
The Efficacy of Roman Silver in Iron Age Scotland: An Object Trajectory for Spiral Rings

Jenna Martin 

This paper uses material efficacy as an analytical position to consider how silver helped to shape large-scale historical trajectories in Iron Age Scotland. Roman silver entered Scotland as imperial matter beginning in the first century AD and later inspired an assemblage of indigenous wearable silver in the fourth–fifth centuries. I investigate the human–silver collaborations involved in the transition from hoarding Roman silver coins to recycling Roman Hacksilber. By tracing the object trajectory of spiral rings, I show how silver’s material properties and entanglements played a role in developing Scotland’s earliest silver products. Around the fourth century, a diversity of spiral rings was replaced by a specific style of silver spiral finger ring. Silver brought to Iron Age Scotland by the Romans inspired and afforded individuals in northern Britain a new and empowering regional socio-political identity. Material efficacy, as explored in this case study, has relevance beyond Iron Age/Roman studies to any anthropological investigation of underrepresented human agency.

Introduction

Iron Age (IA) Scotland has long been regarded as a complex and volatile frontier zone of the Roman imperial period, making it a fascinating case study for exploring intercultural interaction. Roman silver in particular has loomed large in these debates. While both *denarius* and *Hacksilber* hoards have seen dedicated study, the recycling of Roman silver into indigenous products during the fourth to fifth centuries AD has not been as thoroughly explored (but see Blackwell *et al.* 2017 and Goldberg 2012). This paper attends to this period of human–silver collaboration as a case study for exploring how things can impact historical trajectories in cross-cultural contexts. By tracing silver’s influence on the object trajectory of a particular category of spiral rings, I explore a pivotal transition from hoarding to recycling Roman silver. I use material efficacy, a concept developed further below and referring broadly to an object’s ability to produce effects in collaboration with human actors, as an analytical position and I draw inspiration from a wealth of scholarly

investigation on Roman silver (Blackwell *et al.* 2017; Hunter & Painter 2013; Hunter *et al.* 2022) to consider how this material—in addition to humans and institutions—shaped possibilities for human action and influenced large-scale historical processes.

Some twentieth-century interpretations viewed silver *denarius* hoards as signifiers of Roman military occupation or barbarian raiding (Robertson 1978) and *Hacksilber* hoards as stolen booty ill-treated by barbarians (Curle 1923, 108–11). Post-colonial critiques of Roman imperialism (Millett 1990; Woolf 1998) sought more nuanced interpretations of intercultural interaction in northern Britain (Harding 2017; Mattingly 2006) that recognized diverse, localized indigenous human choices in engaging with Roman things (Campbell 2018; Hunter 2010; 2013a). Fraser Hunter (2007c; 2015b) re-interpreted Roman *denarius* hoards as donatives given to local leaders by Roman imperial agents as part of an insidious imperial diplomatic policy. Late Roman *Hacksilber* hoards were argued to be evidence of sophisticated social and political exchange (Hunter 2013b; Painter 2013; but see Collins 2013). These interpretations

see Roman silver, *denarii* most specifically and *Hacksilber* to some degree, as an imperial tool that destabilized northern tribal politics and irreparably impacted IA Scotland (Blackwell *et al.* 2017, 26; Hunter 2015a). This analysis rightly addresses the inequitable power gap between local communities and imperial power, but it does so by attributing historical causality only to imperial agents—the source of the silver—and glosses over the choices of local entities as if these choices and subsequent socio-political changes were inevitable reactions within a historical trajectory triggered by Roman colonization.

I propose another methodological route to investigating both imperial subjugation and indigenous agency: by granting historical driving power to things (Van Oyen 2017, 292; Versluys 2014). Materialist approaches have reimagined Romanization through human–thing entanglements and used object-oriented studies to write histories of intercultural interaction unfettered by long-standing historical narratives and assumptions (Joy 2009; Swift 2014; Van Oyen 2016; Versluys 2014). I take inspiration from these works in seeking to reconsider silver's role in IA Scotland. Instead of seeing socio-political transformations in northern Britain as inevitable due to a trajectory crafted by Roman imperial agents, I explore how silver itself helped shape these trajectories through its collaborations with indigenous people.

By taking an object-oriented approach, I aim to address both imperial subjugation and indigenous agency (Khatchadourian 2020, 1649, *contra* Fernández-Götz *et al.* 2020, 1631). By focusing on things *and* people, I strive to write a history of intercultural interaction in IA Scotland that recognizes objects as more than bounded, defined signifiers representative of an established historical narrative (Van Oyen 2016, 6–9). This approach conceptualizes large-scale historical processes as consisting of a series of non-inevitable collaborations between humans and 'vibrant matter' (Bennett 2010, 3). Most importantly, this paper develops the concept of material efficacy as a methodological tool, 'not a description of the real nature of the world' (*per* Van Oyen 2017, 2). In order to study humans and empires ethically, we must seriously interrogate the efficacy and subsequent impact of the things they collaborated with. I ask if an object-oriented theoretical and methodological approach to silver can help us better understand how indigenous Iron Age peoples collaborated with this colonial material. I argue that investigating object efficacy can bring us closer to detangling subaltern human agency.

By granting material efficacy to silver, I open up analytical space for indigenous-silver collaboration to

have had as much historical driving power as imperial-silver collaboration in IA Scotland. This paper explores how Roman silver's role in IA Scotland changed over time through Scotland's earliest indigenous silver products. Spiral rings featured prominently in this fourth- to fifth-century silver assemblage. I seek to understand how silver's material properties and entanglements influenced the trajectory of this object category and, by extension, a broader movement toward personal silver adornment and identity formation in northern Britain.

Iron Age Scotland

During the first to the fourth centuries, communities in northern Britain inhabited a fluctuating political landscape under diverse colonial pressures (Breeze 2012; Harding 2017; Hodgson 2017; Mattingly 2006) and people selectively engaged with Roman material culture (Hunter 2013a, 17). Settlement studies have revealed significant social upheaval during this period. In East Lothian (central lowlands), small enclosed settlements of the first century AD are difficult to locate, but there is certainly some coalescence of society on large hillforts like Traprain Law (Armit 2021; Hunter 2010; 2022c). In northeast Scotland c. 200 AD, there was a massive dislocation from long-lived open settlements to enclosed forts (Hunter 2019, 60–62; Ralston 2004). Changes in metalwork accompanied these changes in settlement. An appreciation for materializing one's identity using copper alloy (CuA) (and some gold) had just begun to gain momentum in the first centuries BC/AD (Hunter 2007b, 288; 2015a, 239), but a dramatic rise in diverse and regionally distinct metalwork occurred around the Roman period (Armit 2015, 194; Hunter 2007b, 288; 2019, 60–61). Overall, individuals and communities were re-organizing themselves socially and physically. A key player in this story of social change is Roman silver.

Unlike bronze, iron, or gold, which had been used locally for centuries, silver was quintessentially Roman (Hunter 2013a, 24–5).¹ It first entered Scotland as Roman soldiers' payments beginning in 78 AD with Agricola's conquest, but these coins rarely made it to indigenous settlements (Blackwell *et al.* 2017, 11–12). The direct transfer of Roman silver to indigenous communities came in the form of silver *denarii* arriving most likely in large batches c. 160/180 to 230 AD (Hunter 2015a). By tracing the chronology and regional distribution of *denarii* hoards, Hunter (2007b; 2015a) argued that they reflect the accumulation of diplomatic pay-offs made by the Roman military to pacify some local leaders and

isolate others. Accessing silver during this time meant engaging in Roman diplomacy. Imperial agents used this leverage to entangle some local leaders in relationships of dependence that disrupted existing small-scale socio-politics. IA Scotland had no recognized monetary system in the form of coinage and the influx of Roman *denarii* did not inspire one (Blackwell *et al.* 2017, 11). Instead, high-status individuals might have used Roman silver coins as a ‘symbol of the empire’s favour’ to legitimize their power and prestige (Hunter 2013a, 25). Silver coins were carefully buried, sometimes in their original container,² rarely circulated as one-off objects, and apparently not melted down.³ When these *denarii* pay-offs ceased in the early third century (Hunter 2022a, 362), Scotland’s silver flow was briefly cut off and this likely further enhanced silver’s prestige.

Roman silver once again entered Scotland in the late third to fifth centuries, this time as *Hacksilber*. *Hacksilber*—cut up or crushed Roman tableware to be used as bullion—was a common phenomenon within and outside of the Roman empire from the second century onward (Painter 2013).⁴ The absence of gold hoarding or gold objects in Scotland’s hoards compared to their marked prevalence in continental hoards (e.g. Roymans 2017) illustrates a regionally specific taste for silver (Hunter 2022a, 362–3; Hunter *in press*). A lack of one-off *Hacksilber* finds suggests that *Hacksilber* did not circulate independently; hoards were assembled over several generations and tapped as a source of raw material (Hunter 2022a, 372–6; Martin 2013).⁵ In addition to *Hacksilber*, the fourth century saw increased anti-Roman resistance in some areas and the consolidation of power centres across central lowland and northeast Scotland (Noble & Evans 2022, 5–9). At Traprain Law, substantial defensive features were constructed during the fourth or early fifth century (Hunter 2022c, 383; Jobey 1976).⁶ North of the River Tay, a rapid increase of enclosed settlements under way by the fifth century indicates the increasing centralization of power at key defendable centres (Noble *et al.* 2013, 1147). In Ireland and Scandinavia too, c. 400 to 600 AD, the construction of hillforts was ‘one unifying trend deeply implicated in the formation of new kinds of society’ during the post-Roman period (Noble *et al.* 2013, 1145).

Hacksilber and shifting power dynamics in northern Britain seem to have inspired the recycling of Roman silver into indigenous objects of personal adornment in the fourth to fifth centuries. Based on direct and indirect evidence, Roman silver was being recycled as early as the late third century in Atlantic Scotland (Heald 2001, 689), fourth century

in the central lowlands (Blackwell *et al.* 2017, 69) and fifth century in northeast Scotland (Cruickshanks & Noble *in press*). The earliest silver products are an assemblage of personal items developed from local pre-Roman styles with new artistic fusions (Goldberg 2015, 161–3; Youngs 1989, 20). While silver chains and bangles were often left undecorated to emphasize silver’s purity as a marker of power,⁷ penannular brooches⁸ and handpins⁹ were often embellished with inlays of red enamel or, more rarely, niello. These materials, patterns, technologies and forms emerged from intercultural relationships formed during the culmination of the Roman period in Britain (Joy 2015, 43; Laing 2005; Youngs 1989, 20–21). Connections between western England, Scotland and Ireland during the fifth century show widespread movement of this material (Hunter 2022b, 389).¹⁰ Sites like Traprain Law played a key role in this developing exchange network (Hunter 2013b, 7). Scotland’s early silver objects were probably commissioned and enjoyed by only a few high-status individuals or family groups, but they assisted in developing a wider artistic and socio-political movement in the northern and western cultural zones of an increasingly post-Roman world.

Spiral rings (Fig. 1) have a long-lived and enigmatic object history from the Bronze Age through the Late IA and are found on sites across western Europe (Clarke 1971; Déchelette 1910, 315, 352; Engelhardt 1866, 76; Jope & Wilson 1957). Their seeming simplicity of form has made them difficult to date, provenance, typify, or determine uses. In Britain, spiral rings are mostly associated with IA sites although there are some Bronze Age examples from England (Bulleid & Gray 1911, 210–11; Wheeler 1943, 278–80). In Scotland, they generally appear to be ‘most common in the last few centuries BC and first few centuries AD’ (Hunter 2007d, 19). Spiral rings have been the subject of scholarly debate concerning migration in Atlantic Scotland,¹¹ but there has been no recent systematic study of their development, manufacture and distribution. Of some 93 spiral rings found in Scotland, 9 are silver and these have not yet seen sustained analysis. Thus, spiral rings present a fruitful case study for exploring the material efficacy of Roman silver and the transition to silver recycling in IA Scotland.

Material efficacy

Things do not simply represent human messages; they can be productive themselves by transforming



Figure 1. Spiral ring typologies by rod section shape: (left) circular-sectioned; (centre) D-shaped section; (right) rectangular-sectioned. (Centre image © National Museums Scotland; left- and right-hand photographs: author, by kind permission National Museums Scotland.)

or generating social action (Khatchadourian 2016, 57). Jane Bennett (2010) argued that all historical events are collaborative ventures relying on both humans and things. She used the term ‘efficacy’ to describe ‘a power that is less masterful than agency’ (Bennett 2010, 9). Efficacy captures the indirect yet active ways in which things are generative as they collaborate with humans, without intent but with impact, and often in excess of human designs. Instead of explaining existing material assemblages as the result of historical events, an object-oriented, ‘non-retrospective’ approach analyses the active role of things in ‘making history’ (Van Oyen 2016). Instead of questioning ‘who’ creates effects, we should explore ‘what’ things do, ‘how’ they do them and ‘what’ happens as a result (Van Oyen 2016, 9, 131–4). This is particularly important theoretical positioning for interrogating how Roman silver operated in IA Scotland because it lifts focus off the Roman empire as the causal source of all historical processes (Van Oyen 2016, 133).

‘Imperial matter’ encompasses those materials and things of empire that have political efficacy to entangle subaltern people and communities within imperial structures and trajectories (Khatchadourian 2016, 21). Within Lori Khatchadourian’s schema of imperial matter (2016, 68–77), a certain category of objects called ‘delegates’—through their ‘material composition and the practical mediations they help afford’—entangle imperial subjects in dependencies that preserve imperial authority and transform peoples’ political and social lives by drawing them into the politics of empire (2016, 69). Based on Hunter’s analysis of *denarius* hoards and the evident social upheaval in second–third-century Scotland, it seems clear that silver served imperial agents by mediating political interactions with local leaders and drawing IA Scotland’s prestige economy into a relationship of dependence with Rome. To consider silver in this way allows for a material-forward analysis of Roman influence on local communities. Most importantly, delegates’ ‘continuously unfolding effects are always in excess of their

assignments’ (Khatchadourian 2016, 69). Their actions result in unforeseen relationships and outcomes that transcend their imperial mission. Thus, considering Roman silver as an imperial delegate leaves analytical space for silver’s role in IA Scotland to change over time.

Silver’s efficacy—the combination of its material composition and accumulated meanings formed through entanglements—will have influenced its own trajectory of use. Some of these material properties are likely universal affordances of human–silver relationships that transcend time and place: its silvery shine, malleability, and suitability for luxury objects/non-tools.¹² In the Roman empire, and especially in the province of Britain, silver was mainly used for coinage, elite tableware and, rarely (compared to copper alloys), for elite jewellery (Baratte 2013, 57; Blackwell *et al.* 2017, 11–12; Duncan-Jones 1994, 33–46).¹³

Scotland’s spiral ring trajectory

This paper traces the ‘object trajectory’ of spiral rings in Scotland by exploring practices of production, use and distribution (as proposed by Van Oyen 2016, 9, 131) from a long-term perspective (Bronze Age through Late IA). It explores silver’s impact on this object category and, by extension, large-scale historical trajectories. The dataset includes 93 spiral rings found in Scotland, 64 of which were made available for study by National Museums Scotland and the Hunterian Museum at the University of Glasgow (see Supplementary material). To add comparative depth to the Scottish rings analysis, I collected data on additional rings from Ireland, the Isle of Man and England. In what follows, I briefly explore how spiral rings were produced, used and distributed within Scotland and how these practices changed over time.¹⁴ The main focus is a typological analysis and investigation of silver’s material efficacy within the Scottish spiral ring tradition.

Distribution and dating

Using PAS data, online museum databases, archaeological reports and scholarly publications, I created a distribution map for spiral rings that shows findspots across Britain and Ireland (Fig. 2). Within Scotland, there is a heavy concentration in the central lowlands. Five sites have especially high numbers of spiral rings within successive occupation layers, indicating use over time. Three of these sites occur within the central lowlands; based on the mixture of both local and Roman finds, these native settlements were powerful local centres with elite access to Roman imperial agents.¹⁵ Of these three sites, only Traprain Law was still occupied by the time Roman silver started being recycled; it has two silver spiral rings. Additionally, Edgerston fort in southern Scotland boasts five CuA spiral rings and Roman finds (RCAHMS 1956, 225–8). Together, these four sites¹⁶ reveal a concentration of spiral rings on high-status central lowland and southern settlements with connections to Roman imperial agents.

To determine a reliable date range for the spiral ring tradition in Scotland, I considered only rings with findspots in a stratigraphic context dated using radiocarbon or associated finds, then cross-referenced this information with metal type (Fig. 3).¹⁷ Based on these data, spiral rings were most common in the first to second centuries AD when all were made of CuA. The tradition continued to a lesser degree in the third to sixth centuries, but silver became the prominent metal. In contrast, English sites support a CuA spiral ring tradition in the Bronze Age and there seem to be fewer in circulation during the Roman period. This refined chronology shows that spiral rings were an especially popular phenomenon in Scotland during the early first millennium AD. The ring findspots in Ireland fall mainly between 300 BC and AD 500, indicating a shared affinity with the Scottish spiral ring tradition. All of the Scottish rings excluded from this refined chronology could fall within this very wide 200 BC and AD 700 range.

Use

The most commonly assumed function for spiral rings has been as finger rings, although examples from contexts across Scotland indicate a wide range of uses on fingers, toes, footwear, and clothing fasteners (Martin 2023; *in prep.*). Two spiral rings found on two severed hands buried at the Broch of Gurness provide direct proof for finger wear (Hedges 1987, 86–7). In addition, at least eight spiral rings are compressed on one side as if they were worn on the same finger and repeatedly rubbed within the fold of skin between digit and palm (Fig. 4).

To address the question of use, internal diameter measurements for 67 spiral rings were taken (Fig. 5). In a study of Roman burials, Swift (2017, 165) identified modal averages for the internal diameter of finger rings with central motifs for children (14 mm) and women (17 mm); rings found in adult female graves mainly ranged from 13 to 19 mm while rings found in adult male graves ranged between 16 and 22 mm. Of the 67 spiral rings measured for this study, 50 (74 per cent) measured between 13.1 and 19.0 mm and are thus likely candidates for finger wear. Three spikes in the dataset might point towards wear by children (14–15 mm), adult females (16–17 mm) and adult males (18–19 mm). However, most of the spiral rings fall between 15 and 19 mm and thus could have been worn by adult males or females. Furthermore, three spiral rings found on toe bones have internal diameters that could also fit fingers: 13 mm in a female grave at Mine Howe, Orkney (Card 2005) and 16.2 mm in a male grave at Marshell, Alloa (Mills 2003). This, and the fact that we do not know on which fingers spiral rings were worn, makes it difficult to assign use to a specific group.¹⁸ The outliers in this dataset—those of exceptionally small or large internal diameters—certainly point to uses other than finger wear, such as footwear (Hunter 2016, 45–6; Rogers 2016, 46–7; Schweitzer 2005) or composite objects like armlets.

Production

Spiral rings were most likely formed by bending a cast metal rod around a mandrel and winding it into multiple spirals. This involved regular annealing to maintain the metal's structural integrity and filing/finishing with tools to smooth off the shape. Identifying moulds for rods that could become rings is complicated by the fragmentary nature of two-part casting moulds. It is also possible that spiral rings could have been cast in a finished form using a corrugated mould, although this seems unnecessarily complicated. While there is an apparent spiral ring mould from Rhynie, Aberdeenshire (Cruickshanks & Noble *in press*), none of the 93 Scottish spiral rings have connected sections as would be expected of this technology. No other sites have yielded any direct evidence for spiral ring production.

Typologies

The defining typological feature of Scotland's spiral rings is the rod section shape: circular, rectangular, and D-shaped (Fig. 1). Rings without available section height and thickness measurements were

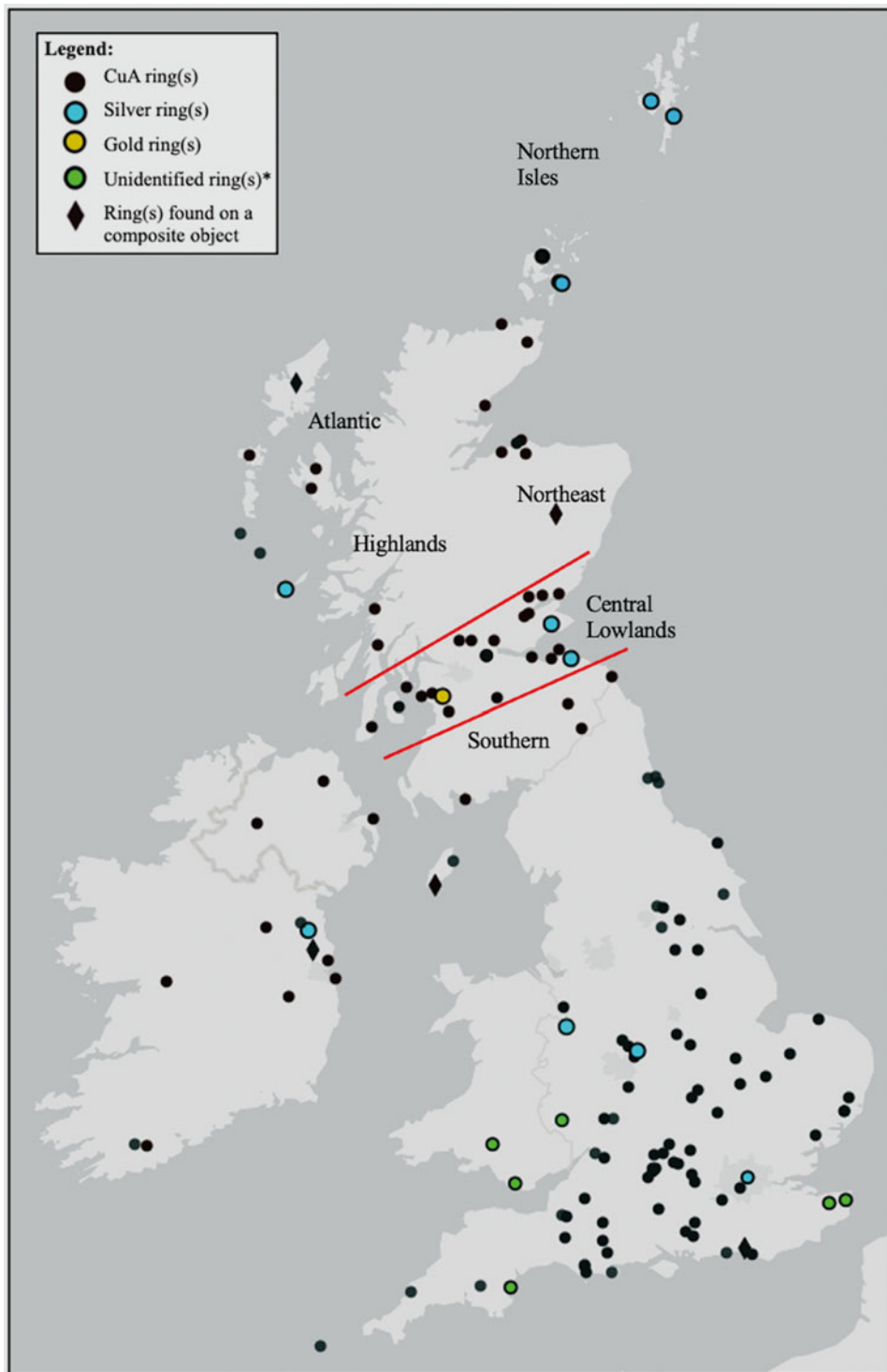


Figure 2. Distribution map of spiral rings in Britain and Ireland. *The unidentified rings are those marked on Jope & Wilson's 1957 map but which remain unidentified by me. They are included here so as not to skew the distribution away from southwest England and Wales. (Map: author using GIS online. This map is comprehensive for Scotland and presents a strong representative number of ring findspots in Ireland and England.)

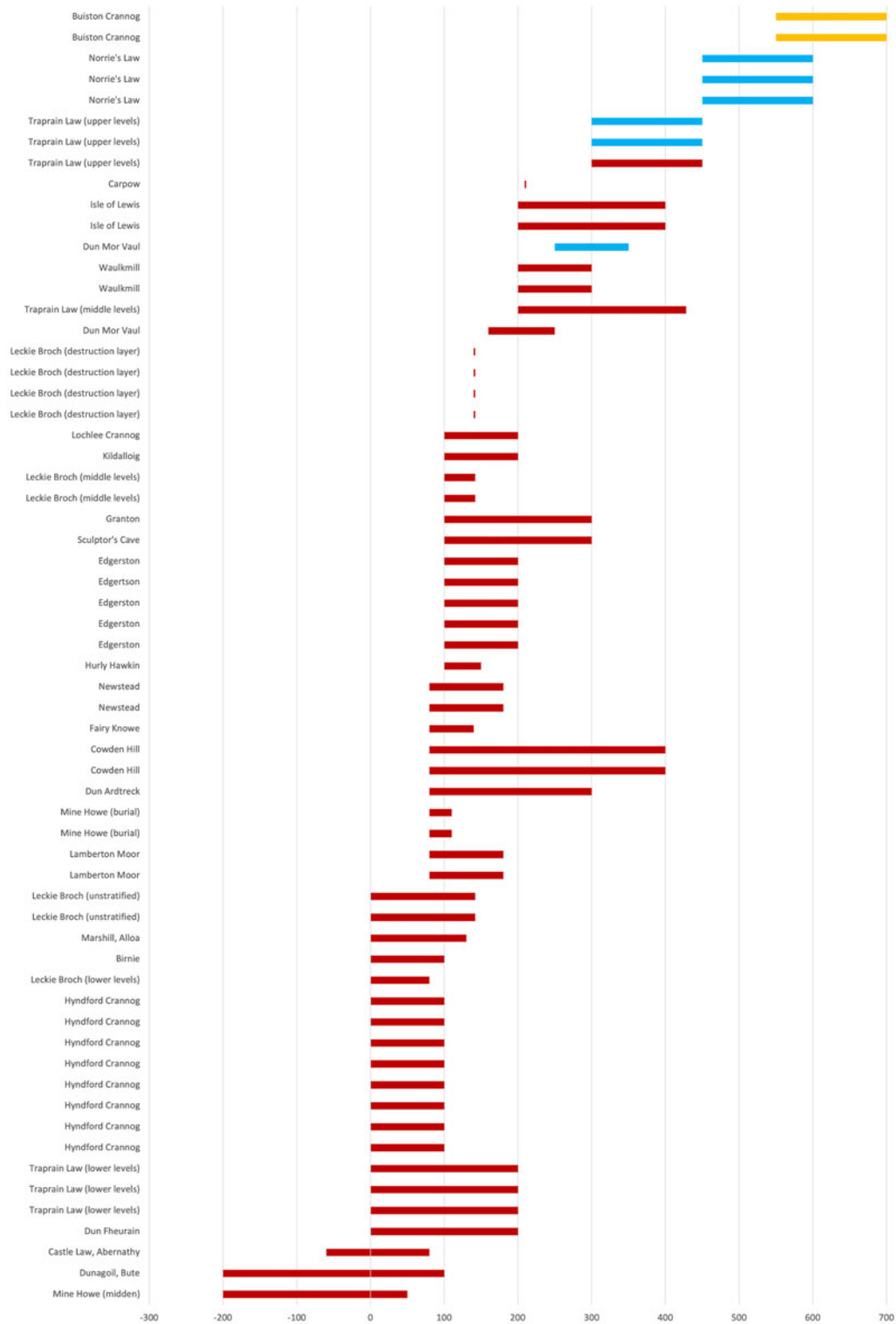


Figure 3. Reliable deposition date ranges for spiral rings by findspot. Colours represent gold (orange), silver (blue), and CuA (red). (Image: author.)

categorized by their apparent rod shape so that 90 rings could be included in the typological analysis.

Both the circular- and rectangular-sectioned spiral rings include a range of sizes and use on fingers, toes and composite objects. Some are spiralled



Figure 4. Copper alloy rings with use-wear on one side (worn-down or compressed) indicating likely use as finger rings: (left) from Cleaves Cove, Ayrshire (NMS X.HM 50) and (right) from Traprain Law, East Lothian (NMS X.GVM 140). (Photographs: author, by kind permission National Museums Scotland.)

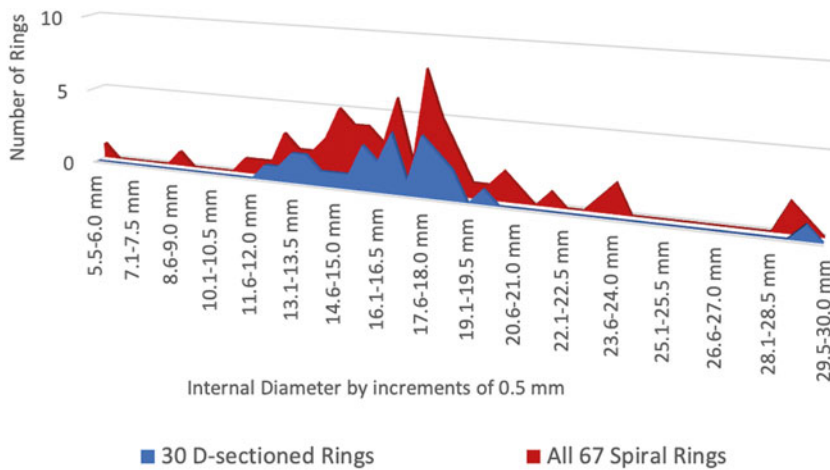


Figure 5. Internal diameters of the 30 D-sectioned rings compared against the entire dataset of spiral rings, with available measurements. (Image: author.)

in a Z direction, others in an S direction. Some are tightly twisted while others are loose. Terminals can be cut, tapered and knobbed. Circular-sectioned rings (29 in total) date mainly to the first–second centuries and are well distributed throughout Scotland, although there is a notable concentration in the central lowlands. Rectangular-sectioned rings (19 in total) date across the first to fourth centuries and have a more sporadic, limited distribution across Scotland (Martin 2023; *in prep.*).

The 43 D-sectioned rings are more standardized in form and use. Available internal diameters for 30 D-sectioned rings, tightly ranging between 12.5 and 20 mm, stand out against the overall dataset of 67 available internal diameters (Fig. 5). This size range implies their use on either fingers or toes: there is one confirmed toe ring (Alloa) and one certain finger ring (Gurness). It seems clear that D-sectioned rings were not worn on composite objects like armlets, torcs or shoes. The flat interior of D-sectioned rings would have made them comfortable as finger or toe rings because they could fit snugly around the digit while maintaining an appealing curved surface on the exterior. The distribution of D-sectioned spiral

rings shows continued heavy activity around the Firth of Forth, but also an intriguing increase in Orkney and Shetland. D-sectioned rings with reliably dated findspots indicate a range from 60 BC to AD 600 (Fig. 6), so all three section types were circulating simultaneously during the first and second centuries. However, while circular- and rectangular-sectioned rings largely disappeared by the fourth century,¹⁹ the more popular D-sectioned shape endured into the sixth. Once silver started being used to make spiral rings, possibly as early as AD 250,²⁰ CuA D-sectioned spiral rings disappear.

D-sectioned rings can be grouped into two subtypes: (D1) undecorated rod (21 rings) and (D2) rod decorated with ribbing (19 rings).²¹ D2 (ribbed) rings tend to be slightly larger than D1 (undecorated) rings in internal diameter. D2 silver rings have an even tighter range between 15 and 18.5 mm (Fig. 7). This implies that D-sectioned spiral rings, and perhaps especially silver ones due to their internal diameters, were most likely worn on fingers, not toes or composite objects. Reliable deposition dates for the D1 rings range from 50 BC to AD 300, while D2 rings fall between AD 1 and 600 (Fig. 6). Leckie

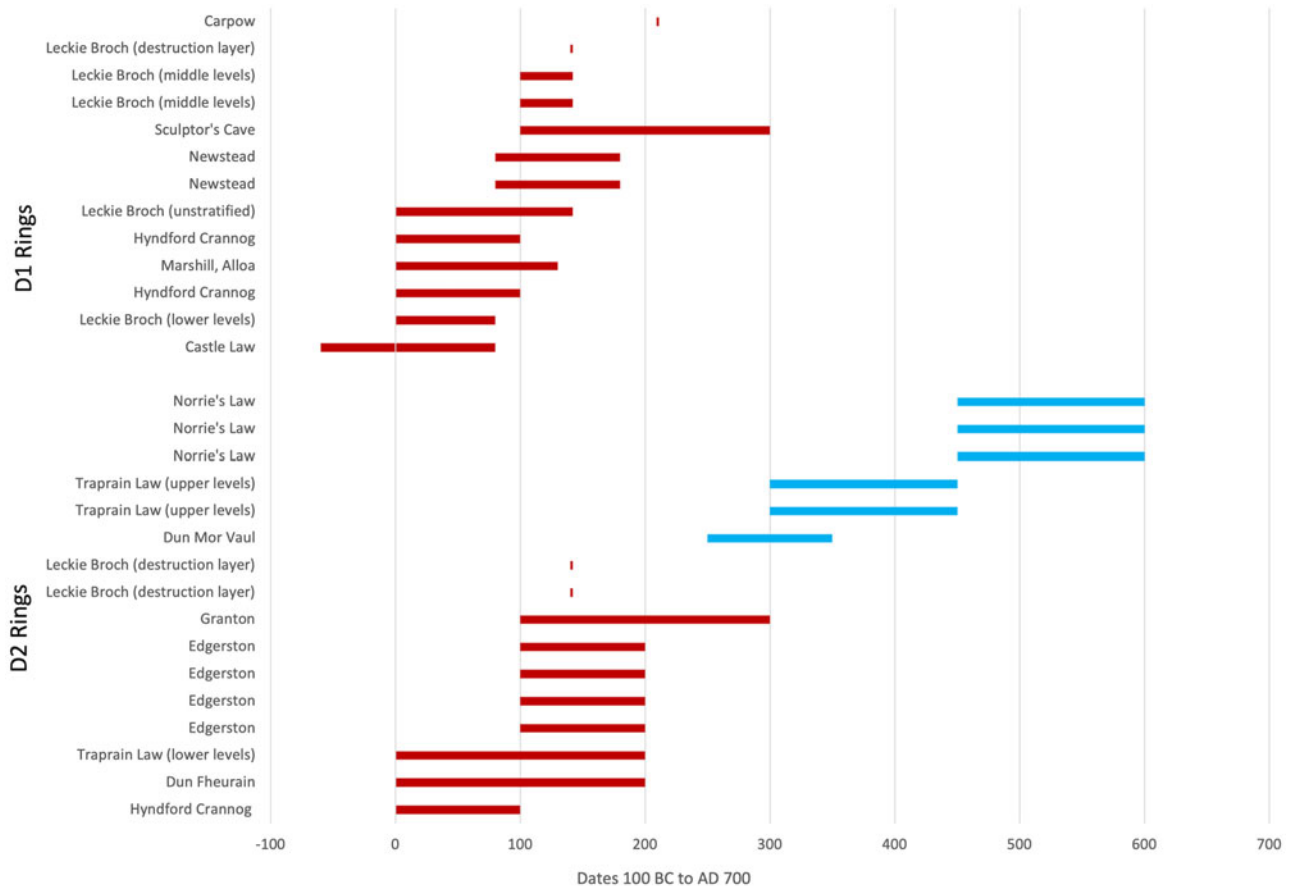


Figure 6. Reliable deposition date ranges for 29 of the 42 D-sectioned rings. Colour represents silver (blue) and CuA (red). (Image: author.)

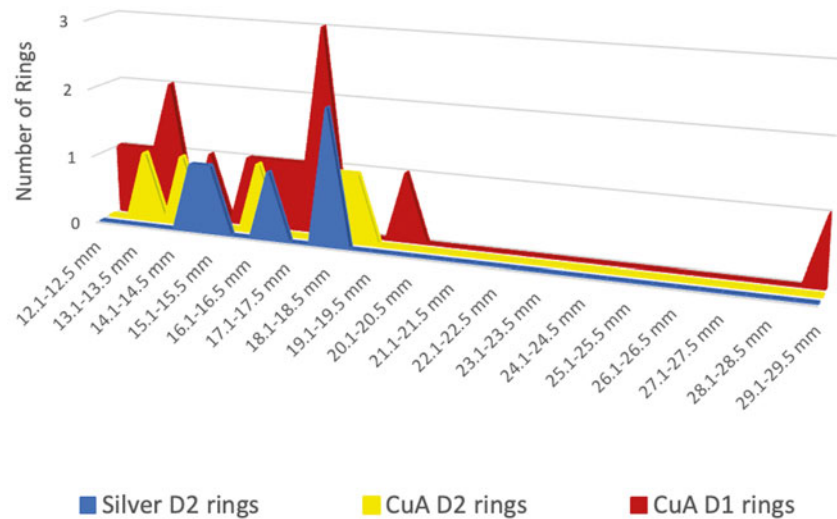


Figure 7. Comparison of internal diameter ranges between silver D2, CuA D1 and CuA D2 rings. (Image: author.)

Broch and Traprain Law have D1 rings in earlier occupation levels and D2 rings in later occupation levels. Overall, it appears that D1 rings preceded D2 rings

in deposition and most likely in production. Once D2 ribbing decoration came into use in the first or second century, it largely replaced D1 rings. And

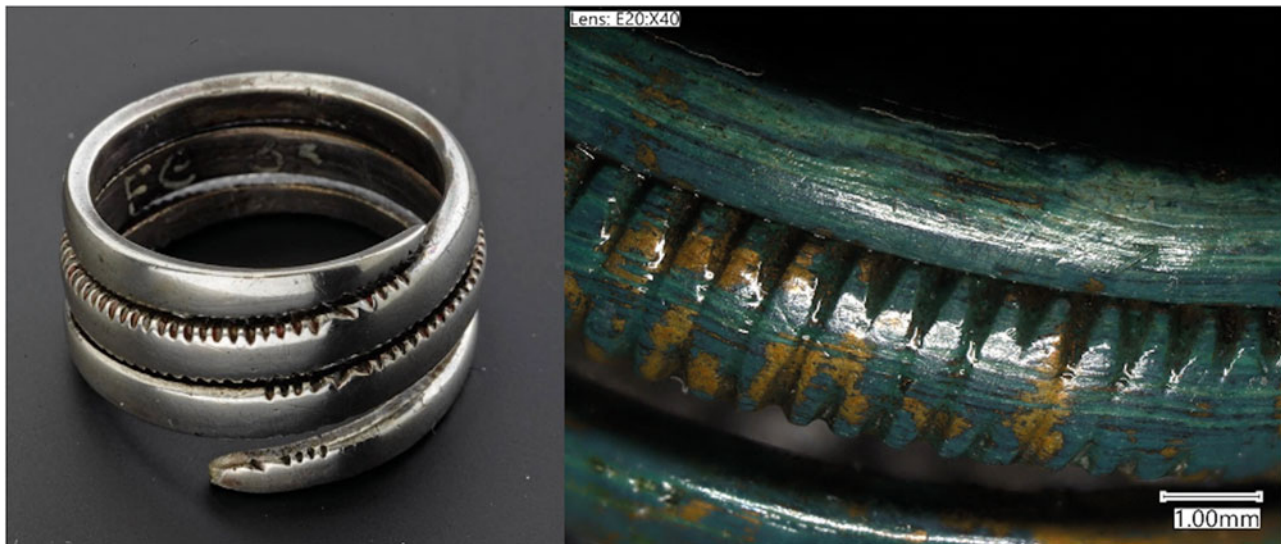


Figure 8. Vertical or angled ribbing pattern on D2 rings: (left) silver ring from Norrie's Law, Fife (NMS X.FC 35); (right) CuA ring from Dun An Fheurain, Argyll (NMS X. HD 410). (Left: Image © National Museums Scotland. Right: photograph by author using a Keyence VHX-7000 microscope, by kind permission National Museums Scotland.)

when silver D2 rings came onto the scene around the fourth century, they replaced CuA D2 rings.

The ribbing pattern on many rings has been worn down so much that only notches or small indentions remain, but these linear patterns were originally well-defined and prominently visible on the exterior surfaces. There are two general forms with slight variations: a vertical, sometimes angled, ribbing pattern (Fig. 8) and a lozenge-and-ribbing pattern (Fig. 9). Both styles run along the exterior of the rod, usually in the central turn for a complete spiral. The ribbing may disappear for a space before taking up again at the ring's (usually) tapered terminals. Where complete, these D2 rings are often made up of exactly three turns so that the central ribbed turn is sandwiched by two plain turns and the tapered terminals align or nearly align. Sometimes, a single lozenge pattern on an otherwise ribbed ring is lined up perfectly from one turn to the next as seen on the Norrie's Law ring (Fig. 9). This implies careful planning in decoration and rod length, and a measurement for the intended wearer's finger, to achieve the perfect D2 look.

The ribbing pattern could have been achieved by casting a metal rod using a ribbed mould, as was done for brooches and other objects (Heald 2005, 310, 343, pl. 8). This appears to be the technique used for at least two CuA rings—one from Hyndford Crannog (NMS X. HTA 9) (Fig. 10) and one from Edgerston, Roxburghshire (NMS X. HH 803) examined using a microscope (Keyence VHX-7000). The very regularly spaced ribs are somewhat soft/rounded and ribbing

is present on sections of the ring still complete with a casting ridge. Furthermore, finishing and hammering marks are visible on top of the cast impressions.

Alternative techniques involved filing or chasing tools. A chasing tool, which pushes the metal outward on either side into ovular ribs, would create bolder, sharper impressions than a casting mould. A filing tool, as tested experimentally in a metalworking shop,²² would have worked well to carve especially sharp, deep and roughly defined crevices for a more dramatic effect, as visible on the Norrie's Law (Fig. 10) and Broch of Howe rings. Perhaps silver's soft malleability allowed metalworkers to achieve ribbing more readily, or perhaps the way silver's colour captures light inspired more dramatic ribbing effects. Chasing or filing certainly allowed more spontaneous creativity than using a prepared mould. Perhaps this approach was preferred for a more prestigious style of silver D2 ring commissioned by privileged individuals.

Scotland's nine silver rings (Table 1), roughly dated from AD 250 to 600, are the most homogenous category. The five precisely measured rings have internal diameters ranging from 15 to 18.5 mm, which could have fitted adult male or female fingers. They were made in the D2 style: cast D-sectioned rod, ribbed in the central turn,²³ and spiralled in a Z direction. The five complete rings all have approximately three tight turns. This explains why their reconstructed lengths range from 179 to 214 mm, a tight grouping compared to CuA rings. Silver spiral rings were produced according to an established



Figure 9. Lozenge-and-ribbing pattern on D2 rings: (left) silver ring from Traprain Law, East Lothian (NMS X.GVM 147); (right) silver ring from Broch of Howe, Sanday (NMS X.GA 1174). (Images © National Museums Scotland.)



Figure 10. Microscopic images of (right) a copper alloy ring with a cast ribbing pattern from Hyndford Crannog, Lanarkshire (NMS X.HTA 9) and (left) a silver ring with tooled ribbing pattern produced using a filing tool from Norrie's Law, Fife (NMS X.FC 35). (Photographs: author using a Keyence VHX-7000 microscope, by kind permission National Museums Scotland.)

number of turns. Compared to CuA spiral rings, silver rings were on average over twice as heavy. This standardization differs from the broader tradition of spiral rings. Evidently, sometime in the fourth century, D-sectioned (and circular-sectioned)²⁴ spiral rings as non-homogenous categories were superseded by a distinctive style of silver D2 finger ring.

In deposition, the silver rings also bear similarities. They have been found at social centres of power

and within *Hacksilber* hoards.²⁵ Two fragments and one complete ring come from the *Hacksilber* hoard buried at an ancient monument at Norrie's Law, Fife, which is plausibly a high-status votive deposit (Noble *et al.* 2016, 737). Two rings come from the hillfort at Traprain Law in East Lothian. Three rings come from brochs:²⁶ Clickhimin (Shetland), Howe (Sanday) and Dun Mor Vaul (Tiree) (Table 1). Both Clickhimin and Dun Mor Vaul bear indications of

Table 1. *Silver spiral rings of Britain and Ireland.* * = Not examined microscopically by this author.

Reference No.	Find Spot	Findspot Type	Region	Date Range	Turns	Spiral Direction	Section Shape	Decoration	Resources
NMS X.GVM 147	Traprain Law, East Lothian	Hillfort	Central Lowlands, Scotland	AD 300–450	2 (partial)	Z	D-sectioned	double-rib and lozenge pattern on central two turns	Burley 1956, 173
NMS X.GVM 153	Traprain Law, East Lothian	Hillfort	Central Lowlands, Scotland	AD 300–450	3 (complete)	Z	D-sectioned	double-rib and lozenge pattern on central turn (very worn)	Burley 1956, 173
NMS X.FC 35	Norrie's Law, Largo, Fife	<i>Hacksilber</i> hoard	Central Lowlands, Scotland	AD 450–600	3.2 (complete)	Z	D-sectioned	ribbed on the central turn and at one terminal end (other end reworked)	Anderson 1884, 246, fig. 12; Blackwell <i>et al.</i> 2017, 87
NMS X.FC 84	Norrie's Law, Largo, Fife	<i>Hacksilber</i> hoard	Central Lowlands, Scotland	AD 450–600	Fragment (terminal and central)		Rectangular (hammered flat?)	ribbed at one terminal end and near the folded, central section	Anderson 1884, 246, fig. 12; Blackwell <i>et al.</i> 2017, 87
NMS X.FC 123	Norrie's Law, Largo, Fife	<i>Hacksilber</i> hoard	Central Lowlands, Scotland	AD 450–600	Fragment (terminal)		Rectangular (hammered flat?)	ribbed at one terminal end	Anderson 1884, 246, fig. 12; Blackwell <i>et al.</i> 2017, 87
NMS X.GA 1174	Broch of Howe, Sanday, Orkney	Broch	Northern Isles, Scotland	AD 300–700	2.9 (complete)	Z	D-sectioned	double-rib and lozenge pattern on the central turn (very worn)	PSAS 1938, 9
Hunterian A.1965.310	Dun Mor Vaul, Tiree	Broch	Atlantic, Scotland	AD 250–350	3 (complete?)	Z	D-sectioned	ribbed on the central turn and at the terminals	MacKie 1974, 132, fig. 17, no. 327
Catalogue no. 161	Clickhimin, Shetland*	Wheelhouse	Northern Isles, Scotland	Late Iron Age	3 (complete)	Z	D-sectioned	double-rib and lozenge pattern on central turn and at terminal ends	Hamilton 1868, 143 & 137, fig. 61,3
Treasure Trove	Walls, Shetland*	Unknown	Northern Isles, Scotland	Late Iron Age	3 (complete)	S	D-sectioned	Undecorated (?)	Treasure Trove Record
Catalogue E56.1712	Newgrange, Co. Meath*	Votive deposit at Neolithic monument	Ireland	AD 200–300	2.75 (complete)	Z	D-sectioned	ribbed in the central turn; very loosely wound	Blackwell <i>et al.</i> 2017, 92–3; Carson & O'Kelly 1977
Catalogue E56.947	Newgrange, Co. Meath*	Votive deposit at Neolithic monument	Ireland	AD 200–300	3 (complete)	Z	D-sectioned	ribbed in the central turn	Blackwell <i>et al.</i> 2017, 92–3; Carson & O'Kelly 1977, pl. VIIIa
PAS, LON-ECB6AE	Cathedrals, Southwark*	Unknown	England	100 BC–AD 800	2.5 (complete)	Z	Rectangular	Undecorated; very loosely wound	Portable Antiquities Scheme
PAS, WMID-24AB05	Tamworth, Staffs*	Unknown	England	100 BC–AD 800	2.5 (partial?)	S	D-sectioned	Undecorated; very loosely wound	Portable Antiquities Scheme
	Wem, Shropshire*	<i>Hacksilber</i> hoard	England	AD 400–500	3 (complete)	S	Circular	Undecorated; very loosely wound (bent out of shape?)	White <i>et al.</i> in press

high status in their architecture, non-ferrous metalworking and unusually high concentrations of imported Roman goods (Hamilton 1968; MacKie 1974). Silver spiral rings have only turned up in well-connected spaces of power. Owning anything silver must have marked out an individual as well connected and wealthy during the IA. The extreme use-wear visible on these silver rings also indicates that they were well loved for many years, perhaps generations. Although it is possible that the material resistance of CuA rings made them more hard-wearing, in general CuA D2 do not seem to have been worn to such an extreme. Furthermore, they were not exclusively found in deposition contexts associated with power through structures and materials and this might indicate a wider social distribution.

Beyond Scotland, there are only two examples of D2 silver spiral rings (Table 1), both from a collection of exotic material deposited near a Neolithic tomb in Newgrange, Ireland. These rings—and other silver items with shared decorative motifs—indicate strong links between Scotland and Ireland during this period (Goldberg 2015, 156). Three silver spiral rings are known to this author from England, but they are stylistically different from the Scottish rings and from one another (Table 1). Clearly, the distribution of D2 silver spiral rings skews heavily toward Scotland and the Newgrange rings are probably exports. One English ring—found in the Wem (Shropshire) Roman *Hacksilber* hoard (White *et al.* [in press](#))—parallels the Scottish silver spiral rings in its find circumstance, but does not share the ribbing pattern or tightly spiralled structure. However, its fifth-century date and location in western England suggests that this ring probably circulated within the same silver economy developing on the outskirts of the empire during and after the decline of Roman rule in Britain.

Discussion

Silver's early form as coinage and its role as a Roman imperial delegate impacted its trajectory of use. Roman *denarius* hoards were preserved *en masse*. Coins were probably considered a special category of foreign objects, prestigious and 'restricted to certain formalized social and religious contexts' (Marzinzik 2022, 406). If Roman goods could be used locally to legitimize social status, then transforming coins into something less Roman would have negated their local relevance. *Hacksilber* inspired new human-object collaborations. *Hacksilber* embodied a socially relevant and obviously divisible medium that encouraged recycling. Hacked, folded and crumpled objects might have showcased silver's

malleability and thus motivated local people to want to work it. Certain existing conditions of possibility—local technical skill in casting and finishing bronze²⁷ as well as a tradition of wearable metalwork²⁸—meant that silver could find relevance and purpose in IA society as prestige jewellery.²⁹ Its relative scarcity in the region probably contributed to its locally specific prestige.³⁰

The trajectory of spiral rings in IA Scotland showcases how silver's material efficacy played out. One of silver's most poignant attributes was its colour, desirable even at the expense of metal purity. The nearly complete replacement of copper alloy spiral rings with silver ones and the contemporaneous development of tinned CuA objects on related fourth- to fifth-century objects within the northwest exchange zone (Blackwell *et al.* 2017, 139; Gavin 2013, 435) indicates that people desired to appear silvery, even if their personal adornment was not truly made of silver. Perhaps tinned objects masqueraded successfully alongside silver objects, bringing status to their wearers in a similar way. The higher percentages of tin in indigenous silver objects of the fifth to seventh centuries (Troalen & Lang 2022, 318) might indicate that a few tinned objects were recycled, whether accidentally or purposefully, along with high-purity Roman silver (Martin Goldberg, pers. comm. 2023). Evidently, silver's material power stemmed not only from its precious metal content but also from its visual identity. Silver's colour had come to be associated with power, much as the second-century BC influx of gold coins and torcs cultivated a desire for yellow-gold-coloured metal objects at the expense of gold purity in southern England (Creighton 2000, 41).

Silver's weightiness was an affordance in that it *felt* more impressive; it *carried* its power more so than CuA. Such heavy silver rings felt more satisfying on one's finger than lighter CuA rings. One need only look at the massive silver chains above to note that weight was a valuable feature of silver's prestige. Both the silver chains and the spiral finger rings developed out of indigenous IA traditions. Perhaps silver brought added weight (literal and figurative) to reimagining these ancient traditions.

The visual complexity of metalwork meant to adorn individual bodies has been identified as a crucial and continuous characteristic of the early European visual world (Wells 2008, 42–84). Silver's particular material properties afforded and inspired new such devices and possibilities beyond existing metalworking traditions in IA Scotland. CuA ribbed rings disappeared abruptly with the introduction of ribbed silver rings. The patterns on silver rings are

more technologically complicated and they were probably applied post casting. Maybe silver's glittering, bright surface colour allowed traditional ribbing patterns to stand out more prominently than on CuA rings. Perhaps revising the technology used to create the ribbing pattern was somehow a result of silver's material properties; or the technology itself was inspired by silver's prestige. Whatever the reason, silver stimulated more material embellishment and a meaningful standardization of the spiral ring tradition.

In addition to its material properties, silver carried an association with Roman-ness due to its diplomatic entanglement. And yet, silver's use in local prestige goods implies that it could play two roles at once. It could convey power without demanding Roman-ness. It was a malleable entity that privileged persons could collaborate with to negotiate a new sense of identity. This holds true for the entire assemblage of wearable silver that developed during the fourth to fifth centuries in northern Britain (see above), but it is directly traceable here in the trajectory of spiral finger rings. Around the fourth century, a diversity of spiral rings was replaced by a very specific style of silver D2 spiral finger ring.

In Scandinavia, gold snake-headed rings developed as insignia for the uppermost elites and visual markers of elite alliances, possibly as counterparts to Roman '*dona militaria*' (Jørgenson & Peterson 1998, 160–61; Reiersen 2018, 31). In mid second-century southern Britain, two types of snake-headed ring became popular in both silver and gold; this regional variant of a long-lived snake jewellery tradition found elsewhere in the empire probably reflects the development of particular Roman religious practices in the province (Cool 2000; Johns 1997). Bezelled and enamelled CuA rings in IA Scotland have also been interpreted as a response to Roman ring-wearing traditions (Hunter 2006, 152; 2019, 97). Scottish silver D2 rings were another regionally distinct collaboration between people and things that developed in conversation with the Roman world. This might partially account for the heavy concentration of early CuA spiral rings and early silver spiral rings in the volatile, cross-cultural zone of the central lowlands. As silver already marked out a person of rare status on Roman sites in northern Britain,³¹ the development of silver D2 rings as a distinct category for indigenous elite wear might be an aggrandized adaptation of this Roman tradition.

Silver was possibly unique among other Roman goods that could only denote a one-sided association with Rome. Coins could not circulate as currency without imperial structure, and they failed to draw northern communities into a Roman monetary

system. Pottery, once broken, could be transformed into smaller, everyday objects (i.e. spindle whorls) in a fragmentary state but it could not be truly re-made. Accessing more coins and pottery was contingent upon a good relationship with Roman agents. *Hacksilber*—partially because it demanded no culturally sanctioned connotations for use—could be more than Roman. It is significant that *Hacksilber* was not recycled to replicate tableware or money (Roman preferences). Instead, silver inspired a pointedly local and innovative style of elite jewellery.

Recycling Roman silver into distinctly indigenous wearable wealth was thus a crucial material-human collaboration, a statement in moving beyond old patterns of Roman-indigenous politics. D2 silver spiral finger rings actively proclaimed a new, regionally specific identity beginning around the fourth century. In fact, these spiral rings might have played a directly assistive role in developing the broader assemblage of wearable silver. The spiral ring form has deep roots in northern Britain, along with hand-pins (Youngs 2016, 307–8). A few tantalisingly early possible deposition dates for silver rings (Dun Mor Vaul and Traprain Law) also could pre-date other early silver products. Perhaps spiral rings were not just amongst the first silver products in IA Scotland, but *the* first. If people were just starting to experiment with silver-working, it would make sense to select a local and relatively simple form which required a low volume of silver material.

The dataset of Scottish silver spiral rings is small and any interpretation of their development and impact demands caution. However, when considered within the larger context of indigenous silver in Iron Age Scotland, silver's efficacy remains convincingly impactful. Scotland's early silver products together made up an assemblage of wearable power which privileged persons could use to draw attention to themselves and enchant viewers. Silver also allowed people in northern Britain to distinguish themselves from other socio-political groups. Irish metalwork in around AD 250–650 shared many commonalities in material and style with Scotland, but the Irish silver products were fewer and less pure (Goldberg 2015, 156–7). Most of the Scottish hand-pins have a high percentage of silver while the Irish pins have a little less silver (Youngs 2016, 306), perhaps resulting from richer Roman diplomatic endeavours in Scotland. The Germanic groups who settled in England during the fifth–seventh centuries preferred fine gold objects (Goldberg 2015, 168). Even when using silver for the body of an object, it was often covered with gold to imitate gold's appearance. Gold was also the metal of choice in Scandinavia for

snake-headed rings. In contrast, silver reigned supreme in Scotland. This selectivity cannot solely be attributed to material availability as the region had known gold before Roman occupation. Instead, silver's power and prestige were directly due to its collaborations with indigenous groups, initially as an imperial delegate and later as a transformative ally.

By wearing silver rings made from recycled Roman silver but designed to display local artistic preferences, individuals in northern Britain could demonstrate their connectedness to the wider world, display their wealth on a local level and define their regional identity in contrast to other 'less silvery' socio-political groups. These were crucial affordances for an emergent aristocracy of larger-scale leaders in northern Britain (Hunter 2019, 63) and the northwest exchange zone (Gavin 2013, 433). In other words, silver was not just central to what this new socio-political identity looked like; it helped forge that identity. Silver's efficacy created the conditions under which that identity could be *made* visible by humans. Silver was not just a tool, but itself a generator of social change. This silvery identity and the accompanying socio-political changes were not inevitable or attributable solely to Roman interference, but can be better understood as the result of indigenous human–silver collaborations.

An interesting point of comparison to silver are Roman glass drinking vessels. Dominic Ingemark (2014, 236–8) argued that native elites in IA Scotland used glass vessels to perform their social and political superiority through pointedly Roman behaviours (albeit reinterpreted to a certain degree). Silver spiral rings seem to reflect a more transformative, purposefully and uniquely indigenous 'post' or 'beyond' Roman northern identity. As Roman drinking vessels and early indigenous silver jewellery circulated together in the fourth and fifth centuries, these two contradictory yet complementary collaborations with Roman imperial things illustrate the multifaceted processes of becoming undertaken within this cross-cultural context.

To ignore silver's efficacy risks seeing changes in socio-politics and material culture in IA Scotland as inevitable steps within an historical narrative of disruptive Roman colonization. It risks seeing the metalwork itself as passively representative of social change or cemented categories of identity, which in turn places agency only on imperial agents and events as the causal means by which such change developed in IA Scotland. Granting material efficacy to silver provides an analytical access point for exploring the diverse and fascinating ways in

which indigenous people played a role in these historical processes by wrestling out new collaborative ventures with imperial things. Effective object-oriented methodologies need not overshadow human actors, but instead work best when they mutually shed light upon one another's impact.

Notes

1. The one piece of (Gaulish) pre-Roman silver in IA Scotland could be a modern loss (Hunter 2013a, 24).
2. One of the *denarius* hoards at Birnie was buried in a Roman leather bag (Hunter 2007c). The Falkirk hoard was found in a Roman pot (NMS X.FR 483; X.FR 482). For further discussion, see Hunter 2007a.
3. There is currently no indication of the melting of silver or gold before AD 300 (Heald 2005, 68). While locally made gold products imply native gold-working activity, there are no such local silver products until the fourth century.
4. For interpretations of Roman *Hacksilber* in Scotland, see Hunter & Painter 2013 and Hunter *et al.* 2022.
5. See also Hobbs 2013 for a review of stray silver finds in southern Britain.
6. Similar evidence for re-establishment might be present at Edinburgh Castle hill, Eildon Hill and Dumbarton Rock, but these sites have not seen the same level of excavation to support this securely (Hunter 2010, 96).
7. For chains, see Blackwell *et al.* 2017, 102; Youngs 2013. For bangles, see Blackwell *et al.* 2017, 79.
8. See Booth 2014, 300–302; Fowler 1960, 153; Hunter 2009; Youngs 2013, 416.
9. See Heald 2001, 690; Youngs 1989, 22–3; 2016, 305–10.
10. See Booth 2014, 302; Fowler 1960, 153; Gavin 2013, 434; Youngs 2016, 307 for specific object types.
11. See Clarke 1971; Jope & Wilson 1957; Lane 1987; MacKie 1971.
12. See Sherratt 2018 for a detailed discussion of silver's appeal throughout human history. For an example in ancient West Mexico, see Hosler 1995.
13. In Cool's (2000) study of 700 first- to second-century finger rings found in southern Britain, 10 per cent (32) were silver.
14. A more detailed study specifically of the Scottish copper alloy spiral rings is in preparation.
15. Hyndford crannog: Cavers 2010; Munro 1899; Leckie Broch: MacKie 2016 and Traprain Law: Hunter 2022c.
16. The fifth site with an especially high number of spiral rings is Clickhimin, Shetland (Hamilton 1968).
17. Due to a lack of evidence for silver-working in Scotland pre-AD 300 (Heald 2005, 68) but a possible late third-century deposition date for one silver ring from Dun Mor Vaul (MacKie 1974, 132–3), this study considers all Scottish silver rings to be no older than c. 250 AD. This remains a circular argument and needs to be consistently reassessed with future research on silver-working and metal composition studies. Where CuA rings have been analysed, the

presence of Zn indicates an AD 80 or later date (Dungworth 1995). These parameters excluded 30 of the 93 rings for dating consideration.

18. Roman depictions generally show rings occur on the smaller third and fourth fingers (Swift 2017, 159), but this cannot be assumed for indigenous spiral rings.
19. The two circular-sectioned exceptions are gold rings from Buiston Crannog and probably Anglo-Saxon products (Munro 1882, 228–9, figs 244–5; Crone 2000 for site).
20. See note 17.
21. The ribbing tradition distinct to D-sectioned rings is found on four (possibly) rectangular-sectioned rings. These require further analysis to understand their relationship to the D-sectioned ribbing tradition.
22. Experimental ring-making undertaken in collaboration with Maciek Sankowski (Glasgow, UK).
23. The Shetland find; was not available for close study.
24. A few rectangular-sectioned rings might have continued to be made in CuA (often containing Zn) but never in silver. These rectangular-sectioned rings seem to have been less often used as finger rings.
25. For source material, see Table 1.
26. Brochs are drystone hollow-walled structures, characteristic of the Iron Age in northern and Atlantic Scotland. They had defensive, cultural and social affordances.
27. The technical differences in working with silver *versus* bronze were probably negligible and thus provided little barrier to local metalsmiths.
28. Heald (2005, 3) concluded that non-ferrous metal-work played a crucial role in socio-politics throughout the Scottish Iron Age.
29. Noble *et al.* (2016, 737) argued that metalworking helped create and support elite identities in the post-Roman period at Pictish hillforts.
30. There is currently no published evidence for a continued influx of silver into IA Scotland after Roman contacts with Britain declined in the early fifth century.
31. Silver brooches make up only 1.2 per cent of all Roman brooches known from Scotland (Blackwell *et al.* 2017, 16, no. 4).

Acknowledgements

I am grateful to my exceptionally supportive MA thesis advisors at Cornell University, Dr Astrid Van Oyen and Dr Lori Khatchadourian. They provided invaluable encouragement, direction and constructive feedback in shaping my theoretical approach. My research was also largely shaped by the guidance and generosity of Dr Fraser Hunter. He welcomed me into National Museums Scotland as a Visiting Researcher, served on my committee as an *ad hoc* member, and made available the scholarly resources, artefacts and connections I needed to successfully complete this project. I would like to thank the following institutions for providing financial support: the Archaeological Institute of America, Mario Einaudi

Institute for European Studies, Einaudi Center for International Studies, Cornell Institute of Archaeology and Material Studies and Cornell Graduate School. Thanks also to the many generous scholars at NMS who offered their feedback and support.

Supplementary material

A supplementary appendix may be found at <https://doi.org/10.1017/S0959774324000180>

Jenna Martin
National Museums Scotland
Chambers Street
Edinburgh EH1 1JF
UK
Email: jrm495@cornell.edu

References

- Anderson, J., 1884. Notice of the gold ornaments found at Lower Largo, and of the silver ornaments, &c., found at Norrie's Law, near Largo, recently presented to the Museum by Robert Dundas, Esq., of Arniston. *Proceedings of the Society of Antiquaries of Scotland* 18, 233–47.
- Armit, I., 2015. Within these walls: household and society in Iron Age Scotland and Ireland, in *Scotland in Later Prehistoric Europe*, eds F. Hunter & I. Ralston. Edinburgh: Society of Antiquities of Scotland, 185–99.
- Armit, I., 2021. Hierarchy to anarchy and back again: social transformations from the Late Bronze Age to the Roman Iron Age in lowland Scotland, in *Alternative Iron Ages: Social Theory from Archaeological Analysis*, eds B.X. Currás & I. Sastre. Abingdon: Routledge.
- Baratte, F., 2013. Silver plate in Late Antiquity, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 57–73.
- Bennett, J., 2010. *Vibrant Matter: A political ecology of things*. Durham/London: Duke University Press.
- Blackwell, A., M. Goldberg & F. Hunter. 2017. *Scotland's Early Silver: Transforming Roman pay-offs to Pictish treasures*. Edinburgh: National Museums Scotland.
- Booth, A. 2014. Reassessing the Long Chronology of the Penannular Brooch in Britain: Exploring Changing Styles, Use and Meaning across a Millennium. PhD thesis, University of Leicester.
- Breeze, D., 2012. *Roman Frontiers in Britain*. London: Bristol Classical Press.
- Bulleid, A. & H. St. G. Gray, 1911. *The Glastonbury Lake Village: A full description of the excavations and the relics discovered 1892–1907*. Glastonbury: Glastonbury Antiquarian Society.
- Burley, E., 1956. A catalogue and survey of the metal-work from Traprain Law. *Proceedings of the Society of Antiquaries of Scotland* 1955–56, 118–226.

- Campbell, L., 2018. Culture contact and the maintenance of cultural identity, in *Roots of Nationhood: The archaeology of history of Scotland*, eds L. Campbell, D. Wright & N.A. Hall. Oxford: Archaeopress, 75–90.
- Card, N., 2005. *Mine Howe: Fieldwork and excavations 2000–2005*. Kirkwall: Friends of Orkney Archaeological Trust.
- Carson, R.A.G., & C. O’Kelly, 1977. A catalogue of the Roman coins from Newgrange, Co. Meath and notes on the coins and related finds. *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature* 77, 35–55.
- Cavers, G., 2010. *Crannogs and Later Prehistoric Settlement in Southwest Scotland*. (BAR British series 510.) Oxford: Archaeopress.
- Clarke, D., 1971. Small finds in the Atlantic province: problems of approach. *Scottish Archaeological Forum* 3, 22–54.
- Collins, R., 2013. Soldiers to warriors: renegotiating the Roman frontier in the fifth century, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 29–43.
- Cool, H.E.M., 2000. The significance of snake jewellery hoards. *Britannia* 31, 29–40.
- Creighton, J., 2000. *Coins and Power in Late Iron Age Britain*. Cambridge: Cambridge University Press.
- Crone, A., 2000. *The History of a Scottish Lowland Crannog: Excavations at Buiston, Ayrshire 1989–90*. Edinburgh: Scottish Trust for Archaeological Research.
- Cruikshanks, G. & G. Noble, in press. Silver-working at Rhynie, Aberdeenshire, north-east Scotland, in *Silver, Status, and Society – The transition from Late Roman to early medieval Europe*, eds M. Goldberg, A. Blackwell & A. Rau. Leiden: Sidestone Press.
- Curle, A.O., 1923. *The Treasure of Traprain: A Scottish hoard of Roman silver plate*. Glasgow: Maclehose, Jackson & Co.
- Déchelette, J., 1910. *Manuel d’archéologie préhistorique, celtique et gallo-romaine*. Vol II. Paris: Librairie Alphonse Picard et Fils.
- Duncan-Jones, R., 1994. *Money and Government in the Roman Empire*. Cambridge: Cambridge University Press.
- Dungworth, D.B., 1995. Iron Age and Roman Copper Alloys from Northern Britain. PhD thesis, Durham University. <http://etheses.dur.ac.uk/1024/>
- Engelhardt, C., 1866. *Denmark in the Early Iron Age, Illustrated by recent discoveries in the peat mosses of Slesvig*. London: Williams & Nordgate.
- Fernández-Götz, M., D. Maschek & N. Roymans, 2020. The dark side of the Empire: Roman expansionism between object agency and predatory regime. *Antiquity* 94, 1630–39.
- Fowler, E., 1960. The origins and development of the penannular brooch in Europe. *Proceedings of the Prehistoric Society*, 26, 149–77.
- Gavin, F., 2013. Insular military-style silver pins in late Iron Age Ireland, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 427–37.
- Goldberg, M., 2012. Ideas and ideologies, in *Early Medieval Scotland: Individuals communities, and ideas*, eds D. Clarke, A. Blackwell & M. Goldberg. Edinburgh: National Museums Scotland, 141–204.
- Goldberg, M., 2015. Out of a Roman world, c. AD 250–650, in *Celts: Arts and identity*, eds J. Farley & F. Hunter. London: British Museum Press, 153–71.
- Hamilton, J.R.C., 1968. *Excavations at Clickhimin, Shetland*. Edinburgh: HMSO.
- Harding, D.W., 2017. *The Iron Age in Northern Britain: Britons and Romans, natives and settlers*. London/ New York: Routledge.
- Heald, A., 2001. Knobbed spearbutts of the British and Irish Iron Age: new examples and new thoughts. *Antiquity* 75, 689–96.
- Heald, A., 2005. Non-ferrous Metalworking in Iron Age Scotland c. 700BC to AD 800. Vols 1 & 2. PhD dissertation, University of Edinburgh.
- Hedges, J.W., 1987. *Bu, Gurness and the Brochs of Orkney. Part II: Gurness*. (BAR British series 164.) Oxford: British Archaeological Reports.
- Hobbs, R., 2013. Stray finds of Hacksilber in Roman Britain?, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 291–304.
- Hodgson, N., 2017. *Hadrian’s Wall: Archaeology and history at the limit of Rome’s Empire*. Marlborough: Crowood Press.
- Hosler, D., 1995. Sound, color and meaning in the metallurgy of ancient West Mexico. *World Archaeology* 27 (1), 100–115.
- Hunter, F., 2006. New light on Iron Age massive armlets. *Proceedings of the Society of Antiquaries of Scotland* 136, 135–60.
- Hunter, F., 2007a. Denarius hoards beyond the frontier: a Scottish case study, in *Limes XX: XX congreso internacional de estudios sobre la frontera romana*, eds A. Morillo, N. Hanel & E. Martín. (Anejos de Gladius 13.) Madrid: Consejo Superior de Investigaciones Científicas, 1619–30.
- Hunter, F., 2007b. Artefacts, regions, and identities in the northern British Iron Age, in *The Later Iron Age in Britain and Beyond*, eds C. Haselgrove & T. Moore, 286–96. Oxford: Oxbow.
- Hunter, F., 2007c. Silver for the barbarians: interpreting Denarii hoards in north Britain and beyond, in *Roman Finds: Context and theory. Proceedings of a conference held at the University of Durham*, eds R. Hingley & S. Willis. Oxford: Oxbow, 214–24.
- Hunter, F., 2007d. The small finds, in G. Mudie *et al.*, *Excavations on the site of a late Iron Age roundhouse and souterrain, Glen Cloy, Brodick, Isle of Arran*. *Scottish Archaeological Journal* 29(1), 1–29 (17–20).
- Hunter, F., 2009. Miniature masterpieces: unusual Iron Age brooches from Scotland, in *Relics of Old Decency: Archaeological studies in later prehistory. A Festschrift for Barry Raftery*, eds G. Cooney, K. Becker, J. Coles, M. Ryan & S. Sievers. Dublin: Wordwell Books, 143–55.

- Hunter, F., 2010. Beyond the frontier: interpreting late Roman Iron Age indigenous and imported material culture, in *Finds from the Frontier: material culture in the 4th–5th centuries*, eds R. Collins & L. Allason-Jones. York: Council for British Archaeology, 96–109.
- Hunter, F., 2013a. The lives of Roman objects beyond the frontier, in *Rome Beyond Its Frontiers: Imports, attitudes, and practices*, ed. P. Wells. (JRA Supplementary series 94.) Portsmouth (RI): Journal of Roman Archaeology, 15–28.
- Hunter, F., 2013b. Hillfort and Hacksilber: Traprain Law in the Late Roman Iron Age and early historic period, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 3–10.
- Hunter, F., 2015a. The lure of silver: denarius hoards and relations across the frontier, in *Understanding Roman Frontiers: A celebration for Professor Bill Hanson*, eds D.J. Breeze, R.H. Jones & I.A. Oltean, 251–69. Edinburgh: John Donald.
- Hunter, F., 2015b. Powerful objects: the uses of art in the Iron Age, in *Celts: Art and identity*, eds J. Farley & F. Hunter. London: British Museum Press, 80–107.
- Hunter, F., 2016. Roman Iron Age artefacts: catalogue of the finds from the 2012 excavation, in R. Bradley & A. Clarke. Excavations at Waulkmill, Tarland, Aberdeenshire: a Neolithic pit, Roman Iron Age burials and an earlier prehistoric stone circle, in *The Use and Reuse of Stone Circles: Fieldwork at five Scottish monuments and its implications*, eds R. Bradley & C. Nimura. Oxford: Oxbow, 22–55 (43–6).
- Hunter, F., 2019. *The Carnyx in Iron Age Europe: The Deskford carnyx in its European context*. Germany: Verlag des Römisch-Germanischen Zentralmuseums.
- Hunter, F., 2022a. Hacksilber in the Roman period and beyond, in *The Late Roman Silver Treasure from Traprain Law*, eds F. Hunter, A. Kaufmann-Heinimann & K. Painter. Edinburgh: National Museums Scotland, 359–79.
- Hunter, F., 2022b. Hacking the Traprain Treasure, in *The Late Roman Silver Treasure from Traprain Law*, eds F. Hunter, A. Kaufmann-Heinimann & K. Painter. Edinburgh: National Museums Scotland, 333–58.
- Hunter, F., 2022c. A context for the treasure: Traprain Law and Rome's northern frontier, in *The Late Roman Silver Treasure from Traprain Law*, eds F. Hunter, A. Kaufmann-Heinimann & K. Painter. Edinburgh: National Museums Scotland, 381–92.
- Hunter, F., in press. The circulation of Roman silver in the fourth and fifth centuries around and across the frontier, in *Silver, Status, and Society – The transition from Late Roman to early medieval Europe*, eds M. Goldberg, A. Blackwell & A. Rau. Leiden: Sidestone Press.
- Hunter, F., A. Kaufmann-Heinimann & K. Painter (eds), 2022. *The Late Roman silver treasure from Traprain Law*. Edinburgh: National Museums Scotland.
- Hunter, F. & K. Painter (eds), 2013. *Late Roman silver: The Traprain treasure in context*. Edinburgh: Society of Antiquaries of Scotland.
- Ingemark, D., 2014. *Glass, Alcohol, and Power in Roman Iron Age Scotland*. Edinburgh: National Museums Scotland.
- Jobey, G., 1976. Traprain Law: a summary, in *Hillforts: Later prehistoric earthworks in Britain and Ireland*, ed. D.W. Harding. London: Academic Press, 191–204.
- Johns, C., 1997. *The Snettisham Roman Jeweller's Hoard*. London: British Museum Press.
- Jørgenson, L. & P.V. Peterson, 1998. *Guld, Magt, og Tro: Danske guldskatte fra old og middelalder* [Gold, power, and belief: Danish gold treasures from prehistory and the Middle Ages] (trans. J. Hines & S. Petes). Copenhagen: Thaning & Appel.
- Jope, E.M. & B.C.S. Wilson, 1957. A burial group of the first century A.D. near Donaghadee, Co. Down. *Ulster Journal of Archaeology* 20, 73–95.
- Joy, J., 2009. Reinvigorating object biography: reproducing the drama of object lives. *World Archaeology* 41(4), 540–56.
- Joy, J., 2015. Approaching Celtic art, in *Celts: Art and identity*, eds J. Farley & F. Hunter. London: British Museum Press, 36–51.
- Khatchadourian, L., 2016. *Imperial Matter: Ancient Persia and the archaeology of empires*. Berkeley (CA): University of California Press.
- Khatchadourian, L., 2020. False dilemmas? Or what COVID-19 can teach us about material theory, responsibility and 'hard power'. *Antiquity* 94, 1649–52.
- Laing, L., 2005. The Roman origins of Celtic Christian art. *Archaeological Journal* 162, 146–76.
- Lane, A., 1987. English migrants in the Hebrides: 'Atlantic Second B' revisited. *Proceedings of the Society of Antiquaries of Scotland* 117, 47–66.
- MacKie, E.W., 1971. English migrants and Scottish brochs. *Glasgow Archaeological Journal* 2, 39–71.
- MacKie, E.W., 1974. *Dun Mor Vaul: An Iron Age broch on Tiree*. Glasgow: University of Glasgow Press.
- MacKie, E.W., 2016. *Brochs and the Empire: The impact of Rome on Iron Age Scotland as seen in the Leckie Broch excavations*. Oxford: Archaeopress.
- Martin, M., 2013. The Traprain objects before hacking: the assembly compared with other late Roman hoards, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 263–89.
- Martin, J., 2023. *The Efficacy of Roman Silver in Iron Age Scotland: An Object Trajectory for Spiral Rings*. MA thesis, Cornell University.
- Martin, J., in prep. Scotland's spiral rings: typology, dating, and distribution.
- Marzinzik, S., 2022. Silver in the Roman and Germanic worlds: provenance, production, uses and significance, in *The Late Roman Silver Treasure from Traprain Law*, eds F. Hunter, A. Kaufmann-Heinimann & K. Painter. Edinburgh: National Museums Scotland, 401–24.
- Mattingly, D., 2006. *An Imperial Possession: Britain in the Roman empire, 54 BC–AD 409*. London: Penguin.
- Millett, M., 1990. *The Romanization of Britain: An essay in archaeological interpretation*. Cambridge: Cambridge University Press.

- Mills, S., 2003. Alloa, Marshill 2003. (MH 03) Conservation of artefacts excavated from Bronze Age short cist, and an Iron Age long cist. Historic Scotland Conservation contract HS/C/52796/3062. Historic Scotland, by AOC Archaeology Group. Midlothian, UK.
- Munro, R., 1882. *Ancient Scottish Lake-Dwellings or Crannogs*. Edinburgh: David Douglas.
- Munro, R., 1899. Notes on a Crannog at Hyndford, near Lanark, recently discovered and excavated by Andrew Smith. *Proceedings of the Society of Antiquaries of Scotland* 33, 373–87.
- Noble, G. & N. Evans, 2022. *Picts: Scourge of Rome, rulers of the North*. Edinburgh: Birlinn.
- Noble, G., M. Goldberg, A. McPherson & O. Sveinbjarnarson, 2016. (Re)discovering the Gaulcross Hoard. *Antiquity* 90, 726–41.
- Noble, G., M. Gondek, E. Campbell & M. Cook, 2013. Between prehistory and history: the archaeological detection of social change among the Picts. *Antiquity* 87, 1136–50.
- Painter, K., 2013. Hacksilver: a means of exchange?, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 215–42.
- PSAS, 1938. Meeting minutes. *Proceedings of the Society of Antiquaries of Scotland* 72, 1–22.
- Ralston, I., 2004. *The Hill-forts of Pictland: Since the 'Problem of the Picts'*. Fortrose: Groame House Museum.
- RCAHMS, 1956. *An Inventory of the Ancient and Historical Monuments of Roxburghshire: with the Fourteenth Report of the Commission Volume 1*. Edinburgh: Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS).
- Reiersen, H., 2018. The death of serpent-head rings. Ritual destruction of elite insignia from the Roman period, in *Charismatic Objects. From Roman Times to the Middle Ages*, eds M. Vedeler, I.M. Røstad, E.S. Kristoffersen & Z.T. Glørstad. Oslo: Cappelen Damm Akademisk, 31–56.
- Robertson, A., 1978. The circulation of Roman coins in north Britain: the evidence of hoards and site-finds from Scotland, in *Scripta nummaria romana: Essays presented to Humphrey Sutherland*, eds A.G. Carson & C.M. Kraay. London: Spink & Son, 186–216.
- Roymans, N., 2017. Gold, Germanic foederati and the end of imperial power in the Late Roman north, in *Social Dynamics in the Northwest Frontiers of the Late Roman Empire: Beyond decline or transformation*, eds N. Roymans, S. Heeren & W. De Clercq. Amsterdam: Amsterdam University Press.
- Schweitzer, H., 2005. Iron Age toe-rings from Rath, County Meath, on the N2 Finglas–Ashbourne Road Scheme, in *Recent Archaeological Discoveries on National Road Schemes 2004*, eds J. O'Sullivan & M. Stanley. Dublin: National Roads Authority, 93–8.
- Sherratt, S., 2018. Why was (and is) silver sexy? Silver during the 4th–3rd millennia in the Near East and Mesopotamia, in *Metals, Minds and Mobility: Integrating scientific data with archaeological theory*, eds X.L. Armada, M. Murillo-Barroso & M. Charlton. Oxford: Oxbow, 97–106.
- Swift, E., 2014. Design, function and use-wear in spoons: reconstructing everyday Roman social practice. *Journal of Roman Archaeology* 27, 203–37.
- Swift, E., 2017. *Roman Artefacts and Society: Design, behaviour, and experience*. Oxford: Oxford University Press.
- Troalen, L. & J. Lang, 2022. The technology of the Traprain treasure, in *The Late Roman Silver Treasure from Traprain Law*, eds F. Hunter, A. Kaufmann-Heinimann & K. Painter. Edinburgh: National Museums Scotland, 315–28.
- Van Oyen, A., 2016. *How Things Make History: The Roman Empire and its terra sigillata pottery*. Amsterdam: Amsterdam University Press.
- Van Oyen, A., 2017. Material culture in the Romanization debate, in *The Diversity of Classical Archaeology*, eds A. Lichtenberger & R. Raja. Turnhout: Brepols, 287–300.
- Versluys, M.J., 2014. Understanding objects in motion. An archaeological dialogue on Romanization. *Archaeological Dialogues* 2(1), 1–20.
- Walton Rogers, P., 2016. Organic remains on a copper alloy ring, in R. Bradley & A. Clarke, Excavations at Waulkmill, Tarland, Aberdeenshire: a Neolithic pit, Roman Iron Age burials and an earlier prehistoric stone circle, in *The Use and Reuse of Stone Circles: Fieldwork at five Scottish monuments and its implications*, eds R. Bradley & C. Nimura. Oxford: Oxbow, 22–55 (46–7).
- Wells, P., 2008. *Image and Response in Early Modern Europe*. London: Gerald Duckworth & Co.
- Wheeler, R.E.M., 1943. *Maiden Castle, Dorset*. Oxford: Oxford University Press.
- White, R., R. Hobbs & R. Abdy, in press. The early medieval hacksilver hoard from Wem, Shropshire: a preliminary description and analysis, in *Silver, Status, and Society – The transition from Late Roman to early medieval Europe*, eds M. Goldberg, A. Blackwell & A. Rau. Leiden: Sidestone Press.
- Woolf, G., 1998. *Becoming Roman: The Origins of the Provincial Civilization in Gaul*. Cambridge: Cambridge University Press.
- Youngs, S., 1989. Fine metalwork to c. AD 650, in *'The Work of Angels': Masterpieces of Celtic metalwork, 6th–9th centuries*, ed. S. Youngs, 20–71. London: British Museum.
- Youngs, S., 2013. From chains to brooches: the uses and hoarding of silver in north Britain in the Early Historic Period, in *Late Roman Silver: The Traprain treasure in context*, eds F. Hunter & K. Painter. Edinburgh: Society of Antiquaries of Scotland, 403–25.
- Youngs, S., 2016. Silver handpins from the West Country to Scotland: perplexing portable antiquities, in *Ancient Lives: Object, people and place in early Scotland. Essays for David V. Clarke on his 70th birthday*, eds F. Hunter & A. Sheridan. Leiden: Sidestone Press, 306–16.

Author biography

Jenna Martin received her MA in Archaeology from Cornell University. She is a Visiting Researcher at National Museums Scotland focusing on Iron Age

and Roman intercultural interaction, metalworking, materiality and object-oriented methodologies. She begins doctoral study at the Joukowsky Institute for Archaeology and the Ancient World at Brown University in August 2024.