PREHISTORIC CARVED STONE BALLS FROM SCOTLAND

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ABSTRACT

Carved stone balls (CSBs) are distinctive prehistoric objects found mainly in north-east and central Scotland as chance finds and in archaeological excavations of prehistoric sites. Originating in the Late Neolithic and found in non-funerary, funerary, and in-water archaeological settings, they appear to have been important personalised objects with tactile qualities.

This paper provides a concise but comprehensive review of CSBs. Four questions regarding these objects are addressed: What are they? How were they made? Where were they found? What was their purpose? Information on CSBs, compiled digitally from online sources, facilitated an efficient approach to address these questions. Object biographies are used to explore what CSBs are, and the manufacturing is described to show how they were made. Evidence from the archaeological record is reviewed to understand where, when and how they were deposited, while their purpose is considered by exploring the evidence for their possible prehistoric uses. CSBs may have had a routine day-to-day domestic use, but were also cherished objects, important enough to accompany individuals into the afterlife. Several appear to have been used during later archaeological periods, which may reflect their important cultural and social significance. Although prehistoric use of CSBs remain unknown, they are used today as evocative representations of Scotland's prehistoric past.

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Keywords: carved stone balls, Late Neolithic, Scotland, *chaîne opératoire*, identity, heritage

INTRODUCTION

Carved stone balls (CSBs) have been found as chance finds and in archaeological excavations of prehistoric sites in Scotland. They are typically spheroidal, hand-sized objects made from durable stone, with carved features (Figure 1).

CSBs attracted the interest of antiquarians as early as the mid-19th century (Wilson 1851, 1863; Evans 1872, 376−379; Anderson 1883, 161–172). Smith (1874, 1875) identified three classes of CSB and described all known CSBs, including their findspots. Childe (1931) documented CSBs from Skara Brae in secure archaeological contexts for the first time. Marshall (1977, 1983) examined every CSB she could access and prepared a detailed typological scheme based on numbers of features, decoration and object size; she also considered archaeological context, dating and possible uses.

In recent years, CSBs have been excavated in secure archaeological contexts at Eilean Domhnuill, North Uist (Armit 1988), Ness of Brodgar, Orkney (Card 2020), and Tresness, Orkney (Anderson-Whymark & Cummings 2021). Experimental archaeology has generated new ideas for interpreting their manufacture and utilisation (MacGregor 1999b; Jones & Diaz-Guardamino 2019). Most recently, Stewart-Moffitt (2022) has conducted a comprehensive review of all currently known CSBs and has proposed a revised typological scheme.

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Figure 1. CSBs in Perth Museum's collection (image: Paul Adair, used with permission from Culture Perth and Kinross).

The objective of this study is to provide a concise but comprehensive review of CSBs. Four questions regarding these objects are addressed:

- What are they?
- How were they made?
- Where were they found?
- What was their purpose?

OBJECT BIOGRAPHIES

Beginning in the mid-19th century, most CSBs have been acquired by museums. Today, they are well-represented and accessible via online museum collections. This allowed a total of 376 CSBs to be assessed as part of this study (Table 1).

A database and well-illustrated gazetteer of all currently known CSBs, comprising over 500 objects, were meticulously compiled by Stewart-Moffitt (2022, appx. 1 & 2); both are accessible online. Canmore (2024), the online historic environment record managed by Historic Environment Scotland (HES), contained entries for sites where CSBs have been found and provides information from museums lacking online collections, as well as private collections (see Addendum). For this study, data were compiled, sorted and searched digitally using these online datasets in order to access information on specific CSBs. This allowed quick comparison between objects in different museum collections and efficient integration with Canmore's archaeological reference materials. The collections at Aberdeen University Museum, Ashmolean Museum and National Museums Scotland were visited in person and the objects discussed with the curators. This was essential for lithological identification and provided a valuable opportunity to handle and experience the objects. Online collections

Table 1. Number of objects examined from online museum collections.

Institution	*Reference*	*No. of CSBs*
Aberdeen University Museum	ABDUA 2024	85
Ashmolean Museum	AN 2024	5
British Museum	BM 2024	22
Glasgow Museums	GLAMCO 2024	24
Glasgow University Hunterian Museum	GLAHM 2024	27
National Museums Scotland	NMS 2024; Sketchfab 2024a	197
Perth Museum	Sketchfab 2024b	10
Pitt Rivers Museum	PRM 2024	6

include plaster and resin casts and replica CSBs; these were excluded from the study to avoid duplication and because replicas are modern objects. Only archaeological stone objects were included in this study.

An inclusive approach was taken in defining all prehistoric stone ball-like objects, such as smooth featureless undecorated balls and polished balls (plain stone balls), as CSBs. The rationale for this approach is because the manufacture of more elaborate CSBs, with features and decoration, required making a plain stone ball early in the manufacturing process (Stewart-Moffitt 2022, 316–319).

A replica of the Ness of Brodgar CSB (Card 2020) was purchased for tactile inspiration.

Findspots

Canmore (2024) provided grid references for CSB findspots; this allowed 326 of the 376 finds to be located (Figure 2). Most were chance finds and exact find locations are unknown. Like Stewart-Moffitt (2022, 77–117), physical geographic regions are used to present CSB findspots, as modern administrative entities (e.g. counties) are not helpful for evaluating these prehistoric finds.

CSB findspots are concentrated in north-east and central Scotland along river valleys and on coastal plains. The occurrence of finds appears higher in active agricultural areas, particularly where fields have been worked manually, and in Orkney, probably due to more intensive archaeological excavation there. Most CSBs were unearthed as chance finds in fields and gardens, or recovered from rivers, lochs and peat bogs (Canmore 2024). They were usually found as single objects; a few have been found alongside other artefacts (Marshall 1977, 62), but descriptions of these associations lack archaeological detail. Finds may have been unearthed in the past and redeposited (Anderson-Whymark 2021) or retained as family heirlooms and their original provenance long-forgotten (Smith 1874, 45).

Morphology

The shape and size of each CSB was recorded. Shape can be described as spheroid, ovoid or cuboid (Figure 3). Spheroids are most

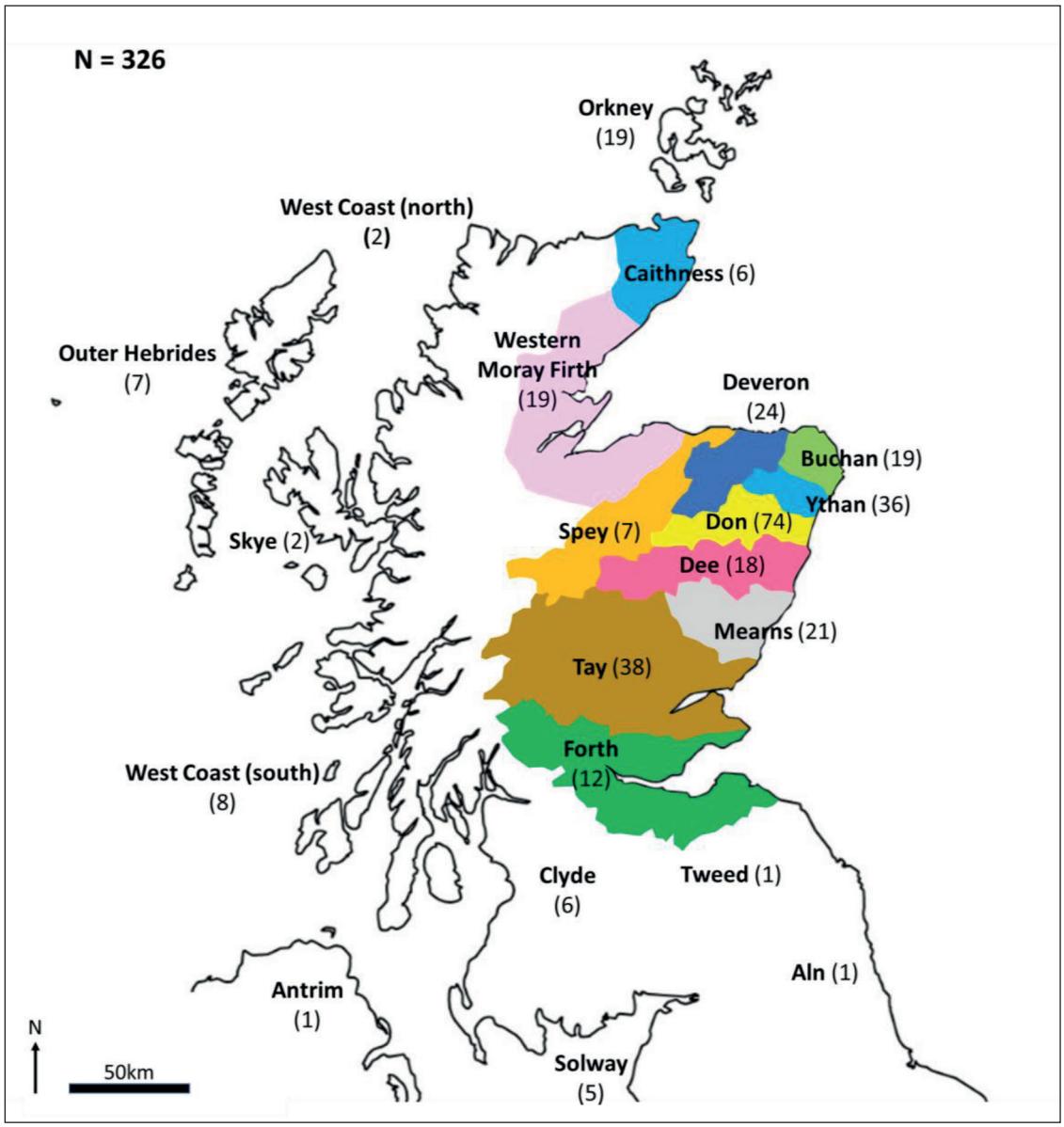

Figure 2. Numbers of CSB findspots by geographic region (map: LRRG 2014, fig. 37; data: Gary Robertson).

common (95%). Ovoids have mainly been recorded in Orkney, where a characteristic regional morphotype (Figure 3.5) is found. A single cuboid was recorded (Figure 3.6).

The diameter of CSBs ranges from 58–200 mm, but most (90%) are less than 80 mm. The average diameter is 74 mm, a size that would allow these objects to fit comfortably in the palm of an adult's hand.

Features

Features can be described as discs, knobs, or prominent knobs (Figure 4). Most CSBs (95%) were carved with some form of feature, although this may be subject to collection bias, given that plain stone balls are easily categorised as other forms of object (Wilson 1863, 194; Jones & Diaz-Guardamino 2019, 108). The number of features on a single CSB ranges from two to more than 150. Four-knob (15% of all objects), six-knob (55%) and multi-knob CSBs with greater than eight features (20%) are most common (Figure 4.4–4.6). There is no clear regional distribution pattern for CSBs with different features (Marshall 1977, 55).

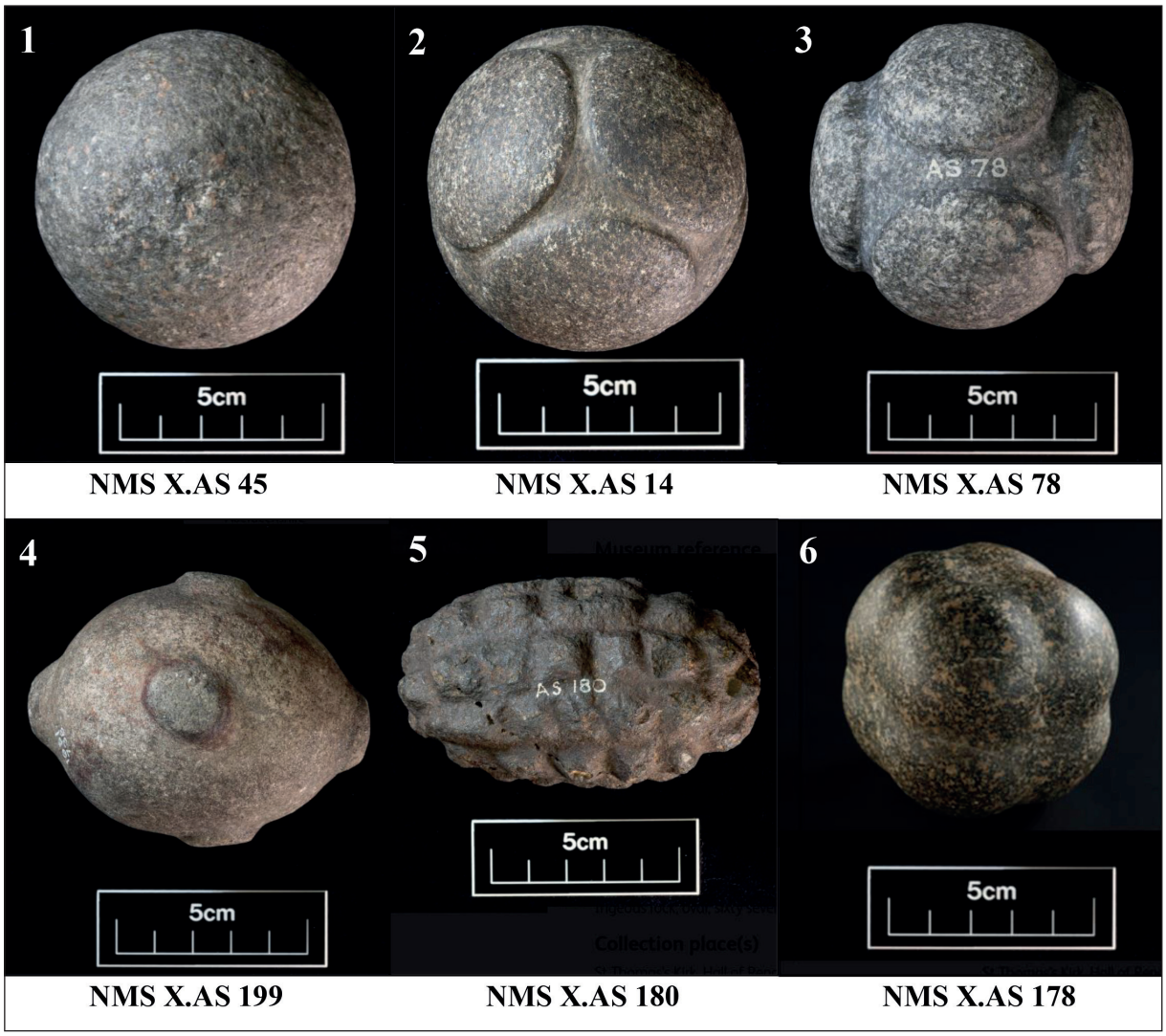

Figure 3. Examples of various CSB shapes: 1–3 spheroid; 4–5 ovoid; 6 cuboid (images: © National Museums Scotland).

Decoration

Marshall (1977) identified four decoration styles: spirals, concentric circles, lines and cross-hatching, and other markings. In total, 15% of CSBs were engraved with some form of decoration. Markings may be incised around objects, on features and in interspace areas between features. Each decorated CSB is uniquely marked, and different decoration styles may be engraved on the same object. There is no clear regional distribution pattern for CSB decoration styles, but trends can be observed, as noted by Marshall (1977, 59). CSBs with lines and cross-hatching are found across Scotland, while CSBs with spirals and concentric circles are typically found in eastern Scotland. CSBs with ridges and perforations are found on Orkney, including one object which may show carved representations of cord bindings (Anderson-Whymark 2021).

Lithology

CSBs are made from a wide variety of durable rock-types, but it is often difficult to determine the lithology of an object if it is weathered and a fresh surface is not visible. As a result, lithology descriptions within the online databases tend to be unreliable or generic (e.g. 'greenstone'). Lithologies can only be identified by examining the objects.

For this study, it was possible to identify

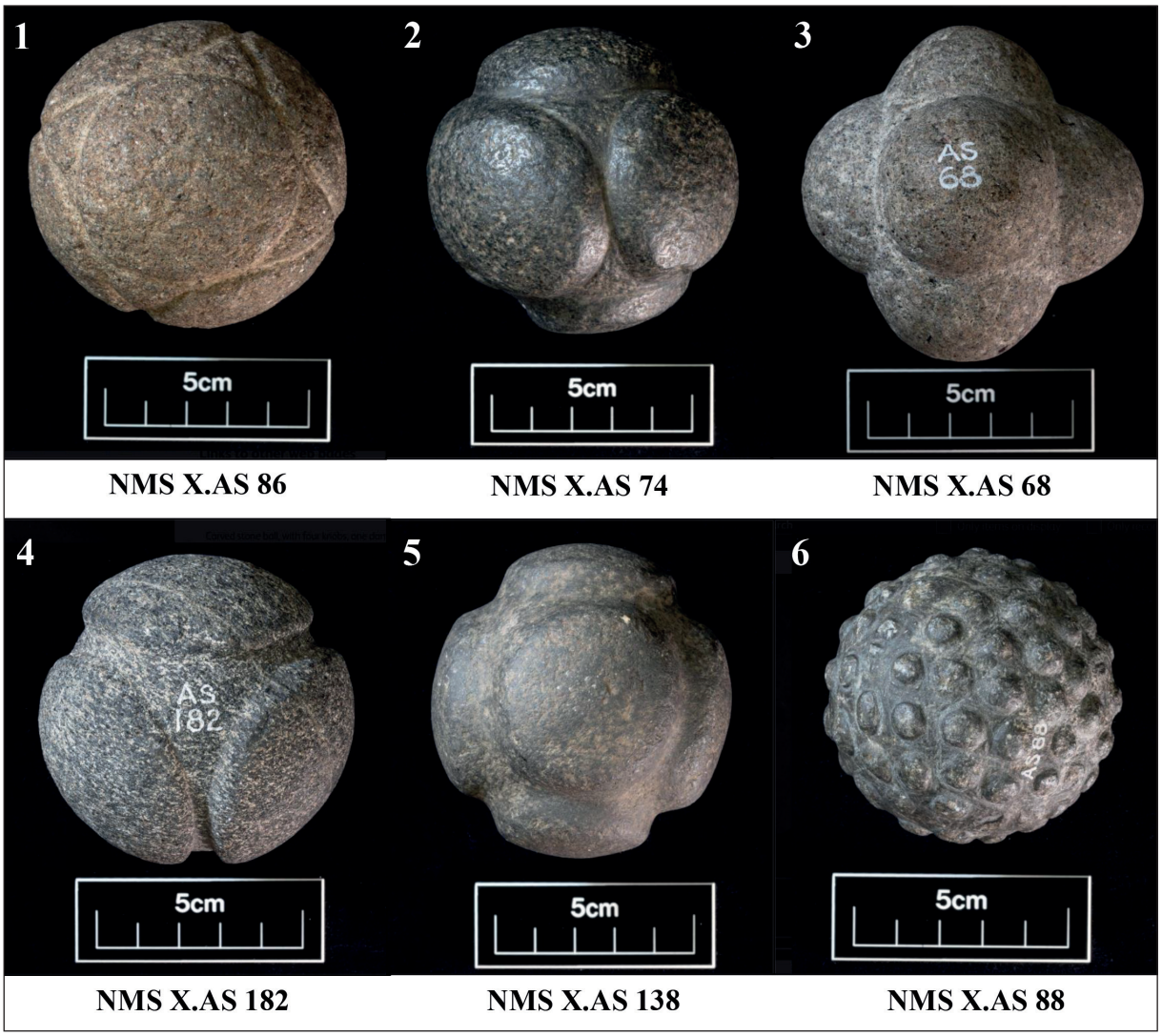

Figure 4. Types and numbers of features: 1. discs; 2. knobs; 3. prominent knobs; 4. four-knob; 5. six-knob; 6. multi-knob (images: © National Museums Scotland).

felsic, mafic and quartzitic mineralogy using macroscopic inspection, mainly in coarser-grained rocks. The mineralogy of finer-grained rocks is more difficult to determine. The felsic, mafic and quartzitic mineralogies identified can be found in igneous and metamorphic rocks (granites, gabbros, gneisses, and psammites) commonly found in outcrop and glacial drift in north-east and central Scotland.

Childe (1931, 101) recognised that the CSBs found at Skara Brae were made from local durable rocks (e.g. camptonite). Stewart-Moffitt (2022, xi, 47) appreciated the difficulties in identifying CSB lithologies. He worked with a Scottish geological expert to visually characterise the lithology of CSBs in the collections at Aberdeen University Museum and National Museums Scotland and concluded that specific rock-types were preferentially selected for CSB manufacture (*ibid*., 51–64, 76, appx. 1 & 2). Rocks suitable for inscription (e.g. serpentinite) and visually distinctive rock-types (e.g. actinolite and garnet metabasite) were among those selected. Occasionally, softer rocks were used, such as claystone. Certain identifiable rock-types (e.g. oolitic ironstone) were clearly sourced from outside north-east Scotland. However, it has not been possible to definitively link CSBs to any specific raw material sources.

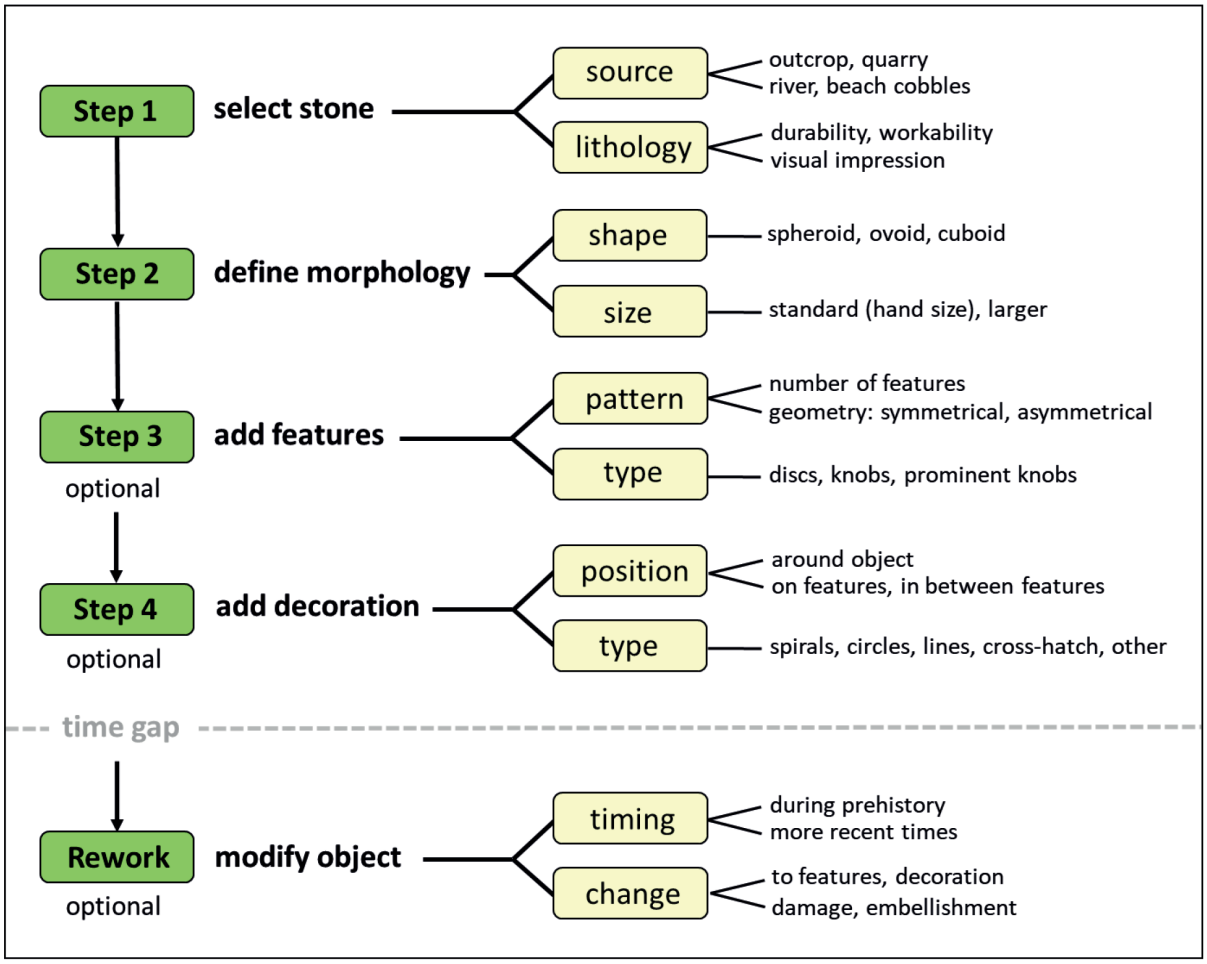

Figure 5. CSB manufacture and rework (image: Gary Robertson).

MANUFACTURING PROCESS

CSBs were made by pecking, grinding, polishing, and engraving using stone tools. The process is time-consuming (one to two weeks per object) and requires skill and knowledge (English Heritage 2024). Pecking involves repeatedly striking the selected stone with a hammerstone to create the desired object morphology, while grinding involves abrasion against a coarse stone to refine the morphology and add features. Polishing involves abrasion using a finer stone or sand to create a smooth finish. Engraving involves making incisions with pointed tools to add decoration. All finished CSBs were pecked and ground; few were polished (e.g. Figure 3.6). Some objects were crudely-made with vague scratchings, others more expertly-crafted with intricate designs.

Chaîne opératoire

The CSB manufacturing process involves a chaîne opératoire (operational sequence) of decision-making steps. Expanding on and simplifying the chaîne opératoire described by Jones (2020, 552–554), the process for manufacturing a CSB is described below and outlined in Figure 5.

Step 1: selection of the stone to be worked. The raw material source may be a quarry or outcrop, but suitable cobbles may be more easily collected from river, beach or glacial drift deposits. Specific raw materials may be selected for durability, workability, or visual impression.

Step 2: defining the morphology by pecking the stone. A decision is required to determine

object morphology, and the stone is either made into a spheroid, ovoid or cuboid of the desired size. This is the most difficult and time-consuming step in the process (Hugo Anderson-Whymark 2022, pers. comm.). The object may be ground and polished once the morphology is defined; the process can be completed following Step 2, resulting in a plain stone ball or continued into Steps 3 or 4.

Step 3: adding features by pecking and grinding. A pattern is selected, based on the desired number of features and their symmetrical or asymmetrical arrangement. The object is sub-divided accordingly and discs marked out. This requires an appreciation of geometry; for example, four-knob CSBs are tetrahedra, while six-knob CSBs are hexahedra. Deliberate asymmetry may also be selected. Interspace areas may be pecked and ground to define knobs. The process can be completed following Step 3 or continued to Step 4.

Step 4: adding decoration by inscribing markings around the object, on features, or in interspace areas between features.

Steps 1 and 2 are required to create a ball-like object. Steps 3 and 4 are optional and used to embellish the object. The process can be stopped at any time and the object either discarded or finished. Later, the process can be restarted and the object reworked.

Jones (2020, 555–556) concluded that making CSBs is a process of interaction, in which the stones are 'in dialogue' with the craftsperson, imparting them with skills and practical learning.

Reworking and object evolution

There is evidence of incomplete working and reworking of CSBs, suggesting changes to objects through time and disruptions to the manufacturing process. Figure 6.1 shows partial reworking of features and interspace areas; new features have been added, but do not cover the entire interspace area. Working appears to have been disrupted, and the object possibly discarded. Figures 6.2 and 6.3 show the transformation of six-knob CSBs into multi-knob CSBs. Palimpsests of the original six-knob patterns remain in the multi-knob objects. Such reworking may explain some of the CSBs that Marshall (1977) classified as atypical.

Anderson-Whymark (2021) interprets object evolution in a sequence of six-knob CSBs, showing the development of features from discs to knobs to prominent knobs, as described in Step 3 of the manufacturing

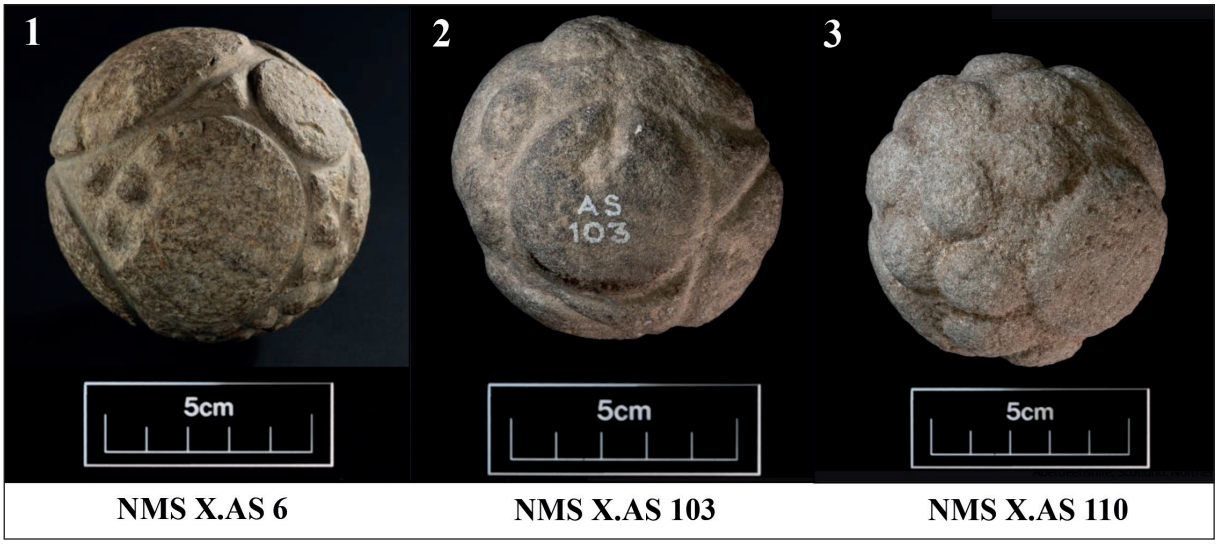

Figure 6. Incomplete working and reworking (images: © National Museums Scotland).

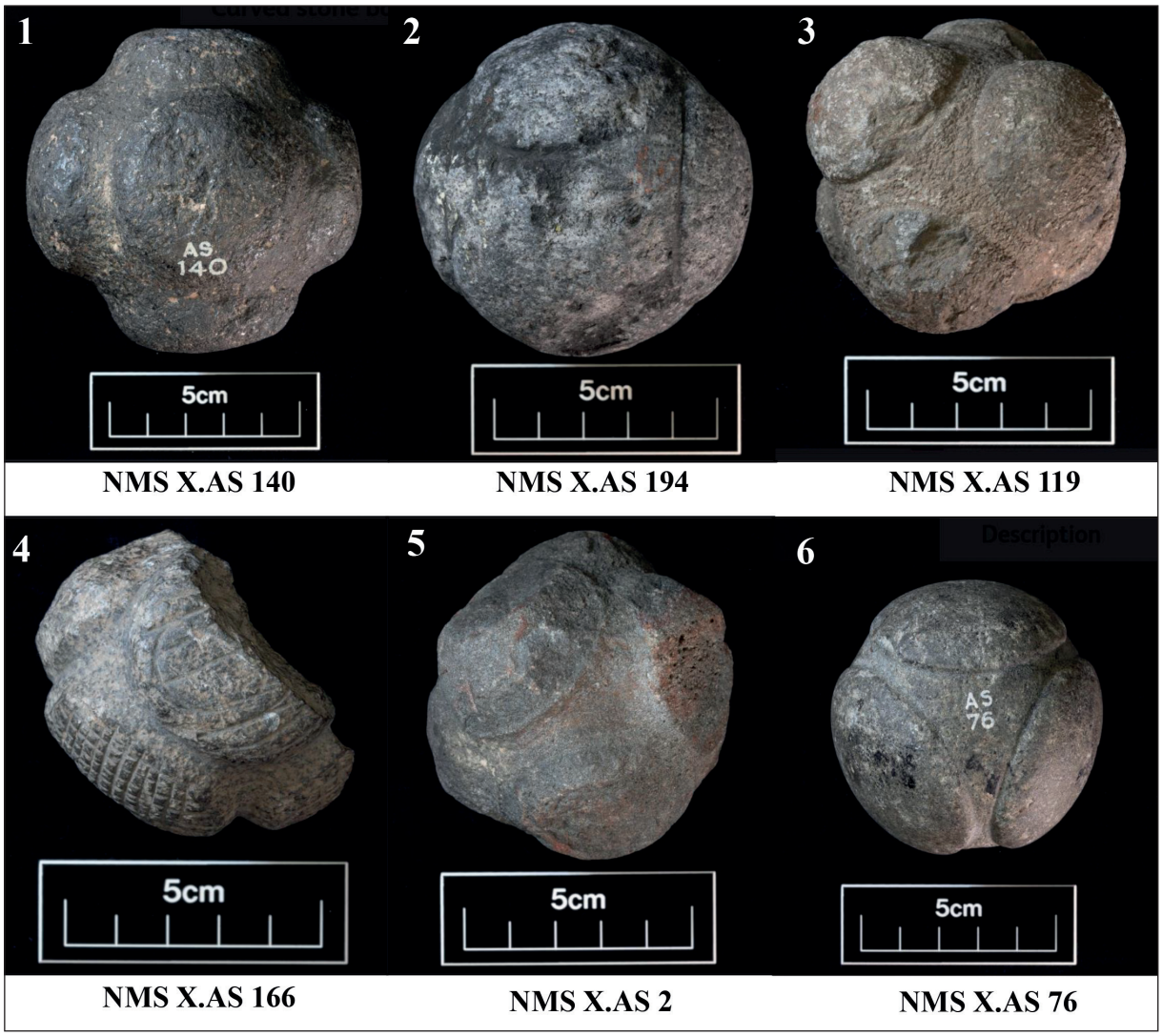

Figure 7. Post-manufacturing changes: 1. tarnish; 2. wear; 3. impact-damage; 4. breakage; 5. fire-damage; 6. paint specks (images: © National Museums Scotland).

process. Stewart-Moffitt (2022, 319–322) suggests that other factors, such as stylistic development and varying skill levels, may have impacted the design and manufacture of CSBs. Since the CSB manufacturing process is dynamic and individual objects may have evolved, a typological approach to classify CSBs may be problematic; inherent in typology is the fact that objects are assumed to be finished products. Experimental archaeology suggests that several of the CSB types defined by Marshall (1977) may instead be intermediate work products (Jones & Diaz-Guardamino 2019, 114).

Post-manufacture changes

CSBs can show evidence of post-manufacture changes that resulted in damage or embellishment to the objects. These later changes are integral to the life-histories of the objects (Figure 7).

Many CSBs are covered in greasy polish or stain (Figure 7.1); this has been attributed to handling in prehistory but could have happened more recently (Anderson-Whymark & Hall 2020, 5). Some CSBs appear smooth, with worn features, possibly related to extensive use (Figure 7.2). Some are broken, with breakage ranging from superficial damage, such as chipped surfaces (Figure 7.3), to more extensive

damage (Figure 7.4). Broken objects may be underrepresented in collections if they were perceived as less collectible. One CSB shows marks possibly attributable to fire-damage (Figure 7.5). Two appear to have been painted, with specks of black paint remaining on their surfaces (Figure 7.6).

The timing for post-manufacture changes is difficult to ascertain. Polish, staining, wear, impact-damage, breakage, fire-damage and painting could have occurred in prehistory or after the objects were unearthed. Saville *et al.* (2011) have described a CSB that may have been modified post-manufacture and embellished with additional features, during which they highlight the difficulties in differentiating phases of working and interpreting objects with long complex life-histories.

FINDS DISTRIBUTION

In the 19th century, CSBs were collected as curiosities. Archaeological information about these early finds is limited. It was only in the 20th century that CSBs were recorded in more secure archaeological contexts; MacGregor (1999a, 282) lists a number of finds with contextual information. Recent finds at Eilean Domhnuill, Ness of Brodgar and Tresness were excavated using modern techniques, maximising collection of archaeological information (Canmore 2024).

CSB findspots are concentrated in north-east and central Scotland (Figure 2). In prehistory, river valleys and coastal plains would have been attractive areas for settlement. These environments could have provided plant and animal resources for hunter-gathering and fertile lands for farming (Armit 2006, 14). The distribution of CSBs appears to reflect prehistoric settlement patterns in north-east and central Scotland. Finds are most common in the upper reaches of the Don, Deveron, Ythan and Tay river valleys, and around the firths and low-lying plains of the North Sea and Moray Firth coasts. Few relationships are found between CSBs and prehistoric monuments and other artefacts (Stewart-Moffitt 2022, p. 128). The distribution of contemporary stone mace-heads in Scotland appears similar to CSBs, but mace-head finds are also widespread across England (Roe 1968, 157). The concentration of CSBs in north-east and central Scotland indicates regionality (*sensu* Cunliffe 2012, 173–175). Although specific raw material locations have not been identified, this area was likely the focus for CSB manufacture and use. The frequency of finds is lower elsewhere in Scotland and only a few CSBs have been found in England, Ireland and Norway (Marshall 1977, 55).

CSBs are attractive, easily-transported objects that may have been exchanged between Scottish regions and beyond (Edmonds 1992, 190–191). Alternatively, designs may have been copied and made locally in outlying regions (Jones & Diaz-Guardamino 2019, 118). If exchange took place, it is difficult to ascertain whether these transactions occurred in the Neolithic or more recently (e.g. Vikings in Orkney).

Dating and archaeological setting

Notable CSB finds presented in Figure 8 provide insights into dating and the archaeological settings in which CSBs were deposited.

In the archaeological excavations at Eilean Domhnuill, Skara Brae, Ness of Brodgar and Tresness, the CSBs can be confidently dated as Late Neolithic (Figure 9). The Sheriffmuir CSB was found in association with Late Neolithic artefacts (Figure 10.1–2) (Anderson-Whymark & Hall 2020). CSBs that lack archaeological information are generally assumed to be Late Neolithic in age, but this cannot be confirmed.

CSB decoration styles are abstract and

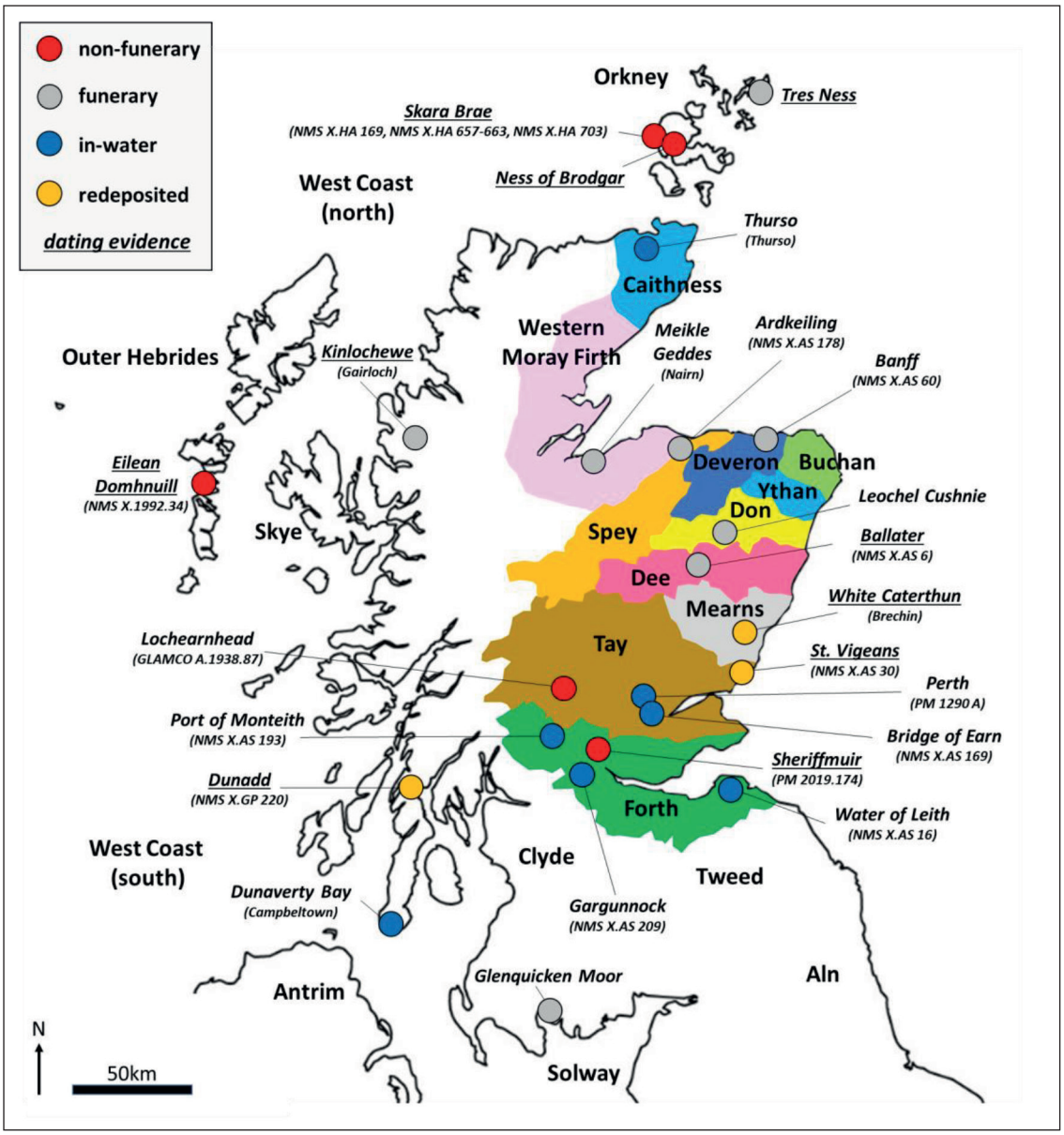

Figure 8. Notable CSB finds (map: LRRG 2014, fig. 37; data: Gary Robertson).

schematic, typical of Late Neolithic rock art (Garrow & Wilkin 2022, 104–119). Marshall (1977, 62) concluded that spiral decorations on CSBs were closely allied to carvings at Newgrange passage grave in Ireland and designs on Grooved Ware pottery, supporting a Neolithic date. Marshall also suggested that CSBs found in cairns and cists, such as the Ballater find, may indicate continued use into the Bronze Age.

Several CSBs, such as the Dunadd and White Caterthun finds, were found in sites ranging from the Iron Age to medieval period in date. Anderson-Whymark (2021) noted an association between CSBs, such as the St. Vigeans find, and Christian religious sites. These CSBs may have been unearthed and then redeposited.

The Neolithic is the age of the first farming communities in Scotland, with the introduction of new food resources, technologies and economic practices (Barclay 2003, 127). Communities were well connected with continental Europe. Influence spread along the Atlantic façade

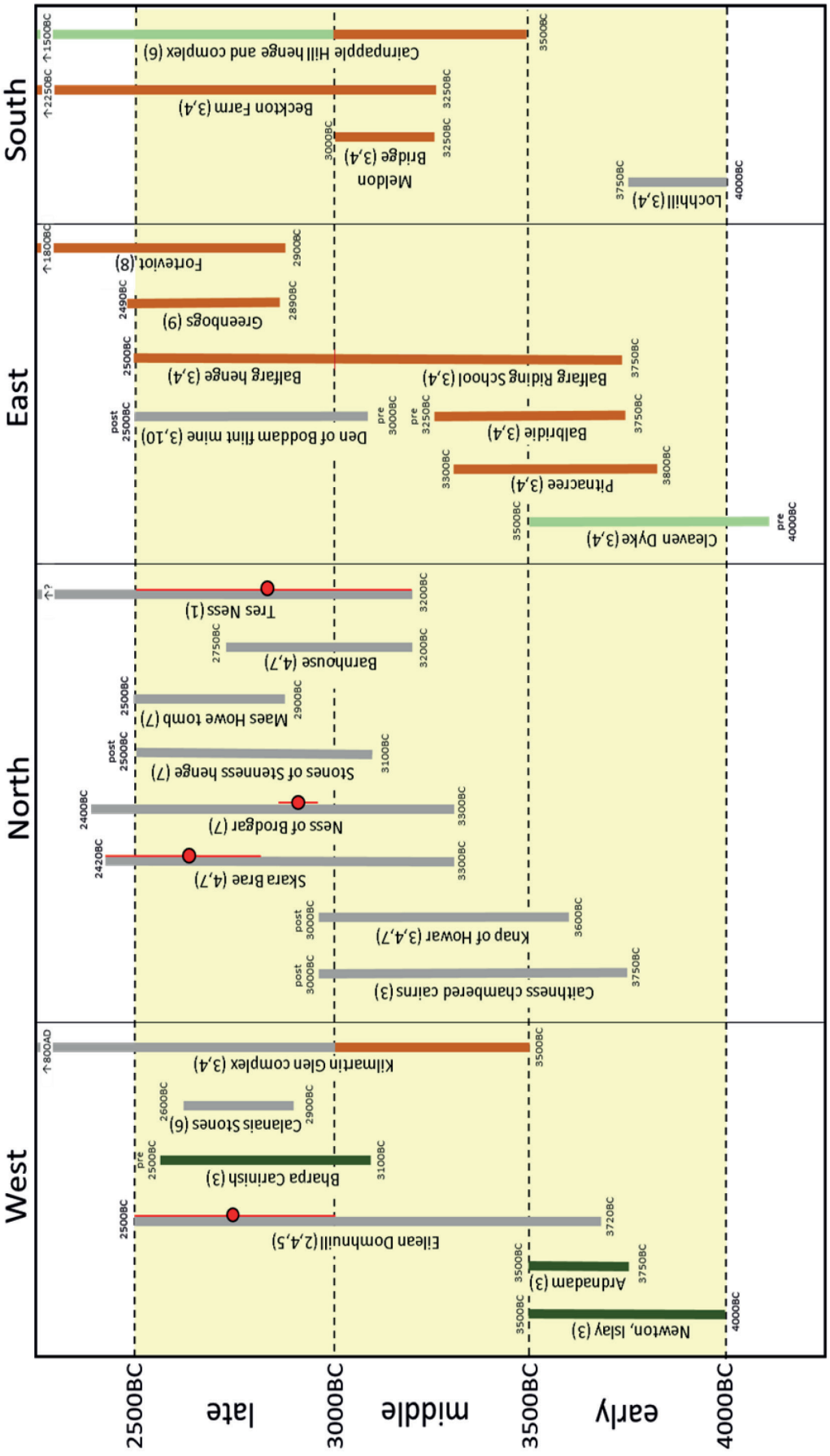

Figure 9. Neolithic timelines for selected Scottish sites and CSBs in secure contexts (sources: 1. Anderson-Whymark & Cummings 2021; 2. Armit 2006; 3. Ashmore 1996; 4. Canmore 2024; 5. Garrow et al. *2017; 6. HES 2024; 7. Ness of Brodgar 2024; 8. Noble & Brophy 2011; 9. Noble* et al. *2011; 10. Saville & Bridgland 1995)*

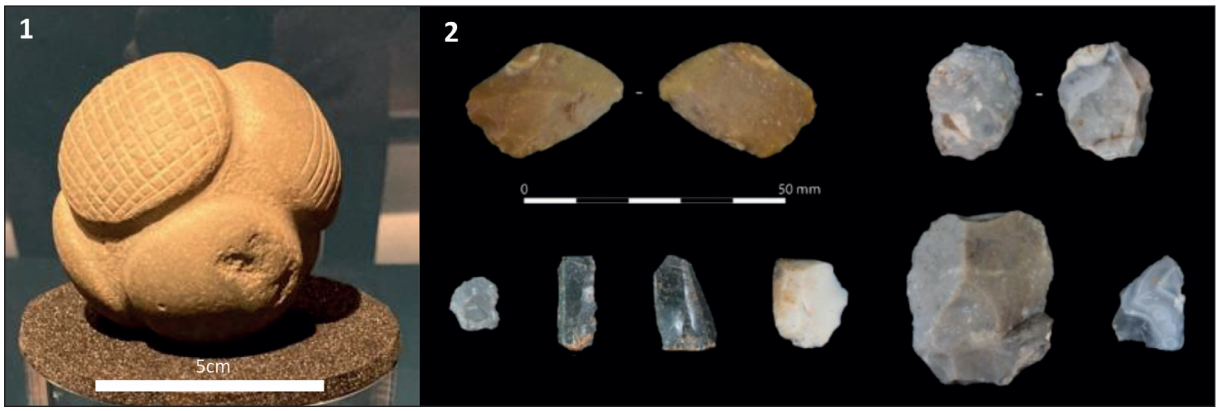

Figure 10. Sheriffmuir finds: 1. CSB (image: Gary Robertson, shared with permission from Culture Perth and Kinross); 2. lithics (source: Anderson-Whymark & Hall 2020 © National Museums Scotland and shared with permission from Culture Perth and Kinross).

in the west and across the North Sea in the east (Noble 2006, 3). Such influence, as well as differing access to stone and timber resources, resulted in regional variations within the Scottish Neolithic (Barclay 2003, 135–139).

CSBs have been found in different Late Neolithic archaeological settings at non-funerary (domestic and communal), funerary, and in-water sites (Figure 8). In north-east Scotland, CSBs appear to be associated with burial sites but this may be a preservation bias caused by the paucity of non-funerary sites (Sheridan 2007, 447). In the Tay and Forth river valleys, there are a number of in-water finds, as noted by MacGregor (1999a, 135). These occur near river crossing points and could possibly have been deliberate ritual deposits. Continuation of use or reuse of CSBs in younger archaeological settings may reflect long complex life-histories and emphasises the cultural and social significance and heritage appeal of these objects long after their manufacture (cf. Diaz-Guardamino *et al*. 2015).

The archaeological settings for the notable CSB finds are summarised by region in Table 2. Where possible, original sources, including museum donors, are referenced. Information on each find is presented as reported without further interpretation, providing an inventory of germane archaeological information. A list of all 30 notable finds is included in the Appendix.

POSSIBLE PRHISTORIC USES

Speculations about the possible uses of CSBs have been made since they were first collected. Evans (1872, 377–379) surmised they could have been used in a game or amusement, or for divination, but favoured them as weapons strung on thongs, such as bolas. Smith (1874, 29–30, 51–62) differentiated CSBs from other stone ball-like objects and proposed they could have been mace-heads attached to wooden handles and used as weapons. Mann (1914, 414–420) dismissed the idea of weapons and suggested CSBs could have been poises for weight measurement. Piggott and Daniel (1951, 14) acknowledged the objects were enigmatic and stated, "their use is wholly unknown". Marshall (1977, 63–64) speculated that CSBs were prestige objects possibly used in clan conferences. MacGregor (1999a, 137–141) considered the haptic and visual aspects of CSBs and suggested they were either highly personalised, perhaps private objects of contemplation, or they were used in a ceremonial context as an affirmation of shared community.

Table 2: A detailed record of sites across Scotland where notable CSBs have been discovered. It includes site names with their corresponding Canmore ID, descriptions of findings, and references to relevant academic and historical sources. The sites are categorized by region.

Region	Site Name & Canmore ID	Description & Findings	References
West Scotland	Eilean Domhnuill (Canmore ID 10069)	Eilean Domhnuill is a crannog in Loch Olabhat, North Uist. The site appears to have been a communal gathering place. CSBs were found in younger occupation deposits with large amounts of Hebridean and Unstan Ware pottery. These deposits are dated as Late Neolithic.	Garrow & Sturt 2019; Copper & Armit 2018, 259; Armit 1988, 23–24; Garrow et al. 2017, 117.
	Kinlochewe (Canmore ID 12086)	At Kinlochewe, a short stone-lined cist with a beaker was uncovered. A CSB was found nearby. It has been suggested the CSB was possibly an heirloom deposited in a Bronze Age burial.	Henshall & Longworth 1966, 245; Forrest 2007, 14.
	Dunadd (Canmore ID 39564)	Dunadd is a hillfort, occupied in the Iron Age and medieval period, located a short distance from the Neolithic and Bronze Age monuments in Kilmartin Glen. A CSB was unearthed near the wall of the hillfort and may be a redeposited ancient object.	Christison 1905, 311–312.
	Dunaverty Bay (Canmore ID 38289)	A CSB was found on the shore at Dunaverty Bay.	Scott 1969, 242–243.
North Scotland	Skara Brae (Canmore ID 1663)	At Skara Brae, Childe excavated CSBs and documented previous finds. These objects were found with Late Neolithic Grooved Ware pottery, flints, and shells in dwellings and passage-ways in the settlement.	Childe 1931, 100–109; Petrie 1867; Balfour Stewart 1914.
	Ness of Brodgar (Canmore ID 269123)	At the Ness of Brodgar, a CSB was excavated underneath a corner buttress in one of the rebuilt Late Neolithic structures. The archaeology suggests this site may have been a communal gathering place.	Card 2020; Ness of Brodgar 2024.
	Tresness (Canmore ID 3566)	At Tresness, two CSBs were excavated in a Late Neolithic chambered cairn. Both are featureless, polished objects made from distinctive rock-types. Fragments of cremated bone confirm this was a burial site.	Anderson-Whymark & Cummings 2021.
	Thurso River (Canmore ID 8489)	A CSB was found in the Thurso River.	Barry 1893, 42.
East Scotland	Meikle Geddes (Canmore ID 15201)	At Meikle Geddes, a CSB was found with a boar's tusk near a tumulus.	Smith 1874, 41–42.
	Ardkeiling (Canmore ID 16399)	At Ardkeiling, the remains of a cairn and burial site were excavated. The graves contained burnt bones and flint tools. Sculpted stones with cup-marks and spiral decorations were found nearby. Two CSBs were found in a cist in one of the graves.	Young 1897, 45; Marshall 1977, 56.

East Scotland	*Banff (Canmore ID 18454)*	*In Banff, a CSB was found in a cairn being broken-up for road metal.*	*PSAS 1886, 318.*
	Leochel Cushnie (Canmore ID 17598)	*At Leochel Cushnie, a CSB was found in a tumulus.*	*Smith 1874, 34–35.*
	Ballater (Canmore ID 31161)	*Near Ballater, three short stone-lined cists containing bones and ashes were uncovered. A CSB was found close to one of these cists. This burial possibly dates from the Bronze Age.*	*Smith 1874, 35–36; Anderson-Whymark 2021.*
	White Caterthun (Canmore ID 34990)	*The Brown and White Caterthuns are two Iron Age hilltop enclosures. A CSB was found near White Caterthun and may be a redeposited ancient object.*	*HES 2024; Canmore 2024.*
	St. Vigeans (Canmore ID 35622)	*A broken CSB was unearthed close to St. Vigeans church tower and may be a redeposited ancient object at a Christian religious site.*	*Duke 1882, 176; Anderson-Whymark 2021.*
	Lochearnhead (Canmore ID 24133)	*At Lochearnhead, cup-marked stones and remains of a stone monument were uncovered. A CSB was found nearby.*	*Haggart 1888; Canmore 2024.*
	Perth (Canmore ID 28149)	*In Perth, CSBs were dredged from the River Tay.*	*Wilson 1863, 195.*
	Bridge of Earn (Canmore ID 28022)	*A broken CSB was found in the River Earn at Bridge of Earn.*	*Barlows 1911, 315.*
	Rusky Burn (Canmore ID 24403)	*A CSB was found in the Rusky Burn near Port of Monteith.*	*MacKeith 1947, 189–190.*
	Gargunnock Burn (Canmore ID 46105)	*A CSB was found in the Gargunnock Burn close to where it joins the River Forth.*	*PSAS 1974, 325.*
	Sheriffmuir (Canmore ID 369046)	*At Sheriffmuir, a near-pristine CSB (Figure 10.1) was unearthed during tree-planting operations. This CSB was found in situ on top of glacial till. No archaeological features were observed at the site. Fieldwalking was conducted and a scatter of Late Neolithic flint, quartz, and pitchstone artefacts recovered (Figure 10.2).*	*Anderson-Whymark & Hall 2020.*
South Scotland	*Water of Leith, Edinburgh (Canmore ID 51930)*	*A CSB was found in the Water of Leith in Edinburgh.*	*Henderson 1878, 614.*
	Glenquicken Moor (Canmore ID 63670)	*On Glenquicken Moor, a cairn was removed during land improvements. Below the cairn, a stone coffin was uncovered containing a human skeleton with an axe injury, a flint arrowhead, and a polished CSB.*	*Wilson 1863, 187–188.*

Jones (2016, 1–4) summarised the possible functional and symbolic uses of CSBs and commented on their plausibility. He dismissed the ideas that CSBs were representations of pollen grains or atomic structures or used as ball-bearings for shifting megaliths. He considered using CSBs as weapons or as measurement devices unlikely and thought it plausible that CSBs could be prestige objects because it agreed with the archaeology, but the idea was hard to substantiate. Jones was most persuaded by the suggestion that CSBs were personalised or communal sensual objects. Stewart-Moffitt (2022, 333) thought that CSBs could be symbols of community identity.

CSBs appear to be personalised objects. Although there are some standard characteristics, such as shape and size, the manufacturing process includes decision-making steps. Lithology, morphology, features and decoration all need to be selected. The variety of CSB designs and uniqueness of decorations indicate personal choices were made in their manufacture. The distribution of CSBs appears to reflect prehistoric settlement patterns, where people lived and died. CSBs have been found in different archaeological settings, including domestic settlements, communal gathering places, burial sites, and possible in-water ritual sites. It appears CSBs were present in routine day-to-day domestic use, but were also cherished objects, important enough to accompany individuals into the afterlife. The artistry involved in CSB manufacture is variable; some were crudely-made, others more expertly-crafted. Expertly-crafted CSBs may have been intended for prestige use. As a result, CSBs may have had more than one use and their use may have changed over time (Anderson-Whymark 2021). Given the limitations of archaeological evidence, it may never be possible to know the actual prehistoric uses for CSBs (Card 2020).

Figure 11. Ness of Brodgar replica (source: Ness of Brodgar 2024, shared with permission from Ness of Brodgar Trust).

Modern uses

Replicas of the Ness of Brodgar CSB are available for purchase (Figure 11) (Card 2020). These are accurate replicas made by local craftspeople to look and feel like the prehistoric object. They are designed to provide the purchaser with a realistic Neolithic tactile experience. As MacGregor (1999a, 137–141) explained and Jones (2016, 4) emphasised, CSBs are undeniably tactile objects. Tactile interaction with the Ness of Brodgar replica is compulsive. The object is weighty and moves easily in the user's hand, encouraging them to explore and manipulate its features. The action is comparable to that of a bowler in cricket or a pitcher in baseball who manipulates their game-ball using the stitching in the seams.

CSBs look similar to modern sensory tactile balls (Figure 12). These objects are used by therapists working with special needs children to calm and de-stress them. Their distinctive shapes allow children to find their own toys using feel-recognition (tfh 2022, pers. comm.). It seems reasonable to assume that the tactile qualities of CSBs were in some way important in the prehistoric past.

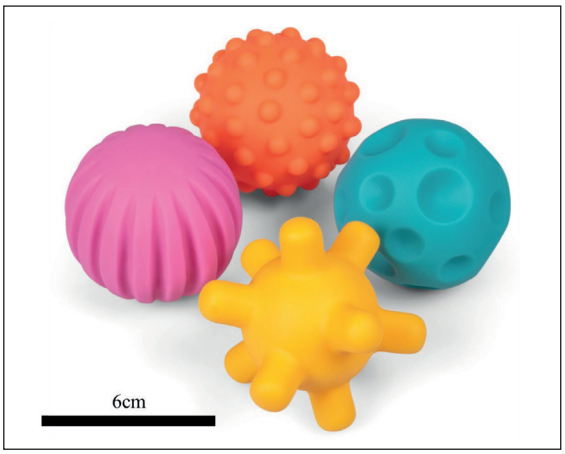

Figure 12. Sensory tactile balls (source: tfh 2022, shared with permission from tfh).

In Oldmeldrum, Aberdeenshire, a sculpture entitled 'The Eternal Present' consisting of three over-sized replica CSBs (Figure 13) is prominently displayed in the centre of the village. This artwork, which is made from locally-sourced stone, was designed to link local history, geology and industry, and was inspired by "our long-forgotten ancient predecessors" (Elphinstone Institute 2024). A similar-themed sculpture entitled 'First Conundrum' is displayed in Festival Square, Edinburgh. These modern examples connect people with the past and promote personal feelings of identity and heritage. Such attributes may also have been important in the prehistoric past.

CONCLUSIONS

Using online sources, this study has attempted to address four questions regarding prehistoric CSBs from Scotland. Their object biographies have been explored to establish what they are; their process of manufacture describes how they were made; their archaeological context describes where, when and how they were deposited; and their purpose has been considered through an exploration of how they might have been used in prehistory. The manufacture and reworking of these objects involved a sequence of personal choices. The concentration of CSB findspots in north-east and central Scotland suggests that this was likely the focus of their manufacture and use.

Figure 13. 'The Eternal Present', Oldmeldrum (image: Gary Robertson, shared with permission from Elphinstone Institute).

CSBs are found in Late Neolithic non-funerary (domestic and communal), funerary, and in-water archaeological settings and appear to have been important personalised objects with tactile qualities. In north-east Scotland, they are associated with burial sites, while in the Tay and Forth river valleys there are a number of in-water finds; these occur near river crossing points and could possibly have been deliberate ritual deposits. It appears CSBs may have had a routine day-to-day domestic use, but were also cherished objects, important enough to accompany individuals beyond death. Several CSBs also appear to have been used during the Bronze Age, Iron Age and later archaeological periods. Later use and modern representations may reflect the important cultural and social significance of these objects.

ADDENDUM

This study was completed in 2022 (Department for Continuing Education, Oxford University) using online sources available at the time; the text was updated in 2024. Since then, at least one new CSB find has been made (UHI 2025), appearing in a funerary setting in Orkney. It is hoped that a better understanding of the prehistoric uses of CSBs may emerge as more CSB finds continue to be made in secure archaeological contexts.

In June 2025, Historic Environment Scotland retired their Canmore website and data were transferred to a new service: trove.scot (2025).

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APPENDIX

Thirty notable CSB finds as presented in Figure 8.

Region	*Find Spot (Geographic Region)*	*Canmore*	*Museum (ID)*	*Setting*
West	Eilean Domhnuill (West Coast north)	10069	NMS (X.1992.34)	non-funerary
	Kinlochewe (West Coast north)	12086	Gairloch	funerary
	Dunadd (West Coast south)	39564	NMS (X.GP 220)	redeposited
	Dunaverty Bay (West Coast south)	38289	Campbeltown	in-water
North	Skara Brae (Orkney)	1663	NMS (X.HA 169)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 657)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 658)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 659)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 660)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 661)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 663)	non-funerary
	Skara Brae (Orkney)	1663	NMS (X.HA 703)	non-funerary
	Ness of Brodgar (Orkney)	269123	-	non-funerary
	Tres Ness (Orkney)	3566	-	funerary
	River Thurso (Caithness)	8489	Thurso	in-water
East	Meikle Geddes (Western Moray Firth)	15201	Nairn	funerary
	Ardkeiling (Spey)	16399	NMS (X.AS 178)	funerary
	Banff (Deveron)	18454	NMS (X.AS 60)	funerary
	Leochel-Cushnie (Don)	17598	-	funerary
	Ballater (Dee)	31161, 32481	NMS (X.AS 6)	funerary
	White Caterthun (Mearns)	34990	Brechin	redeposited
	St. Vigeans (Tay)	35622	NMS (X.AS 30)	redeposited
	Lochearnhead (Tay)	24133	GLAMCO (A.1938.87)	non-funerary
	River Tay, Perth (Tay)	28149	Perth (PM 1290 A)	in-water
	Bridge of Earn (Tay)	28022	NMS (X.AS 169)	in-water
	Rusky Burn, Port of Monteith (Forth)	24403	NMS (X.AS 193)	in-water
	Gargunnock Burn (Forth)	46105	NMS (X.AS 209)	in-water
	Sheriffmuir (Forth)	369046	Perth (PM 2019.174)	non-funerary
South	Water of Leith, Edinburgh (Forth)	51930	NMS (X.AS 16)	in-water
	Glenquicken Moor (Solway)	63670	-	funerary