Chalcolithic and Bronze Age Consultation Draft

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Introduction

The British Chalcolithic period is now widely recognised as beginning during the 25th century BC with the appearance of the first metal artefacts (produced from copper and gold) and introduction of other material culture and practices from the European continent (Allen *et al.* 2012; Parker Pearson *et al.* 2019). True bronze metallurgy (bronze objects produced from alloying copper and tin and later, lead) emerged around 2200/2150 cal BC. The subsequent transition to the Iron Age is more problematic to define across Scotland but is generally understood to occur around 800 BC. For the purposes of this Framework, the Chalcolithic and Bronze Age are defined as 2450–800 cal BC.

Like the preceding Neolithic, the Chalcolithic and Bronze Age period in Perth and Kinross exhibits many of the major practices, monument types and artefact forms that define the significant technological and societal changes brought about in the 3rd millennium BC with the advent of metallurgy and its subsequent development through the 2nd and 1st millennia BC. Continental burial practices and the Beaker pottery tradition of the Chalcolithic are observable in Perth and Kinross with Dutch connections evidenced from the ring-ditched grave and associated Beaker excavated at Newmill near Bankfoot [MPK/Canmore ID 27015].

Artefact recovery has generally been poor in upland areas, especially in terms of chance finds, in contrast to far greater numbers recovered in the lowland areas, a distinction that is largely due to patterns of land use (Stevenson 1975). The context of the lowland historical discoveries is often lacking, however with the increase in developer-funded archaeological work and metal-detecting, stray finds are increasingly informative.

In contrast to earlier periods, evidence for settlement during the Bronze Age is both extensive and exceptional (Strachan 2011: 4). This is especially the case across upland areas where non-intrusive survey work has revealed a diverse range of roundhouse forms including single and double-skinned types plus regionally distinctive tangential pairs (see RCAHMS 1990). Sites and monuments associated with ceremony and burial are prolific and include Scotland's second largest cremation cemetery at Kilmagadwood [MPK/Canmore ID 27852] near Loch Leven (Sheridan *et al*. 2018). Cairns of various forms are present and there is a notable concentration of Bronze Age 'four-poster' stone circles. These latter monuments are generally considered to date to the Neolithic or Early Bronze Age, but in some cases clearly had extended and complex use-lives. Excavation of a four-poster circle at Na Clachan Aoraidh near Blair Atholl [MPK/Canmore ID 25877] revealed a human cremation and associated charcoal, which yielded Late Bronze Age dates (Ellis and Ritchie 2018), an important addition to our understanding of Late Bronze Age funerary rites. The reuse of earlier monuments and ceremonial complexes as places for burial or depositing cremations, such as at Forteviot Henge 1 [MPK#/Canmore ID 26565] offer valuable insight into the nature of monument change over time as well as prehistoric concepts of identity,

ritual, sense of the past (including memory) and their cosmological understandings. The general sparsity of Late Bronze Age burial evidence in Scotland presents an underlying problem affecting the extent to which we can understand many aspects of the human dimension. The information for long-distance connections that is available through the region's rich artefact record (including bronze, gold and amber) therefore becomes of greater importance for understanding the lives and deaths of Perth and Kinross' Late Bronze Age communities.

The watercourses of the region remained of great importance throughout this period with Lowland deposition of single finds and hoards of metalwork concentrated around rivers such as the Tay. Evidence of their role as travel corridors and a source of food has also been revealed through the study of exceptional recoveries and their contexts such as the Carpow Logboat from the Tay estuary near Abernethy, which may also indicate wider trade through linkage with larger plank-sewn coastal vessels currently only known from the East coast of England [MPK/Canmore ID 196138] (Strachan 2010a).

In a break from the structure of the previous chapters, the Chalcolithic and Bronze Age Regional Overview is divided into chronological spans with each containing a knowledge summary highlighting regionally distinctive aspects and an assessment of the extant resource:

Chalcolithic (c.2450–2200/2150 BC)
Early Bronze Age (2200/2150–1600 BC)
Middle Bronze Age (1600–1150 BC)
Late Bronze Age (1150–800 BC)

These divisions are presented according to the latest chronological understandings in relation to burial and artefactual traditions. Although they do not capture the complex nuances of different simultaneous developments (eg they do not necessarily align with changes in the settlement record), they are designed as shorthand to help structure the document. Contextualisation is provided through reference to other areas of Scotland where appropriate, reflecting how past activity did not occur in isolation nor was it restricted by modern administrative boundaries. The Overview concludes with a brief history of archaeological research undertaken in the region. The research agenda follows, detailing knowledge gaps in the form of research questions and outlines key areas where it would be desirable to refine our understanding of the prehistoric communities that lived in the region. This chapter ends with the research strategy where recommendations to help address the agenda are presented. To allow clearer cross-chapter comparability, both the agenda and strategy are presented collectively and do not follow the same chronological divisions as the overview.

Regional Overview

Chalcolithic (c.2450-2200/2150 BC)

In addition to the appearance of the first copper and gold artefacts in the 25th century BC, the British Chalcolithic is defined by the presence of other Continental novelties in the archaeological record. 'Beaker' pottery marks a striking change from the indigenous Grooved Ware that was likely still in use at the time as do new funerary practices featuring individual inhumation. Other artefacts and artefact styles such as barbed-and-tanged arrowheads (see Needham 2012 and Parker Pearson *et al.* 2019) are also features of this chronological span. The Chalcolithic novelties appeared over a wide area within Great Britain, including Scotland (Sheridan 2012), and within a

few generations they seem to have been adopted more widely (Needham 2005; 2012), with the Beaker ceramic tradition lasting for several centuries until around the 18th century BC (Jay *et al.* 2019). Recent aDNA analysis of Beaker-associated human remains has shown that the earliest users of this Continental pottery style were immigrants, coming from the near Continent to different parts of Great Britain (see Olalde *et al.* 2018).

With the predominant diagnostic evidence for Chalcolithic activity centering around imported material culture and funerary practices, these elements feature highly in the resource assessment of this chronological span.

Funerary Monuments and Beakers

Although relatively limited, the Chalcolithic evidence thus far recovered from Perth and Kinross is important in that it underlines the Continental background for Beaker funerary practices in this area. An S-profiled, All-Over-Ornamented Beaker with herringbone decoration excavated from a ring-ditched grave pit at Newmill [MPK/Canmore ID 27015], near Bankfoot (**Figure XX**) sits early in the Beaker typological sequence and can be most closely paralleled with Beakers from the Netherlands and other parts of the Lower Rhine (Sheridan 2008a: 253; Watkins and Shepherd 1980). Although the human remains from this site had fully decayed, the presence of a flint strike-a-light among the grave goods suggests that the occupant of the grave had been male (Sheridan pers. comm.) and deposited in an organic coffin, perhaps of bark or timber planks (Watkins and Shepherd 1980). The form of the grave, with its surrounding ring-ditch and possibly a low organic mound over the grave pit, finds parallels in the Lower Rhine and northern France (see Fokkens 2012 for a discussion of *comparanda*). Beaker graves featuring organic coffins or chambers, as opposed to stone cists, are characteristic of the earliest Beaker funerary practices in Great Britain, and are typical of north-west European Beaker practice, but they are rare in Scotland (where the slightly later cists predominate).

[INSERT] Figure XX: Newmill Beaker and stone tools

The style of the Newmill Beaker remains unparalleled in Perth and Kinross, although a close *comparandum* was discovered at Battle Moss in Highland (Caithness) [MPK/Canmore ID 9021] (Sheridan pers. comm.), and three other early Beakers in a similar type of grave were found at Upper Largie in Kilmartin Glen, Argyll and Bute [MPK/Canmore ID 281470] (Cook *et al.* 2010; Sheridan 2008a: 253). A Dutch connection has also been argued for the Upper Largie Beakers (Sheridan 2008a: 251; 2012; although see Fokkens 2012 for a debate about the geographical range of *comparanda* for the Beakers and grave type). Many of the later Beakers found in north-east Scotland have features reminiscent of Dutch Beakers of Veluwe style, suggesting renewed contacts with this part of north-west Europe later in the 3rd millennium BC (Lanting and van der Waals 1972: 31). (For an overview of other Scottish-Dutch connections during this period, see Sheridan 2008a) It is unfortunate that no human remains survived at Newmill, especially as other confirmed Chalcolithic graves from Perth and Kinross are currently unknown, however, the presence of Newmill raises the prospect for future discoveries in the area.

The discovery of a finely made All-Over-Comb decorated Beaker from a pit at Balnahanaid, Ben Lawers [MPK163/Canmore ID 24479], has been stylistically compared with an example recovered from an early Beaker grave containing unburnt remains of a young adult female buried in a simple pit grave at Sorisdale [Canmore ID 21703] on the Isle of Coll (Sheridan in Atkinson 2016: 28). This comparison is important because recent isotopic analysis of the Sorisdale individual revealed that

this person had not been born locally, and aDNA analysis indicated her ancestry lay in the lower Rhine valley; taken together this suggests the Sorisdale female may well have been a first-generation incomer from the Continent (Ritchie and Crawford 1978: 75-84; Sheridan 2008a: 253ff; Montgomery *et al.* 2019: 395; Olalde *et al.* 2018). This corroborates the argument that the tradition of making Beaker pottery was introduced from the Continent. Other early-style Beakers from Perth and Kinross include those from Aberfeldy [MPK982 / Canmore ID 25592] and Auchterarder [MPK/Canmore ID 25964] (Clarke 1970: fig. 17; Sheridan in Atkinson 2016: 28), and possibly the Beaker sherds from the cist at White Cairn, Glen Cochill [MPK/Canmore ID 26253], which have been compared with a Beaker from Keabog in Kincardine and Deeside, associated with a skeleton dated to 2446–1960 cal BC (Stewart and Barclay 1997: 46). However, on the whole Chalcolithic and Early Bronze Age Beakers are rare in Perth and Kinross.

Ceremonial Monuments

To date, the evidence for Chalcolithic interactions with monuments has been circumstantial, such as the Beaker sherds associated with the Moncreiffe House [MPK#/Canmore ID 28012] henge (Stewart 1986). However, with the increased application of radiocarbon dating, more palimpsest sites are emerging with Chalcolithic engagements recorded at Neolithic sites around the end of the third and beginning of the 2nd millennium BC. At Pitnacree [MPK/Canmore ID 26384] for instance, where a standing stone was erected on top of a Neolithic barrow, cremated remains dating from 2340–1960 cal BC were excavated from a pit intended to hold a standing stone (Coles and Simpson 1965; Sheridan 2010: 44-47).

Large numbers of ceremonial sites with date sequences spanning the Neolithic to Bronze Age exist across the southern portion of the region and in clusters. Four complexes have currently been identified, namely Forteviot [MPK#/Canmore ID 26565], Leadketty [MPK#/Canmore ID 26621], North Mains [MPK#/Canmore ID 26006] and Moncreiffe House [MPK#/Canmore ID 28012]. Ford (2017: 131-132) observes that these complexes are all sited along the River Earn or its tributaries and suggests that their locations indicate the spiritual and logistical importance of the river and could have served as a means of controlling access to this important east-west waterway and the rich agricultural land along its banks. Excavations at the ceremonial complex near Forteviot indicate that it was in use/re-use for most of the 3rd millennium BC (Brophy and Noble 2020). A henge monument dating c.2468–2236 cal BC was constructed here within an earlier timber enclosure surrounded by a much earlier cremation cemetery (Noble, Brophy and Younger 2020). This henge continued in use for several centuries into the 2nd millennium BC and during this time a Chalcolithic/Early Bronze Age cist burial was inserted at the centre of the henge (Noble, Brophy and Sheridan 2020). Dates from a second henge within the Forteviot complex also suggest a construction and use date from c.2400 BC onwards (Brophy and Noble 2020: 209-242).

Whilst Scottish henges have historically been considered a Late Neolithic phenomena, the investigations at Forteviot (and elsewhere in Scotland) have highlighted that in addition to palimpsest reuse, in some cases the actual construction of some henge monuments began in the Chalcolithic and continued in use into the early Bronze Age (Brophy and Noble 2020). Such re-evaluation has also been achieved at the North Mains henge [MPK/Canmore ID 26006] and barrow [MPK/Canmore ID 26005], both of which enclose and/or overlay multiple early Bronze Age burials (Barclay 1983). Radiocarbon dating of one of the burials inside North Mains henge and a cremation sealed by the henge bank indicated that the henge and cemetery were contemporaneously established during the Chalcolithic to Early Bronze Age transition 2150–1940 cal BC (Bradley 2011a: 97).

[INSERT] Figure XX: North Mains henge

Settlement
Across Scotland, there is relatively limited evidence for settlement that can be directly dated to the Chalcolithic and in Perth and Kinross there is currently no securely datable evidence that can inform us about settlement practices.

Material Culture: Metalwork
Whilst there are sources of copper ore in Perth and Kinross, there is no evidence for prehistoric exploitation. The very earliest metalwork was likely imported, either as raw material or as objects that were recycled and turned into insular forms. The earliest known metalwork is concentrated around historic Kinross-shire where a possibly copper flat axehead was found at Bishop Hill [MPK/Canmore ID 27868] near Portmoak, which may be typologically early (Buchanan 1980; O'Connor 2004, 205), and three halberds (one from Portmoak Moss [MPK/Canmore ID 27876], two from Backside of Aldie [MPK/Canmore ID 49621]) have been recovered and date to the Chalcolithic or beginning of the Early Bronze Age (c.2300–2100 BC) (Needham *et al.* 2015). One of the Backside of Aldie halberds is possibly an early type (Pistell Dewy), occurring between 2300–2200 BC (Needham *et al.* 2015, Appendix 2). The distribution of the three halberds is important as they conform to other discoveries from along the Firth of Forth, particularly in south-west Fife (eg one from Falkland [MPK/Canmore ID 29773]). It is likely that, throughout the Chalcolithic and beginning of the Early Bronze Age, the copper ore for producing copper and then bronze artefacts was imported from the mine at Ross Island in County Kerry, south-west Ireland; this is suggested by compositional analysis (Needham 2004). The compositional data for the Backside of Aldie halberds presents a more complicated picture. One was produced from 'A-metal', characteristic of Ross Island and consistent with other Scottish halberds such as those found at Largizean, Argyll and Bute (Sheridan 2013), whilst the other is made from 'BB-metal' (Bell Beaker) which indicates a Continental origin (see data in Needham *et al.* 2015: Appendix 2). The known evidence therefore suggests that the prehistoric communities of Perth and Kinross had access to metal travelling from two directions with both Irish and Continental connections.

The proximity of these findspots to the Forth estuary is indicative of how rivers and waterways were serving as transport routes for the movement of people and metal in and out of the region. It also highlights a potential geographically induced divide between the prehistoric communities of Perth and Kinross living south of the Ochils in Kinross-shire who were looking towards the Firth of Forth and maintaining closer associations with other communities along its shores, and those north of the Ochils who utilised the River Tay and its estuary as their main conduit (see Needham 2004 for comparative work on metal flow pathways).

[INSERT] Figure XX: Portmoak halberd

Early Bronze Age (2200/2150–1600 BC)
The Early Bronze Age sees a rich diversification in monument types, burial practices and material culture as evidence for Bronze metalworking technology and it's associated new artefact forms emerged across Perth and Kinross. Needham (2005; 2012) characterises this chronological span as the 'fission period' where the variety and occurrence of burials with Beakers and other grave goods increases and artefact types became more widespread but with little relation to Continental

traditions or styles. Grave goods and burials across this region, wider Tayside and the Great Glen become more elaborate in this span with dagger-burials and burials with rich grave assemblages including jet necklaces featuring prominently (Brophy and Noble 2020: 282). High status, exotic artefacts such as these deposited as part of burials indicate Perth and Kinross was a wealthy region during the Bronze Age, a factor that could largely be attributed to the fertile agricultural land (Cowie and Shepherd 2003: 153). Although lost to later land-uses in lowland areas, agricultural activity is extensively evidenced in the uplands where field systems and clearance cairns demonstrate a well-managed and productive landscape supporting a mixed subsistence economy (*ibid.*: 162-5).

Funerary Monuments

The complexities of burial practices in Scotland is now widely recognised, involving both inhumations and cremations, predominantly in stone-lined cists or pits, sometimes covered by earth mounds or stone cairns, both enclosed and unenclosed (Sheridan 2007b; Stevenson 1999: 26-28). Scientific investigations of individuals, including aDNA and isotopic analyses, are increasingly common, though very few individuals from Perth and Kinross have thus far been analysed and redressing this should be a priority. Radiocarbon dating programmes, such as that led by Alison Sheridan, have greatly improved our absolute chronology of Early Bronze Age ceramic traditions, burial practices and the construction of monuments (some of which is summarised in Sheridan 2007a; 2007b, though see also information published in the digital issue of Discovery and Excavation in Scotland 2018). The results of these dating programmes have yet to be comprehensively synthesised for Perth and Kinross and the full implications are yet to be realised.

Excavations illustrate the variety and complexity of burial practices, including individual cists (eg Abercairney; Rideout 1987), cairns (eg White Cairn; Stewart and Barclay 1997: 44-46), burials in earlier monuments such as the Forteviot dagger-burial (Noble, Brophy and Sheridan 2020), the Carse Farm Stone Circles (Stewart and Barclay 1997: 48ff) and even a log coffin burial at Dumglow, Cleish (Abercromby 1905). Whereas few Chalcolithic burials are known in this area, numerous flat cemeteries of Early Bronze Age cists are known containing inhumations, often with associated grave goods, or urned and unurned cremations. At Almondbank [MPK/Canmore ID], overlooking Methven Loch, 11 stone-lined short cists were excavated, at least 6 of which contained human remains, most of which were inhumations in various states of completeness (Stewart and Barclay 1997: 24-33). At Loanleven [MPK/Canmore ID], less than half a kilometre to the west-south-west, a four-cist cemetery was excavated, two containing inhumations, two containing cremations (Russell-White *et al.* 1992). Along the Tay Valley, the flat cemeteries at Grandtully [MPK/Canmore ID] (Simpson and Coles 1990) and Westhaugh of Tulliemet [MPK/Canmore ID] (Stewart and Barclay 1997: 34-41), and the Sketewan cairn [MPK/Canmore ID] (Mercer and Midgley 1997), were all found within a few miles of each other and each close to a standing stone. Around Loch Leven, three cremation cemeteries are now known from Shanwell House [MPK/Canmore ID 25877] (Anderson 1995), Gairneybank [MPK/Canmore ID 25877] (Cowie *et al.* 1991) and the large cist cemetery recently excavated to the east of Loch Leven at Kilmagadwood (Sheridan *et al.* 2018) (**Figure XX)**. The Kilmagadwood cremation cemetery is of national significance and is one of the largest so far known in Scotland, smaller only than Southfield in Fife (Sheridan *et al.* 2018). Twenty-three urned cremations were recorded at Kilmagadwood (**Figure XX)**, representing a minimum number of 29 individuals plus three unurned deposits of pyre debris (*ibid.*).

[INSERT] Figure XX: Excavations at Kilmagadwood (© Derek Hall)

[INSERT] Figure XX: An inverted cinerary urn *in situ* at Kilmagadwood (© Derek Hall)

Funerary monuments covering or enclosing cists are also widespread. The large ring-cairn at Sketewan, some 20m in diameter, enclosed and covered an earlier funerary pyre and cist cemetery in which a minimum of 21 individuals were buried in seven cists (Mercer and Midgley 1997). In all, 14 phases of activity were identified at this complex monument with construction spanning the Neolithic and Early Bronze Age. Likewise at Beech Hill House [MPK#/Canmore ID], near Coupar Angus, two phases of activity spanning two periods were identified, beginning with agricultural activity during the 3rd millennium BC that was followed by the construction of a kerbed cairn covering five cists and an enclosing ring-ditch slot for a timber palisade (Stevenson 1995). Reuse of earlier sites during the Bronze Age is widely recognised throughout Britain and Ireland (eg Bradley 1993: 113-129; Bradley and Nimura 2016; Ford 2017) and evidence of this phenomenon can be seen in the region at Beech Hill House and Sketewan as previously mentioned as well as at Moncreiffe House (Stewart 1986), Balnabroich (Stuart 1867), and Carse Farm I (Stewart and Barclay 1997: 48-52), to name a few. The relationship between the Early Bronze Age dagger-burial at Forteviot, which dates between 2199–1977 cal BC, the conversion of Neolithic and Chalcolithic henges into Bronze Age funerary monuments and the wider prehistoric ceremonial complex is by far the most significant example of reuse to have been reported and published in the last decade, informing regional, national and international discourses (Brophy and Noble 2020).

Isotopic analysis of individuals from the region is limited but where undertaken, interesting conclusions have been presented. Strontium analysis of a probably male skeleton dating to 2140-1920 cal BC (2 sigma; 3575±110BP) from Gairneybank, near Kinross, indicated an origin consistent with County Antrim, Ireland which parallels Early Bronze Age inhumations from Culduthel *[Canmore URL]* near Inverness and Kinaldie *[Canmore URL]* in Aberdeenshire (Cowie and Ritchie 1991; Montgomery *et al.* 2019: 397). Connections between Ireland and Perth and Kinross have already been highlighted in this chapter, such as the composition of the Backside of Aldie halberds, and are evident through both the monument and artefact records of the Early Bronze Age. Irish parallels in the Early Bronze Age continue with the cairn at Beech Hill House and the associated Irish-style Food Vessel that was recovered there. Palaeogenetic studies are increasingly influential in understanding prehistoric migrations and for shaping our interpretations, with recent evidence indicating a 92% turnover in the genetic makeup of the population between 2500–1500 BC (Olalde *et al.* 2018; Parker Pearson *et al.* 2019: 435f.) though the exact mechanisms of this turnover continue to be discussed (Booth 2019; Booth *et al.* 2021). To date no individual from Perth and Kinross has been analysed, though aDNA from an Early Bronze Age individual buried just over the local authority boundary at Doune in Stirling contributed to Olalde *et al.*'s conclusions. Together, the Gairneybank individual, rich regional material cultural evidence and positive aDNA work carried out beyond the county indicates great potential for further investigations into the relationships between Ireland and the communities of Perth and Kinross.

Ceremonial Monuments

The scale of Early Bronze Age activity in Perth and Kinross is extensive and the archaeological remains indicate a landscape of intensive interactions. Monuments are diverse and in addition to the continuation of Neolithic forms such as henges and timber circles, there are numerous stone monuments such as rows, circles (including the 'four-poster' variant, which is heavily concentrated

in Perth and Kinross) and individual standing stones with distinctive clusters evident. In Glen Shee, there is a particularly dense concentration of six stone circles of various forms within four miles of each other, as well as a spread along the lower Tay Valley (eg Moncreiffe House and Sandy Road [MPK/Canmore ID]) and a group overlooking Loch Tay (including Fortingall [MPK/Canmore ID] and Croftmoraig/Croft Moraig [MPK#/Canmore ID 278852]) (Burl 2000: 243ff, Fig.27). Dating of stone monuments is difficult and often done relative to associated finds such as at Carse Farm I [MPK/Canmore ID] where a Collared urn was excavated from the base of one of the stones (Stewart and Barclay 1997: 48ff.).

Although useful, relative dating does not offer a date for when such monuments were erected with excavation and follow-up investigations demonstrating that stone circles and their associated features have complex construction sequences. Excavations at Croft Moraig in 1965 initially suggested this site was Neolithic based largely on ceramic evidence (Piggott and Simpson 1971), however, this interpretation has subsequently been revised through re-excavation and radiocarbon dating which has placed the complete sequence of this monument in the Bronze Age (see chapters in Bradley and Nimura 2016). This re-interpretation demonstrates the ongoing fluidity in the chronology of Neolithic and Bronze Age monument traditions across the region and is a theme that is also particularly relevant to henge monuments as well other stone settings such as the four-posters (discussed below). The graded stone circle at Moncreiffe House presents a further example where it surrounded a burial cairn and was preceded by a henge-like monument (Stewart 1986). The circle was later altered to incorporate recumbent stones (suggesting links with the graded recumbent stone circles of Aberdeenshire) and a millennium later, it was used as a metalworking site (*ibid.*).

Of importance to a study of Perth and Kinross are the ‘four-poster’ stone settings, a stone circle subgroup consisting of an arrangement standing stones laid out with the most prominent form the corners of an irregular quadrillateral. With over 30 examples currently recorded, Perth and Kinross has around 30% of Scotland’s known examples of this monument type, a considerable concentration (Burl 1988: 4-5; Ellis and Ritchie 2018, 24) **(Fig XX)**. Excavated examples of four-posters have typically yielded Early Bronze Age ceramic vessels (Burl 2000: 245; Ellis and Ritchie 2018: 6) but general understanding of this monument class remains limited with few sites fully published and only two radiocarbon dated (Na Clachan Aoraidh [MPK/Canmore ID 25877] above Loch Tummel and Park of Tongland, Dumfries and Galloway). Understanding these monuments is a national priority with the question posed in the ScARF Bronze Age report on when and why four-posters were built (ScARF 2012) remaining open. As the first to be dated, Park of Tongland in Dumfries and Galloway provides a benchmark for helping to understand these monuments and reveals two phases of activity, the first being the establishment of a cremation cemetery with two upstanding stones during the Early Bronze Age, the second being erection of two further stones and a cairn mound capping the cemetery during the Middle Bronze Age (Russel-White *et al.* 1992). A Perth and Kinross comparator for Park of Tongland is the possible four-poster at Lundin Farm [MPK/Canmore ID] which was constructed on top of a cairn (*ibid.*: 312–321; Stewart 1966). A cremation buried at Na Clachan Aoraidh was dated to the Late Bronze Age and is discussed later in this document. Previously considered to be palimpsests originating in the Neolithic and later reused in the Bronze Age, the weight of evidence now increasingly points toward four-posters being single-period, multi-phase sites initially established as funerary monuments for interring cremations (see discussion in Ellis and Ritchie 2018) as opposed to ceremonial monuments in the first instance, as argued by Burl (1988: 52).

[INSERT] Figure XX: four-poster distribution map?

Settlement

Settlement evidence pre-2000 BC is currently lacking from Perth and Kinross, but recent excavations across the local authority boundaries would suggest that settlement activity in the early second millennium BC could exist amongst Perth and Kinross's rich upland record of hut circles (see discussion in Middle Bronze Age section). In Clackmannanshire at Meadowend Farm, an Early Bronze Age ring-groove roundhouse was excavated dating to 2115–1880 cal BC with associated pits that had subsequently been succeeded by four Early-Middle Bronze Age roundhouses *c.*1750–1300 cal BC (Jones *et al.* 2018). Other examples include the Early Bronze Age dated roundhouses excavated at Auchrennie in Angus (Cameron *et al.* 2007, 48-57) and Kintore, Aberdeenshire (Cook and Dunbar 2008).

Material Culture

Grave Goods

Early Bronze Age 'grave goods' (ie portable material culture associated with burials) indicate the presence of important members of society or 'elites' in the region and include metalwork (both gold and bronze), a variety of pottery forms (Beakers, Food Vessels and Collared, Cordoned and Vase Urns), stone tools and equipment, including strike-a-lights and arrowheads, and jewellery produced from gold, jet, bone, amber and faience. Single finds and hoards of copper alloy axeheads deposited in significant locations, such as the recent hoard of decorated examples from Bunrannoch [MPK#/Canmore ID] near Kinloch Rannoch (Cowie 2004), conform to wider practices across Scotland.

At the Kilmagadwood cremation cemetery the ceramic vessels recovered included Vase Urns, Collared Urns, Cordoned Urns, Bipartite Urns and possible Bucket Urns (Sheridan *et al.* 2018). These vessels have provided vital information about the phasing at the site and indicate the long use and re-use of the cemetery over several centuries. Associated finds include toggles, bone items, two bronze razors as well as non diagnostic bronze objects and a single faience bead. This diversity of grave goods is matched elsewhere, such as at Almondbank where two Whitby jet and cannel coal necklaces, three Food Vessels, a bronze awl, flint tools and animal bones were all recovered (Stewart and Barclay 1997). Such assemblages offer considerable insight and future research potential into burial practices, the role and range of material within local Bronze Age society, wider connectivity, craft skill and technological sophistication.

Beech Hill House near Coupar Angus provides a good example of the material assemblage assisting with the dating of the site and also informing on international connections. Multiple individuals were cremated and buried within the cists at Beech Hill House and were accompanied by a diverse range of objects including stone artefacts, a bronze awl, Food Vessels, bone toggles plus a bone pommel which provided a radiocarbon date between 2200-–1910 cal BC (Ashmore 2002: 154). Stevenson (1995: 232) paralleled the spatial relationship between the ring-ditch and cairn with that seen at Balfarg *[Canmore URL]* in Fife and at Ballycraigy in County Antrim, Ireland. This Irish connection is further strengthened through one of the Food Vessels which shares affinities with Irish ceramic styles.

The remarkable dagger-burial at Forteviot has presented archaeologists and material specialists with a wealth of well preserved information and artefacts for study.The whole cist was sealed by a sandstone slab weighing 4–5 tons and bears an unusual carving on the underside (Noble, Brophy

and Sheridan 2020). Evidence suggests that the probably male body lay on a birch bark mat with a 'halo' of quartz pebbles around the head (*ibid.*). The grave goods included a bronze knife-dagger, a bronze dagger with a rare corrugated gold hilt band, and partially preserved wooden, animal hide and organic remains. Only three wooden bowls from mortuary contexts are known in Britain and two were contained in this burial (*ibid.*: 190). The large quantity of meadowsweet flowers as a tribute is also significant as it represents the first conclusive association in Britain and Ireland (*ibid.*). The fire-making kit has parallels across Europe but is unique for the components it contains and is of international value as the most complete of its era in Europe (*ibid.*: 181 and 190). Although the grave architecture and setting provide considerable information in their own right it is their consideration alongside analysis of the associated grave goods that has allowed detailed interpretation of the burial, presenting the picture of a well connected high status warrior/leader interred with tributes indicative of a community's care and compassion following a public journey to the heart of a complex ceremonial landscape (Brophy and Noble 2020: 282-283).

[INSERT] Figure XX: Forteviot dagger-burial

Metalwork

By the Early Bronze Age production of metalwork, or at least Migdale-Marnoch axeheads, was ongoing in north-east Scotland (Cowie 1988; Needham 2004), though evidence from Perth and Kinross is minimal, confined to the mould from Easter Clunie on the Perth and Kinross-Fife border (**INSERT FIG**) (Cowie and O'Connor 2009: 317-319).

There is little evidence for production of objects, though this region sits on the fringes of north-east Scotland where numerous stone moulds for Early Bronze Age axeheads are known (Cowie 1988) and the extensive networks that developed for the flow of objects and materials passed through (Brophy and Noble 2020: 283; cf. Needham 2004). The excellent routeways provided by the river valleys through Perth and Kinross indicate the most likely mechanism for metal coming in and out of this region, though historically relatively few deposits of metal objects have been encountered. The Forteviot daggers and what they can tell us thus become further important, especially as the associated gold hilt band on one of them represents the earliest goldwork from Perth and Kinross. Flat and flanged axes dominate the archaeological record with recent finds including those at Kinnesswood [MPK#/Canmore ID] (Cowie and Hall 2009), not far from Loch Leven, and the Bunrannoch hoard of decorated axes (Cowie 2004)**.** Needham (2004, 222-223) observed that Classic Migdale-type axes tend to occur north of the River Tay and particularly in the east including Perth and Kinross, Angus, Fife and Aberdeenshire. This further raises the possibility that the River Tay played an important role as a natural boundary in the circulation of metalwork. Assessment of metalwork assemblages have the potential to offer considerable insight into the interconnectivity of the region's Bronze Age communities, as evidenced by the work published on the Forteviot daggers (see Noble, Brophy and Sheridan 2020). Cowie (2004) provides a further example, suggesting that the depositional location of the Bunrannoch axes between Loch Rannoch and Loch Tummel may indicate an east-west route of communication and connection.

[INSERT] Figure XX: Forteviot dagger

[INSERT] Figure XX: Bunrannoch axe hoard

Middle Bronze Age (1600–1150 BC)

In contrast to the Early Bronze Age, human activity that can be categorically dated to the Middle Bronze Age (1600–1150 BC) is limited in Perth and Kinross. This reflects the picture of this chronological span more generally across central Scotland although it is undoubtedly hindered by the low dating resolution that currently exists for many sites.

In its broadest sense, burial practices become more ephemeral in Middle Bronze Age Scotland and artefact deposition, particularly of metal objects, appears to decline when compared to southern Britain where deposition is particularly high *c.*1400-1100 BC. Pottery types become less diverse during the Middle Bronze Age and from *c.*1600–800 BC, consists largely of Bucket urns/Flat-rimmed ware (Sheridan 2007b: 169-170, fig.14.8) which is a stark contrast to the five types plus their variants that are known in the Early Bronze Age. Improved dating of pottery has assisted our understanding of the sites where assemblages are found, the Croft Moraig stone circle offering a good example of this. Here, the reassessment of pottery excavated in the 1960s indicated that an oval timber structure in the interior of the setting was of Middle-Late Bronze Age date (Bradley and Sheridan 2005). This was later re-enforced through re-excavation of the interior structure which confirmed that it had been built within the earlier stone setting during the Middle Bronze Age (Bradley 2016b; 2016d: 122-127).

Settlement

From around 1800 BC a notable increase in settlement practices is apparent. Pope (2015) makes the observation that although there are a variety of securely dated earlier settlements concentrated largely in the lowlands south of the Firth of Forth, the evidence north of the Forth is sparse. This wider context serves to emphasise the value of the resource in Perth in Kinross where a wealth of hut circles have been surveyed and recognised across the uplands and lowlands to the east of the River Tay (Harris 1984; RCAHMS 1990; 1994). Insufficient excavation has taken place to conclusively date these sites but the majority of features could date broadly to the mid-late second millennium BC or even up to the first millennium BC. Minimal survey in the uplands to the west of the River Tay presents a stark contrast, with Cowley's work (1997) in Strathbraan providing a rare example of survey in the west and demonstrating the great potential for settlement in these areas. Nonetheless, there has been a significant increase in the number of excavations of Bronze Age settlement sites across Scotland since the 1990s, largely due to developer-funded activity (for summaries of the nature of Bronze Age settlement in Scotland (see Halliday 1999; 2007; forthcoming; Pope 2015).

Evidence for Bronze Age settlement is widespread and diverse, represented by a variety of structure forms including predominantly unenclosed building platforms, ring-ditch and post-ring structures, and single- and double-walled stone hut circles, the latter of which are heavily concentrated in the upland glens and straths to the north-east of Perth and Kinross and into Angus (Halliday forthcoming; Pope 2015; RCAHMS 1990: 2-3). Concentrations of hut circles, and therefore settlement by implication, are also known along Strathearn, the Tay valley and Strathbraan. The excellent preservation of structures in the north-east, especially in Strathardle and Glen Shee, where hut circles are situated at altitudes of 300–400m OD (**Figure XX**), has long been a focus of archaeological interest, beginning with the *Statistical Accounts* in the 1790s (Thoms and Halliday 2014: 13ff.; see also RCAHMS 1990) and this area continues to promise great research potential for the future. In contrast, a lack of settlement evidence in the Ochil and Sidlaw hills has been attributed to disturbance from medieval and later agricultural activity as well as a less survey in these areas (RCAHMS 1994: 9-10).

[INSERT] Figure XX: Map of domestic/settlement sites

Within this context, it is perhaps unsurprising that the majority of excavations of hut circles and enclosures in Perth and Kinross has taken place in the uplands. Although comprehensive excavation of an upland Bronze Age settlement is still lacking, investigations at Carn Dubh [MPK#] (Rideout 1996), Dalrulzion [MPK#] (Thorneycroft 1933; 1946) and Tulloch Field [MPK#] (Thoms and Halliday 2014) are valuable contributions producing phases spanning the later second-early first millennia BC. At Tulloch Field in Strathardle a group of at least six hut circles and circular platforms were surveyed and excavated with possible structural timbers from one of the hut circles (Site A) providing radiocarbon dates spanning 1415–1120 cal BC and a possible Middle Bronze Age rapier fragment recovered from a neighbouring hut circle (Site B) (Thoms and Halliday 2014). Despite the rapier, Site B produced a Late Iron Age radiocarbon date (173 cal BC), highlighting that even within a single group of seemingly contemporary hut circles, there may have been decades or centuries during which occupation continued intermittently (Halliday 2007; forthcoming). This has profound implications for the conclusions we can draw from hut circle survey data without corroboration through excavation. Coupled to this is the importance of carefully considering occupation duration and frequency (Halliday 2007).

Middle Bronze Age settlement activity in the lowland areas of Perth and Kinross remains relatively limited, though settlements comprising at least 14 roundhouses and activity dating from the Middle Bronze Age to Early Iron Age was recently excavated around Brookfield House [MPK#] and Kirkton Farm [MPK#] near Blackford (O'Connell and Anderson 2021). The extensive remains of enclosed and unenclosed settlements were investigated across ten areas on well-drained knolls near Blackford. The Middle Bronze Age is the best represented period from the excavations with single and closely grouped roundhouses with ring-ditches and south-east orientated entrances recorded (*ibid.*: 112). Notable is the first regional suggestion of palisade enclosed roundhouses from the Late Bronze Age with a range of interpretations for the enclosure presented ranging from added protection against the weather, to household defense, to a display of status (*ibid.*). A mixed farming economy is also evident, including the recovery of barley and emmer wheat, and craft production is represented through cannel coal jewellery (*ibid.*). The Blackford discoveries coupled with those of other lowland Middle Bronze Age roundhouses at Hatton Farm *[Canmore URL]* (Gray and Suddaby 2010) and Cliffbarn Road *[Canmore URL]* (Dunbar 2012), both in Angus, and at Pitlethie Road *[Canmore URL]*, Fife (Cook 2007) demonstrate that the lowland picture will emerge as more work is undertaken and reported.

Material Culture

Metalwork

As in the Chalcolithic and Early Bronze Age, evidence for the production of metalwork is largely unknown in the Middle Bronze Age and there has yet to be a dedicated study of Bronze Age metallurgy in Scotland. Around 1600 BC dirks and rapiers appear in the archaeological record and represent the first metal blades to be produced for no function other than as weapons. This introduction presents a powerful indicator of a society in which conflict was growing, requiring dedicated means of inflicting harm and defending itself (Harding 2007), though little skeletal evidence exists of trauma and violence. The emergence of weapons is coupled with the development of looped spears and a range of axes which dominate the archaeological record and reflect a variety of craftworking functions. Perth and Kinross's Middle Bronze Age metalworking assemblage is modest with no hoards or associated finds known from this chronological span and this conforms with the general picture across Scotland (Coles 1964). It is during this span that the

earliest evidence of metalwork deposition in the River Tay appears to begin, a practice that continued to the end of the Late Bronze Age (Cowie and Hall 2001; 2010). A Middle Bronze Age dirk recovered from the shore of the River Tay at Friarton near Perth (**Figure XX**) represents the earliest deposit of metalwork from the river though Neolithic and Early Bronze Age stone objects are known (Cowie and Hall 2010; Cowie *et al.* 2011). A replica of the Friarton copper-alloy dirk was subjected to experimentation and wear analysis. It represents the first and only experimental use of a dirk in Britain and Ireland and revealed the weapon to be highly effective against synthetic skeletal material as well as provided key clues into how such objects may be damaged through use (Faulkner-Jones 2016). Compositional analyses of the Friarton dirk and another stylistically similar dirk from Pitcaithly [MPK#/Canmore ID] has indicated that both dirks were produced from Irish metal or were Irish in origin (Cowie *et al.* 2011: 15-17).

[INSERT] Figure XX: Friarton dirk

Late Bronze Age (1150–800 BC)

Developments that began in the Middle Bronze Age largely continue into the Late Bronze Age. The character and nature of settlement practices remain largely unchanged (Pope 2015), while artefact deposition, particularly of metalwork, becomes prolific across Scotland (Coles 1960). Late Bronze Age burial practices remain largely ephemeral, though increasingly it is clear that at least some of the rites were undertaken in relation to Neolithic and earlier Bronze Age monuments. The limited burial evidence means proxies for recognising dimensions of human interactions become important, such as the artefact record as a means for interpreting long-distance connections. Archaeological evidence for Bronze Age Perth and Kinross was first assessed as part of a wider Tayside area by Coutts (1970; 1971) who noted a scarcity of Late Bronze Age settlement and funerary monuments in comparison to earlier in the Bronze Age. Archaeological work had significantly enhanced the picture by the time Winlow (2010) undertook the next, and most recent, comprehensive assessment of the region's Late Bronze Age archaeological resource as part of the Carpow Logboat investigation. Although limited to a study area closely tied to the environs of the lower River Earn, Almond, Tay and its estuary, Winlow's study is informative in outlining the region's Late Bronze Age landscape below the highland boundary fault and includes valuable environmental reconstructive contributions (see Tipping and Milburn in Winlow 2010). Site density has increased further since Winlow's assessment and her conclusions remain relevant to the current resource where understanding of regional settlement and burial chronologies is limited but future research potential is extensive (Winlow 2010: 149-150).

Funerary Monuments

Monuments associated with burial in this period predominantly take the form of individual inhumations and cremation deposits, larger cemeteries and multi-phase sites but for the Late Bronze Age, datable evidence is currently restricted to cremations associated with stone circles and henges. Four cremation pyre burials deposited in the tops of backfilled elongated pits were found in close proximity to North Mains henge and have provided dates *c.*1000 cal BC (Barclay 1983: 187). Excavation of the stone circle at Sandy Road, Scone [MPK#/Canmore ID] revealed cremated remains within a Bucket urn set upright in a pit towards the centre of the circle (Stewart 1965); these were radiocarbon dated to 1190–890 cal BC (Sheridan 2007b: 184). The stone circle at Moncreiffe House (discussed in previous sections), provides a further example of Late Bronze Age reuse (commencing *c.*1000 BC) associated with cremations in pits (Stewart 1986).

Evidence from excavations at four-poster stone circles (mentioned during the overview of Early Bronze Age monuments) adds an interesting dynamic to how we understand Late Bronze Age funerary practices in Perth and Kinross. At a close grouping of three stone settings near Fortingall Church [MPK8], excavation revealed sub-rectangular arrangements of stones which have been interpreted as essentially four-posters (Coles 1908; Welfare 2011). A spread of charcoal and human bone radiocarbon dated to 1108–901 cal BC evidenced that the cremations were deposited during the Late Bronze Age (Sheridan 2008b: 201ff.). As described previously, excavations at Na Clachan Aoraidh near Loch Tummel returned a Late Bronze Age date (901–804 cal BC) from a cremation of human remains deposited in a tree throw hollow (Ellis and Ritchie 2018). What is of particular significance from this excavation is that Ellis and Ritchie concluded from the stratigraphic relationships that the cremation and monument were contemporary with the four-poster being constructed around the cremation in a single phase (*ibid.*: 35). The Late Bronze Age dating and single phase sequencing of Na Clachan Aoraidh is both intriguing and game changing for the understanding of four-poster stone circles, which are generally considered to have been constructed during the Early Bronze Age. In Perth and Kinross, the evidence suggests Late Bronze Age burials were occasionally related to earlier monuments, and the example from Na Clachan Aoraidh has implications for our assumptions about the dating of these monuments, particularly in relation to their burial and ceremonial functions, and emphasises the need for more radiocarbon dating of these monuments.

Settlement

The majority of excavated sites represent open settlements (Winlow 2010: 144) and several of those discussed under the Middle Bronze Age section have produced radiocarbon dates spanning into the Late Bronze Age, though there is limited evidence for sites that commenced in the Middle Bronze Age continuing much after 800 BC. Three of the excavated roundhouses at the Carn Dubh upland settlement produced Late Bronze Age radiocarbon dates spanning 1260–795 cal BC as well as dates indicating subsequent occupation during the Early-Middle Iron Age and a reoccupation in the Early Medieval period (Rideout 1996: 175). Carn Dubh reiterates observations made at Tulloch Field where the sequences of roundhouse construction and phases of settlement are multi-period and complex (Thoms and Halliday 2014). Seven of the 15 roundhouses excavated and dated near Blackford around Brookfield House and Kirkton Farm returned dates within or spanning the Late Bronze Age(see Table 23 in O'Connell and Anderson 2020: 121). These dates indicate that settlement continued within the landscape around Blackford but with variations in house architecture, namely the loss of the ring-ditch and the appearance of four-post structures (O'Connell and Anderson 2020: 112). The presence of structures enclosed by palisades here creates an intriguing composition of unenclosed and enclosed roundhouses within otherwise unenclosed settlements. Further examples of palisade enclosed ring-groove roundhouses exist within the region such as at Mains of Murie, Errol [MPK#/Canmore ID] and Middlebank by Inchture [MPK#/Canmore ID].

Although core narratives suggest a move to enclosed settlement across Britain during the Late Bronze Age, confirmed settlement from this chronological span is predominantly open in Perth and Kinross. As discussed above, palisades around individual roundhouses within open settlements are the most notable evidence of a form of enclosure in the region, a feature that appears to originate in the Middle Bronze Age, based on the interpreted results of the excavations around Blackford. Excavations at the lowland forts at North Mains, Strathallan (MPK1353; Barclay and Tolan-Smith 1990), and Dun Knock (MPK2004; Poller with Campbell 2015) near Dunning have returned Late Bronze Age dates although it should be noted that the taphonomy of the North

Mains sample has been queried and an Iron Age date is preferred for this site (Lock and Ralston 2017). Likewise, although there has likely been some form of Late Bronze activity at Dun Knock, the radiocarbon dates originate from large ditch fills and therefore cannot be confidently used to securely date the enclosure's construction (Poller pers. comm.). Further excavations by SERF (Poller forthcoming) on the lowland forts of Rossie Law (MPK1397; Poller and James 2012) and Ogle Hill (MPK1419; Poller 2015), in the Ochil Hills east of Aucheterarder have produced evidence of higher elevation activity in the Late Bronze Age. On Rossie Law, radiocarbon dates ranging from 1200–800 BC have come from timber and ash lenses within the enclosure and residue from pottery located within the stone quarry behind the main visible bank (Poller pers. comm.). Although Bayesian analyses is yet to be completed, the data suggests that a large timber and stone enclosure was constructed during this period prior to later Iron Age reuse (*ibid*.). Burnt occupation evidence dating to the Late Bronze Age was recovered from beneath a, presumably, later Iron Age stone bank on the summit of Ogle Hill (*ibid.*). The full results for Dun Knock, Rossie Law and Ogle Hill are yet to be published (Poller forthcoming) but the dates obtained promise significant implications for understanding settlement enclosure in the Late Bronze Age to Early Iron Age.

Material Culture

Metalwork

Sites of later Bronze Age metalworking are currently unknown, though the artefactual evidence attests to various complex objects, such as the vessel from Corrymuckloch [MPK#/Canmore ID], which must have required skilled metalworkers or a far-reaching trade and exchange system. The proximity of the region to the Firth of Forth and the concentration of metalwork deposited in and around the Tay suggest the importance of the waterways. Bronze Age metalwork dating from the Middle Bronze Age onwards, as well as the Carpow logboat, certainly implies that this river was utilised throughout much of the Bronze Age and was likely a major transport route (Cowie and Hall 2010). Indeed it may have been an important medium for international connectivity, providing a routeway from the North Sea in the east to Argyll and Ireland in the west by way of Rannoch Moor (Cowie and Hall 2001; 2010). The source of the Perth and Kinross metal in the Late Bronze Age is largely unknown, but it probably derived from Continental sources, like much of Britain at this time.

The main feature of this period is the deposition of metalwork, which is observed across Scotland. Hoards of metalwork pose interesting questions about the connections between different areas at this time and certain landscapes which appear to be focal points. As part of the Carpow logboat investigations, Cowie and Hall (2010) conducted a comprehensive evaluation of Late Bronze Age metalwork deposited in the lower River Tay, which also considered Neolithic, Early Bronze Age and post-Bronze Age deposits. Their assessment demonstrates how the River Tay became a focal point for metalwork depositions from the Late Bronze Age onwards and notes that although a small assemblage, it is third only to those from the much larger River Thames and River Trent (*ibid.*). The River Tay deposits are also the only significant source of river finds in Scotland and as a result have much to contribute to wider discourse. Swords, spearheads and socketed axeheads represent the main groups found with other tools including a rare bronze socketed sickle and a gouge also recovered. The condition of these artefacts suggests minimal disturbance over time, so interpretation of the distribution of the deposits can be made with confidence and the swords in particular suggest a community exercising a deliberate pattern of deposition in the same stretch of the river over time (*ibid.*: 156).

On land, hoards such as Clockmaden [MPK#/Canmore ID] contain objects including socketed axeheads and bracelets that are typical of assemblages dating between 1000–800 BC (Cowie and

Reid 1986: 80ff.). Likewise, a group of metalwork recently detected from Kinnesswood (Cowie and Hall 2009), including axeheads, socketed gouges, a knife fragment and a deliberately fragmented sword, could indicate a dispersed hoard or a depositional landscape during the Late Bronze Age (Mark Hall pers. comm.). This latter material, acquired by Perth Museum and Art Gallery, and its broader context warrants further investigation. Other depositions indicate affinities with Continental metalworking traditions. The Corrymuckloch hoard, for instance, includes a decorated ladle that is so far unparalleled though certainly has closer connections with Continental vessel forms than Scottish ones (Cowie *et al.* 1996). Continental connections are strengthened through comparison with other north-east Scottish hoards such as Balmashanner (Angus), Braes of Gight and Glentanar (both in Aberdeenshire) which include Late Bronze Age weapons, vessels and horse gear that suggests links to the Late Bronze Age elites of Europe. Returning to the River Tay deposits briefly, continental Gündlingen-type swords are typical of the Llyn Fawr metalworking assemblage (c.800–600 BC) and help to reinforce the connectedness of the region to the continent during this period.

[INSERT] Figure XX: Corrymuckloch hoard/vessel

Logboats

The importance of rivers and estuaries as arteries of travel, transport and trade throughout prehistory was highlighted in 2006 through the recovery of the Carpow Late Bronze Age logboat from the head of the Tay estuary near Abernethy. Multi-disciplinary research on this remarkable discovery emphasised the potential of collaborative projects focusing on one iconic find to study and resulted in a comprehensive review of the Late Bronze Age around the Tay estuary (Strachan 2010a).

Detailed study of this *c.*10m long oak boat, dating from *c.*1000BC, provided considerable insight into various aspects of Late Bronze Age life in the area. For example the remarkable nature of the parent log, the tree-trunk from which the boat was formed, being tall and straight with its first branch over 7m above ground (*ibid*.: 110), illustrates the densely packed, oak-dominated woodland which survived around much of the estuary at that time (*ibid.*: 139). This fact re-enforces the importance of water transport in prehistory. In addition to highlighting the ritual deposit of metalwork outlined above, analysis of the surviving tool marks revealed how tools such as socketed axes, gouges and chisels, were actually used, and also the techniques used in creating, and repairing, the vessel (*ibid.*: 97-113). The rare survival of foot-rests suggests predominantly punting (rather than paddling) in the rivers and on the shallower littoral waters of the estuary (*ibid.*: 121-122). The use of the foot rests in this fashion was subsequently tested through experiment on a logboat created with replica tools on Loch Tay in 2009 (Strachan 2010b). Finally, study of the hydrological and geographical context of the find suggested how tides could be used to transport goods across back and forth between the food-rich estuary and riverine environments, and highlighted the potential for medium-sized, estuarine boats such as Carpow to connect to wider Bronze Age trading networks through larger sewn plank vessels. Developed in the Middle Bronze Age, these are currently only known from the East coast of England, such as those from Ferriby on the Humber estuary (Wright, 1991) and from Dover (Clark 2004). They were suited to coastal travel, and arguably to channel crossings, and were probably in use on the Tay estuary also.

The earliest known boats, logboats from the continent, are of mesolithic date (Strachan 2010a: 1), and while the majority of logboats in Perth and Kinross are known from the Tay estuary, they are also known from the River Tay above Dunkeld, and from Loch Tay, a waterbody to which logboats

are well-suited and which has a significant concentration of crannogs (*ibid.*: 129-130). The survival of robust oak logboats, such as Carpow, are therefore informative windows into a wide spectrum of activities across much of prehistory until the early medieval at least, and a reminder of the range of other smaller vessels, such as skin boats (*ibid.*: 170), and larger craft which were such a key feature of estuaries and rivers until modern times.

[INSERT] Figure XX: Carpow logboat

Environmental Evidence (Chalcolithic and Bronze Age)

As with the Neolithic, evidence is patchy across Perth and Kinross with site-based approaches to scientific analysis and environmental reconstruction being the most common for the Bronze Age. Landscape scale investigations and major developer-led projects covering multiple sites across a common landscape offer some of the best sources of environmental data.

The multi-period submerged woodland remains at Craggantoul in Loch Tay [MPK 17641/ Canmore ID 296282] included three oaks radiocarbon dated to various spans between about 2500 and 2100 BC (Dixon 2007), an as yet unassessed resource for potential contribution to the development of long tree-ring chronologies in Perth and Kinross (MIlls 2021). The suite of radiocarbon dated tree remains also include Late Mesolithic and Early Neolithic dates, with a large gap after the Chalcolithic dates until the Early Historic period. However, other phases may have gone undetected and there may be as yet undiscovered sub-fossil woodland remains elsewhere in Perth and Kinross which could contribute tree-ring data.

Drawing from the pollen records of Black Loch near Grange of Lindores in the Ochils (Whittington *et al.* 1991) and Methven Moss near Perth, the Late Bronze Age environment of the river Tay Valley was considered as part of the Carpow logboat investigations (see Tipping and Milburn in Winlow 2010: 141-143). Reconstruction work indicated that oak dominant deciduous woodland remained extensive into the Late Bronze Age with a fluctuating but steady increase in open land and arable agriculture within small forest clearings (*ibid.*). The use of fire as a method of land management and clearance was inferred from the high levels of charcoal observed in samples (*ibid.*). Despite difficulties in securing pollen samples for their study area, the work of the Strathearn Environs and Royal Forteviot (SERF) project nonetheless extends the coverage of Tipping and Milburn's environmental reconstruction further west, enhancing the picture of both the site and setting for the Forteviot prehistoric ceremonial complex with extensive analysis of the organic material recovered from the dagger-grave of particular relevance for this chapter (see chapters in Brophy and Noble 2020). Excavations of prehistoric settlement landscapes around Blackford (O'Connell and Anderson 2020) and Carn Dubh (Rideout 1996) offer noteworthy upland examples where extensive environmental sampling and analysis inform our understanding of the region's Bronze Age environment and offer insight into the land management and cultivation regimes employed.

History of Research in Perth and Kinross

Perthshire and Kinross-shire were an early focus of antiquarian activity, especially through the Perth Literary and Antiquarian Society founded in 1784, active through the 19th century and later joined by the Perthshire Society for Natural Sciences and the Kinross Antiquarian Society. In 1824 the Perth Literary and Antiquarian Society established one of the earliest purpose-built museums in Britain to house the global collections of the Society. Many artefacts have been and continue to

be recovered and donated to what is now the Perth Museum and Art Gallery, forming a rich collection of Chalcolithic and Bronze Age artefacts in Perth (Anderson and Black 1888: 337-341; Callander 1929; Cowie and Reid 1986; Lyddieth 1965), as well as contributing to the national collection at National Museums Scotland. Continued work by curators on these collections is doing much to improve our understanding of the Chalcolithic and Bronze Age material culture from the region (Cowie and Hall 2001; Cowie *et al.* 2011).

By the later 19th century, prehistoric sites and monuments such as the Balnabroich funerary complex and settlement (Stuart 1867), Shanwell cremation cemetery (Anderson 1885) and various stone monuments (Allen 1881; Macmillan 1884; Stewart 1884; Gow 1885) were increasingly surveyed and investigated. The surveys of Perthshire and Kinross-shire stone circles by Fred Coles in the early 1900s built on this earlier work and emphasise the richness of the region (Coles 1906; 1908; 1909; 1910; 1911).

During the 20th century the Bronze Age sites and monuments of Perth and Kinross repeatedly attracted the attention of scholars working in Scotland, resulting in excavations that contribute to our picture of Bronze Age Scotland and, indeed, Britain overall (eg Anderson 1902; Abercromby 1905; Callander 1918; 1929; Simpson and Coles 1990). Notable excavations include the North Mains henge (Barclay 1983) and Croft Moraig stone circle (Piggott and Simpson 1971). Many more have been noted since and continue to be reported in *Discovery and Excavation in Scotland*. Sherriff (2000) presents a particularly useful summary of excavations that took place within the boundary of the pre-1975 county of Perthshire during the second half of the nineteenth century. Margaret Stewart's contribution to understanding the Bronze Age in Perth and Kinross deserves particular mention with her numerous surveys and excavations of stone circles, standing stones and cists (eg Stewart 1965; 1966; 1985; Stewart and Barclay 1997; see also Hall 2018: 414 for an assessment of her role). The surveys of the Royal Commission on Ancient and Historical Monuments for Scotland (RCAHMS) carried out for Kinross-shire (RCAHMS 1933), north-east and south-east Perthshire (RCAHMS 1990; 1994) have added significantly to our understanding of the monument landscapes of these respective areas. Although not extending across all of Perth and Kinross, these surveys have established the density of occupation and interaction with the prehistoric landscape for a large extent of the region upon which future studies can build.

This extensive archaeological work has continued over the last two decades with important new discoveries, broader projects spanning multiple fieldwork seasons, and the re-evaluation of previous archaeological work. Perth and Kinross Heritage Trust (PKHT)'s work is noteworthy where recovery, conservation and analysis of the Carpow logboat applied a multi-faceted approach including studies of settlement, metalwork and the wider Tayside environment (Strachan 2010a). The subsequent experimental archaeology project in partnership with the Scottish Crannog Centre, where a reconstruction was built on Loch Tay, has added further to our applied understanding of logboat design, construction and performance (Strachan 2010b). Similarly, the Strathearn Environs and Royal Forteviot (SERF) project continues to reveal the importance of this landscape, the Forteviot prehistoric ceremonial complex (see Brophy and Noble 2020) and enclosed settlement (Poller forthcoming).

Re-assessment of past excavations and the subsequent revision of chronological understandings have taken place with important contributions by Alison Sheridan, Gordon Noble, Gordon Barclay, Richard Bradley and Kenny Brophy refining our understanding of the region's Bronze Age monuments and material culture. Despite past and ongoing research into the Bronze Age of Perth

and Kinross, a region-wide synthesis of the period has not yet been carried out. Although regional summaries by Stevenson (1999) and Stewart (1973) as well as Tayside studies by Coutts (1970; 1971) and Winlow (2010) provide a strong baseline, a comprehensive synthesis remains a key priority for underpinning future archaeological research and features prominently in the research agenda.

Research Agenda

This section presents the agenda themes for the Chalcolithic and Bronze Age in Perth and Kinross. Some are nested under the **overarching PKARF theme headings** aimed at addressing wider multi-period priorities and others are **period-based** and specific to the scope of this chapter. Where appropriate, a short explanatory note is provided detailing underlying **period-based** thematic priorities which is then followed by the research questions generated to address them.

Environment

Priority 1:

Questions:

1. What potential is there to develop prehistoric tree-ring chronologies for Perth and Kinross for archaeological dating, climate record and other environmental applications?
2.

Upland/Lowland Relationships

Priority 1: Our knowledge of Bronze Age settlement activity is increasing, however, many questions remain, especially with regards to Chalcolithic and Early Bronze Age settlement.

Priority 2: Middle and Late Bronze Age settlement evidence is, by contrast, much denser but where geographical gaps and inconsistencies exist between upland and lowland, east west and south of the Ochils, it is unclear whether these reflect past human behaviour or are a result of historic research priorities.

Priority 3: Extensive evidence of settlement has been identified in the uplands of north-east Perthshire but few examples have been investigated in depth. Full survey and excavation of an upland settlement in north-east Perthshire should therefore be considered a high priority for understanding these upland settlement landscapes better. Previously excavated sites where Bronze Age activity has already been identified, such as at Dalrulzion and Carn Dubh offer obvious targets that would enhance our understanding of the temporal depth of occupation in the uplands, as well as roundhouse construction techniques. The landscape assessment conducted at Dalrulzion by Forestry and Land Scotland between 2009 and 2010 (Shepherd 2010) emphasises the value of further work.

Priority 4: Aerial surveys utilising technologies such as LiDAR throughout Perth and Kinross but particularly in the west, is of importance. This would allow closer examination of known and freshly identified lowland cropmark sites in areas where our knowledge of Bronze Age settlement is currently limited. Recent discoveries around Loch Leven for example indicate that this was an area of high activity in the Bronze Age. Hut circles and enclosures identified in and around the Loch Leven basin therefore merit further investigation for their potential as related evidence for Bronze Age settlement.

Priority 5: A broader understanding of the relationships between prehistoric activity in upland and lowland areas, its similarities and differences in terms of site distribution, types and survival as well as artefact deposition is required.

Priority 6: There is a notable difference in artefact recovery between the upland and lowlands with upland areas generally artefact poor, especially in terms of chance finds, and a greater number of artefacts recovered from lowland areas. The phenomenon is not unique to Perth and Kinross with other Bronze Age upland/lowland areas in Britain such as Dartmoor displaying similar relationships in preservation of the archaeological evidence. Stevenson (1975) used the old County of Perthshire as a case study to explore recognised issues of survival and discovery and demonstrates how ideal the region is, with its density of archaeological features and findspots, for teasing out the nuances between prehistoric practice and modern destruction that influence the archaeological record.

Questions:

1. What is the composition of Chalcolithic and Early Bronze Age settlement?
2. Where were people living in the Chalcolithic and Early Bronze Age?
3. What can the contrasting relationships between known site distributions across the region's different geographies tell us about settlement activity in the Bronze Age?
4. How might the full survey and excavation of an upland settlement in north-east Perthshire enhance our understanding of the temporal depth of occupation and roundhouse construction techniques in the uplands?
5. How can aerial survey, particularly in the west, inform our understanding of the region's Chalcolithic and Bronze Age monument landscape?
6. What can a closer examination of cropmark sites in the Loch Leven environs tell us about the Bronze Age communities of Kinross-shire?
7. What is the relationship between Chalcolithic and Bronze Age activity in the upland and lowland areas of Perth and Kinross?
8. How can the investigation of an area encompassing both uplands and lowlands improve our understanding of past human activity spanning different geographies?
9. Does the upland/lowland contrast in artefact recovery represent a survival bias or a genuine difference in prehistoric practices in these areas?

Periods of Transitions

Priority 1: It is clear that earlier sites, monuments and landscapes were revisited and reused over long periods of time (Bradley 2011b: 169-174; Bradley and Nimura 2016; Ford 2017; Brophy and Noble 2020). Extant monuments therefore offer a crucial starting point for locating Chalcolithic and Bronze Age sites in Perth and Kinross with a view to better understanding use and reuse patterns during the transitions from Neolithic to Chalcolithic and Bronze Age to Iron Age.

Questions:

1. How and why were earlier sites and monuments reused?
2. What can a dedicated study of reused earlier monuments reveal about regional trends and specific areas of concentrated cross-period activity?
3. To what extent can revisiting excavated palimpsest sites with complicated sequences (eg Sketewan, Moncreiffe House) enhance our understanding of transitions between periods?

4. What can the survey and excavation of sites (such as stone monuments) located in multiperiod landscapes where Bronze Age activity has previously been identified tell us about periods of transition?
5. What can the study of artefacts add to our understanding of continuity and change through generations of communities and individuals within and beyond these period definitions?
6. What does the retention of objects through time and the votive deposition of other objects in specific locations tell us about how communities perceived time, the future and their predecessors?

Rivers as Routeways

Priority 1: Multi-disciplinary research carried out in conjunction with the recovery of the Carpow logboat (Strachan 2010a) has contributed greatly to our understanding of how the region's main waterway was used during the Bronze Age. Such studies also highlight the value and potential of future work in this area for exploring a broad range of themes including lifeways, ritual deposition, trade, exchange and migration.

Priority 2: Although the River Tay and Tayside generally has received a lot of attention, there is still much to be gained from investigations into the alluvial archaeology of this area. A broader Loch Tay environs project has previously been identified as a worthy endeavour (Cowie and Hall 2001; 2010) and other regions such as Strathearn and Glen Lyon also offer strong research potential.

Questions:

1. What role did the rivers play in the transmission of people, ideas, technologies and materials to, through and from the region?
2. How can environs projects in landscapes with rivers and lochs at their centres assist with understanding the complex usage relationships between people, land and water during the Chalcolithic and Bronze Age?
3. How do we further capture the spiritual dimension of the use of rivers and other wet places?

Investigative Disparity

Priority 1: When compared to the north-east of the region, examination of data held in both the regional and national historic environment records (HERs) indicates a contrasting sparsity of known Bronze Age sites and monuments in areas west of the River Tay and in the north-west uplands around Rannoch. These western areas haven't received the same level of archaeological survey as north and south eastern Perthshire (RCAHMS 1990; 1993) or Kinross-shire (RCAHMS 1933) but even the recent increases in metal-detecting activity have not contributed many stray finds in the west. Further work is of importance to investigate whether the contrasting picture represents genuine east-west variation in past human activity or is a result of where historic research has been focused.

Priority 2: Re-evaluation and re-excavation of sites and monuments in Perth and Kinross such as Croft Moraig stone setting have changed our understanding of the period through production of revised site construction and use sequences.This work raises the potential to gain more nuanced interpretations of other sites by revisiting past excavations, especially those conducted in the 19th and early 20th centuries (eg Dalrulzion and Balnabroich). Allied to this should be the re-assessment of objects spread across a diverse range of museums within and outwith the region.

Priority 3: Radiocarbon dating of human remains and organic material associated with pottery by National Museums Scotland (Sheridan 2007b) has considerably refined our understanding of monument use and nationwide ceramic chronologies. This work has highlighted the potential of this approach and the need for more sites and assemblages in the region to receive reinvestigation and reconsideration using radiocarbon dating.

Priority 4: Gordon Barclay's work bringing unpublished excavation reports of Margaret Stewart's to publication (Stewart and Barclay 1997) has highlighted the wealth of valuable information that remains inaccessible within unpublished site archives. Publishing historic excavations and promoting full publication of future archaeological investigations through comprehensive post-excavation research designs could add significantly to our understanding of the Chalcolithic and Bronze Age in Perth and Kinross.

Questions:

1. To what extent is the eastern geographical bias of the region's distribution of known Chalcolithic and Bronze Age sites a reality of human activity or a result of where past surveys have been focused?
2. How can a systematic investigation of west and north-west Perth and Kinross, involving aerial survey, LiDAR and ground truthing help to clarify the east/west distribution picture?
3. What detail are we missing from historic archaeological excavations (both published and unpublished) that could refine our understanding of the Chalcolithic and Bronze Age?
4. What implications does the re-examination of published excavations, including re-excavation and new radiocarbon dating, isotope and aDNA analysis, have for the understanding of sites, monument types and the broader Bronze Age period in Perth and Kinross?
5. How can a dedicated radiocarbon dating programme in Perth and Kinross, together with a synthesis of the available data from academic, project and developer funded research refine our understanding of the period, it's sites, monuments and material culture?
6. How can a dedicated isotope and aDNA analysis programme for Perth & Kinross add to our understanding of the period and how people inhabited their sites, monuments and material culture?
7. What can the publication of unpublished historic excavation reports contribute to wider monument and settlement studies?
8. How can the full publication of project and developer funded excavations assist with our understanding of the Chalcolithic and Bronze Age in Perth and Kinross?

Dating and Characterising Chalcolithic/Bronze Age Monuments

Priority 1: The regional overview highlights that a wealth of evidence exists for the Chalcolithic and Bronze Age period across Perth and Kinross, however, synthesis of this information is lacking. A resource assessment of Late Bronze Age Tayside, undertaken a decade ago in the context of the Carpow Logboat investigations (Winlow 2011), is a valuable starting point but a broader synthesis is required to fully unlock the potential of the resource and direct future regional research.

Priority 2: With advances in the last few decades, monuments can be dated with increasing accuracy (eg the refined dating of henges and henge-like monuments). In Perth and Kinross only

around 13% of sites interpreted as possibly Bronze Age can be definitely assigned to the period through dated evidence. Efforts should focus on raising this percentage.

Priority 3: Although the nature of burnt mounds is increasingly understood elsewhere in Scotland, wider Britain and Ireland, there has been little attention given to those identified in Perth and Kinross. Although only a small number are known, this monument type warrants further investigation to assist with dating, as well as contributing to understanding of their function.

Priority 4: Although we can be reasonably confident that four-poster stone circles, stone circles and settings are Late Neolithic or Early Bronze Age monuments (as indicated by the artefacts typically associated with them), we have few radiocarbon dates to corroborate these interpretations. Further absolute dating is required to better understand their construction and use.

Questions:

1. How can a regional synthesis of the known archaeological resource enhance our understanding of human activity across the region during the Chalcolithic and Bronze Age?
2. Set within the broader context of north-east Scotland, how can a regional synthesis and study of burials inserted into earlier monuments expand our understanding of funerary practices in the Middle-Late Bronze Age?
3. To what extent can we refine the dating of Chalcolithic and Bronze Age sites and monuments in Perth and Kinross?
4. How can a reassessment and cleansing of HER data relating to sites interpreted as Bronze Age assist with targeting future research and the production of an accurate, data-driven catalogue/corpus of Bronze Age sites and artefacts for the region?
5. What can a closer examination of the region's burnt mounds tell us about Bronze Age domestic activity in the region and how it compares with elsewhere?
6. What could a systematic programme of excavation and radiocarbon dating of monument types such as four-posters and stone circles (either region-wide or localised) contribute to our understanding of their construction, use, reuse and demise?

Understanding Metalwork

Priority 1: We still know relatively little about the source of the metal that was being circulated and deposited in Perth and Kinross, as well as the system by which it was distributed.

Priority 2: We currently lack an investigation into the compositional data available from Middle and Late Bronze Age metalwork, an issue raised in the Chalcolithic and Bronze Age ScARF report. Our present understanding of the circulation of metal in, out and through Perth and Kinross, and indeed Scotland, is thus limited and requires further attention.

Questions:

1. What can a systematic metallurgical analysis of the metalwork from Perth and Kinross, supported by lead isotope analysis, do to identify sources of the metal in different areas and at different times? This needs to be set within a nationwide agenda to understand the movement of metal into and out of different areas.
2. What can an investigation into cross-country routeways (eg Rannoch Moor to Loch Tay and Killin) utilising survey (eg boreholes) and evaluation (eg trial trenches) add to our understanding of metal movement in and through Perth and Kinross?

3. Does the presence of metalworking activity indicate action in a ritual area or does it reflect a disregard for the past significance of monuments?
4. How does the artefactual use of metalwork relate to artefacts made in other media?

Material and Society

Priority 1: There is still much to learn about where, how and why different objects were made, used and deposited by the prehistoric communities of Perth and Kinross. We lack evidence of Bronze Age craft workshops that might indicate specialist craftspeople operating within the region and there has been no systematic study of the production of certain objects.

Priority 2: Use-wear is increasingly noted on stone and metal objects but to date this data has not been drawn together and analysed holistically. The material analysis that has been conducted on individual objects such as the jet and cannel coal necklaces from Almondbank (Wilthew and Davis in Stewart and Barclay 1997: 30-31) demonstrates the potential of such broader studies.

Priority 3: With the increase in metal-detecting, we now know more about the depositional contexts and findspots of objects in Perth and Kinross than ever before, revealing certain areas of deposition that were in use over long periods of time (eg around Tayside). These practices occurred in specific social and cultural contexts as recognised through 'cultural biographies' of objects (see particularly Kopytoff 1986; Gosden and Marshall 1999). Such studies explore object 'life histories', production, use and deposition processes and the cultural context in which objects functioned. There is a real opportunity in Perth and Kinross for studies of this nature to be carried out.

Priority 4: The Chalcolithic and Bronze Age material culture from Perth and Kinross, including ceramic and metal artefacts, indicates an inter-connected region, however, scientific analyses of human remains to substantiate this have been minimal and needs addressing.

Priority 5: Further post-excavation research is required on the urns excavated from Kilmagadwood, Kinross-shire. Radiocarbon dating of the remaining individuals in the cemetery is a priority. Bayesian modelling would also allow for a more precise assessment of the cremation cemetery's lifespan (Sheridan *et al.* 2018: 17).

Questions:

1. What is the social context of artefact production, use and deposition?
2. What are the origins of the Chalcolithic and Bronze Age people of Perth and Kinross?
3. How did people, ideas, technologies and materials reach the region and from where?
4. How can experimental archaeology improve our understanding of the use of objects?
5. To what extent can biographical studies of objects enhance our understanding of the relationships between people and their objects in Perth and Kinross?
6. What can a holistic approach to the study of portable material culture, bringing together research for a group of objects or a range of materials, add to our understanding of the complex interplay between people, places, materials, objects and their uses?
7. To what extent can the investigation of landscapes where we see concentrated depositional practices and activity (eg Loch Leven and Loch Tay) help to explain the meanings and relationship between water and metal to Bronze Age communities?

8. How can aDNA and isotopic analyses of individuals from Perth and Kinross help us to better understand how the Bronze Age populations of this region fit within the national and international picture of migration and movement?
9. What can further analysis (eg radiocarbon dating and Bayesian modelling) and full publication of the Kilmagadwood urns tell us about this significant cemetery's lifespan, the community that it served and Bronze Age cremation practices more broadly?

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