All that glitters: the case for goldworking at the early medieval monastery at Portmahomack

Cecily A Spall

ABSTRACT: Excavation of the early medieval workshops at the Pictish monastic site at Portmahomack, Ross-shire, has revealed evidence for a range of crafts being practised, dated provisionally to the 7th to 9th century. The crafts of the smith (including glass-working), leather- and wood-workers are recognisable from discarded tools, and raw and waste (including failed) products, recovered mostly from features, floor layers and dumps within the main craft-working zone. The working of copper alloys and silver, signalled initially by crucibles, has been confirmed by a programme of XRF analysis, but to date evidence for goldworking at the site remains elusive. The possibility of early medieval gold-smithing at Portmahomack is examined and discussed in the context of the Tarbat workshops and evidence from contemporary sites in Britain.

Introduction

Over ten years of careful excavation at Portmahomack, Tarbatness (Fig 1) has revealed evidence for a Pictish ecclesiastical establishment of the 6th–10th centuries (Carver 2004). By the 8th century a simple stone church is believed to have stood on the the site within a burial enclosure that featured at least three large cross slabs. Zones of activity have been defined radiating from the church (Fig 2). In the closest excavation area to the church a concentration of craft-working evidence has been found, associated with dedicated workshops and yards arranged in relation to an impressive road, surfaced and kerbed in stone. Beyond the workshops a possible millpond, visible below a man-made terrace as a large stone dam and culverts, separates the workshops from an agricultural zone, characterised in the earliest phase by scratch ploughmarks, and later by a huge 'kiln-barn'. The whole settlement is surrounded by a large C-shaped vallum, showing initially as a cropmark and characterised fully during excavation, which is proposed as comparable to that surrounding the abbey at Iona.

Other features of this famous abbey have also been recognised at Tarbat, most importantly in the form of stone slab grave-markers and the identification of the monastic estate or 'island', its edges marked by the cross slabs at Hilton, Shandwick and Nigg. A preliminary account of these results from the first ten years of the research programme has been published recently (*ibid*). Systematic excavation of the Tarbat workshops has produced rich evidence for craft-working and the Tarbat assemblages of early historic craft-working material are becoming recognised as among the most important from early medieval Scotland to date.

The craft-working zone

The main zone of craft-working within the excavation area is situated close to the site of the monastic church enclosure (Fig 2). The zone is dominated by a stone-slabbed and kerbed road, raised on a causeway of re-deposited sand and gravel subsoil, flanked on both sides by drainage ditches, which may have been plank-lined. The road may have been reconstructed during the late 7th–8th century, but in its latest phase, its surface was refreshed by metalling with small well-sorted pebbles while the ditches were re-cut and maintained, possibly during the 9th–10th centuries.

The strata to either side of the road have been the focus

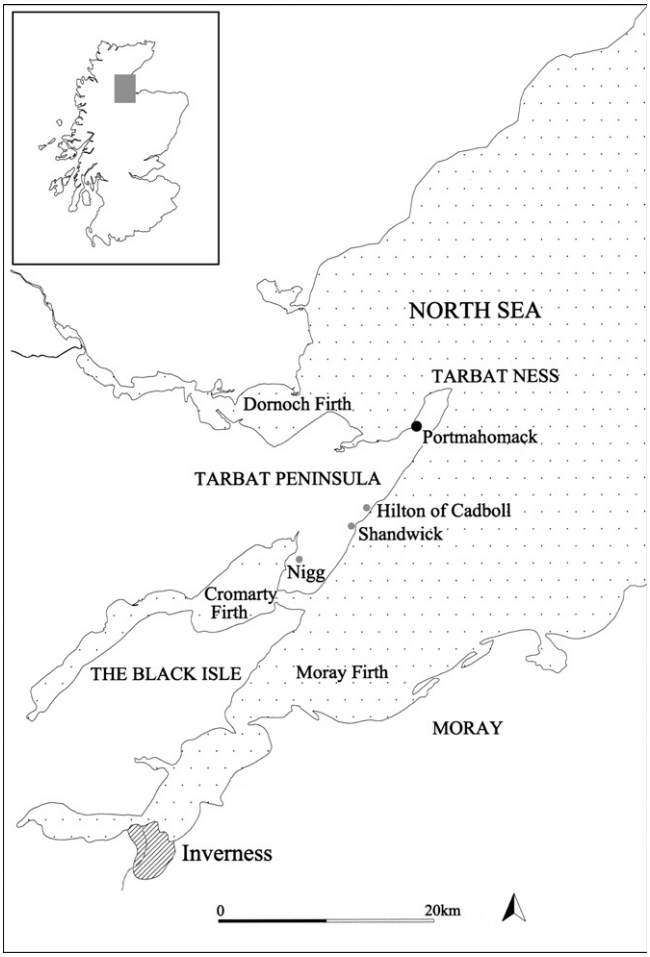


Figure 1: Location map showing places mentioned in the text.

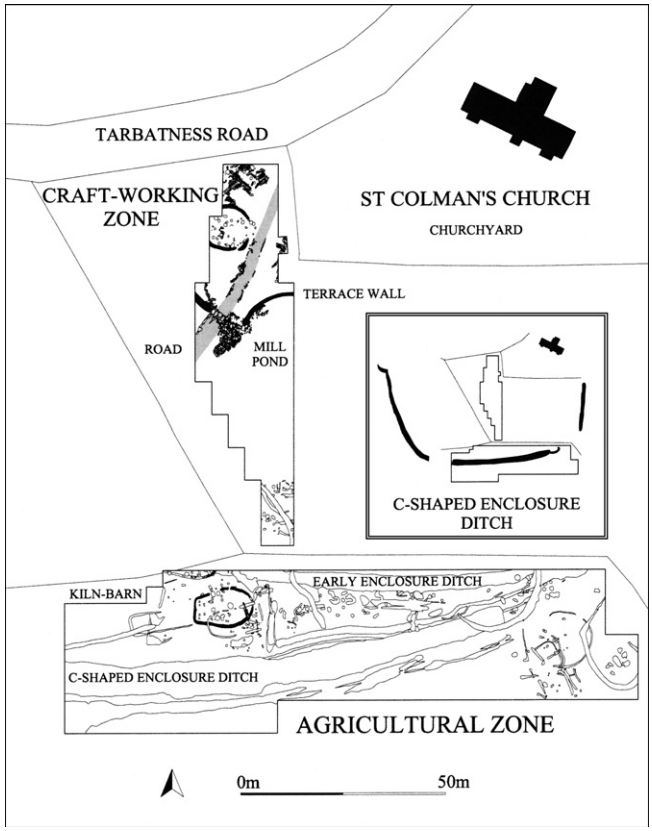
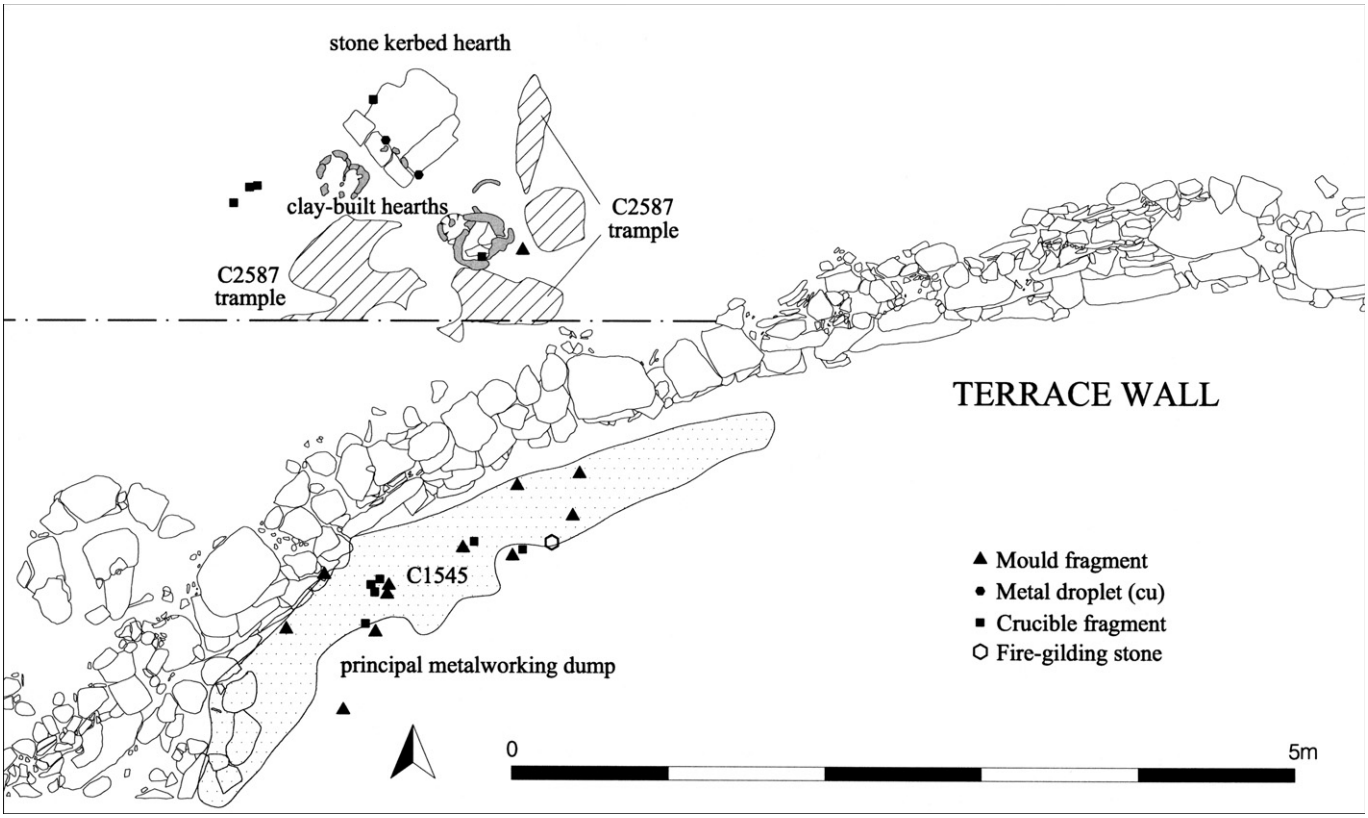


Figure 2: Site plan showing the church, the craftworking and agricultural zones, and the surrounding enclosure ditch.

Figure 3: Plan of central part of the craftworking zone, east of the road, showing the hearths and findspots of metalworking debris.



of eight seasons of excavation. Structures have been elusive, but a workshop, probably of cobble-and-turf construction over a timber frame, and apparently specialising in the production of fine leather, has now been identified to the west of the road. The unique assemblage of artefacts recovered from this building and its yard include an iron *lunellarium*, four pumice rubbers, burnishers, whetstones and needles. Alongside a stone-lined tank and residues of a fine white preservative agent, the finds indicate that fine leather is highly likely to have been produced by the workshop (Carver and Spall 2005). From the context of the peninsula cross-slabs it had already been supposed that a *scriptorium* was active at Tarbat (Higgitt 1982, 318).

To the east of the road, but possibly belonging to a late 8th to 9th century phase, an area of non-ferrous metalworking has been identified. A suite of hearths has been excavated, comprising stone-kerbed, open-fronted examples accompanied by small clay-built, stone-based features, which are thought to be without parallel on contemporary sites (Fig 3). Excavation and fine-sieving of the hearth fills has recovered small fragments of crucible, clay mould and droplets of copper alloy. Adjacent dumps contained complete specimens of bag-shaped crucibles as well as fragmentary triangular and open forms (Fig 4), clay moulds, and a range of stone implements. The crucibles have been analysed by X-ray fluorescence (XRF) (Heald 2003). The results have demonstrated the crucibles had been used to melt copper alloy and silver, interestingly, predominantly the latter (Andy Heald, pers comm).

Figure 4: A selection of bag-shaped, triangular and conical crucibles from the metalworking area.

In the sunken fills of an early enclosure ditch in the agricultural zone, adjacent to the 'kiln-barn', a second, significant assemblage of material has been recovered. This deposit contained moulds of the most intricate design bearing interlace and a floreate cross, and a disc decorated with peltae and spirals. A failed blue glass stud, with an as yet unspecified metal geometric wire-inlay, and yellow enamelling has been recovered, as well as a small opaque white glass stud with collar of similar design (Spall forthcoming). These studs are so similar in composition and design to those which punctuate the elaborate rim of the Derrynaflan patten that we can suggest that similar liturgical objects were produced at the Tarbat monastery. It is in this rich context of craft-working and patronage that we have been anticipating evidence for the working of gold in the workshops, and hope not only to confirm its presence, but to understand how it was employed.

Gold supply

The first challenge at Tarbat is demonstrating that gold was worked in the workshops at all, especially since no scraps or droplets have been recovered, and preliminary scientific investigation has not shown it to be present in the crucibles. On contemporary sites in Scotland evidence has been more forthcoming. At the Mote of Mark, evidence for refining gold was identified in some of the crucibles recovered (Longley 2001, 79). Tiny amounts of gold or fragmentary gold objects have been recovered from other sites; for example, the 7th century gold and garnet stud from Dunadd (Campbell and Lane 2000, 150, illus 4.53), the unusual gold ingot from Period I, and gilded silver from Period II at Whithorn (Nicholson 1997, 397-8). Even at Dunollie Castle, where evidence for craft-working was generally scarce, a small length of gold chain was recovered (Alcock and Alcock 1987, 141).

Native Scottish gold occurs near the surface inside Pictland (Caithness) and beyond (in the Borders) (Alcock 2003, 91) but there is no evidence that these sources were exploited during the early historic period. The source of precious metal at Tarbat appears, somewhat unsurprisingly, to have been recycled Roman antiquities, some items of which could conceivably have been of

gold. The recycling of Roman antiquities has not been detected in the composition of copper alloys identified by XRF, but has been demonstrated by the presence of two Roman artefacts at Portmahomack, an area in which the Roman presence is otherwise extremely sparse.

A copper alloy coin, an antoninianus of Tetricus II minted possibly at Trier between 270–273AD, was found at the churchyard gates in 1978, and almost certainly arrived at the peninsula in the early historic period for recycling. In spite of having circulated in Roman Britain in quantity, and therefore being one of the most commonly recovered Roman coins (Craig Barclay, pers comm), it is nonetheless 'a long way from home'. In addition, a carnelian gemstone, dated by Martin Henig to the 2nd century AD, was recovered from a dump in the metalworking area. Seaborne contacts which appear to have reached Tarbat included traffic from Frisia, the Rhineland and the Mediterranean; evidence from excavation of contemporary settlements suggests that gold passed through these areas, sometimes in quantity (*eg* Tulp 2003, 225).

While the arrival of Roman antiquities at Tarbat can be identified with reasonable confidence, and with it the likelihood that gold was therefore available, the broader model for the availability of gold is almost inverse to the investment in industry at the site. That is to say, when the Tarbat workshops were at their most productive and industrious, during the 8th–9th centuries, the gold sources which had been relied upon during the 5th–7th centuries had dried up and the metal would have been scarce at any site.

The gemstone

The oval gemstone represents a simple oval cabochon (21x14x3mm) and is made from carnelian. The front of the gemstone displays several areas of damage from having been prised from its metal setting. Whether the stone was mounted in iron, copper alloy, silver or gold is not clear, but its setting was valuable enough for the piece to have been transported far from the fringes of the Roman empire more than six centuries after its manufacture. This might suggest silver or gold, but is proof of neither. The damage wrought to the object during its removal from the metal setting put it beyond being reset and this does not seem to have been the intention or the reason for its presence in the workshop. Therefore this object is held to imply the recycling of gold.

The touchstones

Of the many stone artefacts which have been recovered from the metalworking zone, one has been identified as a possible touchstone and two others may also have been used in the same way. The former consists of a well-finished black fine-grained stone; it was 58mm long with a square cross-section of *c*17.5mm. These characteristics compare well with examples from a variety of British contexts (Moore and Oddy 1985). A small black pebble has also been recovered from a trample layer which accumulated around the metalworking hearths and a fragment of shale armlet recovered nearby would also have provided a suitably black background against which the colour of gold might be judged. No traces of gold were visible, but the same is true of a simple black pebble recovered during excavation at 16–22 Coppergate, York, which has been identified tentatively as a touchstone (Bayley 1992, 794).

The well-finished possible touchstone was submitted for XRF and EDX-SEM analysis, which were undertaken by Lore Troalen and Jim Tate of the Analytical Research Section of the National Museums of Scotland (Troalen and Tate 2006, 3–6). Microscopy showed the presence of gold-coloured particles, *c*50μm across, on the surface of the stone but EDX analysis in the SEM detected copper and zinc (brass) rather than gold. This did however confirm the object's association with metalworking. Its preliminary identification as a touchstone is still possible, though the analyses have failed to provide positive evidence that it has been used as such.

Moore and Oddy (1985) provide examples of touchstones of early medieval date, some from 7th-century Anglo-Saxon graves in Kent (Gilton-Town in Ash, Kingstone Down and Ozengell, Ramsgate), but others more importantly from craft-working contexts: two definite and five probable examples have been identified from Winchester, most from 9th–10th century deposits, some notably associated with buildings used for goldworking. To these examples can be added three further possible examples from Coppergate of 9th–10th century date (Mainman and Rogers 2000, 2497), a possible example from Whitby published as a penknife whetstone (Backhouse 1981, 31) and the gold 'rubbing stone' from Clogher (Youngs 1989, 210).

Two touchstones of 5th–9th century date from excavations of the Frisian terpmound at Tjitsma, near Wijnaldum in present day Netherlands, have been regarded as possible items of trade rather than indicators of goldworking *per se* (Tulp 2003, 223, fig 17.2). The Tarbat touchstone seems a little more secure, having been recovered from a craft-working zone, although the stone is clearly not native to the peninsula, where the geology is dominated by Old Red Sandstone.

Goldworking techniques

Solid cast gold elements in metalwork of 8th–9th century date are very rare, partly due to the metal's scarcity, but also due to the fact that casting such a malleable and versatile metal as gold is an extremely inefficient way to use it. Perhaps then we ought not to be surprised that no traces of gold have been identified in the Tarbat crucibles since, apart from refining or assaying, most goldworking techniques did not require molten metal. Instead, gold was worked cold which would not have produced waste or left residues.

Among the identifiable goldworking techniques on insular metalwork are foil or sheet onto which patterns were chased, carved, punched and stamped. Filigree, soldering and granulation did require molten gold, but the techniques must have required great discipline, and waste would have been rare, especially given that a minimum of heat was probably employed (Craddock 1989, 173). The same is true of wirework, which may have only required annealing. Consequently, few techniques might be expected to have left residues; one of the rare examples being fire-gilding.

The fire-gilding stone

Evidence for mercury- or fire-gilding is encountered most commonly in the analysis of objects. From these analyses, we know that the technique was commonly applied to early Anglo-Saxon copper alloy objects from the late 5th–6th centuries onwards (David Hinton, pers comm). The presence of mercury amalgams indicates not only that links existed with those areas of Europe where mercury could be obtained – Italy, Spain, Yugoslavia (Leahy 2003, 158–9) and possibly Ireland (Craddock 1989, 170) – but that exchange or supply was probably accompanied by the spread of new skills and knowledge in metalworking.

In spite of the fact that mercury-gilding was the most common method of gilding from the 3rd century AD (Lins and Oddy 1975), to date few examples of the practice exist in a craft-working context. A sealed capsule containing droplets of mercury was found in a Merovingian smith's grave at Hérouvillette, in Normandy (Decaens quoted in Oddy 1996, 82), and droplets have also been found, possibly residually at Hamwic (Bayley with Andrews 1997, 220), at York (Bayley 1992, 795), Hedeby and Lund, the latter in a workshop context (Oddy 1996, 82). From Britain, only one example of early medieval mercury-gilding has been identified, through analysis of a small mortar from the

Figure 5: The possible fire-gilding stone.

Middle Saxon settlement at Hamwic (Hinton 1996, 80–81). The flat stone with hemispherical depression was recovered from an early 9th-century craft-working context; visible red, black and yellow powdery deposits were analysed by XRF and emission spectroscopy, revealing the presence of a gold alloy and mercury salts.

The form of the Hamwic fire-gilding stone allows tentative comparison with a very similar stone from Tarbat. The object is a flat oval beach pebble with a central hemispherical indentation (Fig 5). The indentation is incredibly smooth and has clearly been used as a mortar. The indentation measured only 31mm across so the quantities involved were clearly small-scale. The stone is naturally micaceous and deceptively sparkly, but areas of blackening, which have the appearance of being simply burnt, represent the only possible residue visible to the naked eye. Due to the shape of the object, XRF analysis of the hollow was not possible, and it was too large for SEM analysis to be undertaken (Troalen and Tate 2006, 2). The dimensions and apparent function of the object in a metalworking context suggest the preparation of small quantities of possibly precious ingredients by grinding. Although analysis did not confirmed the object's use as a fire-gilding stone, it could be a second example from Britain, and the possibility that gold amalgam was being prepared in the Tarbat workshops remains.

Goldworking and fine leather

Of perhaps anecdotal interest is the close association between goldworking and fine leather. Some goldworking techniques – namely the production of gold leaf and foil, and the separation of excess mercury from gold amalgam using chamois leather (Oddy

1996, 81) – required fine leather or parchment. The preparation of a gold-mercury amalgam requires the gold to be in leaf form, the manufacture of which is facilitated by laborious hammering and rubbing of gold sheet interleaved in stacks of vellum or parchment (for a description see Campbell 1991, 131).

The Portmahomack repertoire includes the manufacture of leather, and it is highly probable that the resulting product was of the finest quality. Likewise, gold foil illumination might arguably have been applied to manuscripts and, though entirely conjectural, this possibility lends a comfortingly symbiotic relationship to the Tarbat workshops.

Conclusion

The recent interim publication of the site at Tarbat and its assemblages (Carver 2004) is intended to elicit comment and advice from colleagues while the workshops are still under excavation. With this comes the unfortunate position of having to commit ideas to paper before the sequence at the site has been established and therefore before the necessary intelligent and prudent programmes of analysis have been undertaken. While the evidence for goldworking at Tarbat is so ambiguous, and until the find-context of each artefact can be understood fully, any conclusions on this particular craft must remain tentative.

Until further analysis of the artefacts discussed above confirms the presence of gold in the workshops, the arguments presented here remain contingent ultimately on the context of the Tarbat monastery and on what we expect its workshops to have been producing with the patronage that they clearly enjoyed. The cross slabs at Nigg, Shandwick and Hilton stand alongside the three or more monuments which are likely to have stood in the burial enclosure at Portmahomack (Carver 2004, 14) as an index of the wealth of the monastic estate and its patrons. In addition, investment in the engineering and architecture of the entire Portmahomack settlement, not least of the workshop area itself and most famously the activity of book-making, is another measure of the affluence and power of the community. So, if anywhere should have been working gold, surely it is at the workshops at Tarbat.

So far, definite evidence of goldworking has eluded us. Even if further scientific analyses of the artefacts proves the presence of gold in the workshops, most of the techniques that employed it lie sadly beyond reconstruction. Indeed, if no firm evidence for its presence is forthcoming, perhaps our assumptions that gold ought to have been worked might need to be re-evaluated. Some of the most famous and finest pieces of contemporary metalwork are solid silver. Indeed, pieces in this metal on its own stand as something of a hallmark of some of the most sumptuous Pictish metalwork, such as the famous silver chains and plaques from Norrie's Law and St Ninian's Isle (Henderson and Henderson 2004). Perhaps the conspicuous use of silver reflects a conscious choice, and not one forced through lack of gold, but made by aesthetics, symbolism or cultural affiliation. It is in the light of this better-known assemblage of silverwork that the hint of gold reported here, from the first Pictish monastery to be excavated, may be noted.

Acknowledgments

The author is especially grateful to her co-directors, Martin Carver, University of York and Justin Garner-Lahire, Field Archaeology Specialists, and also to David Clark and Andy Heald of the National Museums of Scotland, Edinburgh for their invaluable support of the Tarbat Discovery Programme.

References

Alcock L 2003, *Kings and Warriors, Craftsmen and Priests in Northern Britain AD 550-850* (Edinburgh).

Alcock L and Alcock E A 1987, 'Reconnaissance excavations on the early historic fortifications and other royal sites in Scotland, 1974–84. 2: Excavations at Dunollie Castle, Oban, Argyll, 1978', *Proceedings Society of Antiquaries of Scotland* 117, 119–47.

Backhouse J 1981, *The Lindisfarne Gospels* (London).

Bayley J 1992, *Anglo-Scandinavian non-ferrous metalworking from 16–22 Coppergate* (London: Archaeology of York 16/2).

Bayley J with Andrews P 1997, 'The non-ferrous metallurgical remains', in P Andrews (ed), *Excavations at Hamwic, Vol 2: excavations at Six Dials*, (York: CBA Research Report 109), 219–21.

Campbell E and Lane A 2000, *Dunadd, an early Dalriadic capital* (Oxford).

Campbell M 1991, 'Gold, silver and precious stones', in J Blair and N Ramsay (eds), *English medieval industries: craftsmen, techniques and products* (London), 107–66.

Carver M O H 2004, 'An Iona of the east: the early-medieval monastery at Portmahomack, Tarbat Ness', *Medieval Archaeology* 48, 1–30.

Carver M O H and Spall C A 2005, 'Excavating a *parchmenerie*: archaeological correlates of making parchment at the Pictish monastery at Portmahomack, Easter Ross', *Proceedings Society of Antiquaries of Scotland* 132, 183–200.

Craddock P T 1989, 'Metalworking techniques', in S Youngs (ed), *'The Work of Angels': Masterpieces of Celtic metalwork, 6th–9th centuries AD* (London), 170–74.

Heald A 2003, Non-ferrous metalworking in Iron Age Scotland c700BC to AD800 (unpublished PhD thesis, University of Edinburgh).

Henderson G and Henderson I 2004, *The art of the Picts, sculpture*

and metalwork in early medieval Scotland (London and New York).
Higgit J 1982, 'The Pictish Latin inscription at Tarbat in Ross-shire', *Proceedings Society of Antiquaries of Scotland* 112, 300–21.
Hinton D A 1996, *The gold, silver and other non-ferrous alloy objects from Hamwic* (Stroud: Southampton Finds Vol 2).
Leahy K 2003, *Anglo-Saxon crafts* (Stroud).
Lins P A and Oddy W A 1975, 'The origins of mercury gilding', *Journal of Archaeological Science* 2, 365–73.
Longley D 2001, 'The Mote of Mark: the archaeological context of the decorated metalwork' in M Redknap, N Edwards, S Youngs, A Lane A and J Knight (eds), *Pattern and Purpose in Insular Art* (Oxford), 75–89.
Mainman A J and Rogers N S H 2000, *Craft, industry and everyday life: Finds from Anglo-Scandinavian York* (York: Archaeology of York 17/14).
Moore D T and Oddy W A 1985, 'Touchstones: some aspects of their nomenclature, petrography and provenance', *Journal of Archaeological Science* 12, 59–80.
Nicholson A 1997, 'The gold and silver', in P Hill, *Whithorn and St Ninian: the excavation of a monastic town 1984–1991* (Stroud), 397–400.
Oddy W A 1996, 'Fire-gilding in early medieval Europe', in D A Hinton, *The gold, silver and other non-ferrous alloy objects from Hamwic* (Stroud: Southampton Finds Vol 2), 81–2.
Spall C A forthcoming, 'Reflections on the monastic arts: recent discoveries at Portmahomack, Tarbat, Easter Ross', in N Edwards (ed), *The Archaeology of the Celtic Church, proceedings of the conference held at University of Wales, Bangor, September 9th to 12th, 2004* (Oxford).
Troalen L and Tate J 2006, Investigation of two objects from Tarbat, which may be associated with gold-working. Analytical Research Section Report AR 06/16 (National Museums of Scotland, unpublished technical report).
Tulp, C 2003, 'Tjitsma, Wijnaldum: An Early Medieval Production Site in the Netherlands', in T Pestell and K Ulmschneider (eds), *Markets in early medieval Europe: trading and productive sites, 650–850* (Cheshire), 221–233.
Youngs S 1989, *'The Work of Angels': Masterpieces of Celtic metalwork, 6th–9th centuries AD* (London).

The author

Cecily Spall is a director of Field Archaeology Specialists Ltd and a co-director of the Tarbat Discovery Programme.
Address: Field Archaeology Specialists Ltd, Unit A3, Parkside Centre, Terry Avenue, York, YO23 1JP
e-mail: cecily.spall@fieldarchaeologyspecialists.co.uk.