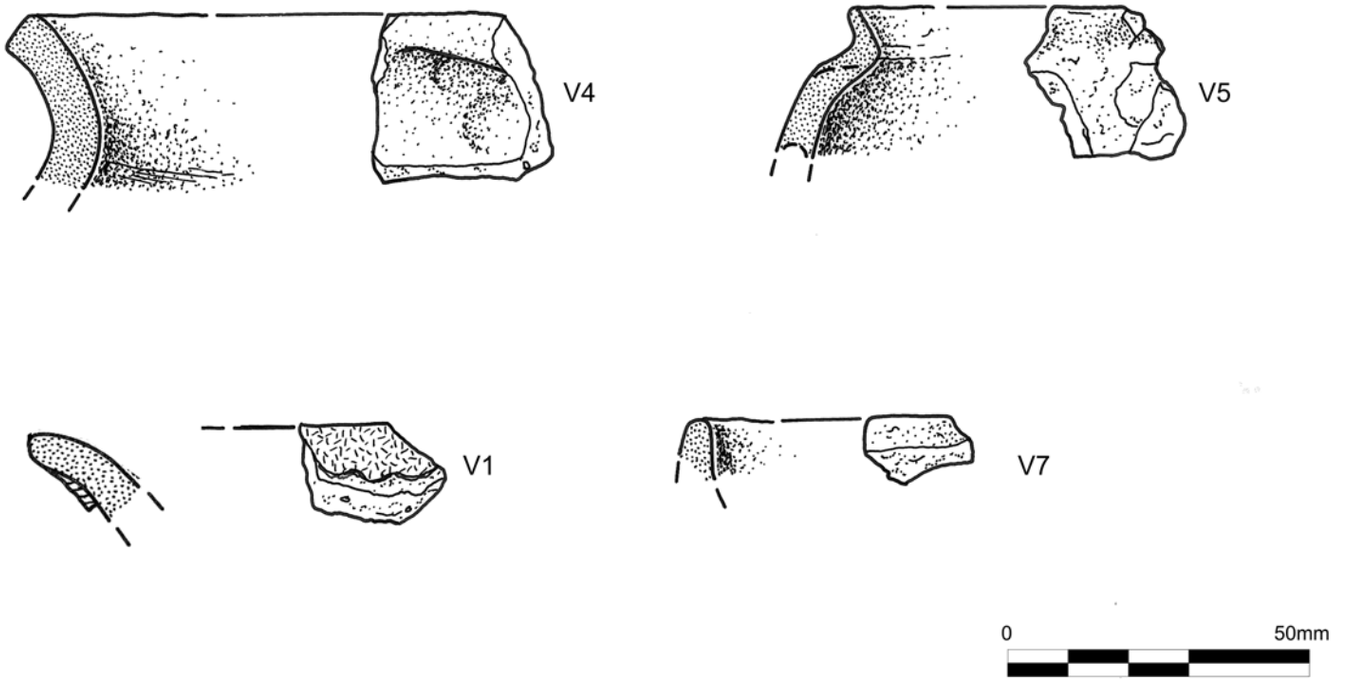
Two small assemblages of handmade pottery were recovered from the Craw Stane complex and Tap o' Noth, and a single undiagnostic sherd was found at Cairn More. Twenty-eight sherds from a minimum of seven vessels are from the Craw Stane complex, all from the upper fills of the outer ditch, dating to the 5th and early 6th centuries AD. Tap o' Noth produced 46 sherds from a minimum of seven vessels, predominantly recovered from floor layers on platforms in Trenches 5, 11, 12 and 17, spanning phases of occupation between the mid-3rd and mid-6th centuries AD. Everted, rolled and plain rounded rims from vase- and bucket-shaped vessels are represented. Contemporary parallels are scarce, but the similarities with slightly earlier assemblages in north-east Scotland reveal a longer handmade pottery tradition than previously thought.

Method

Each sherd was catalogued in accordance with the Prehistoric Ceramics Research Group's recommended methods (MPRG 2016). Sherds were divided into separate fabric groups for each site and assigned vessel numbers based on differences in form, surface treatments and dimensions. Each of the 'vessels' represents a minimum of one vessel but could conceivably comprise more than one very similar vessel. Degree of wear was recorded along with the position and extent of residues and/ or soot. The fabrics and forms for each assemblage are summarised first, followed by a joint discussion at the end. Catalogue entries for each vessel are found at the end and a full catalogue detailing each sherd is in the archive.

Fabric and Form: Craw Stane complex

Four fabric types were identified:
A: Fine sandy clay with occasional small (0.5–1mm) mixed rock inclusions (Vessels 1, 2 and possibly 4).
B: Sandy clay with moderate small quartz inclusions (0.5–1mm). Appears sandier/grittier than Fabric A (Vessel 3 and possibly 4).
C: Fine, hard-fired grey clay. No obvious inclusions and a flakier fracture (Vessel 5).
D: Fine, micaceous, soft clay. No obvious inclusions (Vessels 6 and 7).
Some of the fabrics, particularly A and B are not always very distinct from each other and may represent a spectrum within the same variable clay source. Thin-section analysis of similar fabrics from Sculptor's Cave and Birnie, both in Moray (Sahlén 2020;



Illus 7.63
Illustration of handmade pottery vessels from the Craw Stane complex. Alan Braby

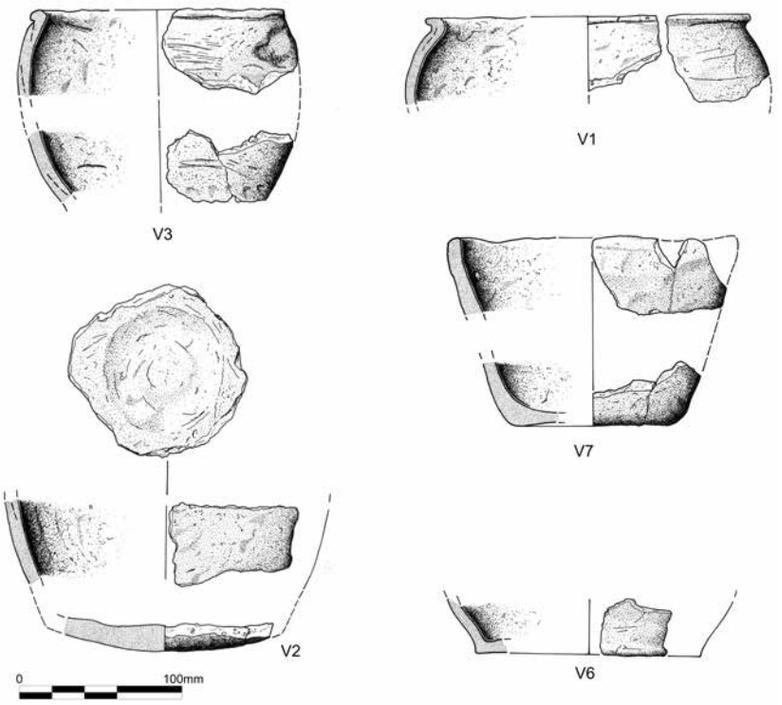
2009: 36), has shown that such fabrics were usually locally sourced and while their inclusions appear indistinct, their regularity and even distribution suggests they were often deliberately added (Sahlén 2020).

Form

Vessels 1, 4, 5 and probably 7 (Illus 7.63) had everted rims, while Vessel 6 had a thick, plain, rounded rim. There are no diagnostic sherds (eg rims) from Vessels 2 and 3; they are designated separate vessels from fabric or surface treatment only. No basal sherds are present, and therefore no complete vessel profiles can be reconstructed, but everted-rimmed vessels tend to be vase-shaped with rounded shoulders, narrowing to a flat base. Intact wall thicknesses vary between 7 and 10mm, with most measuring around 8mm. No sherds are large enough to estimate original vessel diameter.

Fabric and Form: Tap o' Noth

Five fabric types were identified:
A: Fine clay with frequent sub-rounded grits (*c* 0.1–4.5mm) (*c* 5–10%) including quartzite and a distinctive orange-red grit (Vessel 3)
B: Fine sandy clay with a few small (*c* 0.1–3mm) quartz inclusions (Vessel 1)
C: Sandy clay with frequent angular grits (*c* 0.1–4mm) (*c* 5%), mostly quartzite, micaceous (Vessels 2, 5 and 7)
D: Fine clay, micaceous with occasional inclusions (*c* 0.1–1mm) (Vessel 4)
E: Similar to A, but with distinct mica inclusions (*c* 5%) (Vessel 6)



Illus 7.64
Illustration of handmade pottery vessels from Tap o' Noth. Alan Braby

Form

Vessel 1 has a short, everted rim while Vessel 3 has a rolled rim defined by a circumferential groove around the exterior, and Vessel 7 had a plain rounded rim (Illus 7.64). Basal sherds are present from Vessels 2, 4, 6 and 7, illustrating they were flat based, with the interior of Vessel 2's base displaying a distinct circular depression. Such depressions served to reduce the thickness of clay at the base to aid even firing and while concentric striations within the depression in Vessel 2's base give it the appearance of a wheel-thrown pot, it would seem odd to hide such a feature on the inside if purely for aesthetics.

While no complete profiles survive, Vessels 1 and 2 share the same vase-shaped profile with everted or rolled rims and rounded shoulders, tapering to narrow, flat bases. Vessel 7, with its plain rounded rim, was more bucket-like and the other vessels could have been either vase or bucket forms; not enough survives to determine which. The average wall thickness is 8mm (all within 7–9mm). The rim sherds from vessels 1, 3 and 7 are sizeable enough to estimate their original external rim diameter. Vessels 3 and 7 both have an estimated rim diameter of 140mm and Vessel 1 is slightly larger with a rim diameter of 180mm.

Fabric and Form: Cairn More

The single undiagnostic body sherd (SF802) retrieved from an occupation deposit (C8005) at Cairn More has a broadly consistent fine micaceous fabric and wall thickness (8mm) but is too abraded to comment on further.

Construction, function and wear: Craw Stane complex and Tap o' Noth

Technology and Manufacture

The highly variable sherd colours at the Craw Stane complex reveal fairly inconsistent firing conditions. Even across a single sherd some areas are oxidised and others reduced. In contrast, the sherds from Tap o' Noth were predominantly oxidised on the exterior with a reduced core, suggesting reasonably consistent firing. All the vessels from both sites had smoothed surfaces, suggesting they had been wiped with a wet cloth or hand prior to firing. This technique brings smaller clay particles to the surface, creating a smoother finish either for aesthetic purposes or to seal any small gaps and improve water-retention. Smoothing on both the interior and exterior surfaces suggests it was not simply for aesthetics.

The surface of the Craw Stane complex's Vessel 3 was burnished to create a shiny, polished black finish. Aside from some very fine organic impressions on the exterior of Vessel 5 (possibly hair?) there is no evidence of organic tempering. However, occasional grass or chaff impressions on broken edges of the Tap o' Noth sherds indicate there was some organic additions to the clay there.

The sherds from the Craw Stane complex were too fragmentary to determine which manufacturing technique was used, eg diagonally-joined straps, or 'tongue and groove' methods, although the lack of obvious join breaks on broken edges would argue against tongue and groove construction, which tends to leave distinct traces. Where discernible, angled-strap construction was used for the Tap o' Noth pots.

Function

Vessel 1 from the Craw Stane complex preserves soot and burnt residues on the exterior and interior surfaces, indicating it was most likely used for cooking food. Slight sooting on the interior of Vessels 3, 4 and 5 imply proximity to an open fire, also likely to represent cooking or heating water. As the original diameters cannot be measured, it is difficult to interpret if any were large enough to be storage vessels, but the relatively thin walls and presence of sooting on most suggests not or at least that they had multiple purposes and functions. At Tap o' Noth, all vessels apart from Vessel 4 show exterior sooting and vessel diameters (140–180mm, where measurable) indicate a cooking or serving, rather than storing, function.

Phytolith analysis of selected sherds from both sites indicates they held a barley-based food, such as a porridge or stew at some point during their use and does suggest that some of the vessels, perhaps intermittently, were used for storage (Section 8.5).

There are examples of ceramic vessels found sunk into the ground beside metalworking furnaces at Midhowe (Callander & Grant 1933: 476) and Howe (Ballin Smith 1994: 52), both in Orkney, which may have been used to hold water for quenching hot tools. It is worth considering, given the sherds deposition amongst extensive metalworking debris deposits in the outer ditch, that the pots there need not necessarily have had a solely domestic function at the Craw Stane complex, or that cooking pots could have been later repurposed for other functions.

Wear

The degree of wear on each sherd was recorded on a scale of 1 to 4, with 1 representing freshly broken vessels and 4 showing a high level of abrasion. This was used to analyse how much the pottery may have moved around since deposition, creating the potential to identify residual sherds from primary deposits. At the Craw Stane complex sherds from all vessels apart from Vessel 6 show fresh breaks or only slight wear, while the single sherd from Vessel 6 is notably more worn. The Tap o' Noth assemblage similarly has very little wear, suggesting it had moved very little since breaking.

Discussion: context and significance

All the sherds from the Craw Stane complex were recovered from fills of the outer ditch (C1703, C1707, C161003, C161047, C161048, C161054). Upper ditch fill C1703 produced 21 of the 28 sherds, including all but two sherds from Vessel 1 (15/17), and all sherds from Vessels 3 and 6. This, along with the lack of wear on most sherds, suggests they saw little movement after deposition. Notably, while the single sherd from Vessel 6 was significantly more worn than the other sherds it is also the only vessel with a robust, rounded rim, suggesting it may be older than the rest of the assemblage and unrelated to the early medieval activity. Vessels with plain rounded rims have a lengthy history but its relatively fine fabric suggests a broad later prehistoric date.

The upper fills of the outer ditch have been radiocarbon dated to between the 4th and 6th centuries AD. While this only dates the final deposition of the pottery rather than its manufacture and use, the relatively fresh condition of the sherds suggests they are unlikely to have derived from activity much earlier than this.

The Tap o' Noth assemblage was found in occupation deposits on several platform structures. Vessels 1, 2 and 3 were from the main occupation layer (C5101) on platform 5, Vessels 4, 5 and 6 from platform 11 deposits (C11002, C11003, C11004, C11005 and C11010) and Vessel 7 was found in the platform 12 lower floor deposits (C12003). Vessels 4 (flat base sherd) and 7 (bucket-shaped with rounded rim) came from earlier phases of occupation which have been radiocarbon dated to mid-3rd to early 5th centuries AD. The other vessels are from later deposits dating to the early 5th to mid-6th centuries.

Securely dated handmade pottery assemblages from the early and middle first millennium AD are scarce on mainland Scotland, exceptionally so from the timeframe represented here. Therefore, despite the small size and fragmentary nature of this assemblage, it is of great value in revealing a tradition of handmade pottery later than previously evidenced in this region. Scarcity of parallels makes any wider contextual discussion challenging, but the similarity of some of these vessels to Roman Iron Age pottery in north-east Scotland is striking. For example, vessels with similar everted rims and fabrics to those here are known from 2nd- to 4th-century AD deposits at the promontory fort of Dunnicaer, Aberdeenshire (Cruickshanks 2020b), two similar vessels from Birnie, Moray, contained hoards of late 2nd-century AD Roman denarii (Holmes 2006: 3, fig 2) and several everted-rimmed vessels were recovered from the Roman Iron Age layers in Sculptor's Cave, Covesea (Cruickshanks & Sheridan 2020). No aspects of this assemblage would be out of place on a Roman Iron Age site several centuries earlier, revealing the continuation of local handmade pottery traditions into the early medieval period.

From other areas of Scotland there are glimpses of a range of forms in this period, such as a flattened beaded rim from Tarradale (visually similar to the 'rolled' rim from Tap o' Noth) (McGill 2001: 246) and a range of flat, flaring, everted and inverted rims from Phase 3 (5th to 7th centuries AD) at Eilean Olabhat, North Uist (74, illus 27). A similar range of slightly everted, rolled and plain tapered rims are present in Phase 6 (4th to 8th centuries AD) at Pool on Sanday, Orkney (Hunter 2006: 83; MacSween 2006: 312, illus 8.1.15) and comparable forms in Phase 8 (*c* 4th to 7th centuries AD) at Howe, Orkney (Carter 1994: 262; Ross 1996: 253, illus 152). The broad forms present at the Craw Stane complex and Tap o' Noth are therefore geographically widespread at this time and regional diversity is more likely to be found in aspects like decoration, which is completely absent here.

Within the broader trends in form, however, subtle differences are seen when comparing the Craw Stane and Tap o' Noth assemblages. For example, less consistent firing conditions at the Craw Stane complex, and the presence of occasional organic temper at Tap o' Noth, reveal some of the finer detail in local potting traditions. Therefore, from the little evidence we have, early medieval handmade pottery forms follow geographically broad trends, with some regional variation, but also finer variations between sites, as is typical for small-scale local production. The Craw Stane complex and Tap o' Noth pottery assemblages illustrate the potential of a wider study to fully understand the organisation of handmade pottery production during this period.

Catalogue

A full catalogue of each sherd is in the archive with vessels summarised here. Measurements are in mm. Abbreviations: T thickness, SF small find number, C context.

The Craw Stane complex

A single wall sherd SF161041 (C161003) is not included below; it could not be assigned to a specific vessel but is not distinct enough to be a separate vessel.

Vessel 1 (Illus 7.63)

Two everted rim sherds (SF1783B and 1783G, the latter just the tip) and 15 wall sherds from a vessel with smoothed interior and exterior, sooting and residues on interior and exterior and low levels of abrasion on broken edges. Colour is predominantly pale brown on the exterior, with a black/ grey core and interior. Fabric A. Average wall T 8.

SF1772, 1786, 1783A, B, D–H, 1785A–F: C1703

SF1804, 1805: C1707

Vessel 2

A single wall sherd (SF161254) from a vessel similar to V1 in fabric (A) but less well-fired, slightly more worn and lacking soot or residues. Wall T 8. C161047

Vessel 3

Five wall sherds from a vessel with black, burnished outer surface. Some sooting on the interior, coloured grey with a red-orange core and only slight wear on the broken edges. Fabric B. Average wall T 7.5.

SF1709A–E: C1703

Vessel 4 (Illus 7.63 and 7.64)

An everted rim with slight, rounded external lip (SF161403). Finely smoothed exterior with patches of sooting present. Grey with a red-brown core and only slight wear on the broken edges. Fabric A or B. Wall T 9. C161048

Vessel 5 (Illus 7.63)

A small, finely shaped everted rim (SF161511) from a vessel with smoothed surfaces, slight sooting on the exterior and freshly broken edges. Grey colour throughout. Fabric C. Wall T 7. C161054

Vessel 6

A single, thick, rounded rim sherd (SF1783C) from a vessel with smoothed surfaces. No soot or residues present and edges much more worn than other sherds. Pale grey-brown in colour throughout. Fabric D. T 10. C1703

Vessel 7 (Illus 7.63)

A single tapering rim sherd (SF161187), most likely from an everted rim. Smoothed surface, no soot or residues, pale brown-grey throughout and only slightly worn on edges. Fabric D. T 5 (incomplete). C161003

Tap o' Noth

Vessel 1 (Illus 7.64)

Two rim and four body sherds from a medium-walled vessel with short everted rim. Shallow finger impressions are visible around the rim's interior. Sooting and smoothing on both faces were smoothed with rare fine organic impressions visible. Fabric B. No abrasion. Estimated rim D *c* 180 (*c* 21%); wall T 8mm.

SF 510 and SF517: Tr 5, C5101 (hut platform, occupation deposit)

Vessel 2 (Illus 7.64)

One large, flat base sherd and six body sherds from a medium-walled vessel. Interior and exterior are sooted, and smoothed with occasional burnt-out fine and coarse organics (straw?). Interior of base shows a circular depression, resembling wheel-thrown pottery. Oxidised faces, reduced core. Fabric C. No abrasion.Wall T 9; base T 12.

SF511, SF512 and SF521: Tr 5; C5101 (hut platform, occupation deposit)

Vessel 3 (Illus 7.64)

One rim and nine body sherds from a medium-walled vessel with rolled rim, defined by a circumferential groove on the exterior. Frequent burnt-out coarse organics (straw/chaff?). Exterior shows coarse circumferential wipe marks (coarse cloth/grass?) and heavy sooting. Light greyish-buff exterior, pale grey core, light buff-orange interior. Fabric A. Sherds from Tr 5 show no abrasion, those from Tr 17 are moderately abraded. Estimated rim D *c* 140 (*c* 17.5%); wall T 8mm.

SF516 from Tr 5, C5101 (hut platform, occupation deposit)

SF1704 and SF1706 from Tr 17, C17002 and C17003 respectively (floor layers).

Vessel 4

Two base sherds, one body sherd and four fragments from a flat-based vessel. Occasional fine and coarse (straw?) burnt-out organics. Oxidised exterior, reduced core and interior, buff where faces are intact. Most sherds are incomplete and fractured. No sooting or residues. Fabric D. Some abrasion. Wall T 8mm.

SF1128: Tr 11; C11015 (hut platform, hearth 3)

Vessel 5

Four small body sherds from a medium-walled vessel. Occasional fine and coarse (straw?) burnt-out organics. Buff; oxidised interior, reduced core and exterior. Fabric C. Sooting to exterior. Some abrasion. Wall T 8–10mm.

SF1102, SF1108, SF1111: Tr 11, C11002 (hut platform upper occupation deposit)

SF1123: Tr 11, C11010 (hut platform burnt/collapse deposit).

Vessel 6

One base sherd and three small body sherds from a medium-walled, flat-based vessel. Body projects at 45 degrees from base. Fine and coarse (straw?) burnt-out organics within fabric. Light orange-buff; oxidised faces, some reducing to core. Sooting to exterior. Fabric E. Some abrasion. Wall T 7; base T 10mm.

SF1115, SF1116 and SF1130: Tr 11, C11003; 11004; 11005 (deposits in and around upper and lower hut platforms)

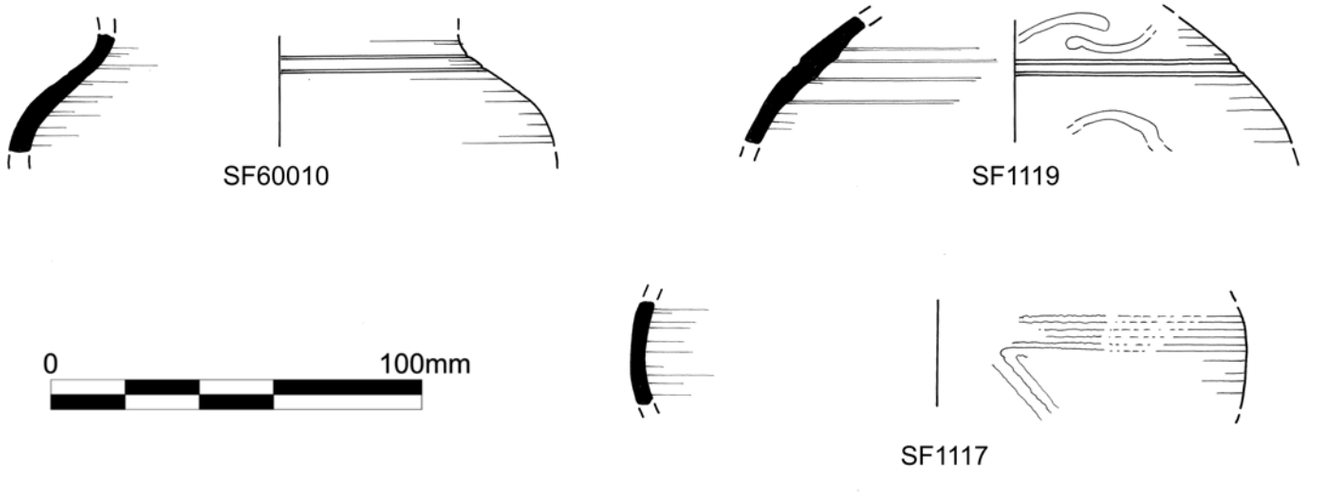
Vessel 7 (Illus 7.64)

Three rim sherds, three base sherds and three body sherds from a medium-walled flat-based bucket-shaped vessel with a tapering plain rim. Body projects at 45 degrees from base. Occasional fine and coarse (straw?) burnt-out organics within mid-grey-brown fabric. Sooting on exterior and possible residue on the rim. Fabric C. No abrasion. Estimated rim D *c* 140; Wall T 9mm.

SF1201, SF1202 and SF1203: Tr 12, C12003 (Lower occupation deposit, lower hut platform)

Cairn More

SF802: A very abraded handmade body sherd made from micaceous fine clay with occasional (5%) sub-rounded grits (*c* 0.1–1mm). Light orange coloured exterior with a grey reduced core. Abrasion has removed any traces of surface treatments. L 31; W 28; T 8mm; 6.6g. C8005: occupation layer



Illus 7.65
Illustration of Romano-British pottery from Tap o' Noth. Alan Braby

7.15 Imported Pottery at the Craw Stane Complex and Tap o' Noth

7.15.1: Roman and Romano-British Pottery from Tap o' Noth

JAMES GERRARD

An assemblage of 23 sherds of Roman and Romano-British pottery weighing 80.1g was recovered (Table 7.19). This is a small assemblage by Romano-British standards, but it is an important group from a hillfort located far beyond the *limes*.

The topsoil (5001) in Trench 5 produced a single tiny fragment of Samian (1.1g) (SF503) probably from a Dr 33 cup form. The fabric is probably Central Gaulish and the vessel should date from *c* AD 120–200.

The floor layer (C6003) and fill (C6004) of post-hole [F6005] in Trench 6 produced 12 sherds weighing 55.2g (SF60009 and SF60010; Illus 7.65 and 7.66). These are all fresh but slightly abraded, perhaps a consequence of the ground conditions. All of the sherds are in a pale brown-buff fabric with a lighter, almost whiteish grey core. The external surfaces are smoothed, except in one case where the sherd has a burnished surface. Tiny well-sorted mica particles are visible in the external surfaces along with sparse and tiny angular black inclusions. The assemblage probably all derives from one or at most two vessels with a flagon or beaker being the most likely vessel form, although clearly diagnostic elements are lacking.

Identifying a source for this distinctively micaceous fabric (MICA) has proved difficult. Micaceous fabrics were produced at a number of kilns in early Roman Britain (for instance Davies et al 1993: 139–41), with poorly understood local manufacture of specialist wares like flagons along the Hadrianic frontier during the 2nd century (Alex Croom pers comm). These sherds are probably derived from a 2nd-century vessel but a precise identification eludes us.

Context	Fabric	Sherd Count	Weight (g)
6003/4	MICA	12	52.5
5001	SAM CG	1	1.1
11002	LNV CC	4	8.4
11009	LNV CC	6	18.1
Total		23	80.1

Table 7.19
Quantification of the Romano-British pottery from Tap o' Noth

Illus 7.66
Photograph of Nene Valley Ware from Tap o' Noth (SF1119). Leanne Demay/ National Museums Scotland

Trench 11 yielded ten sherds weighing 26.5g of Late Roman Lower Nene Valley Colour Coated Ware (Illus 7.66) (Tomber and Dore 1998: LNV CC). Four abraded body sherds (SF1117), probably from a beaker were recovered from floor layer (11002). One of these sherds had deep score marks cutting through the exterior slip and into the body of the vessel. These marks are probably best considered 'use-wear', or part of the afterlife of the vessel as a sherd.

The other sherds (SF1119, SF1120 and SF1121; Illus 7.65 and 7.66) are from floor deposits on platform 11 (11009). All of these probably derive from one vessel. One sherd is probably from the upper shoulder of a vessel and is decorated externally with an incised line or groove under its dark-brown slip. Above and below the groove and applied in typical fashion over-slip are two panels of white-painted lines. White-painted decoration is more common on later Roman Lower Nene Valley Colour Coated vessels (Perrin 1999: 98). The vessel is likely to have been a beaker (Howe et al 1980: Fig 5.48–50; Perrin 1999: Fig 61.172–73), or perhaps, given the groove with white-painted scrollwork above and below, a jug (Howe et al 1980: Fig 6.68; Perrin 1999: 98 and Fig 62.195). Again, the lack of diagnostic elements precludes a precise identification.

Discussion

The presence of these sherds so far north is noteworthy and requires explanation. How the vessels may have reached the site is uncertain. The early Roman Samian and micaceous sherds could have been acquired from a site along the Hadrianic frontier or in the lowlands of Scotland. Whether they reached Tap o' Noth as a complete vessel, or even in the 2nd century remains uncertain. The vessel(s) could have been scavenged, either in a complete or incomplete state, at a later date, or been acquired from an intermediary or intermediaries who had curated the vessel(s) from the early Roman period.

The recovery of Lower Nene Valley Colour Coated ware is potentially easier to understand. The industry was located in the eastern Midlands and was traditionally seen as focused on the small town of *Durobrivae* (Water Newton, Cambs.), although recent work has identified kilns producing very similar wares in *Lindum* (Lincoln, Lincs.) (Fiske & Rowlandson 2024). Products of the 'Nene Valley' were widely distributed in Roman Britain (Tyers 1996: Fig 218).

The distribution of LNV CC north of Hadrian's Wall is extremely restricted. A number of allegedly 'LNV CC' sherds have been claimed at a small number of Antonine sites (for instance Richmond 1980: 302; Keppie 1981: 54, 89 and Fig 26.38). However, these would be precociously early in an industry that seems to have begun in the middle of the 2nd century. Almost all of these Antonine sherds are likely to be either continental imports, or other Insular fabrics like Colchester Colour Coated Ware. The late Paul Bidwell (2019) was of the opinion the LNV CC was absent from the Antonine frontier.

LNV CC is present in early 3rd-century deposits at South Shields (Bidwell & Speak 1994: 221) and appears, not unexpectedly, at Severan sites like Carpow (Dore & Wilkes 1999: 544) and Cramond (Cook et al 2017: 36). Nevertheless, the fabric and form of the Tap o' Noth sherds places them firmly within the Late Roman products of the industry and thus they could not have been sourced from the pottery in use at Severan or earlier sites. Nene Valley ware was distributed to the northern frontier in small quantities during the 3rd and 4th centuries and it is most likely that the Nene Valley ware was acquired from these pottery-using frontier communities (Bidwell & Croom 2010: 31–2). Beyond the frontier the main occurrence of Late Roman LNV CC is at Traprain Law, where a variety of Nene Valley products are reported (Campbell 2012: Fig 18). Other findspots include Dumbarton Rock (Alcock & Alcock 1990: 116; Alcock et al 1992: 293) and Whithorn (Hill 1997: 293–4), where the sherds come from early medieval contexts. At Whithorn the site's maritime location and close proximity to Cumbria, with its Roman fortifications and settlements (for instance Zant 2019: 87), may explain the presence of the pottery. In simple terms the LNV CC probably reached Tap o' Noth, either as complete or incomplete vessels, from the northern frontier of Roman Britain *via* intermediaries located between the Forth-Clyde line and Hadrian's Wall.

7.15.2: Imported Early Medieval Ceramic Vessels from the Craw Stane complex and Tap o' Noth

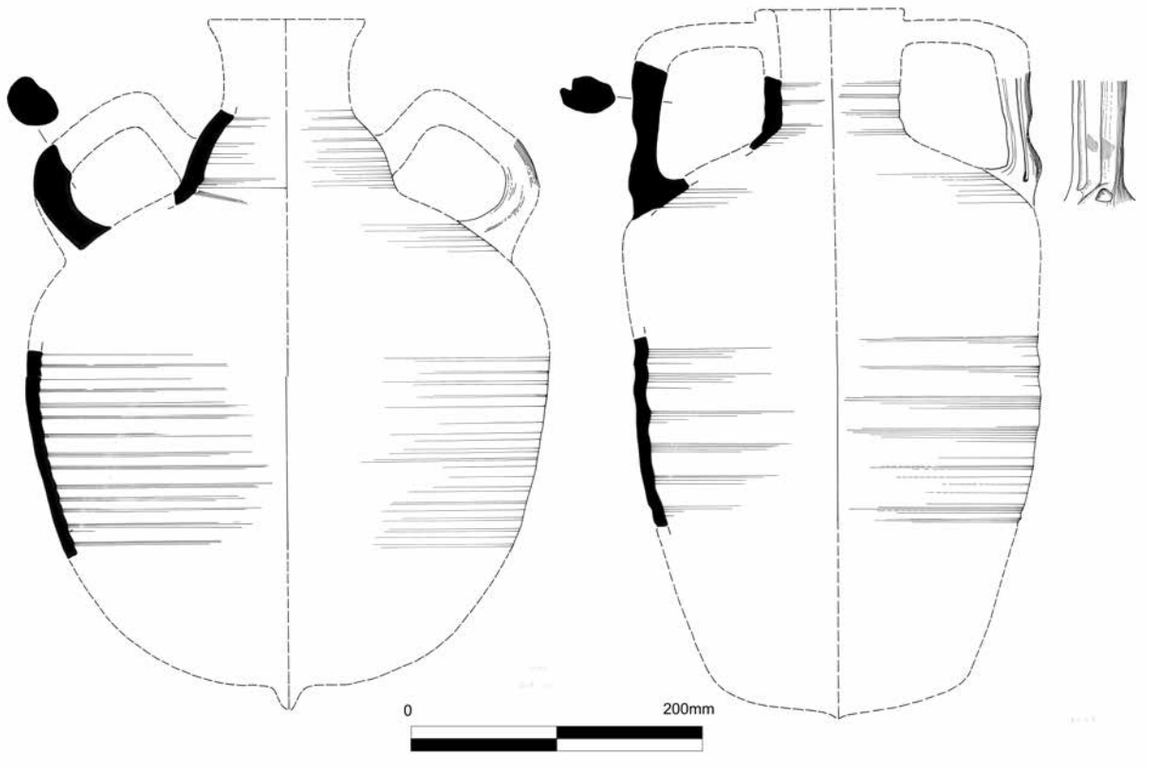
EWAN CAMPBELL

Late Roman Amphora 1 (LRA1)

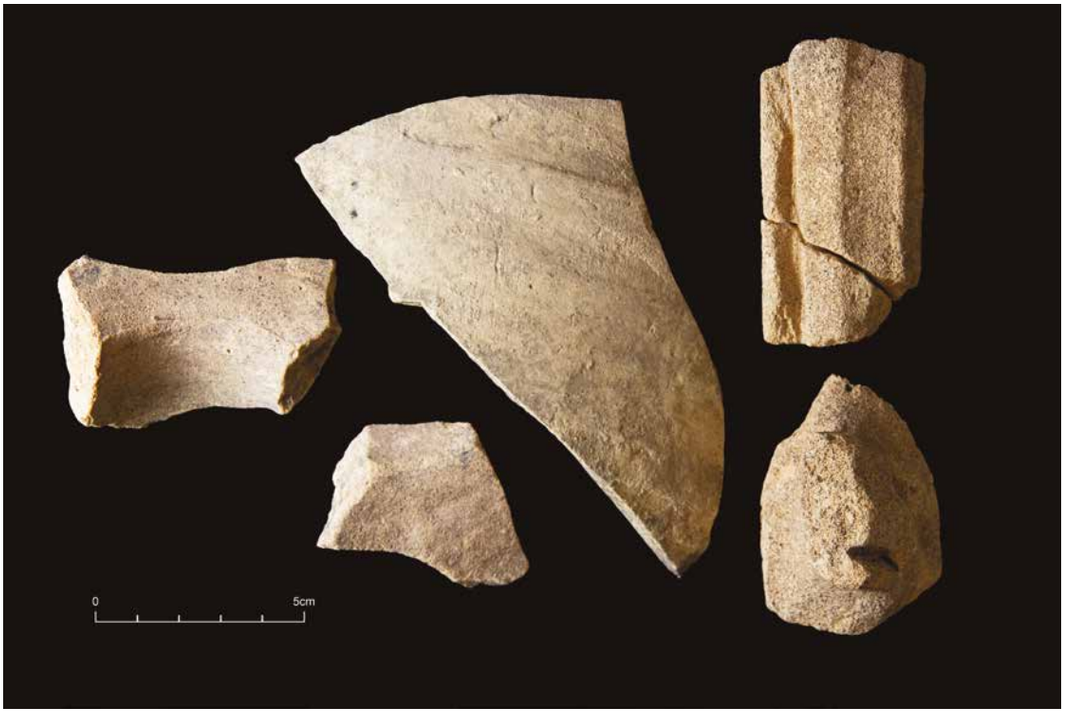
Around 72 LRA1 sherds were recovered from the Craw Stane complex, including body, neck and handle sherds, some joining (Illus 7.67). A further 13 small, fragmented LRA1 sherds were found on Tap o' Noth (Illus 7.68). The Craw Stane sherds provide a good indication of vessel form and size. The upright neck is at right angles to shoulder, thicker than the body, while internal neck diameter is *c* 70mm. The handle section (40 x 28 mm) is rounded with shallow finger grooves and one deep asymmetric groove, slight twisting towards lower end. The body has typical tegulated ribbing of varying width and prominence. Fabric is soft, gritty, buff or pinkish and numerous pits left by weathered out limestone with numerous inclusions of mixed grits (0.2–0.5mm), sub-rounded, including quartz, orange chert, mafic minerals, iron ore and yellow limestone. The sherds are mainly unabraded.

Variations in the overall LRA1 fabric suggest that there were at least three LRA1 amphorae from the Craw Stane complex and at least one from Tap o' Noth. Most of the sherds from the Craw Stane complex are in a typical gritty buff/pink fabric (*Vessel 1*), but there are large pieces in a smoother harder buff fabric (1822, 15061, 15026, 161101) (*Vessel 2*), and a few pieces in a softer more orangey fabric (161119, 161153, 161110) (*Vessel 3*). There are substantial fragments of two different handles. One of these (042, 044) joined six other bodysherds (054) from a context in the palisade destruction level showing that a significant section of an amphora was deposited here.

The sherds are from a type of medium-sized cylindrical amphora (Illus 7.67 and 7.68), belonging to the well-known Late Roman Amphora 1 (Riley 1979; Riley et al 1989), sometimes referred to as Thomas's Bii type. This was one of the common transport amphorae of the Mediterranean in 5th to 7th centuries. The type was produced at many locations in southern Turkey and Cyprus, and different sources may be discriminated by petrographic work (Williams 2005). The contents carried in the amphorae are disputed, but both wine and olive oil are possible.



Illus 7.67
Reconstruction of LRA1 and LRA2 amphorae from the Craw Stane complex. Alan Braby



Illus 7.68
Photograph of LRA1 sherds from Tap o' Noth. Leanne Demay/National Museums Scotland

Examples reached Britain in a short period from the late 5th to mid-6th century alongside fine tablewares forming a package of wares of eastern Mediterranean origin (Campbell 2007: 18–26). They are mainly concentrated in south-west England and believed to have been associated with the metal trade (Campbell 2007). Much small numbers are found scattered further north around the Irish Sea, with only two other sites in Scotland, at Whithorn Priory and Dumbarton Rock.

The fabric is softer than examples from the Mediterranean, due to the weathering of the limestone inclusions, but this is normal in the acid soils of western and highland Britain. The vessels would have been around 30 centimetres in diameter, and around 50 centimetres high, with a capacity of around 30 litres.

- SF011 Small bodysherd of LRA1 amphora. Buff fabric. C001
- SF026 Two joining sherds from neck/shoulder. Buff fabric. Neck upright, internal diam 70mm. 110 x 45mm, T 6–10mm. C025, slot 5
- SF028 Small bodysherd of LRA1 amphora. Buff fabric. C025
- SF034 Small bodysherd of LRA1 amphora. Buff fabric. C025
- SF039 Seven non-joining bodysherds of LRA1 amphora with broad tegulated ribbing. Buff fabric. C025, slot 10
- SF042 Handle of LRA1 amphora in two pieces. Asymmetric section with two curved grooves. Also five small bodysherds. Buff fabric. 73 x 36mm, T 25mm. C025
- SF044 Handle and neck attachment of LRA1 amphora. Asymmetric section with two curved grooves. Buff fabric. Same handle as 042. 50 x 40 mm. C025
- SF049 Small bodysherd of LRA1 amphora. Buff fabric. C025
- SF054 Six joining sherds and one other, forming a large section of the body of a LRA1 amphora with broad tegulated ribbing. Remains of the luting of a lower handle attachment. Buff fabric. 113 x 93mm, T 8–10mm. C025. Joins handle 042/044
- SF055 Small bodysherd of LRA1 amphora. Buff fabric. C025
- SF1822 Two large joining bodysherds LRA1 amphora with wide-spaced rilling, from lower body. Buff fabric. Body diam *c* 400mm. Size 175 x 90mm, T 8–10mm. C1702
- SF15009 Small bodysherd of LRA1 amphora. Orangish fabric. C15007
- SF15024 Four small bodysherds of LRA1 amphora. Buff fabric. C15005
- SF15026 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 73 x 60mm, T 7–9mm. C15005
- SF15029 Small bodysherd of LRA1 amphora. Buff fabric. C15007
- SF15031 Two non-joining bodysherds LRA1 amphora with wide-spaced rilling. Buff fabric. T 7–10mm. 70 x 57mm and 40 x 41mm. C15005
- SF15032 Small bodysherd of LRA1 amphora. Buff fabric. C15005
- SF15036 Three joining and one non-joining bodysherds of LRA1 amphora with broad tegulated ribbing. Buff/pinkish fabric. 80 x 60mm, T 8–9mm. C15005
- SF15038 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 36 x 30mm, T 8mm. C15005
- SF15040 Five small bodysherds of LRA1 amphora with broad tegulated ribbing. Buff fabric. C15005
- SF15041 Small bodysherd of LRA1 amphora with narrow tegulated ribbing. Buff fabric. C15005
- SF15042 Two small bodysherds of LRA1 amphora. Buff fabric. C15005
- SF15043 Small bodysherd of LRA1 amphora. Buff fabric. C15005
- SF15048 Large bodysherd of LRA1 amphora with narrow tegulated ribbing. Buff fabric. 62 x 51mm, T 7–9mm. C15005
- SF15049 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 40 x 32mm. C15005
- SF15050 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff/pinkish fabric. 54 x 46mm, T 7–8mm. C15005
- SF15052 Small bodysherd of LRA1 amphora. Buff/pink fabric. C15005
- SF15055 Large bodysherd of LRA1 amphora with narrow tegulated ribbing. Buff/pinkish fabric. 37 x 32mm, T 7mm. C15005
- SF15056 Small bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. Unstratified
- SF15060 Small bodysherd of LRA1 amphora with broad tegulated ribbing. Buff/pinkish fabric. C15007
- SF15061 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 75 x 51mm, T 6–8mm. C15007
- SF15064 Bodysherd of LRA1 amphora with broad tegulated ribbing. 82 x 50mm, T 7–10mm. C15007
- SF15083 Large bodysherd of LRA1 amphora. Buff fabric. 43 x 62mm, T 6mm. C15005
- SF161031 Small bodysherd of LRA1 amphora. Buff fabric. C161003
- SF161038 Five bodysherds of LRA1 amphora. Buff fabric. C161003
- SF161101 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 68 x 25mm, T 7mm. C161003
- SF161110 Handle of LRA1 amphora. Asymmetric section with two curved grooves. 36 x 27mm, T 20mm. C161037. Joins 161119 and 161153
- SF161111 Neck sherd LRA1 amphora. Red fabric. 55 x 30mm, T 7–13mm. C161037
- SF161119 One large fragment of a handle, with grooves, of a LRA1 amphora and many smaller pieces, including bodysherds. Orangish fabric. C161037
- SF161153 Upper part of handle of LRA1 amphora. Asymmetric section with two curved grooves. Joins 161110. 70 x 32mm, T 24mm. C161037
- SF161180 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 60 x 33 mm, T 7–10mm. C161003
- SF162000 Small bodysherd of LRA1 amphora. Topsoil.
- SF162001 Small bodysherd of LRA1 amphora with narrow tegulated ribbing. Buff fabric. C162001

- SF162017 Large bodysherd of LRA1 amphora with broad tegulated ribbing. Buff fabric. 35 x 40mm, T 8mm. C162001
- TAP SF501, 514, 515 Three groups of small fragmented bodysherds from a Late Roman Amphora LR1. The exterior shows the characteristic tegulated ribbing. The fabric is sandy, buff, soft. T 5. C5001 and 5004.

Late Roman Amphora 2

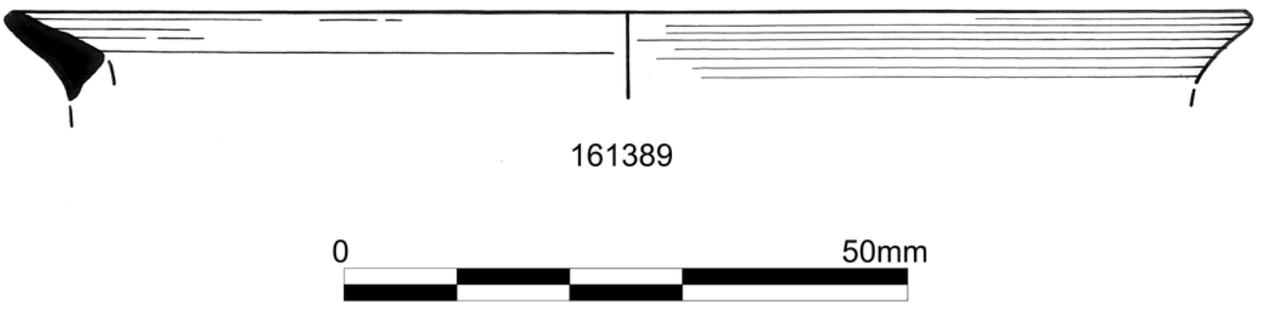
There are 17 sherds from typical LRA2 amphorae of the 6th century. The fabric and rilled decoration immediately identify it as a Late Roman 2 type (Riley 1979) (Illus 7.66). The fabric is smooth and orange to buff in colour, with limestone lumps and scattered quartz grains. As with LRA1, this was a common transport amphora of the 4th to 6th centuries in the Mediterranean, and is almost always found with LRA1 on British sites, and dates to the same late 5th- to mid-6th-century range. It was manufactured at various sites in the Aegean, and again contained wine or olive oil. Where identifiable, many of the sherds are from the neck/shoulder/handle area of the vessel. Only one sherd shows the combed rilling found on the upper body of LRA2 of this date. It is not clear if all the sherds come from the same vessel – two of the neck sherds appear to have different diameters, but this is not conclusive as the neck is conical in form. None of the sherds join, but most are unabraded.

- SF035 Shoulder sherd with base of handle of LRA2 amphora. Body with faint combed rilling, overlain by luting of handle. Size 35 x18 mm, T 6mm. Soft buff/pink fabric. Abraded. C025, Area F/G, slot 6
- SF205 Neck sherd of LRA2 amphora. Hard fabric orange-buff exterior, red interior. 45 x 40 mm, T 13mm, some abrasion. C218 palisade trench
- SF216 Large upper bodysherd of LRA2 amphora from just below neck, undecorated. Buff fabric. Size 83 x 75 mm, 8mm. Interior surface spalled off. C288
- SF217 Spall from inner face of bodysherd of LRA2, possibly SF216. Same fabric as 216. 50 x 35mm. C288
- SF218 Tiny spall of LRA2 amphora, possibly same as SF216. C288
- SF406 Small bodysherd of LRA2 amphora. 26x 20 x 8mm. C406
- SF1705 Two large shoulder sherds of LRA2 amphora, broken at neck junction. Neck diameter *c* 140mm. 90 x 68 and 45 x 43mm, T 10–12mm. C1703
- SF1745 Spall from surface of LRA2 amphora. 20 x 25mm. C1703
- SF1770 Large bodysherd of LRA2 amphora. Surface undecorated. Body diam *c* 400mm. 141 x 127mm, T 8–10mm. C1703
- SF1808 Shoulder/neck junction sherd of LRA2 amphora. Neck diam *c* 100mm, 60 x 40mm, T 9mm. C1726
- SF15012 Handle of LRA2 amphora, from neck attachment. Buff colour throughout. D-shaped in section, with finger grooves on outer surface. Handle 27 x 37mm. C15112, Structure 4
- SF15020 Small bodysherd of LRA2 amphora. 26 x 17 mm, T 5mm. C15007
- SF15030 Thick bodysherd of LRA2 amphora. 60 x 35mm, T 13mm. C15007
- SF15051 Two sherds from neck of LRA2 amphora. 44 x 28mm and 36 x 19mm,. T 20mm. C15096
- SF161013 Tiny abraded sherd of LRA2 amphora. 18 x 11mm, T 9mm. C161037

African Red Slipware (ARS)?

ARS vessels were imported as a rare accompaniment of tableware dishes alongside Mediterranean amphorae in western Britain. One sherd, SF161389, is from the rim of a bowl in fine orange-red fabric (Illus 7.69 and 7.70). Although the sherd is abraded and does not show any sign of slip, the form is similar to ARS Form 50 or 57 (Fulford & Peacock 1984: 67–71). These forms date here to the early sixth century (Campbell 2007: 18). The same form is found in some Late Roman wares such as Oxford ware, so it is possibly a residual item, but the fact that it was found stratified with LRA1 and LRA2 sherds in the outer ditch might support the attribution. The only other examples in Scotland are from Whithorn and Iona.

- SF161389 Fragment of an everted rim from a bowl. Estimated rim diam 200mm. Fine soft fabric, some mica and scattered quartz grains. 25 x 20mm. C161048. Illus 7.69 and 7.70



Illus 7.69
Illustration of African Red Slip ware. Alan Braby

Illus 7.70
Photograph of African Red Slip ware (SF161389). Leanne Demay/National Museums Scotland

Other unidentified pottery

The fabric of 162041 is also similar to that of ARS, though the piece is too small and abraded to have any certainty over this attribution. The piece has been ground down on two faces, a feature often seen on Samian ware sherds found on post-Roman sites in Scotland (Campbell 2012). It may have been used as jeweller's rouge to polish metalwork. It was found stratified with a cache of mould fragments in the outer ditch, which might support this identification. 531 is probably a post-medieval intrusion as it does not match any import fabric.

- SF162041 Abraded fragment of fine orange-red ceramic with scattered quartz inclusions. Perhaps rubbed down on two faces. 20 x 13 x 11mm. C162054

7.16 Discussion of Imported Glass and Ceramics at the Craw Stane complex and Tap o' Noth

EWAN CAMPBELL

The assemblage of imported pottery and glass vessels is small, but of great significance. In total there are a minimum of four LRA1 amphorae, one LRA2 amphora, one possible ARS vessel, two Group A glass vessels, three Group B vessels and one Group C vessel. Although not precisely dateable, all the material would fit in a late 5th- to mid-6th-century context. The lack of E Ware or any glass vessels associated with the later Atlantic trading system, confirms the radiocarbon dating evidence that the site was abandoned by the later 6th century, as such an important site would likely have received these imports. Almost all the imported material in Atlantic Britain is found on coastal sites, with only a scatter of usually single vessels found inland. The only inland sites with substantial numbers of imports are Cadbury Castle in Somerset and Clogher in Tyrone. Both of these are likely royal sites and important strongholds of their regions.

The Craw Stane complex and Tap o' Noth ceramic import occurrences lie far outside the normal distribution of Mediterranean wares in the world of Late Antiquity. They are not only the northernmost examples of amphorae from the entire Roman world, but the only ones known from eastern Britain. All the other Insular examples have a coastal Atlantic distribution. These sites lies more than 40 kilometres from the coast, again highly unusual for an import site of the period. All these factors suggest that the sites are extremely unusual, and of high status. Other sites which received quantities of these wares were often known or suspected to have royal associations, or were important ecclesiastical sites. The high-status secular centres seem to have acted as centres of importation and redistribution by gift to other sites (Campbell 2007). However the Craw Stane complex and Tap o' Noth material reached the sites, it illustrates the power and widespread contacts of the inhabitants. Although some glass did spread up the eastern coasts of Scotland from Anglo-Saxon England (Campbell 2009) and is found on sites such as Dundurn and Portmahomack, this material belonged to a Germanic tradition (Group B) of glass production, and represents a different system of exchange from the Group C/D Atlantic Tradition material from western France. Although most of the Group C/D glass is found alongside the later E Ware pottery, sites such as Whithorn (Campbell 2007: 106–8, figs 75, 76) show that its chronology overlaps with the earlier Mediterranean pottery in the early 6th century.

In terms of the stratigraphy and taphonomy of the material from the Craw Stane complex, virtually all of it was found in the latest contexts of the site, in the destruction layers of the palisade, the upper fill of the outer ditch and Structure 4. In some places in the outer ditch the imported pottery and glass was found alongside dumps of moulds and crucibles, but in others they were not, suggesting that there had been different activity areas within the enclosure. Large joining pieces of some of the amphorae were found in close proximity in some places, perhaps indicative that newly broken vessels had been swept out of the interior of the site. In other words, there is little likelihood that residual material was incorporated in the process of clearance of the site. No imported material was found in any of the primary fills of any of the structures, ditches or palisade, perhaps indicating that these had been constructed before the late 5th century, but it should be noted that only a small proportion of these features was excavated. Imported material was found in all sectors of the outer perimeter of the site, making it unlikely that the material came from a single midden. At Dinas Powys broken amphorae and glass vessels were swept out onto the rear of the rampart closest to the structures in which they had been used (Campbell 2007: fig 69), but there is no obvious relationship with Structures 1 and 3 at the Craw Stane complex. At Tap o' Noth, the LRA1 sherds were all similarly retrieved from later deposits. The sherds were found on T5 platform in possible disturbed material on the edge of the trench (C5004) and a floor layer (C5101).

7.17 Conclusion

This rich assemblage provides a vivid insight into the wealth of skills, past times and wider contacts possessed by the inhabitants of the Craw Stane complex, Tap o' Noth and Cairn More, casting new light on life during the 4th to early 7th century AD in

north-east Scotland. Metalworking evidence (discussed in Section 7.8) reveals production of a range of jewellery items, including icons of the early medieval period, such as handpins, nail-headed pins, spiral finger-rings and penannular brooches alongside objects never seen before. The moulds for a range of unique, naturalistic animal figurines reveal the skill of artists who had observed the animals with an exquisite level of detail.

Analysis of the wide range of metalworking residues has revealed they were working with iron, copper alloys and silver from a range of sources, including locally available bog iron ore and recycled Roman non-ferrous metals. Analysis of stone refining vessels (Section 7.5) has revealed they were not only melting silver to make new objects, but they were also refining the silver to make it purer. The silver-working evidence from the Craw Stane complex is a significant find which starts to bridge the gap between the world of Late Roman silver and the dominance of elaborate silver objects in early medieval Scotland. Further study of the silver-working evidence is planned, including composition analysis of the silver-casting debris and comparison with Late Roman and early medieval silver objects.

The range of wider contacts demonstrated by the imported ceramics and glass in particular, show clear links with Mediterranean, Germanic and Atlantic trading networks (Section 7.16). The amphorae fragments are the most northerly yet found and lie outwith the usual Atlantic coastal distribution of these forms. The presence of such a wide range of imports suggests the Craw Stane complex was a powerful centre of trade and redistribution.

While these imports provide clear evidence of wider contacts, the origins of other items remain unclear. For example, along with some of the glass vessels, the crumb bead, the pattern-welded knife, and possibly the copper-alloy pins and iron buckles have potential Anglo-Saxon parallels, or at least suggest some level of contact and subsequent adoption of items into local material culture. Aside from a single unprovenanced bead, there were no known Anglo-Saxon objects or Anglo-Saxon-influenced objects from Aberdeenshire (Blackwell 2018: 131) before this excavation.

It is tempting to focus on exotic contacts and labels like 'Anglo-Saxon' when examining such a difficult to parallel assemblage, but the wide range of objects also reveal local knowledge and traditions. Locally sourced stone types, handmade pots in forms familiar from several centuries earlier and evidence of structured deposition of items like rotary querns, decorative pins and deliberately damaged iron tools all sit comfortably within the archaeological record of north-east Scotland, providing glimpses of local roots.

The Craw Stane complex's assemblage as a whole cannot be paralleled in 4th- to 6th-century Scotland at present. While small quantities of comparable metalworking debris or a few fragments of similar imported vessels are found on other sites of this date (see Sections 7.8 and 7.15), no assemblages match the full scale and range of material discovered here. A large quantity of high-status metalwork was produced at the Craw Stane complex, by craftworkers with remarkable levels of technical skill and artistry. This, along with the evidence of extensive importation networks, indicate this site was a powerful centre of production and trade.

The closest parallels are to be found are in contemporary Irish sites, such as the early medieval settlement at Garranes, particularly at Lisnacaheragh ringfort (O'Brien and Hogan 2021; Ó Ríordáin 1942). Lisnacaheragh produced extensive metalworking evidence, including stone metalworking vessels and evidence of silver working, along with other rare craft evidence such as glass rods, implying a strikingly similar range of skills were present. Imported Late Roman amphorae sherds and a fragment of glass vessel reveal long-distance trade at Garranes too, while items like polished stone discs, a crumb bead and an amber bead add to the wide range of objects Garranes and the Craw Stane complex have in common.

While there are obvious risks of comparing two sites separated by such a distance, the parallels are striking. Garranes benefits from the survival of early texts which reinforce its interpretation as a royal centre. While the Craw Stane complex lacks such historical sources, the cluster of sculptured stones in the site's vicinity adds to the overwhelming evidence from the assemblage that this was one of the most important sites in Scotland at this time; almost certainly royal. Without more sites of this date, it is difficult to know how large an area the Craw Stane complex was controlling and distributing goods for, whether north-east Scotland or northern Scotland in its entirety. Both seem possible. Perhaps similar sites will be found in Scotland in future, but it is hard to envisage how any site could produce evidence of a higher status than the Craw Stane complex has. The Craw Stane complex assemblage with its array of remarkable finds sets a new benchmark for what to expect from an early Pictish royal centre.