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ARO56: Unearthing Ancient Tweeddale: Tinnis Castle, Thirlestane Barrows and Merlin's Grave

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ARO56: Unearthing Ancient Tweeddale: Tinnis Castle, Thirlestane Barrows and Merlin's Grave

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Summary

Drumelzier has long been associated with the legendary Merlin, who was reputedly imprisoned there by a Dark Age King, killed and buried by the banks of the Tweed nearby too. The *Drumelzier's Hidden Heritage project* set out to investigate the archaeological roots of this local legend.

A geophysics survey over the reputed location of Merlin's Grave at Drumelzier revealed that there is an archaeological feature resembling a pit or grave near to this.

Excavation of Tinnis Fort, which overlooks Merlin's Grave, found that this prominent hillfort was occupied around the late sixth and early seventh centuries AD when the story was set and that it has the hallmarks of a lordly stronghold of the time.

And excavation of the Thirlestane Barrows across the other side of the Tweed discovered that sometime between the late-third and late-sixth centuries AD a square barrow was added to a much earlier group of Bronze Age Round Barrows, within which two individuals of exceptional elite status were buried.

What the findings reveal is not that the local story was true, but that the legend, containing pre-Christian customs, ancient Cumbric names and located at local sites that could credibly have given rise to the story, was not brought here as a wandering medieval tale but more likely originated in Drumelzier itself. This is a startling survival of the early medieval cultural heritage of the Britons of southern Scotland.

Nor, given the archaeology encountered from the Late Mesolithic/Early Neolithic, Bronze Age, Iron Age and medieval periods, was this the only trace of local stories that the *Drumelzier's Hidden Heritage project* discovered.

Figure 1: Tinnis then and now

Introduction

By Ronan Toolis

From the outset, the aim of the *Drumelzier's Hidden Heritage* project was to investigate the archaeological roots of the local Merlin legend. This was not an easy thing to do. Marrying archaeology with history is extremely difficult, often impossible. Linking archaeology with legends is even harder.

But this was why three archaeological sites, near the villages of Drumelzier and Broughton in the Scottish Borders, were chosen for investigation (Figure 2). The work was not looking for evidence for Merlin nor seeking to prove that the legend was true. Instead, the project sought to examine those parts of the local legend that could be tested archaeologically, to determine if the origins of the story do indeed lie in Drumelzier as some contend (Randall 1987; Clarkson 2016; Crichton 2017).

Before explaining how this could be attempted, a brief examination of the Drumelzier legend is required. In the two stories that form this legend, the Merlin depicted was not a wise old sage, King Arthur's trusted adviser, or some pointy-hatted bearded wizard. His name was not even Merlin.

The figure that jumps out of the earliest surviving version of the *Vita Merlini Silvestris* – the life of Merlin of the Forest – is a naked raging wild man of the woods startling Saint Kentigern from prayer. He was called *Lailoken*, though the medieval author of the *Vita Merlini Silvestris* noted that certain people recognised him as Merlin, unique amongst the Britons for his powers of prophecy (MacQueen and MacQueen 1989b, 77 & 83). The Cumbric name *Lailoken* is a derisive nickname meaning something like 'little one', 'little brother', 'little lord' or 'little friend' (*ibid.*, 90; Clarkson 2016, 30-31). Somewhat akin to 'wee man' and far from the archetypal great wizard of Arthurian legend.

What follows in the *Vita Merlini Silvestris* is an account of how Lailoken came to be banished to the wilderness – he had caused the great slaughter in a battle fought in the plain that lies between *Lidel* and *Carwannok* – and Lailoken's persistent demand for St Kentigern's initially reluctant absolution, during which Lailoken prophesises three ways that he will meet his own death – crushed by stones and cudgels; pierced by a sharp wooden stake; and drowned. Upon receiving absolution, Lailoken offers a further prophecy, that the most outstanding of kings, the holiest of bishops and noblest of lords will die that same year. These were identified as *Rhydderch*, the King of *Alt Clut* (the Rock of the Clyde), St Kentigern himself and *Morthec* in Jocelin's *Life of Kentigern* (MacQueen and MacQueen 1989b, 91). The first story ends with the revelation that Lailoken was subsequently stoned and beaten by shepherds of king Meldred and while in the throes of death fell down into the Tweed near *Dunmeller* on to the sharp stake of a fishtrap where, impaled and face down, he drowned (*ibid.*, 77-86).

The second story in the *Vita Merlini Silvestris* is set in *Dunmeller* where the underking Meldred has Lailoken bound and kept prisoner in order to hear some new prophecy (MacQueen and MacQueen 1989b, 87-89). After three days, while Meldred sits on his 'lofty throne', Lailoken wryly observes the king's rage at an innocuous leaf caught in the queen's wimple. In response, Lailoken offers the king three nonsensical riddles. Meldred is unable to understand these and so in return grants his release and Lailoken's request to be buried on the east side of the Tweed near where the *Passales* runs into the *Tuedense* for he then foretells his imminent threefold death. After explaining how his riddles reveal the queen's adultery, Lailoken makes a hasty exit from the ensuing domestic argument. But the queen exacts her revenge years later when she stirs the shepherds to attack him, and the king who honours his request to be buried at his chosen spot, apparently thirty miles distant from Glasgow (*ibid*.).

The protagonist was called *Lailoken* but the anonymous author acknowledged that this character was recognised as one and the same to the more widely known Merlin in the Arthurian tales popular across medieval Europe (MacQueen and MacQueen 1989b, 77). How Lailoken came to be Merlin is a long and convoluted tale in itself, but versions of the same story are set in Strathclyde where Meldred was replaced by *Rhydderch Hael*, the real late sixth century king

Figure 2: Site Locations. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

of *Alt Clut*, and Wales too where *Lailoken* became *Llallogan* and then *Myrddin,* of great reknown for his gift of prophecy (Clarkson 2016, 30-31 and 66-67). In the twelfth century, it was from these various Welsh tales and poems that Geoffrey of Monmouth created the wizard *Merlin* of Anglo-Norman Arthurian legend that spread far and wide (MacQueen and MacQueen 1989b, 90; Clarkson 2016, 1-21).

Aside from its literary pedigree, there are other hints as to the older origins of the Drumelzier legend, such as the name of the protagonist, which derives from the ancient Welsh Cumbric dialect spoken in southern Scotland during the early medieval period. Lailoken's gift of prophecy seems related to the aspect of prophecy and divining the future attributed to druids by ancient classical writers (Koch 1995, 24-29); and Lailoken's triple death – stoned, impaled and drowned – reflects the overkill observed amongst Iron Age bog bodies, often considered to be sacrificial victims (MacQueen and MacQueen 1989b, 92).

The core elements of the *Lailoken/Myrddin/ Merlin of the Woods* stories comprise a geographical context in southern Scotland, the protagonist's madness after a great battle, his power of prophecy and his threefold death. That the origins of these stories may lie in the Scottish Borders is intriguing but what elements could be put to the test?

The *Vita Merlini Silvestris* stories include a real person, St Kentigern, the sixth century bishop of Glasgow, whose death is recorded in the *Annales Cambraie* around AD 612 (MacQueen and MacQueen 1989b, 89; Lowe 2006, 2). The story also alludes to a real event, the Battle of Arfderydd (Arthuret) fought in AD 573 between Liddel and Carwhinley in northern Cumbria (Skene 1866, 95-98), placing the story around AD 573-614. Much of the story takes place in and around *Dunmeller*, from which the toponym Drumelzier is thought to derive (MacQueen and MacQueen 1989b, 92). The prominent ruin of Tinnis Castle which overlooks Drumelzier is associated with the 'lofty throne' where Meldred held Lailoken (Clarkson 2016, 69). The converging stream and river referred to in the *Vita Merlini Silvestris* – Passales and Tuedense – are the Powsail Burn and the Tweed that converge at Drumelzier (MacQueen and MacQueen 1989b, 92). And the distance between Glasgow and Drumelzier is 39 miles as the crow flies.

What the Drumelzier story therefore offers is a period, place and context to investigate.

Merlin's Grave

The story of Merlin reputed grave, on the haugh on the east bank of the Tweed and north of Drumelzier Church, is at least as old as the early fifteenth century, given the date of the surviving copy of the *Vita Merlini Silvestris*, if not earlier to the twelfth century when it is considered to have been written (MacQueen and MacQueen 1989b, 77). An abbreviated version of this legend is also included in Walter Bower's Scotichronicon written in the 1440s (MacQueen and MacQueen 1989a, xiii). While its apparent location was known in the seventeenth century (Pennecuik 1715, 26), marked on maps from 1775 onwards (Figure 3), and apparently visible in the nineteenth century as a "kind of tumulus situated a short way back from the river" (Chambers 1864, 416), no actual remains have ever been recorded here though it has been speculated that the tradition of this site at Drumelzier may have originated from the discovery of a Bronze Age cist grave (RCAHMS 1967, 61).

Tinnis Castle

The ruins of Tinnis Castle and Fort occupy a prominent rocky knoll overlooking the Upper Tweed valley. The castle occupies the central part of the summit and comprises a quadrangular keep with two circular towers defining its north-west and south-west corners. A fifteenth - early sixteenth century date has been postulated for the castle's construction by the Tweedies of Drumelzier, who held this land from the early fourteenth to the early seventeenth century (RCAHMS 1967, 272). It is also understood to have been destroyed around 1525 by the Flemings of Biggar during a feud with the Tweedies of Drumelzier (Maxwell-Irving 2014, 49).

The underlying fort is defined by the remains of a rampart enclosing the natural summit of the knoll, supplemented by the remains of two non-concentric outer ramparts, on the north-east

Figure 3: Extract from Mostyn Armstrong's 1775 map of the County of Peebles. Reproduced by permission of the National Library of Scotland.

and south-west flanks of the knoll (Figure 4). This layout – a fortified summit with a series of lesser enclosures looping out along lower-lying terraces and crags - is typical of a 'nucleated fort', a type of hillfort unique to Scotland between c. AD 600 to AD 1000 (Toolis and Bowles 2017, 111). Nucleated forts are quite rare in the Scottish Borders. Only two others are found in Peeblesshire, with another four further south-east in Roxburghshire, and none have as yet been excavated. However, excavations of nucleated forts in other parts of Scotland have revealed these to be high status settlements of the early medieval period (Toolis 2021, 259-262).

Vitrified stone had previously been recorded below the south-west corner of the summit rampart (RCAHMS 1967, 142-144; marked 'x' on Figure 4). This indicates that this was originally a timber-laced rampart that was deliberately burnt to the ground, causing the rubble to vitrify. This phenomenon is apparent on over 100 hillforts across Scotland that can date to anywhere between 800 BC to AD 1000, from the Iron Age to the early medieval period (Mercer 2018, 220-223). Vitrified hillforts are particularly unusual in the Scottish Borders and indeed south-east Scotland, with only one other recorded in the Borders, that at Black Hill near Earlston, and only two others across the Lothians (Mackie 1976, 233-235; Mercer 2018, 251-256).

Tinnis Fort thus offered the opportunity to examine similarities with other nucleated and vitrified forts elsewhere in Scotland but also what distinguishes this hillfort from the many other hillforts in the Scottish Borders. Indeed, the area of Peeblesshire surrounding Tinnis Castle is particularly rich in hillforts and forms part of a cluster within Upper Tweeddale and Upper Clydesdale separate from distributions across the Lothians, Dumfriesshire and the central and eastern Borders (Lock and Ralston 2017). Henry's Brae lies on an adjacent ridge and comprises a single stone rampart enclosing a much larger area containing at least 28 round-house platforms. Across the valley lies Dreva Craig, a hillfort containing several roundhouses, enclosed by two ramparts, *chevaux de frise* set out on its approaches and associated with several clusters of outlying settlements. Further south-west on the other side of the valley

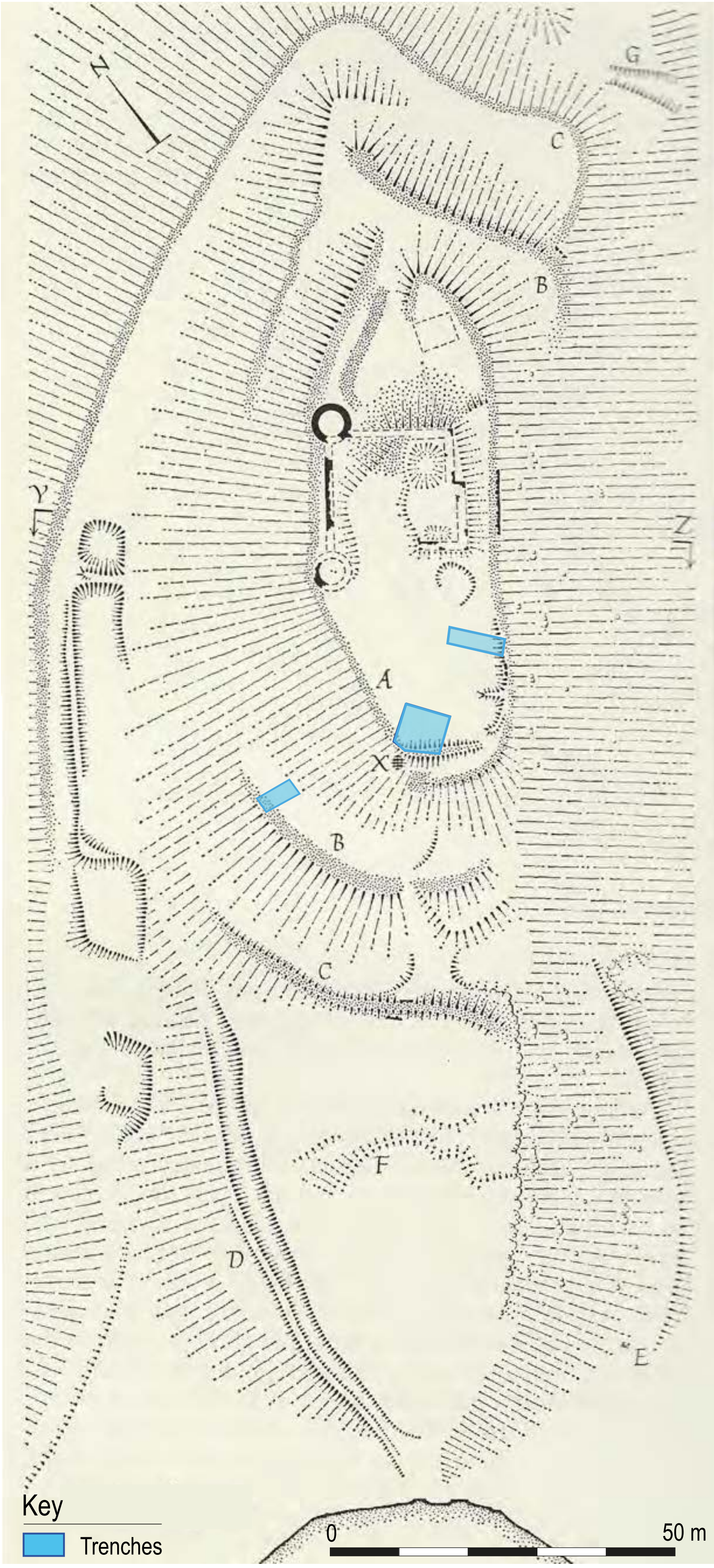


Figure 4: RCAHMS survey of Tinnis Castle and Fort, overlain with 2022 excavation trenches. © Crown Copyright: HES (Ordnance Survey Archaeology Division Collection) / © GUARD Archaeology Ltd

is Rachan Hill, which is also enclosed by the remains of two stone ramparts and contains the remains of several roundhouses within its interior. While these hillforts, like most such enclosed hilltop settlements, are understood to be Iron Age, Tinnis Castle Fort stands out as the most likely contender for an early medieval date, a period from which there is as yet very little archaeological evidence recovered from the Scottish Borders and which only a handful of known settlements are considered to date from. The very name of the hill itself may indicate an early medieval origin. Tinnis derives from the word dinas, meaning 'fort' (Watson 1926, 372) from the Cumbric language spoken in southern Scotland during the early medieval period. Dinis is prevalent in Cornwall while Dinas is common in Wales where broadly the same language was spoken at the time. While the site was alternatively known as Thanes Castle, the earliest cartographic depiction of it, in William Edgar and Richard Cooper's map of 1741, names it as *Tinice Castle* (Figure 5).

Thirlestane Barrows

During the dry ground conditions of summer 2018, cropmarks were spotted from a nearby hillside by a local resident. These cropmarks were apparent across two fields south of Broughton. An aerial photographic survey in July 2018 further revealed that these cropmarks included at least four potential barrows (Canmore ID 361432; Figure 6). Three of these barrow cropmarks comprised circular ditches enclosing a small area, c. 5 m in diameter, with a central feature. The fourth barrow cropmark comprised a square shaped ditch enclosing a small area containing a central feature. Where sites such as this have been excavated, the central feature is a grave, which was originally buried beneath a small mound of earth cast from the enclosing ditch. However, ploughing over the subsequent centuries has usually removed the mound, leaving only the buried archaeological remains, which are often only visible from the air. Such barrow graves can be Iron Age or early medieval

Figure 5: Edgar and Cooper's 1741 depiction of Tinnis Castle. Reproduced by permission of the National Library of Scotland.

in date. It was considered possible then that these barrows were the graves of some of the inhabitants of the numerous hillforts distributed around this location.

The *Drumelzier's Hidden Heritage* project therefore sought to investigate if there any archaeological remains survive at the Merlin's Grave site and if any of the other two archaeological sites were actually contemporary with the late sixth century AD when the story set out in the *Vita Merlini Silvestris* was set. The aim was to test if the origins of the legend, not is historical veracity, conceivably lay in Drumelzier.

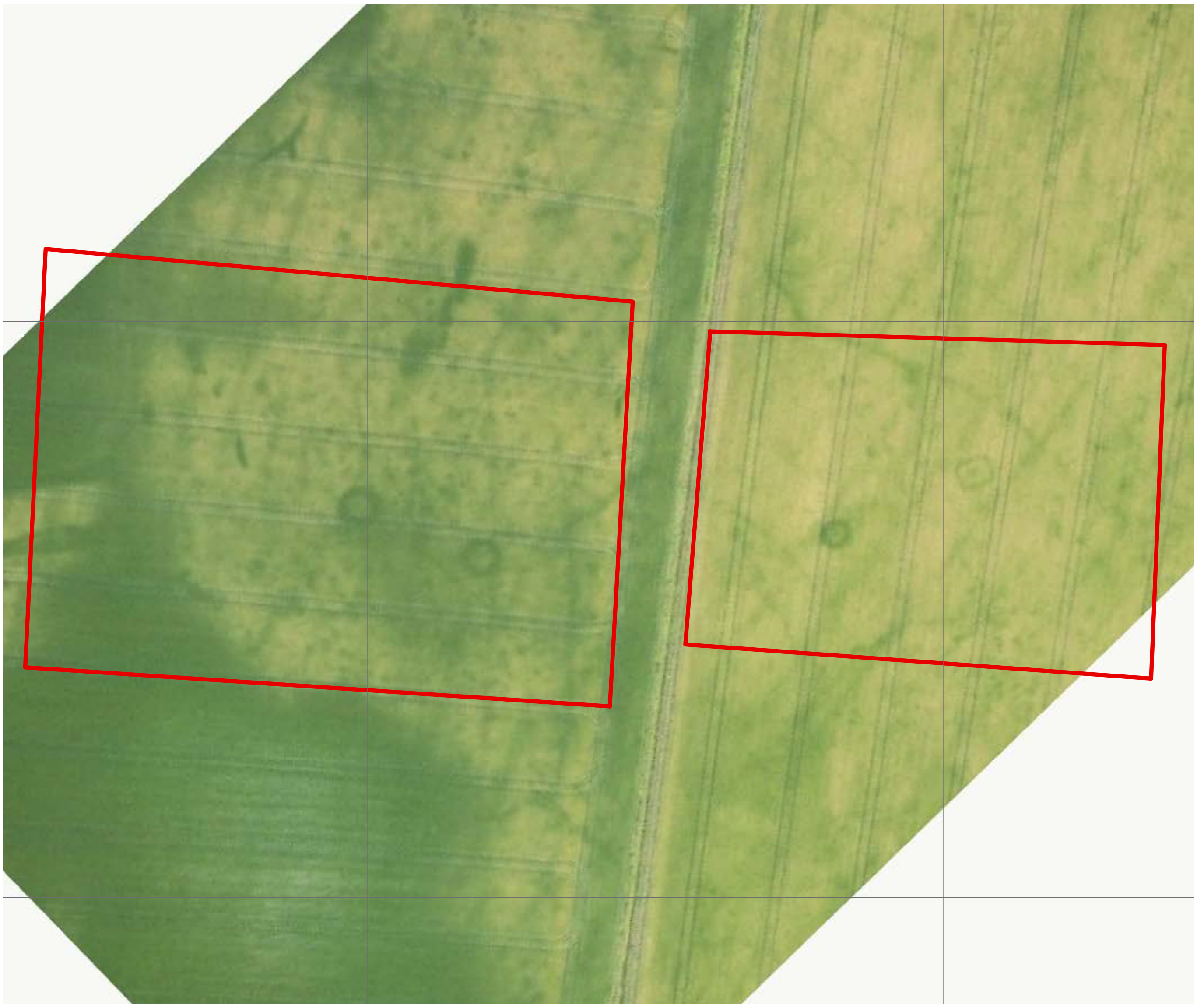


Figure 6: Aerial photograph of Thirlestane Barrows, DP 277947 © Historic Environment Scotland.

History of Tinnis Castle

By Morag Cross

This analysis of the historical evidence for Tinnis Castle sought to answer four principal questions:

1. What are the origins of the place-names 'Tinnis' and 'Drumelzier', and to which sites do they refer?
2. When and by whom was Tinnis Castle built?
3. What do any medieval records reveal about Tinnis Castle within the wider medieval landscape?
4. Who destroyed Tinnis Castle (if anyone) and when?

Evidence from the thirteenth-fifteenth centuries was provided by the archival study of charters while sources such as unpublished court cases provided evidence from the sixteenth century. This evidence also addressed further questions. Do the names 'Drumelzier' and 'Tinnis' ever refer to the same site? Did Tinnis Castle and Drumelzier towerhouse overlap in time and co-exist, or were they chronologically distinct? Was Tinnis deliberately destroyed?

What are the origins of the place-names 'Tinnis' and 'Drumelzier', and to which sites do they refer?

The toponym 'Tinnis' most probably derives from Northern Brittonic '*dinas*', a 'fortified settlement', rather than 'thane' (Watson 1926, 372). While an earlier hillfort underlies the castle, the first record of 'Tynnes' as a place-name is in August 1525 (*RMS* III, No 334), very late in its history.

A chronological list of older forms of the place-name 'Drumelzier' with sources and dates was compiled by the author and commentary by Dr S Taylor (*pers. comm.*):

1. *D'umedl'; Glas Reg* I, No 104, C 1200, Gylis filius Buht apud *D'umedl'*, [Stobo witness list; printed with tilde through the initial *d* and the *l*; as c. 1200. *OPS* expands and translates this as 'Gylis the son of Buht at *Dunmedler*'. The assumption that it represents Drumelzier is probably correct].
2. *Dun- or Dum-melliare; Melr Lib* No 355; 1291 x 1306, domino de *Du<n>melliare* or *Du<m>melliare* [Nasal suspension mark over *u*, which represents either *n* or *m*. Laurence Fraser late 'lord of D'].
3. *Drumelier*; NRAS2720/Bundle 95, 'Drumelier', 1300-1320.
4. *Drunmeyller*, NRAS2720/Bundle 96, (also contains 'Drumeyller'); undated but *HMC* V, No 2 assigns to '1300-1320'.
5. *Drumellyer*; NRAS2720/Bundle 99, *HMC* V No 5, c. AD 1320.
6. *Dumellier; RRS* V, No 255, 1324; '*vna cum communi pastura ville de Dumellier'*; ['*with the common grazing of the vill of Drumelzier*'. See below for more details of this charter].
7. *Drummeiller*; *RRS* V No 309, 1326, 'baroniam de *Drummeiller'* 1326 ['to Roger son of Finlay (*Finlai*), formerly held by William Fraser (*Fraser'*)].
8. *Drumelzer;* Duns Castle, NRAS2720, Bundle 102; *HMC* V, No 8; AD 1331.
9. *Dummellyere; RMS* I No 252, 1366, 'apud *Dummellyere*', [Royal inspeximus dated 'at D'; see also *RRS* VI, No 364].
10. *Drummelsier; RRS* VI No 365, 1366 apud *Drummelsier* [Royal charter dated 'at D'].
11. *Drummelzare*; *HMC* V, No 12, 1426, 'Drummelzare'.
12. *Drummellioure*; *HMC* V, No14, 1455-6, 'Drummellioure'.
13. *Dun Mellis*; Watt 1989, 2, 87 (Bk III, Ch 31). *Scotichronicon*, 1440s; 'prope oppidum *Dun Mellis*'; [Threefold death of Lailoken '*beside the town of Drumelzier*'].
14. *Drummellioure*; *RMS* II, No 1124, p230, 1473, 'Drummellioure'.
15. *Drummelzore*, *HMC* V, No 15, 1475, Retours, 'Drummelzore'.

16. *Drummelzer, Drummelzier* ; *HMC* V, p11, no 16, 1490, Sasine, Drummelzer, Drummelzier.

17. *Drummelzare; RMS* II, No 2852, 1505, 'Drummelzare'.

18. *Drummelzeare*; *RMS* II, No 3568, 1511, 'Drummelzeare', p768.

19. *Drummelzear; RMS* III, no 334 1525, 'Drummelzear', (x 4 times).

20. *Drummelzare*; *RSS* I, No 3874 AD 1527 'Drummelzare'.

Given the earliest forms of the place-name, the first syllable of the toponym 'Drumelzier' almost certainly represents a Gaelicisation of the Brittonic '*din*', a 'fortified place', hillfort, or similar, rather than '*druim*' meaning 'ridge'.

The second element is debatable, and may well not be a personal name, let alone 'Merlin' whose name did not take on the form '*Merlin(us)*' until the twelfth century, and the place-name is probably older than that (Thomas Clancy, *pers. comm.*). Instead, Drumelzier can be deconstructed as '*dīn *medel wīr* plural of wūr (e.g. modern welsh *medelwyr*) where '*medel*' has meanings analogous to 'meadow' or 'reapers' (James 2023, Vol 2, 204-5). Cereal crops were cut with a sickle, and the larger physical actions of cutting grass or fodder, and the locations of such work, were distinguished between the common pasture and the home meadow in the local charters of AD 1300-1326. The home farm or mains is still called 'Drumelzier Haugh', referring to level ground on the banks of a river or a river-meadow and '*a very common as a second element in place-names from AD 1165'* (*DSL*, 'haugh').

Roots and forms of '*medel*' were used figuratively of warriors as 'reapers of enemies', such as for Owain ap Urien in the Book of Taliesin, which has been suggested for this site and Drumalzier in Stirlingshire (James 2023, Vol 2, 205). Warriors of legend may have sliced through their foes with sharp-edged swords, but when so much revolved around food and subsistence farming, there is a strong case for a more mundane explanation. Sickles were universal, but weapon-like scythes did not become widespread until around the thirteenth century in Britain when increasingly intensive livestock husbandry led to the much faster and more efficient method of harvesting fodder (Fairlie 2006; Tikkanen *et al.* 2023). The iconic modern image of 'death with a scythe', reaping human souls, only became widespread after the Black Death of the mid-fourteenth century (McKenna 2009).

As an ancient centre, the fort's practical, quotidian 'Drumelzier' name may have extended to cover the surrounding hinterland. In sharp contrast, 'Tinnis' only applies to the defensive structure itself. If Drumelzier is indeed the '*fort of the reapers*' or '*fort of the meadows*', then it encompasses the nearby haughs and might have had a simpler descriptive agricultural meaning to one more redolent of violence.

A plausible suggestion is that the castle itself was referred to as 'Drumelzier' in the earliest surviving written records (Ronan Toolis, *pers. comm.*). When it was abandoned, the name was probably transferred to the later Tweedie stronghold, Drumelzier Castle located to the south on the bank of the Tweed. Applying existing labels to another place was commonplace, as demonstrated by the nearby and analogous case of the 'portable naming' of Castle Oliver (Patterson 2017, 93-4). It retained and commemorated the older location and celebrated its intangible cultural and political links with the owners and their ancestral tenure.

When and by whom was Tinnis built?

Drumelzier lay within the medieval parish of Stobo, and it became the name of a barony in the mid-thirteenth century. One 'Laurence Fraser' is the first explicitly named Lord of Drumelzier (*Melr Lib,* No 355). The *People of Medieval Scotland* database (*PoMS*) places his *floruit* as AD1231-1248 (*PoMS, Factoid* 70480). Nevertheless, the existence of a baron of Drumelzier around AD 1240 did not necessarily guarantee the existence of a castle (Prof D Broun, *pers. comm.*).

Landed estates can often predate the parish structure in Scotland (Ross 2006, 215) which was only formally established over most of Scotland by the later twelfth century (Oram 2020, 248). Frustratingly, there are no relevant early parish records, nor any other historical sources that give names or dates for Drumelzier's early secular lordship. Neither is there any historical evidence for Tinnis Castle being the '*caput'* of an early pre-thirteenth century estate. The monarch delegated local government and agricultural organisation through baronies, or units of lordship. The head place may have been at Stobo, Castle Oliver or Drumelzier, but communal meetings were often held outdoors, without requiring a fortified stronghold like Tinnis Castle.

However, three informative and unusually-detailed charters do survive from the early fourteenth century. These vividly depict the layout of a mature, long-developed and subdivided landscape (*HMC* V, Nos 2, 5, 6). The primacy of the textile industry is striking. By the late thirteenth century, Scotland had become, after England, the most important wool producer in Europe, exporting to Flanders through the port of Berwick upon Tweed (McNeill and MacQueen 1996, 238). The Wars of Independence deeply disrupted this well-organised Borders farming economy and fieldscape. England occupied Berwick permanently from 1333, causing wool prices to plummet (*ibid.*, 239). This background of invasion and decades of insecurity might be expected to provide a possible context for the building of Tinnis Castle. But grants by Sir William Fraser, baron of Drumelzier (*HMC* V, Nos 2, 5, 6), the first sources descriptive of what was on the ground in the early fourteenth century, do not even hint at any high-status residence.

Various architectural analyses of Tinnis Castle have assigned differing dates for its construction, ranging from the fourteenth century (MacGibbon and Ross 1889 III, 159; Buchan 1925, 230-231), the fifteenth century (Coventry 2001, 397), the fifteenth to early sixteenth centuries (RCAHMS 1967, 272; Strang 1994, 246-247; Chambers 1864, 421; Maxwell-Irving 2014, 48) and the early sixteenth century (Cruft *et al.* 2006, 724-725).

It is therefore necessary to examine the historical evidence. Records are another resource to clarify, if not actually resolve, the various competing, overlapping, and sometimes contradictory scenarios.

Robert I confirmed two grants concerning Drumelzier in 1324 and 1326 (*PoMS*, Doc 1/53/286 & *RRS* V, No 255; *PoMS*, Doc 1/53/353 & *RRS* V, No 309). There are also charters by early Frasers and their vassals to various tenants, including the Tweedies (*HMC* V, 2, 4, 5). The Tweedies replaced the Frasers as lairds in 1326 (*RRS* V, No 309) after William Fraser had renounced Drumelzier, before the king and magnates of the realm, at Berwick (*PoMS*, Doc 1/53/353; *RRS* V, No 309). Tweedie's lands were confirmed to him by David II c.1342 (Penman 1999; *RMS* I, App 2, No 772, 563). English hostilities renewed in the following years and David II languished in English captivity from 1346-57. Intermittent cross-border warfare, the puppet Balliol monarchy, and generalised instability were compounded by the Black Death, reaching Scotland in 1349-50, and again in 1361-2.

In the shifting, complex relationship between the imprisoned king's heir, rival and 'regent in absentia' Robert Stewart and the powerful William Douglas, variously Warden of the Eastern Marches, and 1st Earl of Douglas (*PoMS*, Person 23219; Doc 1/54/234), the Tweedies followed the latter faction (Brown 2004). In 1355, Stewart pardoned James Tweedie for supporting England (Penman 1999, 320; *RRS* VI, No 137; *PoMS*, Doc 1/55/11). On his return to Scotland and to strengthen local support in his turbulent borderlands, David II reconfirmed in 1359 the earlier pardon of James Tweedie (*PoMS*, Doc 1/54/234; *RRS* VI, No 221). This had the effect of asserting that royal authority derived from the king, not from Stewart or Douglas (Penman 1999, 320).

Against this background, two royal interventions at Drumelzier stand out because these indicate the presence of a high-status dwelling or stronghold before the dates concerned. In the deepest winter of December 1366, David II issued two charters while staying at Drumelzier (*RRS* VI 8-9; No 365). Even if escorted by the minimum of servants, the king still required secure accommodation. If he stayed at Tinnis Castle, then 'Drumelzier' refers to that same site in 1366. The motive for the attention to the Tweedie in 1342, 1355, 1359 and 1366 altogether suggest that Tweedie (a fairly minor landholder) possessed valuable assets. Could this have been a defensible stronghold, namely Tinnis Castle?

The second royal event, almost ninety years later, was a '*bond of maintenance and manrent'* between James II and James Tweedie in 1455.

This royal bond is worth quoting: James Tweedie, by his '*special manrent … is oblist til us that his house of Drummellioure sal be redy til us … quen [pleases] us, … we sal mainteine, supple and defende [Tweedie] and his saide house as we walde do oure castellis and housis … oure lieutenant … has ony entre in [Tweedie's] house*' (*HMC* V, 10-11, No 4). Such written contracts specified the formal allegiance owed by a vassal to his lord, and the reciprocal rights or protection due by such a patron.

The threat posed to the royal Stewarts by the Douglas power-bloc was in the process of being overthrown and newly-created magnates substituted. As part of his apparatus to bind their loyalty, James II used such bonds as '*the basis of the personal relationship*' between himself and valuable subjects (Wormald 1985, 87, 236-237). This particular bond, among others, was '*clearly part of the build-up to James's final onslaught on the Douglas power-bloc at Arkinholm weeks later' (ibid.,* 236).

In a way similar to the franchising of local government by the granting of fiefs under the feudal system, the king was pragmatically contracting out the fortification of a particular area to a local leader. James was '*the only Scottish king undertaking the non-royal practice of … individual bonds*', (*ibid.*). Tweedie, although not politically significant, owned a strategically important locality in the northern Middle Marches. The Douglases had formerly controlled the entire area, and their gradual overthrow (*ibid.*, 86, 236) allowed the king to insert diverse and unthreatening lesser players like the Tweedies into his military forward-planning. James II was effectively leasing Tweedie's fortification as a quasi-official military post, if and when required by the state. This was pragmatically enhanced with a subsidy towards its structural repair and defensive readiness.

Drumelzier was split into two, perhaps for administrative reasons, probably after 1490. In 1525, two baronies are listed, with 'head places' assigned to each – 't*he lands of Easter Drumelzier, with the place of Tynnes*', and '*the lands of Wester Drumelzier, with the place thereof*' (*RMS* III, No 334). This is the first surviving written use of the toponym 'Tinnis', distinguishing Tinnis Castle from Drumelzier Towerhouse. The absence of the term 'Tinnis' from written records until 1525, has been seized upon by recent writers as the primary basis for an early sixteenth century date of construction (Maxwell-Irving 2014, 48-49; Cruft *et al.* 2006, 724). However, as names are often transferred, duplicated or changed, this is not evidential proof of Tinnis Castle's construction date. As already suggested above, the formal title of the late fifteenth-early sixteenth century 'Drumelzier' may have been simply re-applied in the 1520s to a new or existing towerhouse at Drumelzier Place Farm.

The division of the barony of Drumelzier by 1525 suggests that the first incarnation of Drumelzier towerhouse was purposely built to serve as the centrepiece of Wester Drumelzier. This would certainly fit with the archaic Tinnis having been built in the 1350s-1450s, as the caput for a previously unified barony only to be later superseded and 'demoted' to the manor-place of the eastern half. At present, it is not known if the two sites were ever occupied at the same time, or whether they overlapped chronologically.

There is substantial evidence to date at least part of the surviving towerhouse at Drumelzier to the mid-1530s. In June 1535, the Scottish parliament ordered the '*building of strengths on the borders … for the safety of men … in time of war*', to be completed by 1537 (*RPS*, 1535/31). This accords with the first irrefutable, written identification of the '*tower, mansion and place*' of *'the west side of Drummelzeare*', in a sasine dated October 1537 (*HMC* V, No 22). In 1540, James Tweedie's '*tower and pertinents*' were assigned to his new wife, Mariota Stewart in life-rent. Thus, the main residence had shifted from Tinnis to Drumelzier towerhouse by 1540, and Tinnis Castle, only ever mentioned in 1525-27, was lost to record. Prestigious marriages are commonly occasions on which properties were built or remodelled. The now-obsolete Tinnis Castle may have been demolished around this time in order to harvest the stones for a more modern (but still defensible) range at Drumelzier towerhouse.

It would seem that the current weight of historical evidence supports either a mid-fourteenth or mid-fifteenth century date for Tinnis Castle. By 1455 at the latest, Drumelzier was a substantial stronghold '*always ready at the king's disposal*' (Maxwell-Irving 2014, 48).

Therefore, it appears very unlikely that Tinnis Castle was only constructed in the late fifteenth or early sixteenth centuries.

What do any medieval records reveal about Tinnis Castle within the wider medieval landscape?

Drumelzier Barony is fortunate in having minutely-itemised charters dating to the early fourteenth century, which give a virtual photograph of the dramatis personae and land use prior to the construction of Tinnis Castle (*HMC* V, No 2 c1300; No 4, c.1320; No 5, c1320; No 6, 1324 (also in *RRS* V, No 255); *RRS* V, No 309, 1326 (also at *PoMS*, Doc 1/53/353)).

For brevity, the charters are referred to by their *HMC* V numbers, and in full for 'e', *RRS* V, No 309, below. The earlier charters holding topographic information are contained in *RRS* V, *PoMS* and *HMC* V (a-c are not in *PoMS*), as follows:

a. Charter by William Fraser to Bernard Sutor, c. AD 1300-20 (undated but assigned foregoing date by *HMC* V, No 2).

b. Charter by Roland, son of Bernard Sutor, to Roger Tweedie, c. AD 1320 (*HMC* V, No 4).

c. Charter by William Fraser, Lord of Drumelzier to Roger Tweedie, c. AD 1320 (*HMC* V, No 5).

d. Charter by Robert I confirming agreement between William Fraser and Roger Tweedie, lasting either six (according to *HMC* V, No 6), or 16 years (as in *RRS* V, No 255), 12 June 1324. *PoMS*, Doc 1/53/286, gives 16 years, sourced from *RRS* V, No 255.

e. Charter by Robert I, granting barony of Drumelzier to Roger Tweedie, 16 November 1326, *RRS* V, No 309; *PoMS*, Doc 1/53/353. This charter is not in *HMC* V.

One of the few undoubted place-names traceable from the sixteenth century to the modern period is 'Tentarhill', given as the site of a ceremony of sasine (*HMC* V, No 35). Here, on a hill centrally located in the only village in the barony, the new laird James Tweedie was formally invested in 1589 in the lordship and estate of Drumelzier. The estate plan (NRS, RHP 14541) situated 'Tenter Know' at the entrance to the village where the main east/west road crossed the Powsail Burn, between the inn, smithy and church, all focal points of any village. The ceremony of sasine (a symbolic land-transfer) was performed either on the actual ground being conveyed, or at the traditional head-place of the barony. The possibility is that Tentarhill was once the legal, ritual centre of Drumelzier, the remnant of where the barony courts met in the years before Tinnis Castle and Drumelzier towerhouse were constructed.

Among the persons named, there is a preponderance of textile artisans. The 1324 charter states that Drumelzier had a fuller; at least one weaver ('Richard'), and possibly a second; and someone called 'Courtenanus', an obscure, garbled word, recently translated as '*the curtain maker'* (*PoMS*, Doc 1/53/286; *RRS* V, No 255). The ingenious solution that *'*courtenanus' may derive from '*cortine*', the Old French for 'blanket', has recently been offered (Bill Patterson *pers. comm.; Etymonline,* 'curtain'). However, it could also refer to a 'tenter', who finished fabric by stretching it on a frame. There would seem to be few rural uses for domestic 'curtains' as such, unless they were blankets, or some heavier agricultural coverings.

Fulling and grain mills are listed (*HMC* V, Nos 2, 5, 6), the former also being used for wool processing. With yarn-based specialisations, there was a gendered division of labour – spinning fibres was traditionally 'women's work', while the higher-status weaving was 'male', but the entire family was involved in the enterprise. From rearing and shearing the sheep, creating yarn, weaving and fulling, the order of the processes is reflected here. Fullers took Richard the webster or weaver's cloth (*HMC*, No 6), soaked it in urine and then 'beat' or hammered it to enmesh the fibres giving a smoother, tighter finish. This could also be done with the newly shorn wool to remove dirt but either way this was a stinking and deeply-unpleasant job.

Bernard '*called Sutor of Drumelzier' (HMC V, No 4) was probably named from 'giving sute', (i.e. being present), at his feudal superior, William Fraser's, court (DSL, 'sute*'; *DSL, '*sutour'). The lord's husbandmen (*HMC* V, No 2) were free tenants, who still owed service, and this arrangement became the archetypal tenure of late medieval Scotland (Dodgshon 1981, 125). At Drumelzier, husbandmen gave common assistance and served in the kings' army as required (*HMC* V, No

2). Such tenants held land considered sufficient to support a family, notionally about 26 acres though possibly reducing later to 13 acres (Dodgshon 1981, 75).

The blocks of land within the charters varied greatly in size and nomenclature. Older, more central areas in fermtouns (e.g. infield), tended to be measured in oxgangs and ploughgates, while more-recently colonised land was measured in acres. This formed '*a line of cleavage running through touns … The older, assessed core [area rents were] paid in kind'*, while payments for land newly taken in was given in money (Dodgshon 1981, 186-187). The only units of assessment in the various Drumlezier charters are acres, suggesting their layout was relatively recent to the early fourteenth century.

Although it is popularly supposed that runrig or strip fields were reallocated periodically, the Drumelzier charters depict a picture of stability. As the term '*in fee and heritage'* indicates, the full right of property with ability to convey it to the recipient's heir was granted sometime around 1300 to Bernard Sutor (*HMC* V, No 2; Gibb 1946, 35). This continuity of tenure is demonstrated by the same houses and land passed on in a successive charter in 1320 by Bernard's son to Roger Tweedie (*HMC* V, No 4).

Of the means '*that brought profit to the landlord and amenity to the inhabitants … the most important was undoubtedly the grain mill'*, which all inhabitants were compelled to use, or 'thirled' (Sanderson 1982, 17). The mill was cited in all the Drumelzier charters discussed here, and its monopoly on fulling and food production was further enforced by the barony court. Other rights such as fishing were sometimes 'conveyed silently', included under '*together with all pertinents'*, (*HMC* V, No 5; *RRS* V, 36). Because the Tweed transected the barony and was an obvious source of food, the right of fishing must have been significant (Sanderson 1982, 32).

Fraser's charter to Bernard, dating approximately to 1300-20 (*HMC* V, No 2), also mentions a 'chief brewhouse', indicating there may have been several of them, along with its garden and an acre beside the house - all facilities once belonging to '*William, son of Utting'*. Domestic or household brewing was traditionally woman's work, but the only female named here was Eda, mother of Sir William Fraser. Unusually for a woman, she was a witness to the charter, and presumably had servants to make the beer for her (*HMC* V, No 2). Weak ale provided vital calories to fuel the heavy, physical chores necessary in ploughing, planting and preparing food (Perren 2011, 835-6). The peasants were, as with all good monopolies, thirled to the brewhouse (Sanderson 1982, 17), although it is not clear whether William was the brewer in this case. William's former possession of a house, garden and chief brewhouse all suggest that this may have been a specialist or service croft, worked by male artisans for the whole barony, on a much larger scale than producing for a single household.

There are indications that early touns or hamlets may have been assessed, both financially and in allotments of work and growing capacity, in multiples of eight acres. We see the use of systems based on sometimes co-existent scales of eight and/or 13 units (Dodgshon 1981, 87-89). At Drumelzier, this may be reflected by the enumeration of '*seven acres of his home meadow, with the eighth acre of the meadow held by the fuller'* (*HMC* V, No 6). The agreement ratified in 1324 by Robert I, between William Fraser lord of Drumelzier and Roger Tweedie, dated 1324, was for 16 years (*RRS* V, No 255; 'six years', probably mistranslated, in *HMC* V, No 6). This same document also quotes *'common pasture for 16 cows and other animals*', eight oxen being a standard plough team. It depicts an open, unfenced layout of the 'ville de Dumellier' surrounding the church (variously called a parish church, chapel or pendicle of Stobo).

The pasture, meadow and other categories of land were of vital importance. The number of animals that could be supported was known as the 'soum' (*DSL*, 'soum'). This was '*a unit of pasture that supported a finite number of livestock'* over the course of one year, '*commonly calculated as the grass requirements of one cow or converted into other livestock units'* (Ross 2006, 214). One cow equalled four to 10 sheep while one horse equalled two soums (*ibid.*). The totals were naturally constrained by what could be fed over-winter. Around AD 1300-20, Bernard Sutor was granted the right to pasture '*100 sheep with lambs*' and '*four cows with calves*' (*HMC* V, No 2). When calves and other young animals were raised to '*remain over a year*' rather than being butchered and salted, they had to be fed during the winter, with feed collected from the hay meadow, possibly relating back to the origins of the name, 'Drumelzier'

In 1324, Robert I confirmed an existing agreement which characterised some land as 'home pasture', that is, the lord's own demesne, and some as 'common pasturage' (*RRS* V, No 255). The latter was available for all the inhabitants to graze their stock. The charter recipient, Roger Tweedie, received land to the east of the 'Cossalays' stream, a now-lost place-name whose origin is unclear, but geography dictates that it must have been the Drumelzier, also called Powsail, Burn, passing the kirk and glebe. Cossalayes may simply be a careless scribal creation – '*a version of Powsail with an erroneously substituted initial letter*' (Bill Patterson, *pers. comm.*).

Even in the early fourteenth century, this watercourse formed a customary boundary between the landowner's own ground and farm, on the east bank, and the township lands, on the west bank. In 1525, Tinnis was called the 'place' (i.e. manor) or formal centre of the eastern barony (*RMS* III, No 334), again underlining the antiquity of the lord's dwelling being in the eastern portion, where the home farm remains today (see NRS, RHP 14511). Pasture was grazing land, carefully curated and rotated over time, whereas meadow was generally used for haymaking, or foggage, for sustaining animals in the byre over winter. The low-lying haughs, or water meadows alongside rivers, were often valued as sources of '*natural hay cut for winter fodder'* (Whyte 1995, 141).

The micro-management of forestry resources is also apparent. The burn again demarcated where the landlord separated his own woodland from that open to his tenants. The use of timber was a privilege and it had to be tightly regulated, in writing if necessary. 'Timber' specifically referred to cut wood used for joinery and carpentry. Around 1320 William Fraser granted Roger Tweedie the right of '*taking timber for building … from his woods'* (*HMC* V, No 5). Other details may also indicate that construction work was either underway or planned. Trees were a renewable resource but unrestricted cutting would soon remove them. They also provided bark for tanning, cover for wild animals for hunting or eating, pannage for pigs, if any were kept, and many other side products. Arboriculture and forest management were a skilled knowledge base, albeit now intangible. Woods and their by-products were gathered or harvested in regular growing cycles and in varying areas, e.g. for coppicing over several years. Roof couples were reused, implements were inevitably partly wooden, and so very little about arboriculture went unnoticed by the neighbourhood, whose men after all, formed the jurors and attendees at the barony court, which was really an agricultural arbitration panel.

The largest areas of land use were the moors, which also encompassed some common grazings. The grant to Bernard, from about 1300-20, enabled one household to collect '*fuel in the moors, mosses, peateries and turferies*' (*HMC* V, No 2). Peat was the primary local fuel, and huge quantities would have been needed to make the lime mortar which binds the Tinnis masonry like concrete. Unlike peat, turf was live, growing grass, and if too much was taken, the ground was left bald and barren. Turf was another multi-functional material, used for building walls, buildings and roof coverings. It was also *'the general custom to spread old thatch or roof turf and abandoned fold dykes from outfield over arable as fertiliser'* (Dodgshon 1981, 238-239). *'Common grazings were a resource complex'* beyond just grass (*ibid.*, 169), and encompassed peat cuttings, grazing, and the usage of whatever plants such as heather for bedding, or maybe sphagnum moss to absorb wound and menstrual blood.

While none of these charters are contemporary with Tinnis Castle, these do indicate the intensively farmed and heavily-scrutinised management of the land within the barony of Drumelzier prior to the construction of the castle. All of this conveys a rigidly-regimented social backdrop, but a very different scenario is depicted around the time of the possible abandonment of Tinnis Castle in the earlier sixteenth century. This is only too evident in the 50-year blowback from the murder of John, 2nd Lord Fleming of Biggar, in late 1524, by the Tweedies. This crime generated multiple, still-unpublished court petitions, summonses, malicious accusations and counter-claims, all perpetuating the original offence.

The motive for this murder was probably embedded in a territorial dispute, itself exacerbated by the longstanding Angus/Albany political rivalry between the Tweedie and Fleming kindreds. John Fleming was a cousin of James V through the Albany Stewarts and was a supporter of the French-born Regent, John, Duke of Albany (Devlin 2019, 139-40). As Lord Chamberlain, Fleming also sat as a judge of the burgh court in Edinburgh's tollbooth and undertook diplomatic missions to France (Bonner 2006). James Tweedie, heir to the estate of Drumelzier, supported the Earl of Angus's faction, political opponents of the Francophile Lord Fleming and the Duke of Albany. However, these national factors may have been subsumed into a local conflict over property. It seems that much of their conflict revolved around both families wish to gain control of the estate and castle of Catherine Frissell, Lady Frude, who was married (or betrothed) to Fleming's illegitimate son, Malcolm. To confuse matters further, Fleming's legitimate heir was also called Malcolm, half-brother of his namesake.

The murder happened in late October or early November 1524 but there is some debate as to exactly where and when it took place, due to different dating systems being used in records. By one interpretation of the royal remission (pardon) to the burgh's councillors on 27 January, 1526 (*Edin Recs* I, 224-6, 338-9), it possibly happened within, or just outside Edinburgh Tolbooth (Emond 1988, 427, 447 n90). English missives to Cardinal Wolsey intimate '*The laird of Drommeller, kinsman to Angus, slew last Wednesday [29 October] lord Fleming, the best Frenchman of Scotland, and took his son prisoner'* (*L&PHVIII* Vol IV, pt I, 334, No 762). Charles Rigg, who has generously allowed access to his own research, also favours Edinburgh as the likely setting (Rigg 2023).

The chronicler, Robert Lindsay of Pitscottie, was probably the first to place Fleming's assassination during a hunting trip, though he gives no precise location. His duplicated manuscript circulated from the late sixteenth century onwards but was only printed in 1728 (Scott 2004). Using hearsay, or other means, he stated that after the Duke of Albany, regent for the boy-king James V, departed for France in 1524, '*thair raise great trubill and deidlie feidis … the Laird of Drumellzeid slew the lord Fleming at the halking*' (Pitscottie, *Historie* I, 305). So, the whereabouts of the killing are left wide open.

From here onwards, the sequence of events and the parties involved is rather contradictory. After being captured, one of the Malcolms, probably the illegitimate son, was conveyed to a '*privat presoun*' (*RSS* I, No 3317) by implication at Drumelzier. On 17 November, his half-brother Malcolm, now 3rd Lord Fleming, stated that '*for delivery of his brother Malcolm and [others] … kept prisoners by …Tweedies'*, he is sending Catherine Frissell 'there' presumably to Drumelzier (*WCC*, No 463). He went on to state that he was under duress '*for the releving of Malcolm flemyng brodir to the lord flemyng'*, and that his lordship '*for his plight beand in captivite in drum[m]elyeare',* wanted any agreements with the Tweedies nullified retrospectively (NRS, CS5/35, f45r). He also wanted the cost of Lady Frude's marriage refunded. This was because she was adjudged to have been '*free un mariit and failyeang th[e]r[e]of to … pay to him … 8,000 m[e]rk[i]s for her mariage'* and for the profits of her lands (*ibid.*, f77r). In other words, Catherine Frissell was a human title deed and bank account, and Fleming's guardianship had not prevented her virtual abduction as part of a hostage exchange.

The gender politics, and the probability that Catherine Frissell was subject to sexual assault when forcibly transported to and detained in Drumelzier towerhouse, are outwith the scope of this paper. However, she was apparently both legally of marriageable age (over 12, but probably older), and aware of her limited rights under church and secular law. Frissell appears in documents dated around 1509 (*WCC,* No 444), so could have been at least 15 or 16 in 1524-25. She stated in 1524 that she was married to one 'Malcolm' and would only change places with him to ensure his freedom, but she wanted her reluctance to be committed to record, probably to absolve her from future accusations of adultery (*WCC,* No 464). In the unpublished proceedings of the Lords of Council of June 1525, Lord Fleming showed a notarised statement by Frissell, '*protestit that what she did anent her passage to drumelzear should turn her to no* *prejudice, but that she might have remeid at time and place opportune*' (NRS, CS5/35, f45r). That is to say, she wanted released from the situation as soon as possible.

Further evidence for official confusion and mistaken identity is apparent in unpublished early court proceedings between the Tweedies and Malcolm, 3rd Lord Fleming, dated 19 June 1525. These state that the laird of Tweedie '*had maryit the lady frude w[i]t[h] the said la[i]rd[i]s secund sonn'* (NRS, CS5/35, f44v). Her new partner was actually Tweedie's eldest son and heir, James, not any younger son. This general lack of clarity could further support the events having taken place somewhere isolated, and remote from formal justice and record-keeping in Edinburgh. The 3rd Lord Fleming was elevated to his father's former office of Lord Chamberlain. About three months after the murder, he married Janet Stewart, illegitimate sister of James V, and it's hard not to see this as royal compensation for the killing, almost a 'bribe', to avoid causing the government any further discord.

Fleming was awarded the forfeit property of the Tweedies for a period of seven years, from August 1525 (*RMS* III, No 334), the first explicit naming of '*the place of Tynnes'*, caput of Easter Drumelzier, along with '*Westir Drummelzear with its own place'*, i.e. the manors or headquarters of each half of the barony. This would have been a partial payback for the loss of the 8,000 merks previously due to Fleming for the marriage of Catherine Frissell, Lady Frude (NRS, NRS, CS5/35, f77r). Fleming and Janet, '*the king's sister'*, were again awarded the two halves of Drumelzier in late 1527, '*cum loco de Tynnes*', again showing the castle was probably still useable, and serving as the symbolic centre of the estate (*RMS* III, No 515). It was almost certainly not blown up in 1524 or 1525.

As for James Tweedie, he and about 12 others were ordered to depart Scotland and England within three months of a decree by the court of session on 4 March 1531 (*ADCP*, 352). Both kindreds were sworn to preserve amity and peace with each other and the Tweedies were exiled for three years. In a retrospective document of 1546, we discover their fate: Notwithstanding the truce, '*Malcolme be his selfe, his kyn, frends … has oft & divers tymis … con(n)travenit the co(n)tar th(e) r(e)of & broke(n) the sami(n)*', (NLS, Ms20793, f14v). The Tweedies departed Scotland '*to the realme of france quhair thai arrivit about the begyning of … Juin [1531] 'quhair … for mair e(a)sy sustei(n)ing & furnes(h)ing of … all expenss(i)s necess(a)r … offerit & desirit to have to have had s(e)rvice of the kyngis grace of france & his g(u)ard or scott(i)s co(m)pany ... as mony uth(e)r gentilmen(i)s of our realme usit to obtene'*, (*ibid.*).

Malcolm and his late brother Ninian Fleming, prior of Whithorn, however, fraudulently interfered. They sent letters to the French king's lieutenant, stopping and forbidding Tweedie and his allies '*fra obtaining of the said s(e)rvice and wageis'*, contrary to the exile conditions, forcing James *et al.* to exist '*upone th(ei)r awin expenss(i)s during the hail tym(e)*' in France, for food and clothes (NLS, Ms20793, f14). This attempt to bankrupt and ruin Tweedie did not work, as he served his time and returned home, but it demonstrates the endemic hatred between the parties and their disregard for the law.

There exist a substantial number of unpublished legal proceedings regarding the constant petty raiding and feuding that subsequently continued between the Flemings and Tweedies (e.g. Flemings, NLS, MSS.20770-20800; Tweedies, NLS, Ch.12210-12311). In 1535, James V ordered that Border lairds should aid the defence of his realm by constructing a tower and surrounding wall, or barmkin (the latter 18.8m square, and 5.3m high). These had to be completed by 1537 (*RPS*, 1535/31), but seemed to do nothing to inhibit the endless hit-and-run sorties generated by local vendettas, cattle theft and retaliatory crop-burning. Cattle could be stolen by near-neighbours, and concealed in the same valley; and Biggar and Drumelzier were only 12 miles apart. 'Reiving' was the term used by the parties themselves, in south Lanarkshire and Peeblesshire just as amongst the more (in)famous Border Reivers of Sir Walter Scott's epic '*Minstrelsy of the Scottish Border'*. Because much of the sheep rustling and house-wrecking lacks the grandeur of balladry and the hyper-sentimental attention of Scott, it has been overlooked and under-studied. Nevertheless, vivid narratives can be found amongst the long, glued-together sheets of paper, some of which form closely-written rolls over a metre long (e.g. NLS, MS.20793).

In one example, the Fleming papers recount an onslaught on Mossfennan (two miles south of Drumelzier), in July 1543, by James Tweedie and 100 tenants and accomplices (NLS, MS.20793, f8). John Batty of the Kirk, James Moffat in Auldtoun and others, '*hurt the lands'*, stealing 80 wedders (castrated lambs) worth 12 shillings each; in September '*the whole clan of the Battysons and Thomsons*' took 36 cattle, four horses and kidnapped two tenants and goods worth 200 merks. This was a considerable sum given that cows were valued at six and oxen at ten merks.

In summer 1544, Tweedie was said to have met on 'Moffett Wattir' an 'Inglisshman' called Armstrong, and with 40 men hit Mossfennan again, robbing 160 ewes, at ten shillings each, and many cows (*ibid.*). Another group totalling 33, including 'Englishmen', descended upon the Fleming territory of Smailhope in October 1544 (*ibid.*). They harried and destroyed '*whole houses and buildings with all their furnishings'*, stealing eight oxen (a plough team, without which the farmers could not plant their crops). These crimes are myriad and ephemeral, but they are among allegations made by bitter enemies, and may be slanted propaganda rather than reliable, objective documentary records.

In August, September and October, James Tweedie's bandits again preyed upon Mossfennan, '*schine [sheared] … medois there … rivin and distroyit the gerss [grass]*' and corn, but '*tuke away to the … place of drumelzare*' the best crops (*ibid.*). These Tweedie assailants either removed, or spoiled 18 bolls of oats and fodder, which would have fed both Fleming's tenants and their stock over winter. Given that a boll was 211 litres volume, or 140 pounds weight (63.5 kg), the sheer amount of material being conveyed away indicates that these were planned events, the raiding parties going equipped to steal.

Unexpectedly, the roads were obviously sufficiently passable to support heavy carts. James, the laird, and Thomas Tweedie 'callit preistis', (his nickname) and his 'household men' descended again on unfortunate Mossfennan around October 1545 ((NLS, MS.20793, f28). They '*tuk fra Johnne Hoge …. Furt of his houses … his insyt gudis [domestic utensils] cruk above the fyre twa greit catt bandis of irne of the barmkin yett all the bandis cruikis lokkis and all the Irne graith [fittings] …the damnaige and skaith [harm] be gud estimatioun to … ten pundis*' Scots money' (*ibid.*). This supplies otherwise ephemeral evidence that metalwork fixtures were not necessarily 'fixed' – they could be 'informally' transported between sites.

Besides this retributive level of pillaging and aggression, which must have made subsistence agriculture almost impossible, other damage showed the virtual professionalization of 'reiving', which was the term used by the parties themselves. There were several recognised muster-points, such as when James Tweedie met co-conspirators the Armstrongs, Thomsons, Littles and Beatsons, at '*the wattir of Moffett … at the aikrig*' in August 1544 (NLS, MS.20973, f28).

Both sides were equally thuggish in their arson and plunder, although these legal writings are not impartial. They were inevitably heavily biased, being created on behalf of two competing, self-interested antagonists. James Tweedie constantly brought his own lawsuits against Malcolm, 3rd and James, 4th Lords Fleming (NLS, MS. 20793, ff14-17, ff18-21). Malcolm, much wealthier and probably more cunning, frequently used intermediaries, bribes and known criminals to undertake his revenge by proxy, although on occasion the then Chamberlain of Scotland rode in person, with his 'household men and servants'. Special friends, kinsmen, allies, partakers and accomplices – there was a stereotyped list of such terms used to denigrate the allegedly guilty opposition.

This was, as much as anything, economic warfare, in broad daylight. Named Fleming parties '*daily and continually … cuttit and distroyit'* James Tweedie's woods and *'great trees'* growing at Drumelzier, Stanhope and Hopecarton. The timber stolen in either spring 1543 or 1544 amounted to 300 merks (NLS, MS.20793, f25). To further enrage his nemesis, in July 1543, Malcolm's 'special household men' numbering 16, 'cruelly invaded' a Tweedie mailing (tenanted farm) at Wrae, which faces Drumelzier towerhouse across the Tweed. There, they '*brynt his fewale & turves'* comprising '*five rikkillis of turffis'* (stacks), giving Tweedie '*grete occasioun to avenge'* (NLS, MS.20793, f20). Without fuel, there was neither heat, light nor cooking, a disaster for a family, when everything had to be home-produced, and new peat sourced and dried for use.

Women hardly appear in these papers, except for James Tweedie's forced bride Catherine Frissell, and his second wife, Marion or Mariota Stewart of Traquair. Drumelzier towerhouse may have been enlarged or updated for Stewart in the late 1530s. She came from an old landed family, and as her marriage contract was made by her mother, Stewart probably had some input (*HMC* V, inferred from No 22). About 1544, some Fleming kin visited two poor tenants in the steading of Kirkland of Drumelzier and removed '60 mylk yowis', each 12 shillings, and '*draif [them] to beggare. Albeit marione stewart … James spous come in the mentyme to [the ringleader] and desyrit to haif borrowit the guds to ane day. And offerit caution [security]*' (NLS, MS.20793, f21). It is unclear if Marion was buying back the sheep, or diplomatically pretending the flock was 'on loan' to the Biggar rustlers. As Tweedie wrote this into his court case, he presumably approved of her action, though married women had strictly limited financial autonomy – but theory and practice were, in reality, often very different.

In 'March last', probably 1545, David Elwald 'called bagat' ('swollen', or 'pot-bellied') met Malcolm at the Crosskirk 'beside Peebles' where another '*common thief spak at grat linth'* with Malcolm and was '*tenderly treated and rewarded with great sums of money'* by the latter (NLS, MS.20793, f15). Within three days of Malcolm's '*causing, soliciting, persuasion, command and assistance'*, he and his men preyed upon Tweedie's fields at Hallmyre, removing 30 cattle, and '*took and led away six tenants'*. As a sequel, Malcolm bribed more brigands at the Bridge of Lyne, who within 3 days went with Malcolm accompanied '*with his haill clan of scottis of ewsdaill*', totalling 180, and burned and harried Drumelzier (*ibid.*). The numbers of men involved on individual enterprises varied, from as few as 12 or 16, or up to 300. Nicknames also appear – John Fleming, '*callit the pantreman, John Huntare callit Inglish'* (*ibid.*).

What may be the most sensational or spectacular Fleming adventure is hidden behind terse legalese. In November 1543, 100 of Malcolm's allies including '*Adame Armstrang of Hairlaw*' and the '*young laird of mangerstoun [Mangerton] … with the hail clannis & companies of armstrangis & battesounis johnstonis & litillis …300 personis cum to … lochurde netherurd [and] The toun of blyt', (NLS, MS.20793, f25). They 'caus … James and his servands Ishe [go forth, make sortie] and cum to the reskew and help thairof … [The Armstrongs et al.] tratoris [by] sik greit … distructioun … At the entrie into the reskew … [the Tweedies hoped the Flemings] myt not resist But [by] force … James with four of his sonnis and fourty of his kyn … war than taine [captured] … and led away captivis & prisoneris in Ingland … thai war put be payment of ransoun & uther wais'*, but not before their captors '*cruellie slew … George Glenquhoy of the Wra, servand to James [Tweedie]*' (NLS, MS.20793, f25). This sounds like a warring, wild frontier, or the tribal regions of modern Afghanistan, with inherited guilt for long-ago slights on male honour, and kinship loyalties always treated as serious priorities.

There was a two-tier exercise of justice between the Flemings and Tweedies, and their numerous and named allies and 'partakers'. They rode out and stole, burned or terrorised the poverty-stricken subsistence peasants, while somehow keeping score of each their respective losses and submitting the receipts and accounts to distant officials in Edinburgh. The volume of under-studied records here may be common to other Peeblesshire reivers, but certainly hides a rich cultural heritage of out-laws, unlaws and no laws at all, with the same actors repeatedly taking the stage.

Who destroyed Tinnis Castle (if anyone) and when?

It might seem unsurprising if Tinnis Castle was destroyed during this period of tumult. However, its demolition by gunpowder was not recorded until around 1689 or so, by Dr Alexander Pennecuik of nearby Romanno Bridge. His '*Description of Tweddale*' appears in two versions, the earlier dating to c.1685-89 (*Geog Coll* III, 140-54). He states, '*The House [of Tinnis] was blown up with powder by the Lord Fleeming whose Father Drumelzar had slain in a bloudy Feud … Some of the Rounds & Turrets of this strong little Castle, are yet to be seen, and huge lumps of disjointed Walls*' (*ibid.*, 154). Strangely, the second version, which was in fact published first, merely states that, '*Upon the top of a Hill above [Drumelzier Tower] is still to be seen, the remains of [the Tweedies'] little Old, but very strong Fortalice, called the Tennis-Castle, whereby all sorts of Passengers that had occasion to travel that way, were oblidged to stryke Sail, Salute and pay Homage to that haughty Baron, or else to return from whence they came, not without some Marks of Disgrace'* (Pennecuik 1715, 26).

This raises some doubts as to the veracity of the story of Tinnis Castle being deliberately destroyed in the Fleming/Tweedie feud. Firstly, the gunpowder plot was not written down until about 165 years after its supposed occurrence in the mid-1520s, although nowhere does Pennecuik ascribe the blast to any specific date *(Geog Coll* III, 154). Secondly, the earlier version of Pennecuik's manuscript was not published until 1908 and Pennecuik's own approved text of 1715 omitted the gunpowder anecdote entirely. It seems highly unlikely that a serious, reliable historian like Pennecuik would confuse Tinnis at Drumelzier with the separate, but identically-named Tinnis in Yarrow, the demolition for which a royal warrant was issued in 1592 (Maxwell-Irving 2014, 49-50; MacGibbon and Ross III, 160). Michele Learmonth's own research also convincingly shows that the Yarrow site is that referred to in 1592 (Learmonth 2022).

If Drumelzier's Tinnis Castle was blown up, for which the main evidence would seem to be the widely-scattered blocks of mortared masonry at the site, then the account was orally transmitted for over 160 years. The assumption has been that Tinnis Castle represents a debris field, following a 'revenge explosion' by Malcolm, 3rd Lord Fleming in 1524-5, after his father's murder (Cruft *et al.* 2006, 724; Maxwell-Irving 2014, 49-50). However, this blast is nowhere mentioned in contemporary documents, despite the decades-long legal consequences. In summary, two disparate events seem to have been merged without much hard evidence.

Modern explosives and demolition consultants, as well as military heritage enthusiasts, have generously offered their expert assessments of Tinnis Castle during this study. Slighting by gunpowder, if done at all, was usually '*by a large army at the beginning of a major expedition, with the resources to make a point*' (Dr A Johnston, *pers. comm.*). From the limited visual material he examined, Roland Alford, defence engineering consultant, suggests that the walls and roof had simply fallen in. As to whether the masonry represented a catastrophic debris field, Dr Claire Knock of Cranfield University stated, '*If the stone has just landed below the original position, then it will be difficult to determine if it fell or was blown out'* by explosives. If the debris was farther away, more measurements could be gathered to calculate whether it was propelled by gunpowder. The balance of current opinion seems to mitigate against any very obvious use of destructive ordnance.

The 1760s-80s Drumelzier estate maps show recently-enclosed fields (NRS, RHP 14511; RHP 14515; RHP 14541) so contemporary drystone dyking could have denuded the fortification over many decades. The site could have reached its current state, without any artificial help, beyond what was necessary to free the stones from their mortared settings.

Conclusions

The toponym 'Tinnis' derives from Northern Brittonic '*dinas*', a 'fortified settlement' while 'Drumelzier', it is suggested, derives from 'fort of the meadows'.

Based on the written evidence, Tinnis Castle was possibly built by the Tweedies, either around 1360-65, during the hiatus in the wars with England, but prior to David II's visit in 1366. Alternatively, Tinnis may have been constructed in the earlier fifteenth century, as James II refers to a fortalice there in 1455, *'the house of Drumelzier'*, when it was counted as an asset in the national defence infrastructure against England. The mid-fifteenth century appellation 'Drumelzier' seems to refer to the caput of the barony of 1455, today known as 'Tinnis Castle'. The name was naturally transferred to the more comfortable, and adaptable, site of Drumelzier towerhouse when the Tweedies adopted it as their main seat, likely around the 1520s, and certainly by 1537.

Some assumptions about the layout of a typical medieval Borders farming settlement also apply to Drumelzier, namely that the hamlet comprised arable infield, outfield, pasture, and the common moor beyond. The rare precision and granularity of data supplied by surviving early fourteenth century charters for the barony of Drumelzier conveys a closely-managed medieval landscape linked to outside institutions by ties of land ownership and agricultural necessity. Various transport rights and routes were to the north, south and west of (and traversed) Drumelzier, hence its residents could not fail to be well-acquainted with the wider commercial activity of the Border abbeys. Wool export and the textile trade permeated everything from specialist artisans to place-names. All environmental resources were both fully exploited and strictly controlled, and the demesne was governed, as was conventional, by the barony court.

Unpublished legal records from the 1540s reveal an unstable, febrile network of kinsmen and rivals who accompanied the chief Tweedie or Fleming of the moment, in an emotionally intense and turbulent round of theft, raiding and recovery of livestock. This might now be branded toxic masculinity, produced by an honour-based, deeply factional and localised culture, embedded in the farms and economy of Tweeddale and the Marches. The Border Reivers of popular legend were based further south, but the Tweedies and Flemings of the Clyde and Tweed valleys were enacting the same behaviour and using the same terms, such as 'reiving' and 'kindreds'.

The first undoubted reference to the towerhouse, under the name of 'Drumelzier', ('*tower, mansion and place thereof*') appears in 1537, the deadline for James V's order for Border lairds to build a tower and barmkin (*RPS,* 1535/31; *HMC* V, No 22). This is the earliest identifiable mention of the present riverside ruin, using the title of 'Drumelzier' tower. Any putative explosion at Tinnis seems very unlikely and is only first recorded by the historian Alexander Pennecuik approximately 165 years later, in the late 1680s-early 90s. He chose to publish only the edited or redacted account during his lifetime, which lacks the anecdote about the slighting of Tinnis.

Two disparate events, the ruin of Tinnis, and the killing of an important statesman over a petty local dispute, seem to have been merged without much evidence. This blast is nowhere mentioned or referred to in contemporary documents of the 1520s or 1530s, despite extensive references to the homicide and subsequent decades-long legal consequences.

The abducted bride, Catherine Frissell's death is not on record, nor how many, if any, children she bore James Tweedie. He was either her second husband, or guilty of sexual abuse, rape and assault. In a way, it might have been fitting had Tinnis Castle been destroyed in rage against Frissell's ravishment, but the Scottish weather seems the more likely culprit.

A fuller report (online, URL below), which contains the full historical analysis, sources and detailed material on Drumelzier's fourteenth century farmers and named residents is available on the dark-age-digs.com/blog. The sixteenth century records of the Tweedie and Fleming rivalry, raiding and reiving, are discussed there in more detail.

Fieldwork Results

Tinnis Castle and Fort

by Eduardo Perez-Fernandez, Thomas Muir, Laura Muser and Lauren Reid

Tinnis Castle lies within a field of rough grazing ground to the north-east of Drumelzier in Peeblesshire (NGR: NT 14155 34439; Figure 2). The site is a scheduled monument (SM No: 2984) covering 32,630 m² in total, though the entirety of the fort itself comprises just 6,450 m² and the summit alone 1,417m². Tinnis Fort sits between 270.74 m and 285.69 m OD.

The site lies on a rocky knoll bounded to the south-east by a steep gorge that separates it from the scree slopes and crags of Vane Law which overlook the site. To the south-west the ground drops sharply before rising again towards the summit of Henry's Brae hillfort. To the north and west the ground drops to the level fields alongside the B712 road (Figure 2). The course of the river Tweed runs between 800 m and 900 m to the west of Tinnis Castle and Fort.

The bedrock geology across the entire site was Gala Group – Wacke; sedimentary bedrock formed between 443.8 and 433.4 million years ago during the Silurian period. The superficial deposits comprise Glaciofluvial Deposits - Gravel, sand and silt; Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period (British Geological Survey 2024).

The survey and excavation of Tinnis Castle and Fort adhered to the conditions of Scheduled Monument Consent (Case ID: 300040603) following the agreement of a comprehensive Method Statement.

Topographic Survey

By Eduardo Perez-Fernandez

An aerial drone survey of Tinnis Castle and Fort was undertaken on 5 August 2022 by members of the Peeblesshire Archaeological Society (Figure 7). Using photogrammetry, this photographic record was then used to create measured site plans (Figures 8 and 9), thus updating the previous survey (RCAHMS 1967, 144; Figure 4). The new survey confirms that the central oval enclosure measures 65 m north-east/south-west by 25 m crosswise and is defined by a rubble stone rampart largely reduced to a grassy escarpment (Rampart A in Figure 4). The summit wall encloses an area of 1,415 m². The area of the summit has a relatively flat surface except in the central sector where a slight elevation stands out and the mortared masonry remains of Tinnis Castle, a medieval fortification with a square plan of about 15 m by 15 m, reinforced by two circular towers on the north-west and south-west corners.

The new survey also confirmed that the summit rampart is flanked by two smaller enclosures on the lower-lying south-west side of the hill (Figures 8 and 9). These are defined by a rubble stone rampart (Rampart B in Figure 4) that rises about 7 m above another lower rubble stone rampart (Rampart C in Figure 4). It is unclear if the gaps through the centre of these ramparts relate to an original entranceway feature, or simply mark a later modern approach to the summit. It is also unclear if the middle stone rampart (Rampart B in Figure 4) continues along the north-western flank of the hill to join the ramparts defining the northern and southern middle terraces; a break of slope is apparent here but not quite on a continuous course from the southern rampart.

A clearer entranceway to the summit is apparent on the north-east side of the hill (Figure 9). This is approached via a ramp along the north-western foot of the summit, the north-western edge of which is defined by a sharp break of slope rather than a rampart. The underlying ground along this ramp appears to comprise levelled stone rubble, likely derived from the collapsed summit rampart. The course of this break of slope merges into a rubble stone rampart that encloses a terrace below the north-eastern side of the summit (Rampart C in Figure 4). A further rubble stone rampart encloses another terrace lying between the lower terrace and the summit (Rampart B in Figure 4). Both of these enclosures open to the entranceway up to the summit, which leads through a small gap in the summit rampart. The area between the entranceway and the mortared remains of Tinnis Castle is obscured with loose rubble. Only to the south-west of upstanding remains of Tinnis Castle is the summit levelled, although rubble can be felt underfoot.

Figure 7: Oblique aerial photograph of Tinnis Castle and Fort immediately prior to excavation, from the west.

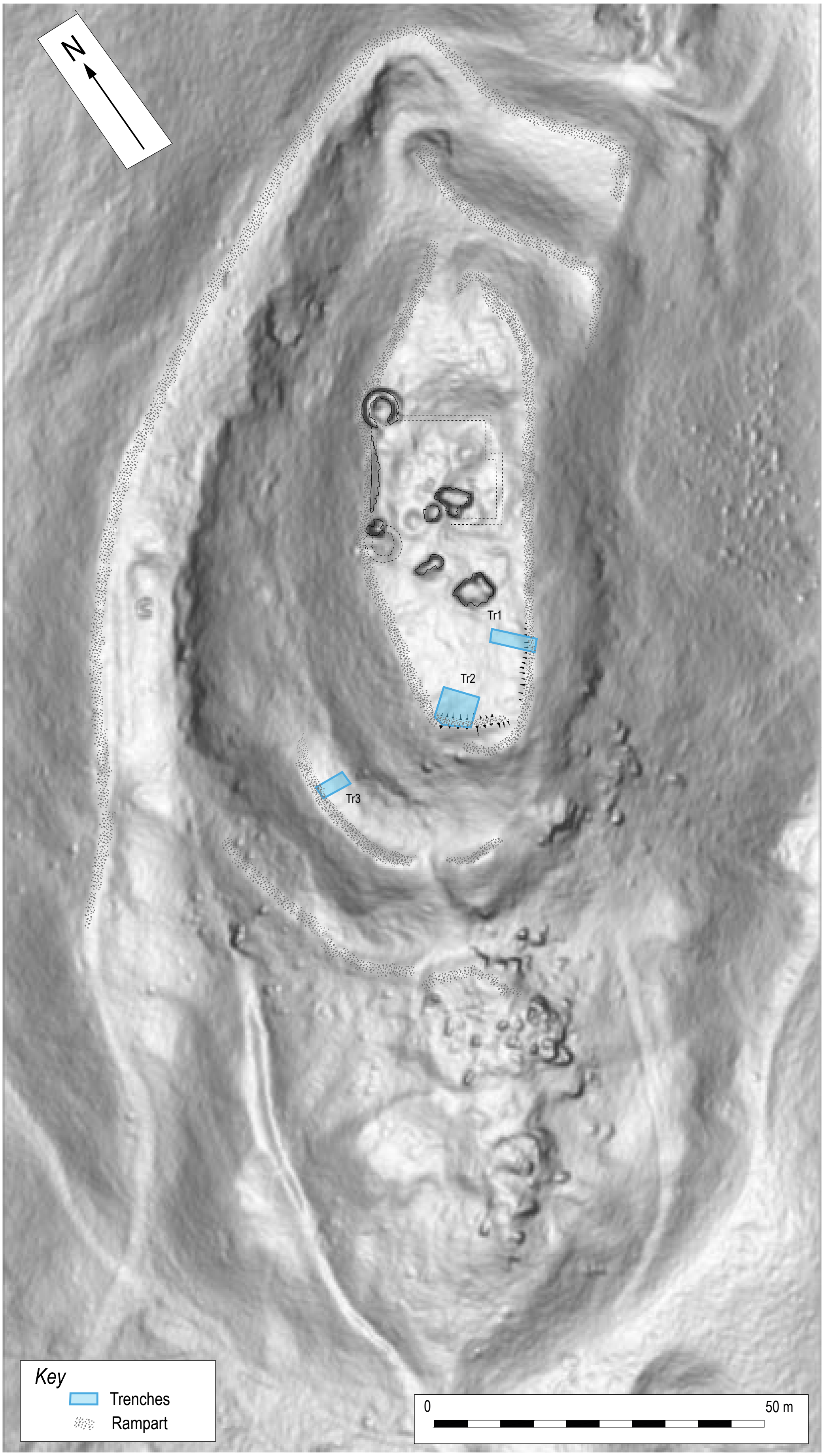


Figure 8: Photogrammetry Digital Surface Model generated by drone of Tinnis Castle and Fort

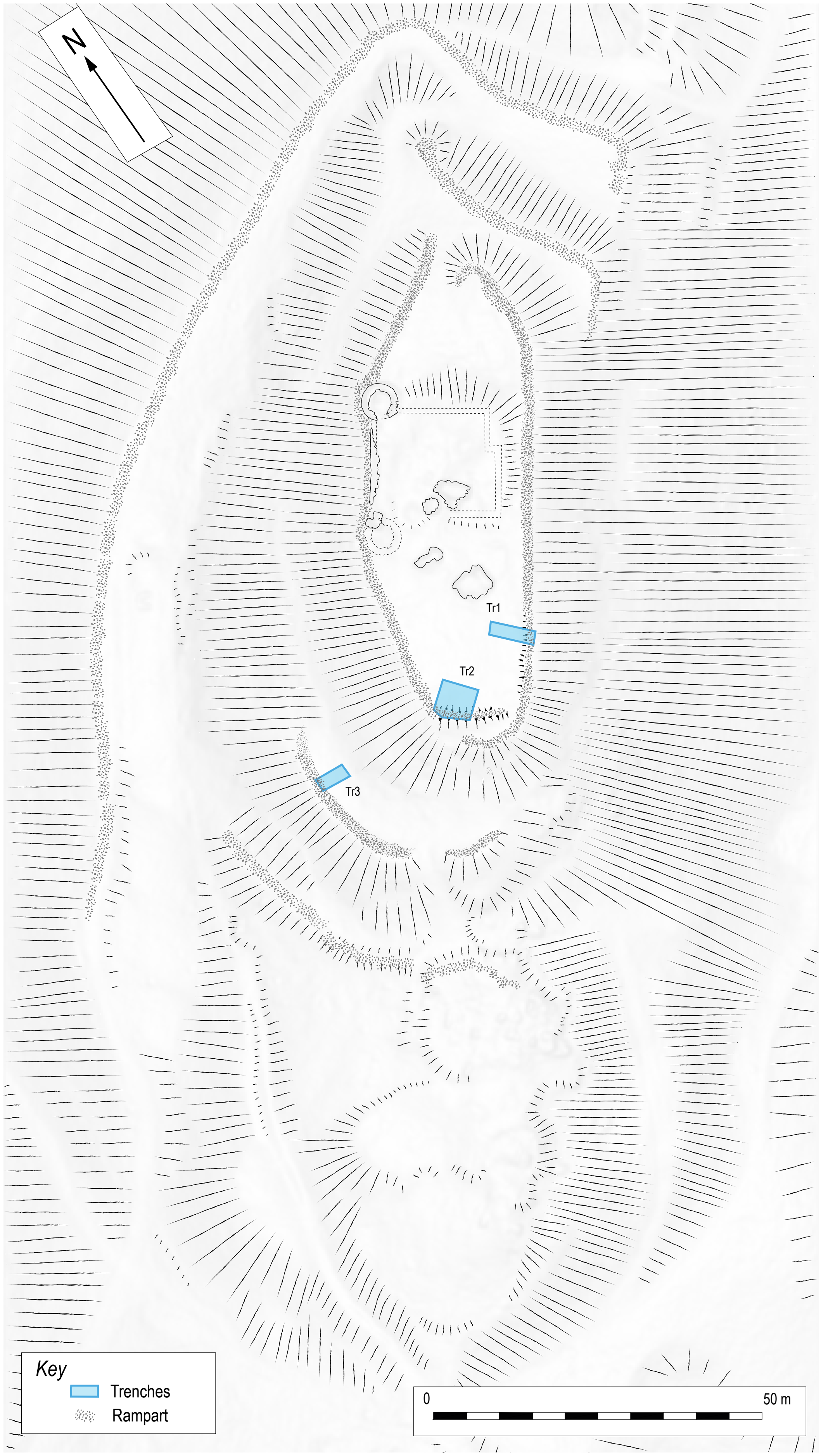


Figure 9: Tinnis Castle and Fort Site Plan © Crown Copyright: HES (Ordnance Survey Archaeology Division Collection).

Trench 1

By Thomas Muir

Trench 1 measured 14 m^2 and was located on the south-east edge of the summit, to the south of the visible ruins of Tinnis Castle (Figure 9).

Overlying outcrops of natural greywacke bedrock (1012) was subsoil (1011) of friable, dark brown grey silty sand. Fragments of charcoal, bone, slag and mortar were recovered from the processing of the soil sample (S 23). The earliest stratigraphic deposit within Trench 1 (Figure 10), overlying the subsoil and bedrock, was a compact, dark grey brown silty sand layer (1010) with frequent small sub-angular and rounded stones, and charcoal flecks throughout, and a fragment of vitrified stone SF 170. Charcoal, bone, slag, flint and quartz were recovered during the processing of the soil sample (S 27). This deposit (1010) was 0.18 m thick, and extended 2.38 m north-west from the north-east corner of the trench, and across the width of the trench. It was overlain by the drystone rampart wall (1003). The rampart was aligned north-east/south-west along the south-eastern edge of the summit and was 1.7 m in width (Figure 11). It comprised two courses (Figures 12 and 13) and survived to a height of 0.83 m. It was constructed of medium to large sub-angular greywacke stones, the larger stones forming an interior face on the north-west side and an exterior face along its south-east edge. The smaller stones formed a rubble core between these stone faces (Figure 14). A 0.85 m wide slot was excavated through the rampart wall (1003) and its soil matrix (1004) along the north-east edge of the trench. The soil matrix (1004) of the rampart wall consisted of a firm, mid grey brown sandy silt with inclusions of bone SFs 143, 146 and 191, vitrified stone SF 144 and 148, charcoal SFs 149 and 192 and a small loose piece of mortar SF 147. Fragments of charcoal, bone and quartz were recovered during the processing of the soil sample from the top of this matrix (S 24). Further charcoal, bone and slag fragments were recovered during the processing of the soil sample from the lower part of this matrix (S 25). Fragments of charcoal, bone and slag were recovered during the processing of the soil sample from the base of this matrix (S 26).

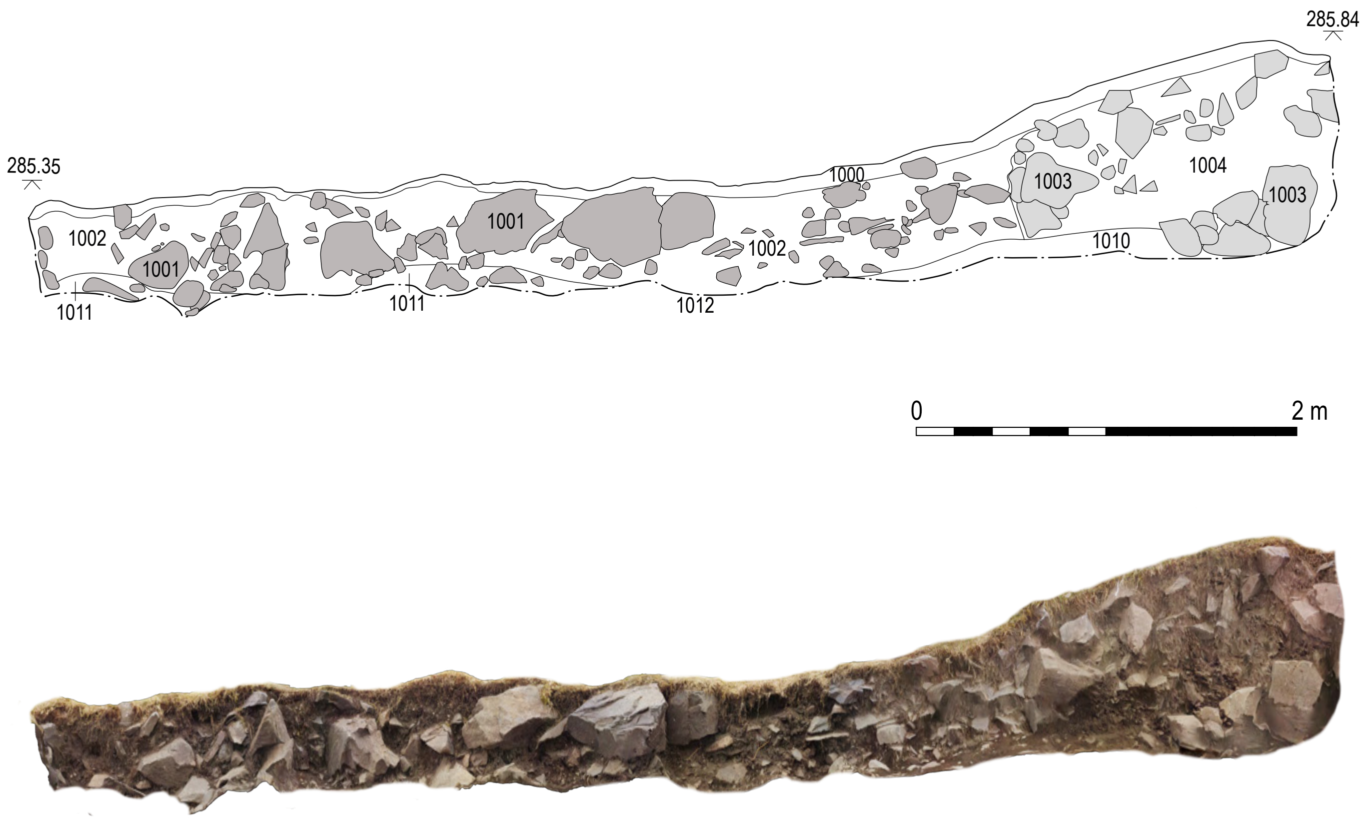


Figure 10: South-west facing elevation of rampart (1003).

Separately, near the centre of Trench 1 were the remains of a surface identified in two discrete areas (Figure 11). From 1.40 m north-west of the interior face of the stone rampart (1003) was an area of compact, light yellow grey sandy mortar (1008) with frequent small to medium sub-angular stones (Figure 15). The main bulk of this survived in a roughly east-west curvilinear shape measuring 0.9 m long by 0.23 m wide and 0.07 m thick, with three smaller patches identified around its southern and eastern extents. At 2.34 m from the north-west of the interior face of the stone rampart (1003), a cluster of broken stone slabs (1009) was also identified in a small, uneven circular pattern measuring 0.38 m east/west and 0.30 m north/south (Figure 11 and 16). The slabs were flat, hand shaped greywacke stones, 0.08 m thick. The stones were set in a friable, dark brown grey sandy silt matrix deposit (1007). This was 0.08 m in depth, and survived in an uneven-oval shaped deposit, measuring 0.88 m long east/west and 0.8 m wide north/south and continuing into the south-west section. Three pieces of unburnt animal bone SFs 121, 122 and 127 were recovered from the deposit as well as a small piece of charcoal SF 128. Four sherds of medieval pottery as well as further fragments of charcoal, bone, metal, quartz and mortar were recovered during the processing of the soil sample (S 13). The surface of both the mortar and the stone slabs lay at the same level (Figure 10) and both features lay directly upon subsoil (1012).

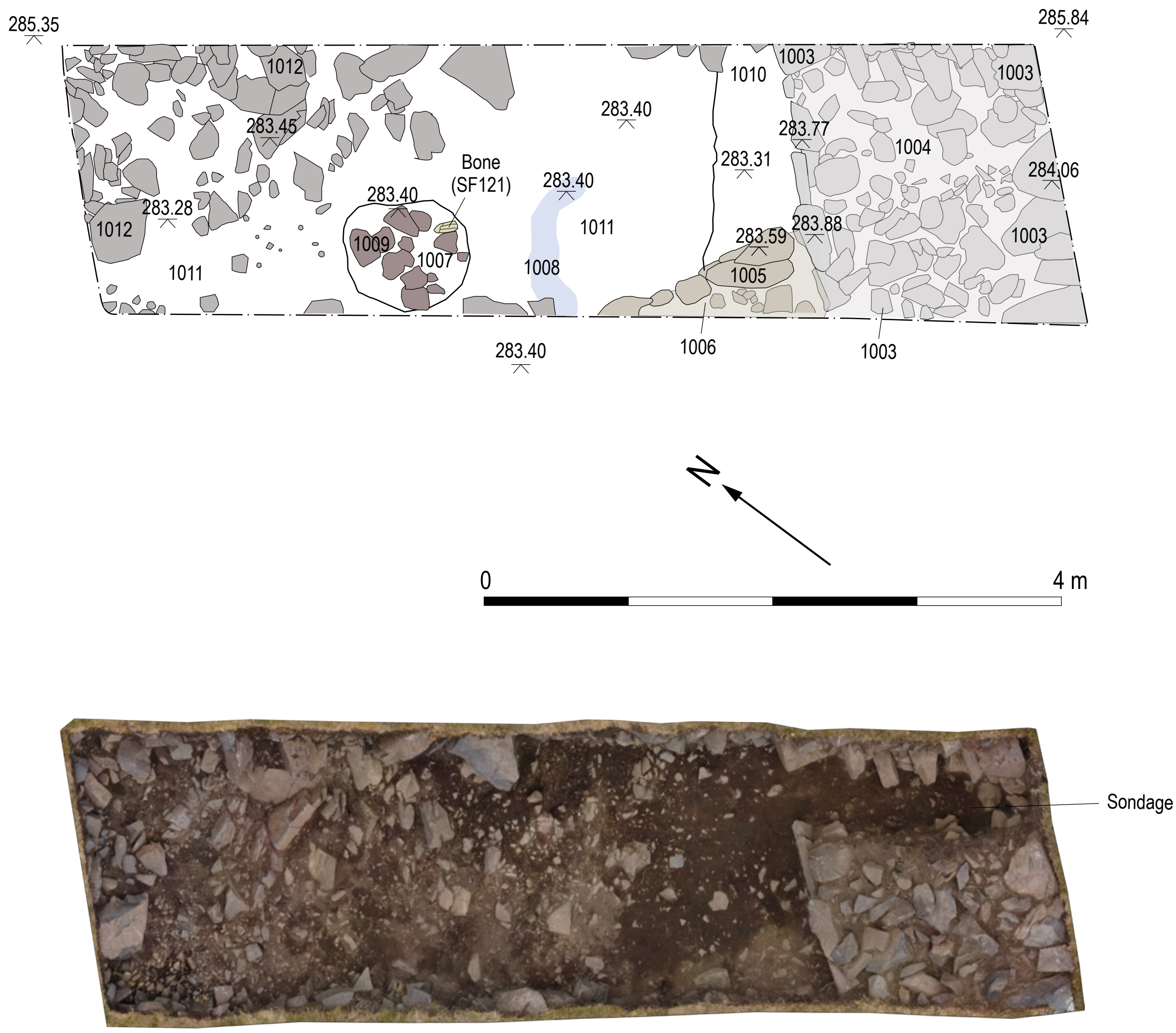


Figure 11: Plan of Trench 1.

Figure 12: Interior face of rampart (1003), from NW.

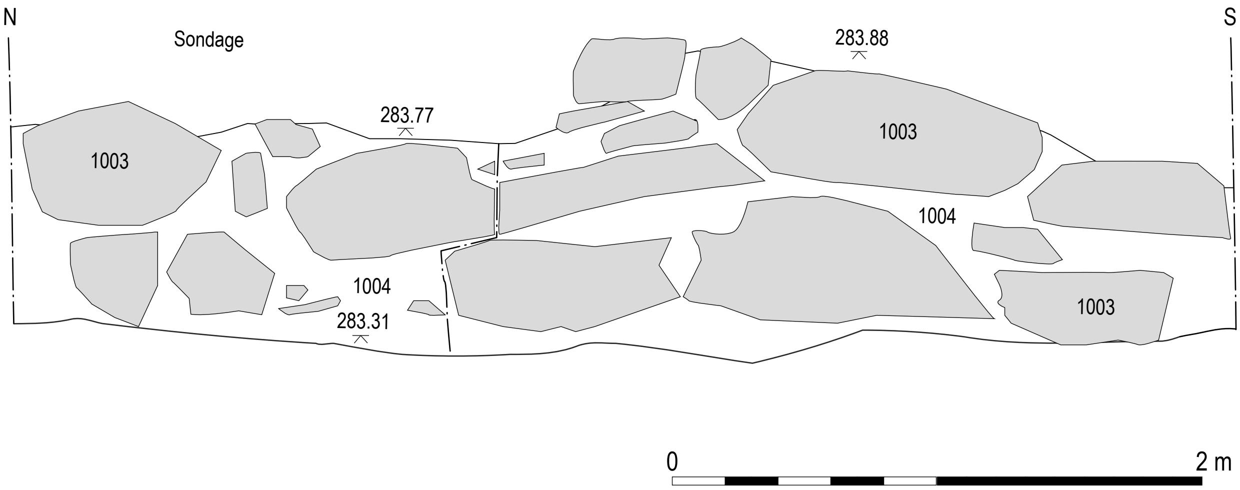


Figure 13: South-west facing section of Trench 1.

Figure 14: Rampart (1003), from NE.

Figure 15: Mortar surface (1008), from SW.

Figure 16: Stone slabs (1009) and matrix deposit (1007) with bone SF 121, from NW.

Abutting the interior face of the rampart wall (1003) and overlying the mortar surface (1008) was a stone wall (1005), oriented east/west and surviving as a single course of medium to large greywacke stones (Figures 17 and 18). It measured 0.37 m wide and 0.32 m in height and a length of 1.25 m was revealed within Trench 1. The matrix deposit (1006) was a friable, mid grey brown silty sand with occasional small stones, mortar and evidence of rooting throughout. A small sample of mortar SF 126 was recovered from this deposit. Fragments of bone, slag and mortar were also recovered from the processing of the soil sample (S 11).

Overlying the wall (1005) was a layer of tumbled small to large sub-angular greywacke stones (1001), including several stones with mortar attached. This covered the entire length and width of Trench 1 from the interior face of the rampart (1003) and was up to 0.50 m deep (Figures 10 and 19). The soil matrix of this rubble deposit comprised a friable, mid-grey brown silty sand (1002) with occasional rooting throughout and numerous inclusions of bone fragments SF 57, 58, 84, 87, 97, 100, 123 and 125, charcoal SFs 83, 98, 99 and 101, vitrified stone SF 051, mortar SF 61, oyster shells SFs 63 and 91, a fragment of slate SF 71, a small piece of lead SF

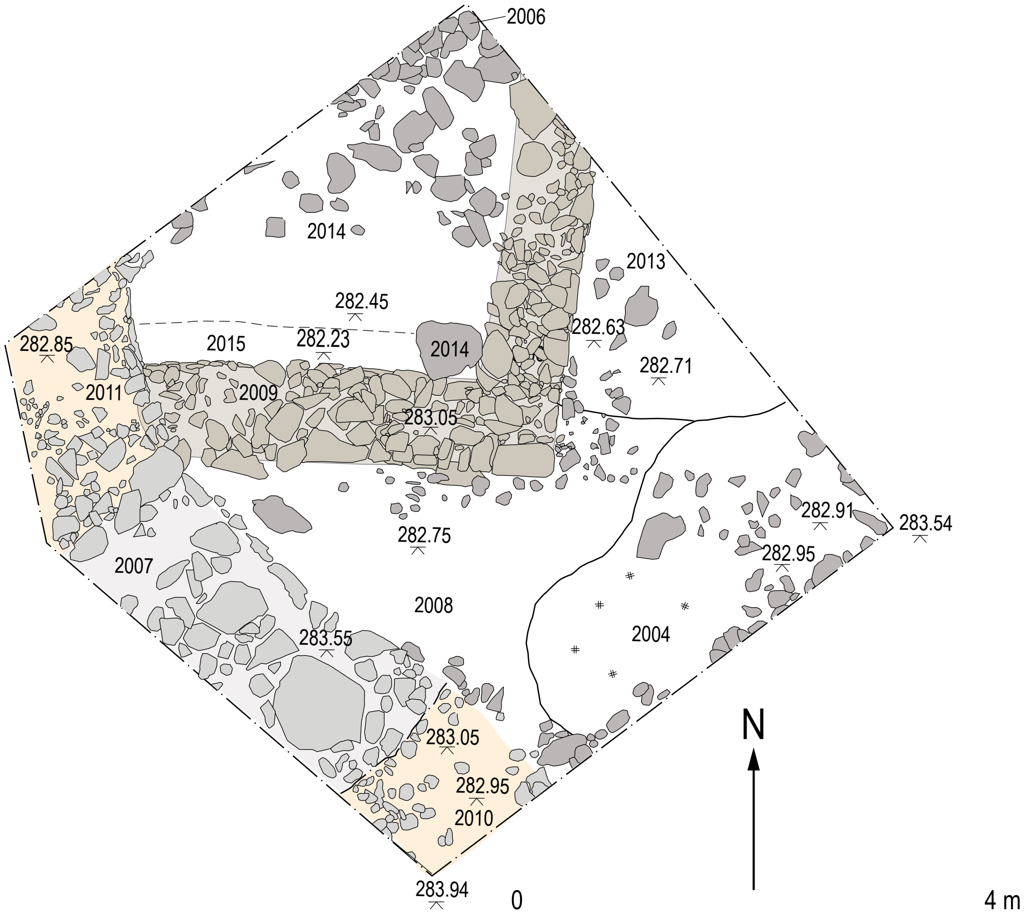
56, pieces of iron SFs 59 and 86), a nail SF 90 and a horseshoe SF 124. This deposit was sealed by a thin turf and topsoil layer (1000) comprising friable, mid grey brown silty sand up to 0.16 m deep in places. Numerous pieces of bone SFs 11, 12, 31, 33, 44 and 52, mortar SFs 32, 34 and 35 and charcoal SF 30 were recovered from the topsoil. Further fragments of bone, mortar and slag were recovered during the processing of the soil sample (S002).

Figure 17: Wall (1005) abutting rampart (1003), from NW.

Figure 18: Wall (1005), from N.

Figure 19: Rubble deposit (1001), from NW.

Figure 20: Horseshoe SF 124 in situ, from NE.



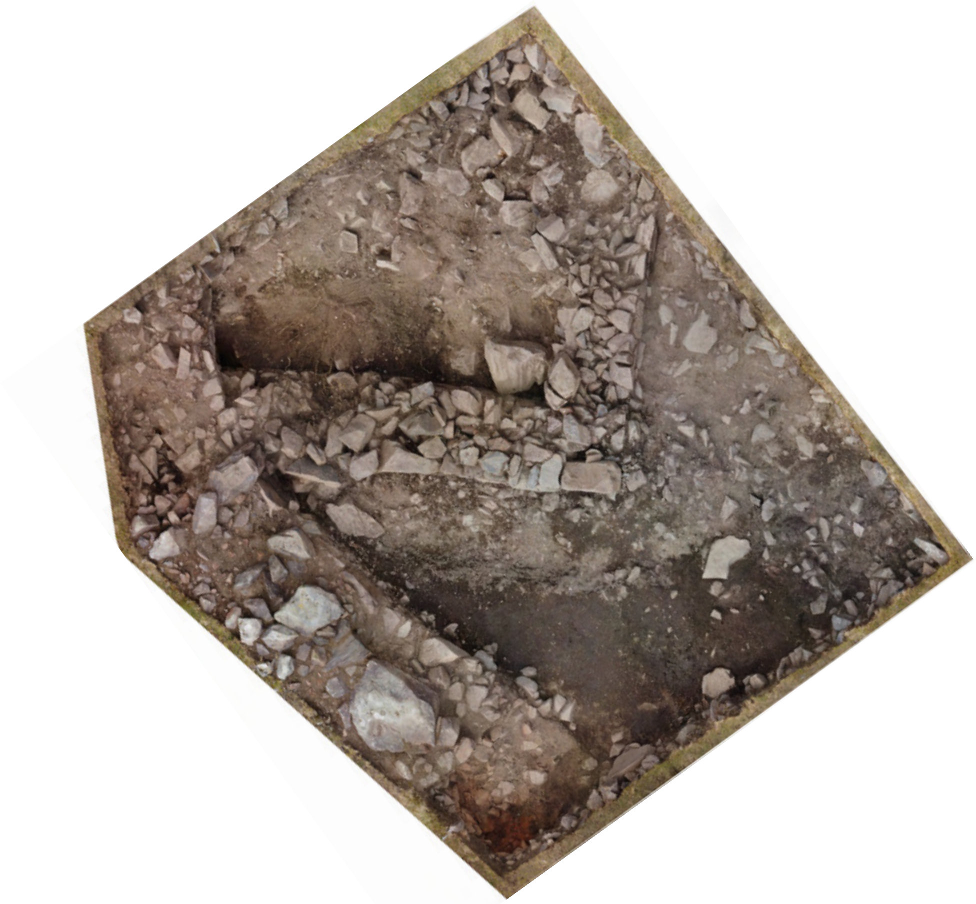


Figure 21: Plan of Trench 2

Trench 2

By Laura Muser

Trench 2 measured 32 m^2 and was located at the south-west edge of the summit, south-west of the visible ruins of Tinnis Castle (Figure 9).

The earliest stratigraphic features within Trench 2 comprised two discrete parts of the drystone rampart that encircles the summit, located at the southern corner (2010) and the north-west corner (2011) of the trench (Figure 21).

Rampart (2010) was apparent 0.08 m below the modern ground surface and comprised a 1.09 m long and 1 m wide rubble accumulation of medium to large sub-angular and angular stones with a mid-grey brown silty sand matrix. A sondage, measuring 0.6 m wide, was excavated at the southern corner of Trench 3 to a depth of 0.56 m (Figure 22), though the base of the rampart core itself was not reached. The sondage through (2010) revealed vitrified stones in situ (Figure 23) immediately adjacent to burnt, discoloured and fire-cracked stones in situ (Figure 24) and a burnt animal bone SF 167 (Figure 25). Inclusions of burnt and vitrified stone SFs 131, 158, 168 and 179, animal bone fragments SFs 139, 156, 159, 176, 178 and 180 and charcoal SFs 138, 157, 160, 175, 177 and 181 were recovered from the rampart core (2010). Further fragments of charcoal, nutshell, bone, slag, metal, mortar and quartz were recovered during the processing of soil samples (S 28 and 31).

At the north-west corner of Trench 2 was rampart core (2011) again comprised medium to large sub-angular and angular stones with a mid-grey brown silty sand matrix. This was first apparent 0.05 m below the modern ground surface and comprised a 1.51 m long and 1.20 m wide rubble deposit, of which a depth of 0.32 m was exposed but no further excavation to its actual base undertaken. While a fragment of vitrified stone SF 162 was recovered from rampart core (2011), no in situ vitrified stone or burnt and discoloured stone was apparent. Inclusions of animal bone fragments SF 161 and charcoal SF 163 were also recovered from rampart core (2011).

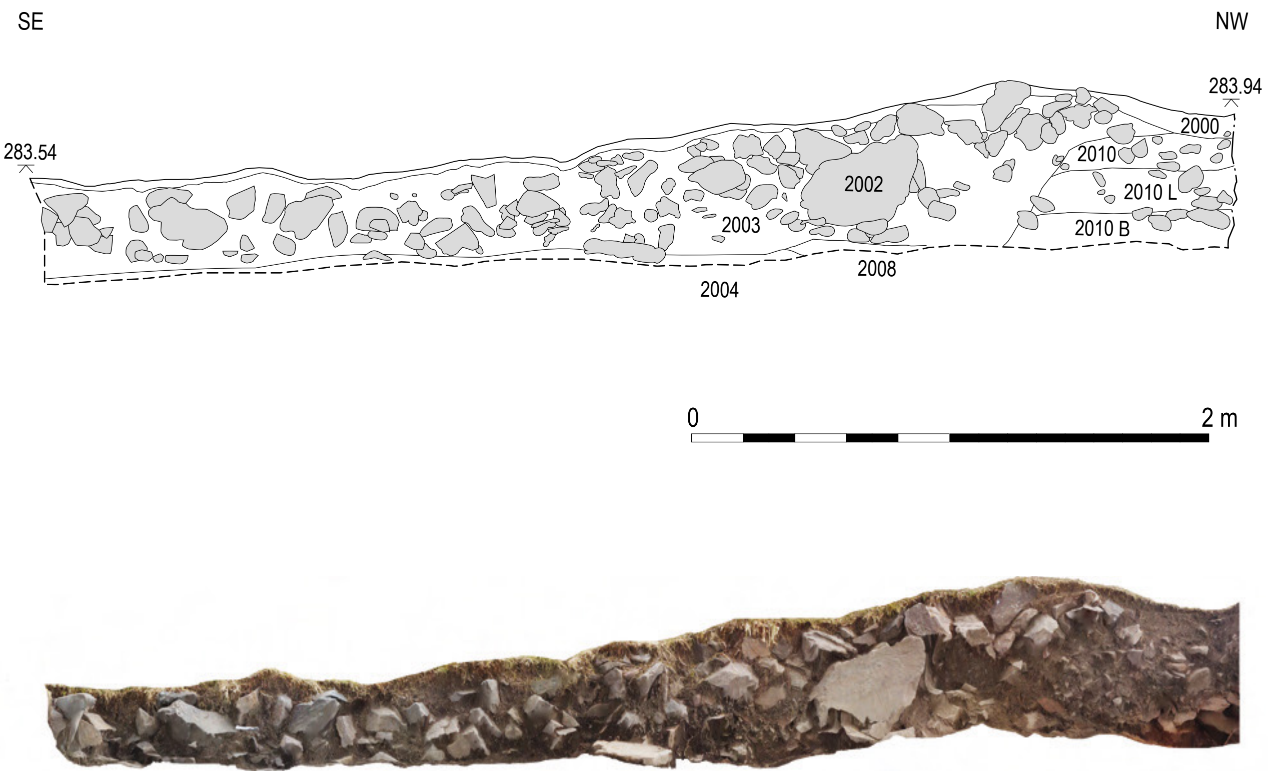


Figure 22: North-west facing section of Trench 2.

Figure 23: In situ vitrified stone (2010), from NE.

Figure 25: Burnt bone SF 167 in situ within rampart core (2010), from NE.

Figure 24: Burnt and discoloured rampart core (2010), from NE.

Merging with the NNW/SSE aligned interior side of rampart core (2011; Figure 26) was stone wall (2009), which ran 3.56 m east/west before turning 90° and continuing for a further 3.48 m north and beyond the edge of the trench (Figure 27). It measured 0.70m in width, and was constructed with a mixture of angular and cuboid dressed stones with mortar bonding visible in some areas. The base of the wall was not reached during the excavation. At its deepest visible point, the wall was 0.81 m and four courses high (Figure 28).

A slot measuring 2 m by 0.5 m was excavated along the inner, north-facing wall face of wall (2009) to reveal a friable, light greyish brown sandy silt deposit (2015). This 0.17 m deep deposit contained very frequent inclusions of mortar SF 169 and 188, and charcoal SFs 187 and 190. Charcoal, bone, slag, quartz and mortar fragments were recovered during the processing of the soil samples (S 29).

Figure 26: Integration of wall (2009) with rampart core (2011), from NE.

Figure 27: Wall (2009), from SE.

Figure 28: Wall (2009), from N.

In the south-eastern corner of Trench 2 was apparent a deposit layer (2004) of friable, dark black brown sandy silt with frequent inclusions of medium angular stones and very frequent inclusions of charcoal (Figure 22). This deposit extended over an area of 3.60 m by 1.43 m, extending beyond the south-eastern edges of the trench and though a depth of 0.04 m was excavated, its base was not reached. This layer (2004) was a particularly artefact-rich deposit, from which green glazed redware pottery sherds SFs 106, 109, 145 and 151 (Figure 29), animal bone fragments SFs 096, 108, 110 and 172, an iron nail SF 171 and charcoal SF 095, 107, 152, 173 were recovered. Further charcoal, nutshell, bone, slag, non-ferrous metal and quartz were recovered during the processing of the soil samples (S 10 and 22).

Edging deposits (2004 and 2008) at their northern extents was a friable, mid grey brown silty sand deposit layer (2013) with frequent inclusions of angular stones and occasional charcoal, which covered an area of approximately 2.2 m^2 and abutted the east facing side of wall (2009). This deposit layer (2013) was at least 0.26 m deep though it was not fully excavated.

Overlying layer (2004) and abutting the southern side of wall (2009) was another layer of 0.37 m deep friable, mid black brown sandy silt (2008) with frequent small to medium angular and sub-angular stones and infrequent inclusions of charcoal SF 154, animal bone SF 153, 174 and vitrified stone SF 155. While deposit layer (2008) also abutted the rampart core (2010), it underlay stone structure (2007), which was located between the rampart segments (2010 and 2011).

Situated along the south-western edge of Trench 2, stone structure (2007) intersected the rampart segments (2010 and 2011). However, it was not similar in composition, comprising instead two large flagstones on the surface embedded in a compact, dark grey brown sandy silt matrix with frequent medium to large sub-angular and angular stones and occasional charcoal flecks. It measured 3.53 m long, 1.02-1.20 m wide and was 0.46 m deep in elevation (Figure 30). While it was defined during the excavation, it was left unexcavated.

Figure 29: Green glazed redware pottery sherd SF 151 in situ, from NE.

Both deposit (2015) to the north and deposit (2008) to the south of wall (2009) were sealed by rubble (2014) and its soil matrix (2012). While the rubble (2014) was predominantly light brownish grey greywacke stones with mortar still attached in some cases, its matrix (2012) comprised friable, mid grey brown silty sand and small to medium sub-angular stones with occasional inclusions of charcoal. Together this 0.31-0.64 m deep rubble deposit covered an area of 3.01 m long by over 2.24 m wide and beyond the north-west edge of the trench (Figure 31). A variety of finds was recovered from the rubble matrix (2012), ranging from mortar SFs 132 and 183, charcoal SFs 165 and 184, and bone SFs 166 and 186 to glass SF 182, possibly burnt bark SF 164 and slag SF 185. Further fragments of charcoal, bone, chalk, quartz and mortar during the processing of the soil samples (S 14 and 18).

Overlying this interior rubble deposit was a further 0.21-0.49 m deep layer of rubble (2002) comprising small to large sub-angular and angular light brown grey greywacke stones (Figure 32). Amongst the rubble deposit, mortared stone (SF 089) was observed. The rubble (2002) and soil matrix (2003) covered most of Trench 2, including the rampart segments (2010 and 2011). The soil matrix (2003) comprised friable, mid grey brown silty sand with numerous inclusions such as one sherd of green glazed redware pottery SF 078, a clay pipe bowl fragment SF 135, a sample fragment of slate SF 073, various animal bones SFs 062, 066, 074, 079-081, 104, 111, 112, 120, 129, 133 and 134, a shard of glass SF 136, a partial oyster shell SF 103, an iron nail SF 150, two flat strips of metal SF 075 and 105 and charcoal SFs 077, 082 and 137. Charcoal, nutshell, bone and metal fragments were recovered during the processing of the soil sample (S 9).

Figure 30: North-east facing elevation of stone structure (2007).

Figure 31: Rubble layer (2012/2014), from NE.

Figure 32: Rubble layer (2002/2003) and (2001/2006), from NE.

In the north-eastern corner of Trench 2, the rubble deposit (2002 and 2003) was truncated by a 4.72 m2 and 0.46 m deep curvilinear pit (2005), which was visible in the trench section (Figure 33), extending 2.19 m NW/SE and beyond the south-east facing section and 1.86 m SW/NE and beyond the south-west facing section of the trench. It was filled with rubble (2006) comprising light brown grey, medium to large greywacke stones, though including a fragment of red sandstone (SF 072), within a soil matrix (2001) of friable, dark black brown sandy silt with very frequent inclusions of small rounded stones and mortar fragments, animal bones SFs 021, 054, 076 and 102 and an iron nail SF 045.

The topsoil (2000) overlying Trench 2 comprised friable, mid grey brown silty sand with very frequent small to medium angular and sub-angular stone under mossy grass with an average depth of 0.11 m. The finds recovered from the topsoil (2000) included a sherd of green glazed redware pottery SF 047, vitrified stone SF 003 and 005, a water-worn rounded stone SF 004, a sample fragment of slate SF 014, pebbles with mortar SF 022, 026, 027 and 028, mortar SFs 016, 024, 025, 029, 042 and S 3, animal bone SFs 001, 002, 010, 013, 020, 046, 049, 068 and S 3, glass shards SFs 015 and 023, an iron nail SF 043, a small metal ring or chain element (SF 048) and slag (S 3).

A loose fragment of mortar (SF 130) was collected from the masonry ruins of Tinnis Castle as a sample for comparison with the mortar collected from Trenches 1-2.

Trench 3

By Lauren Reid

Trench 3 measured 10m^2 and was located to the west and downslope of the south-west edge of the summit (Figure 9).

Though the top of it was located close to the surface, the earliest observed stratigraphic feature in Trench 3 was a north/south aligned drystone rampart wall (3002) located on the western edge of the trench (Figure 34). Only the east face of this wall, measuring 1.63 m in height was exposed (Figure 35). The wall comprised at least nine courses of large angular stones measuring from 0.15 m by 0.09 m to 0.45 m by 0.20 m, dressed on the eastern face and embedded within a silty sand and clay matrix (3009; Figure 36). The base of the wall (3002) was not exposed due to the safety limits of the 2 m wide trench.

Abutting the wall (3002) at a depth of 1.20 m was a 0.40 m deep layer (3007), comprising mid-brown silty sand sloping down westwards towards the wall (Figure 36). A lead artefact, SF 117 was recovered from this deposit (3007) close to the wall face. Fragments of charcoal, cereal, nutshell, bone and slag were recovered during the processing of the soil sample (S 20).

The lowermost layer (3007) was partially overlain by a 0.05 m deep layer of scree (3008), from which fragments of charcoal, bone, slag quartz and egg cases were recovered during the processing of the soil sample (S 016). This layer

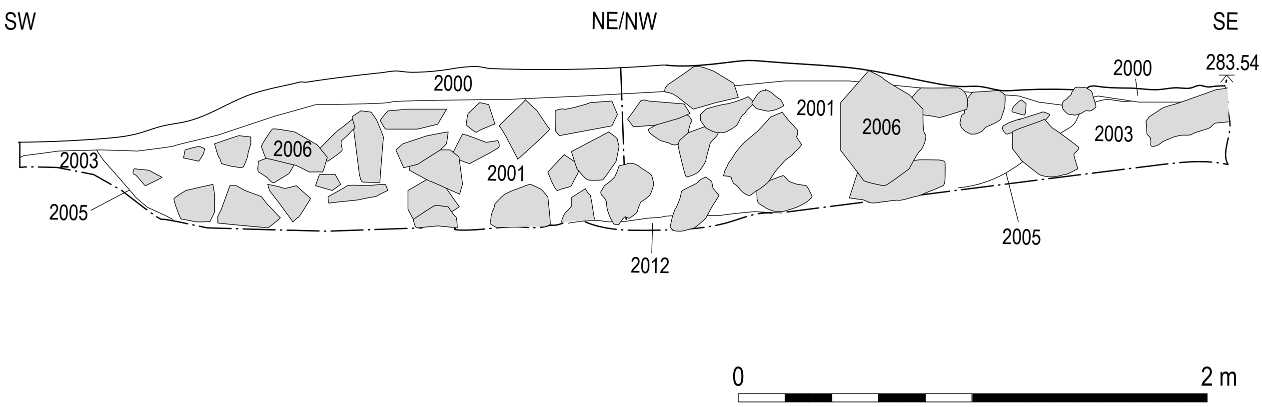


Figure 33: Wrap around section of north-east corner of Trench 2, showing pit (2005).

was itself overlain by a 0.25 m deep compact layer of mid-dark brown charcoal rich clay (3003) again sloping down westwards towards the wall, containing frequent inclusions of sub-angular stones and charcoal SFs 064, 065, 092 and 141 as well as animal bones SF 142, slate SF 094, a water-worn rounded pebble (SF 069) and an oyster shell SF 088. Charcoal and slag were also recovered during the processing of soil samples (S 007 and S 008). Embedded within this layer (3003), at a depth of 0.70 m from the modern ground surface was a 0.20 m by 0.20 m and 0.10 m deep lens of black silty clay (3006) containing very frequent inclusions of charcoal SF 115 (Figure 37). Further fragments of charcoal, cereal, bone and slag were recovered during the processing of the soil sample (S 17).

The deposits (3003 and 3006) were overlain by a 0.40 m deep layer of rubble (3005) comprising smaller red sub-angular stones exposed in the eastern end of the trench (Figure 38). This was itself overlain by a 1 m deep layer of large greywacke stones (3004), sloping down westwards (Figure 39).

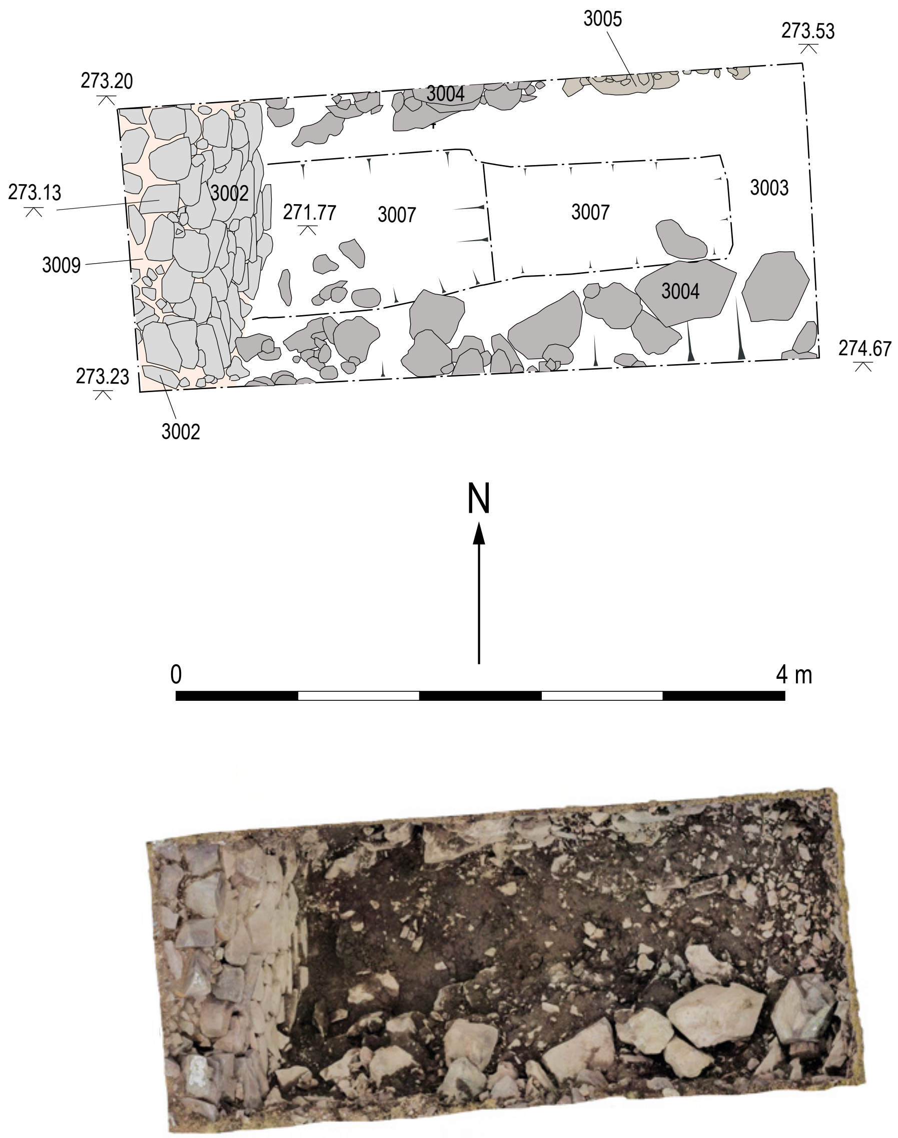


Figure 34: Plan of Trench 3.

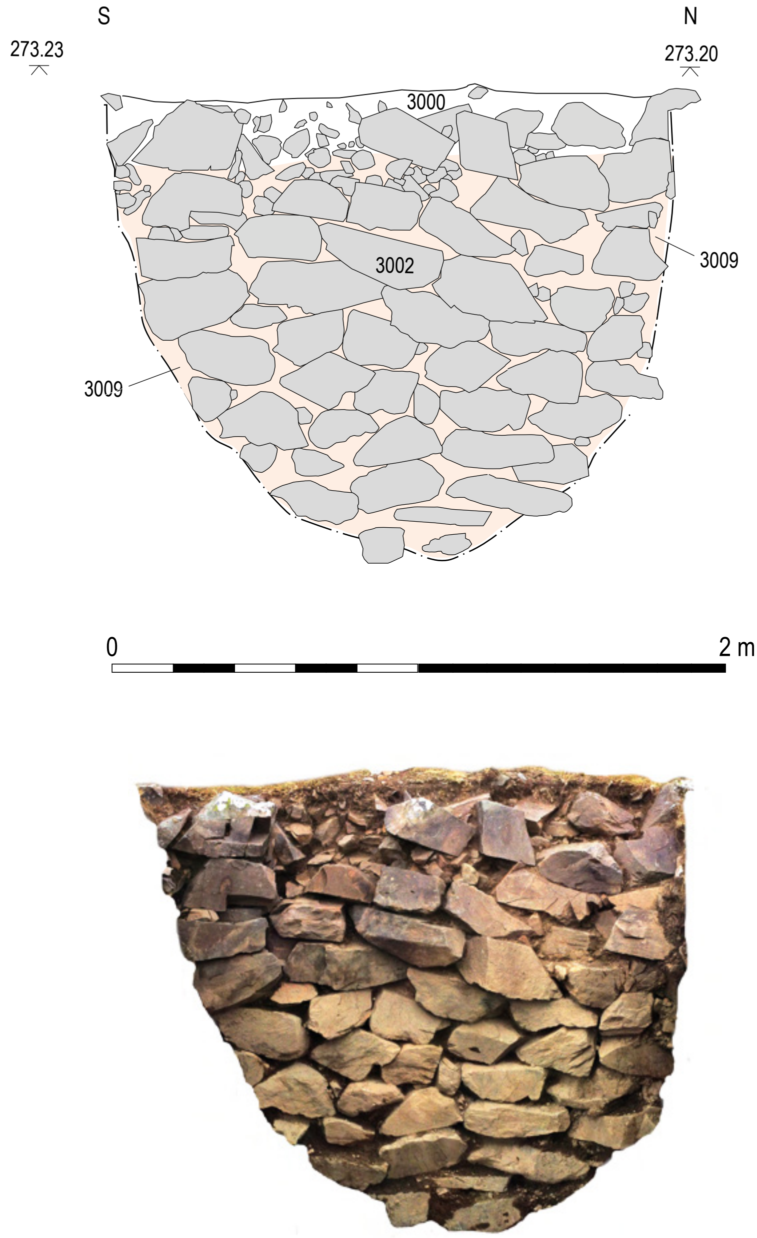


Figure 35: East facing elevation of rampart wall (3002).

Figure 36: Interior face of rampart wall (3002), from E.

Figure 37: Charcoal deposit SF 115 in lens (3006) embedded in layer (3003).

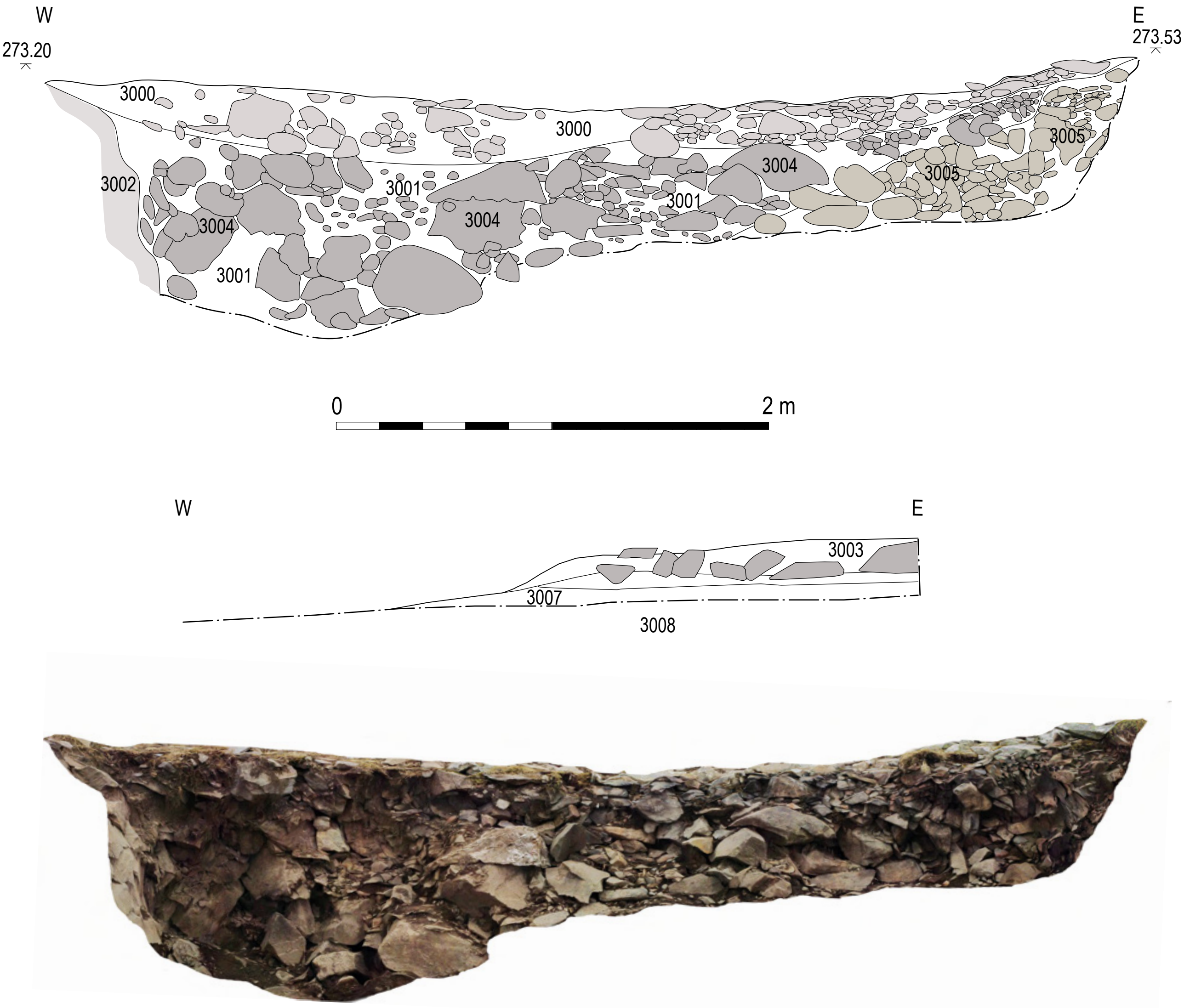


Figure 38: South facing section of Trench 3.

Figure 39: Rubble deposit (3004), from E.

Concentrations of large angular stones were apparent at the eastern and western limits of rubble accumulation (3004) with smaller rubble deposited between (Figure 38). Both rubble layers (3004 and 3005) had the same mid-dark brown silty sand matrix (3001) which included frequent animal bones, SF 055, 070 and 118), slate fragments SF 093, 113 and 119, charcoal SF 053 and 116 and oyster shell SF 050 and 140. Charcoal, bone, glass and slag were recovered during the processing of the soil sample (S 06).

The patchy 0.10-0.28 m deep topsoil (3000) overlying Trench 3 comprised mid-brown silty sand with frequent sub-angular greywacke stones (Figure 38). The topsoil included vitrified stone SFs 006, 040, and 114, mortar, SF 008 and 017, animal bone SFs 009, 019, 037 and 039, oyster shells SFs 036 and 038, slag (S 01), as well as one water-worn rounded pebble SF 041 and modern pottery SF 007.

Thirlestane Barrows

by Joseph Lewis Anderson, Eleanor Dacre, Amanda Gilmore, Lauren Reid and Tamsin Scott

The Thirlestane Barrows are located south of Broughton Village and to the east of the A701 road (NGR: centred NT 11700 35260; Figure 2). The barrows straddle two rectangular agricultural fields that sit between 193 m – 205 m OD on an eastern facing slope. The fields are separated by a narrow watercourse and fence. The area is bounded with agricultural fields to the north and south, the A701 road to the west and Biggar Water to the east.

The underlying drift geology consists of Kirkcolm Formation - Wacke. Sedimentary Bedrock formed approximately 449 to 458 million years ago in the Ordovician Period when the local environment was dominated by deep seas. The superficial deposits formed up to 2 million years ago in the Quaternary Period and comprise of alluvial silts, sand and gravel when the local environment was dominated by rivers (British Geological Survey 2023).

Geophysics Survey

By Joseph Lewis Anderson and Eleanor Dacre

A fluxgate gradiometer survey was completed and identified anomalies of an archaeological, agricultural, natural and undetermined origin across the two survey areas (Figure 40).

Archaeological activity was identified two round barrows (centred at NT 11699 35265 and NT 11719 35257) and associated pit like features in the western field. These correspond to cropmarks visible in the survey area (Figure 6). Further rectilinear anomalies were also identified in the western field and though their morphology is indicative of periglacial formations, due to the detection of probable archaeology in the survey area, these have been classified as possible archaeology and may represent ditch like features. Broad sinuous linear anomalies were apparent across both survey areas. No barrows were apparent in the eastern field though cropmarks are evident here too (Figure 6).

Following completion of the geophysical survey, consolidated results from the aerial and geophysical surveys were employed to enable accurate positioning of two 6 m by 6 m archaeological excavation trenches.

Trench 4

By Lauren Reid and Tamsin Scott

Trench 4 measured 36 m^2 and was centred at NT 11806 35272 in the eastern survey area (Figure 41).

The earliest observed stratigraphic feature truncating the natural subsoil (4001/4009) in Trench 4 was that of a square barrow ditch (4004/4007) enclosing two sub-rectangular graves (4010 and 4012; Figure 42). Approximately 50% of the barrow ditch was visible in plan within Trench 4, it extended beyond the limit of excavation to the west and south. The barrow ditch was rectilinear in shape, extended 3.94 m WSW/ENE in the north of Trench 4, turning NNW/SSE and extended 4.96 m in the east of the trench. Two slots were excavated through the square barrow ditch.

The ditch (4004) was excavated at an oblique angle to the western limit of excavation. It was present at a depth of 0.28 m from the modern ground surface and measured 0.90 m wide and 0.36 m deep. The barrow ditch had steep faces, a flat base and contained a single fill (4005) comprising mid-orange brown clayey silt with moderate inclusions of small to medium sub-rounded and sub-angular stones (Figure 43). Frequent fine root bioturbation was recorded throughout the fill. No artefacts were encountered during the excavation but charcoal, nutshell and quartz fragments were recovered during the processing of the soil sample (S 33). A sample was recovered from the ditch (4004) at the west-facing section (Figure 44) to be assessed for optically stimulated luminescence dating.

Ditch (4007) was excavated at the north-east corner of the square barrow ditch. It was present at a depth of 0.28 m from the modern ground surface and measured 0.91 m wide and 0.37 m deep at the west/north-west facing section and 0.75 m wide and 0.39 m at the east/north-east facing section (Figure 44). The barrow ditch had steep faces, a flat base and contained a single fill (4008) comprised mid-orange brown clayey silt with moderate inclusions of small to medium sub-rounded and sub-angular stones (Figures 45 and 46). Frequent fine root bioturbation was recorded throughout the fill. No artefacts were encountered during the excavation. Fragments of charcoal and cereal were recovered during the processing of the soil sample (S 37).

In the south of Trench 4 two sub-rectangular graves (4010 and 4012), oriented ENE/WSW were excavated within the area enclosed by the rectilinear ditch. The graves were present at a depth of 0.29 m from the modern ground surface and were excavated using a grid (Figure 47). The grid split the two graves into eight quadrants each (A-H), allowing for sufficient multi-element sample collection to enable analyses for traces of human remains (Figure 42).

The southern grave (4010) measured 2.10 m in length, 0.80 m in width and 0.27 m in depth. It contained a single mid-brown silty sand fill (4011) with frequent inclusions of small-medium sub-rounded and sub-angular stones. Frequent fine root bioturbation was recorded throughout the fill. No artefacts or human remains were

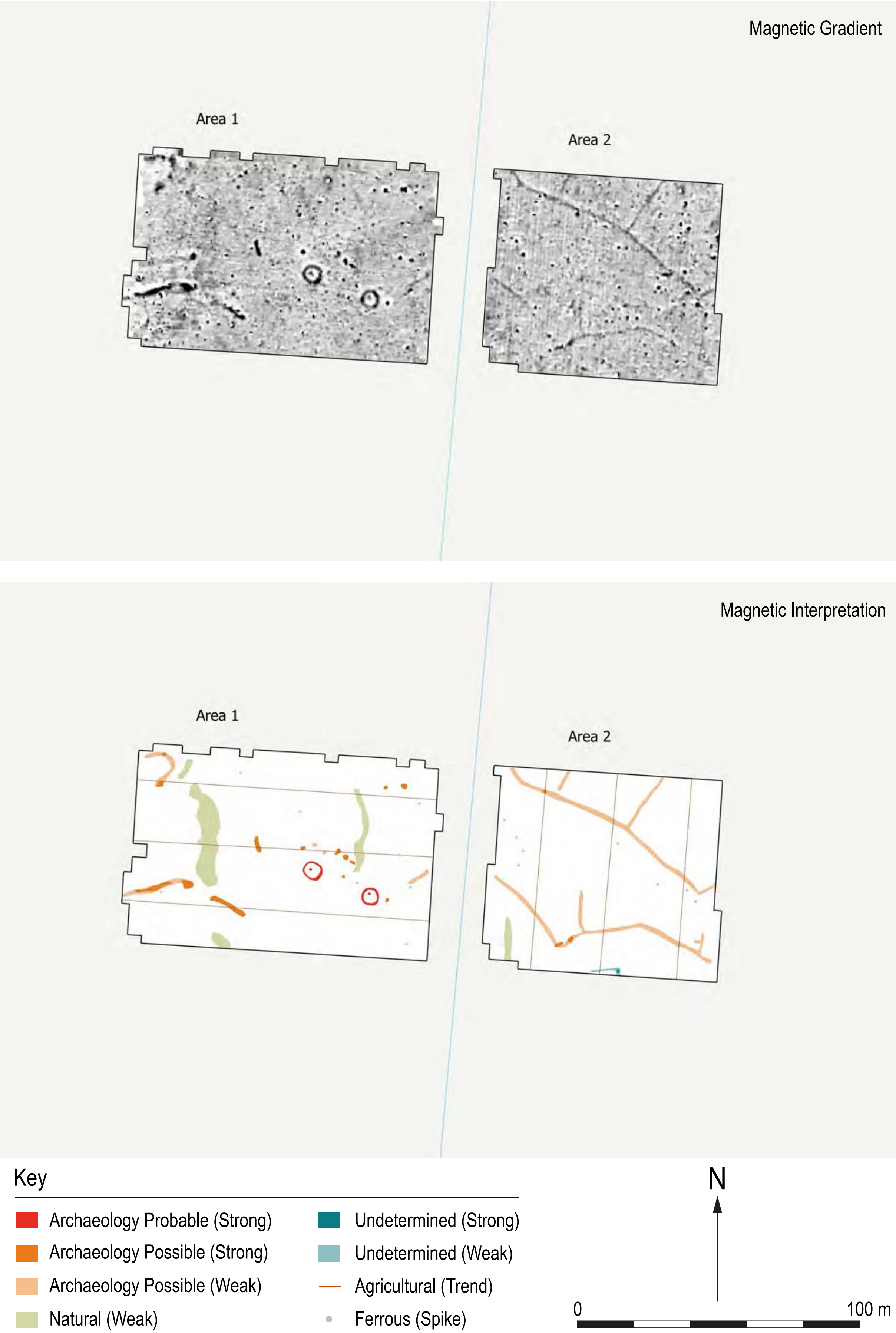


Figure 40: Thirlestane Barrows Geophysics Survey results, Magnitude Surveys Ltd 2022, contains Ordnance Survey data, © Crown Copyright and database right 2022.

identified during the excavation (Figure 48). Fragments of charcoal and bone were recovered during the processing of the soil sample (S 38). Further soil samples were taken for multi-element analyses.

The northern grave (4012) measured 2.30 m long, 0.65 m wide and 0.30 m deep. It contained a single mid-brown silty sand fill (4013) with frequent inclusions of small-medium sub-rounded and sub-angular stones. Frequent fine root bioturbation was recorded throughout the fill. No artefacts or human remains were identified during the excavation (Figure 48). Fragments of quartz were recovered during the processing of the soil sample (S 39). Further soil samples were taken for multi-element analyses.

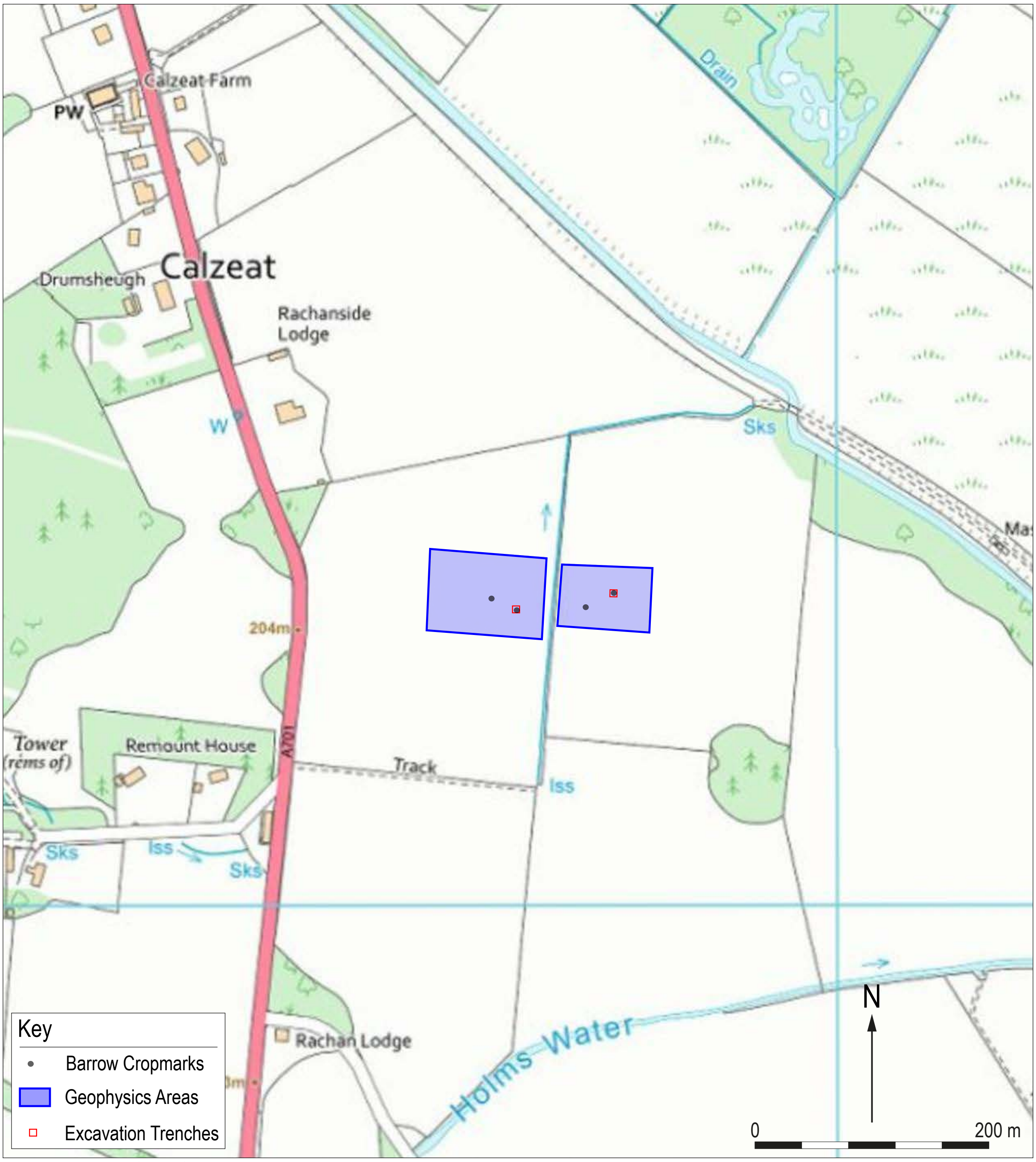


Figure 41: Thirlestane Barrows Geophysics Survey Areas and Excavation Trenches.

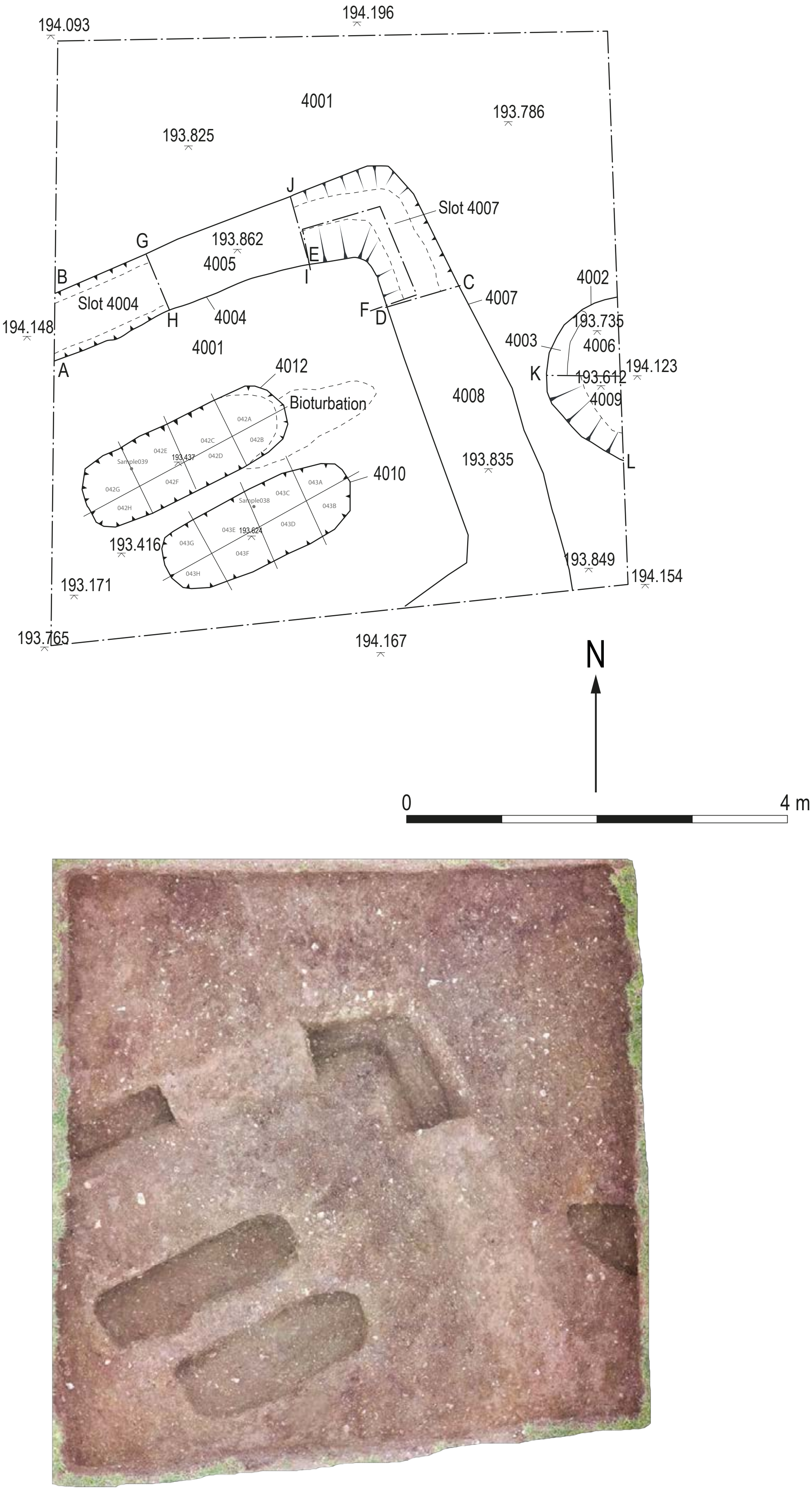


Figure 42: Plan of Trench 4.

Figure 43: ENE facing section of Square Barrow ditch (4004).

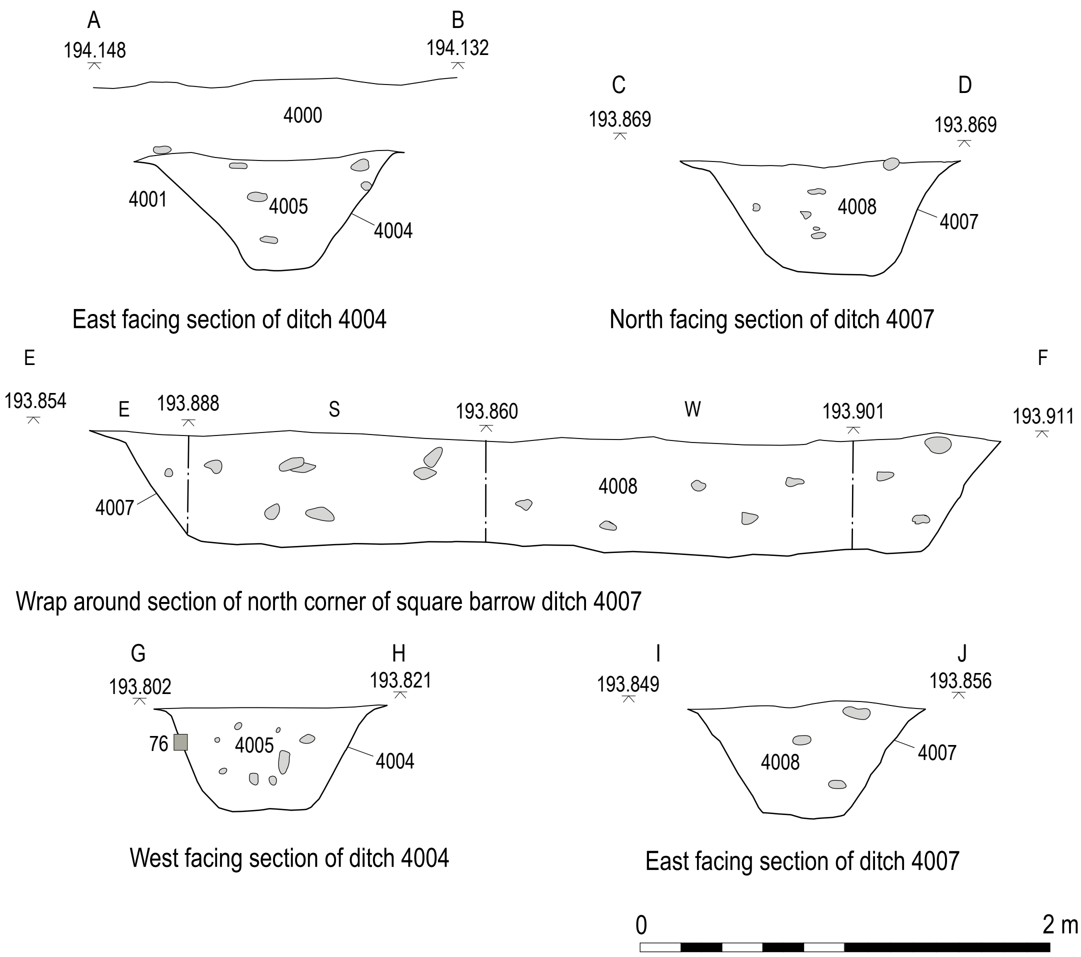


Figure 44: Sections of Square Barrow ditch, Trench 4.

Figure 45: View of square barrow ditch (4007), from SSE.

Figure 46: Square barrow ditch (4007), after excavation, from NNW.

Figure 47: Graves (4010) and (4012) with excavation grid.

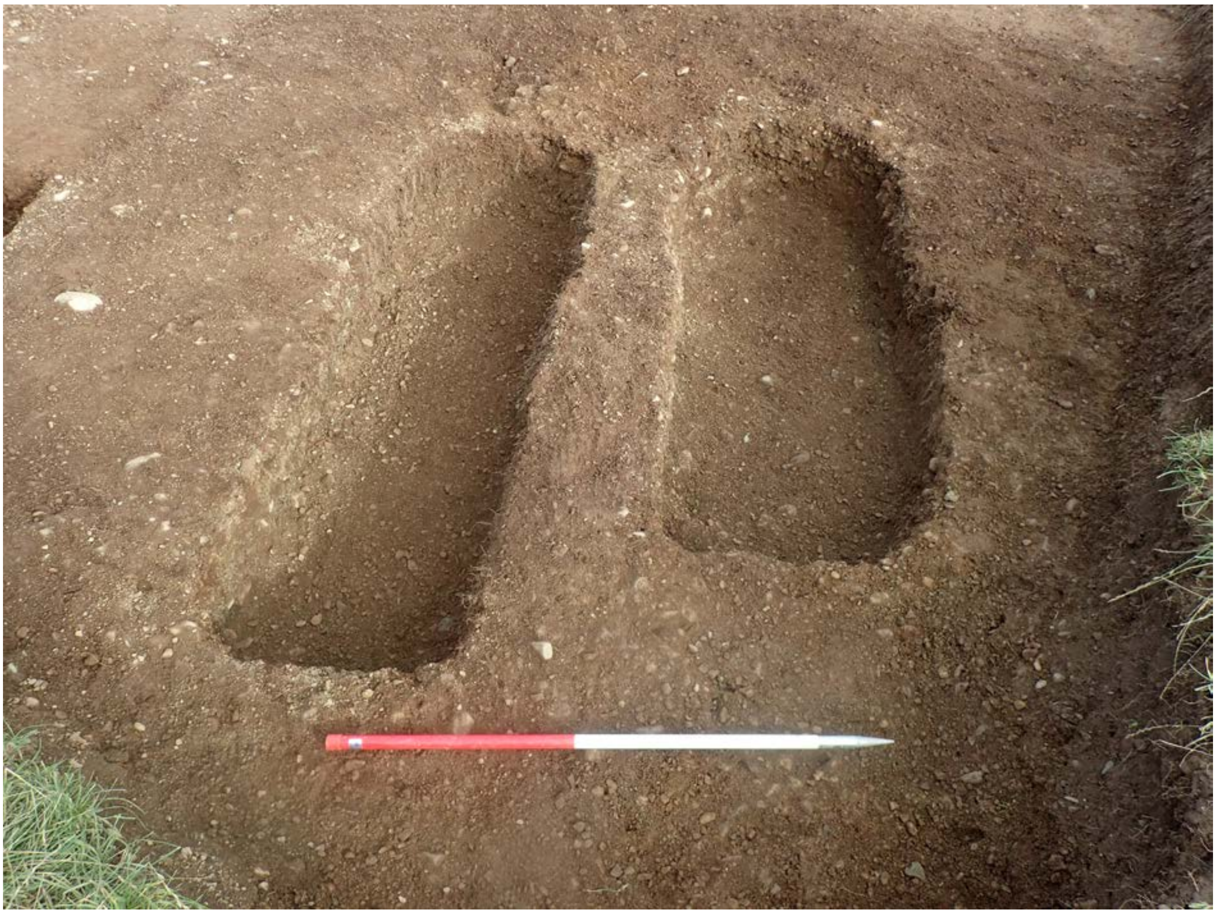


Figure 48: Graves (4010) on right and (4012) on left after excavation.

A tree bole hole (4002) was identified near the eastern limits of Trench 4, located 0.32 m east of the square barrow and present at a depth of 0.21 m from the modern ground surface (Figure 42). It measured 1.84 m long and 0.28 m deep and 0.85 m wide extent was exposed from the limit of excavation (Figure 49). It contained two fills (4003 and 4006). Fill (4003) comprised light-brownish orange sandy silt with frequent inclusions of small-medium sub-rounded and sub-angular stones (Figure 50). Fragments of charcoal, quartz and modern plastic were recovered during the processing of the soil sample (S 34). Fill (4006), redeposited natural subsoil comprised dark-brownish grey silt with abundant small to medium sub-rounded and sub-angular stones. A fragment of quartz was recovered during the processing of the soil sample (S 35). Frequent fine root bioturbation was recorded throughout both fills. No other artefacts were encountered during the excavation of either fill.

All features identified in Trench 4 were discretely cut into natural subsoil with no intercutting of features evident. The natural subsoil (4001/4009) comprised dark-grey small to medium sub-rounded and sub-angular stones with occasional brownish yellow clayey silt lenses and mottling. Present at a depth of 0.29 m from the modern ground surface, frequent fine root bioturbation was evident throughout the subsoil surface. Fragments of charcoal and quartz were recovered during the processing of the soil samples (S 36 and 83). The trench was covered by a 0.29 m deep layer of topsoil (4000) comprised mid-brown silty loam. Twelve metal artefacts (SF 193) of modern date were recovered from metal detecting of the topsoil immediately prior to excavation. Charcoal and cereal/seed were recovered during the processing of the soil sample (S 32).

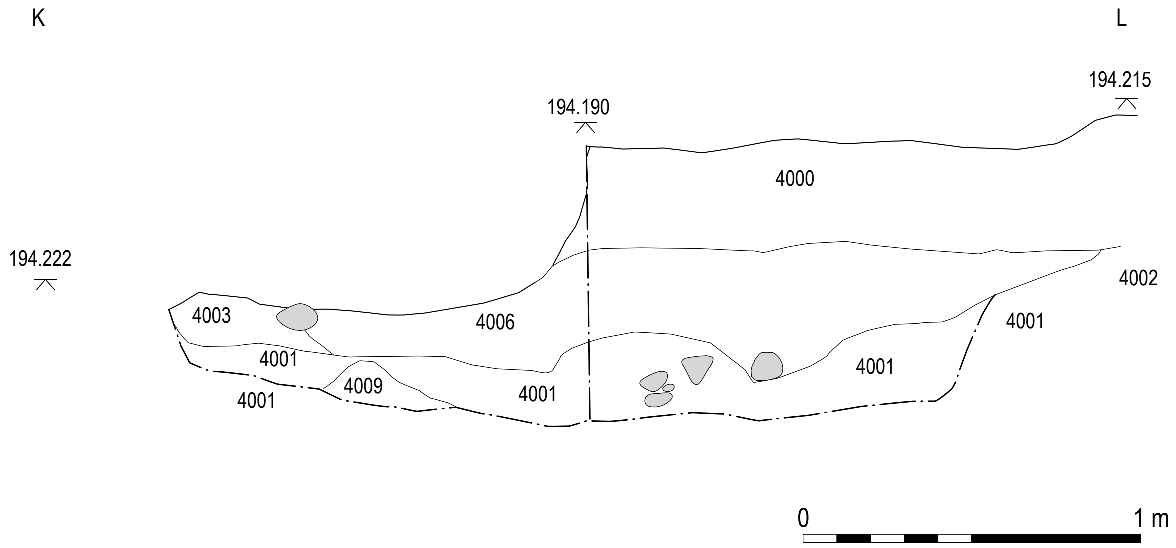


Figure 49: Wrap around section of tree-throw hole (4002), Trench 4.

Figure 50: West facing section of tree-throw hole (4002).

Trench 5

By Amanda Gilmore and Tamsin Scott

Trench 5 measuring 36 m2 was centred at NT 11719 35257 within the western survey area (Figure 41). The underlying natural subsoil (5001) comprised dark-grey small to medium sub-rounded and sub-angular stones with occasional brownish yellow clayey silt lenses and mottling. Present at a depth of 0.29 m from the modern ground surface, frequent fine root bioturbation was evident throughout the subsoil surface. Charcoal was recovered during the processing of the soil sample (S 85).

The earliest observed stratigraphic feature overlying the natural subsoil (5001) in Trench 5 was that of an inhumation deposit (5027). The feature was identified by a capstone (SF 222; Figure 51) in close proximity to barrow ditch (5009) in the north-west of the barrow (Figure 52). Present at a depth of 0.65 m below modern ground level the deposit was left in-situ unexcavated due to time constraints. The deposit (5027) comprised mid-orange-brown silty clay containing occasional small to medium gravel inclusions.

Figure 51: In-situ capstone SF 222 and barrow mound deposit (5028) truncated by (5013). Image taken prior to removal of pottery SF 221 from (5014).

Deposition of the primary burial appeared to have been followed by the cutting of sub-circular barrow ditch (5009/5011/5025), measuring 6.90 m in diameter and enclosing a 3.80 m diameter area. Approximately 80 percent of the barrow ditch was visible in plan within Trench 5 (Figure 52). It extended beyond the limit of excavation to the east, west and south. Two slots were excavated across the ditch.

Ditch (5009) was excavated in the north-west (quadrant 4) of Trench 4 (Figure 52). It was present at a depth of 0.34 m from the modern ground surface (Figure 53). The ditch here measured 1.55 m wide and 0.51 m deep with a gentle break of slope and moderately sloping sides on the external ditch face and a U-shaped base (Figure 54). The internal ditch face was under-excavated to preserve the unexcavated burial (5027) to the immediate south-east of the barrow ditch.

Ditch (5011) was excavated in the south-east (quadrant 1) of Trench 4 (Figure 52). It was present at a depth of 0.26 m from the modern ground surface. The ditch here measured over 1.55 m wide and was 0.81 m deep with a moderate break of slope and moderately steep sides on the internal ditch face, a gentle break of slope and moderately sloping sides on the external face, and a u-shaped base (Figure 54). The external ditch face was excavated abutting the limit of excavation and is estimated to have extended approximately 0.12 m further south-east.

Unexcavated sections of the round barrow ditch were recorded in plan as ditch (5025) and fill (5019); bone (SF 202) and charcoal (SF 206-209) were recovered from the surface of this deposit.

The primary burial (5027) was sealed by re-deposited barrow ditch material (5028) comprising light orange clayey sand with occasional sub-angular and sub-rounded stone inclusions. Located in the north-west of the barrow, this unexcavated deposit was truncated by two inhumation burials (5013 and 5015) while the deposit horizon was diffused with overlying redeposited barrow mound deposit (5020). A lens of re-deposited barrow ditch material (5026) was also identified to the exterior the unexcavated barrow ditch (5025) to the north-east (Figure 52). This comprised light-orange sandy clay with occasional sub-angular and sub-rounded stone inclusions. Probably stratigraphically contemporary with these deposits was primary ditch fill (5026) encountered within the south-east section of the barrow ditch.

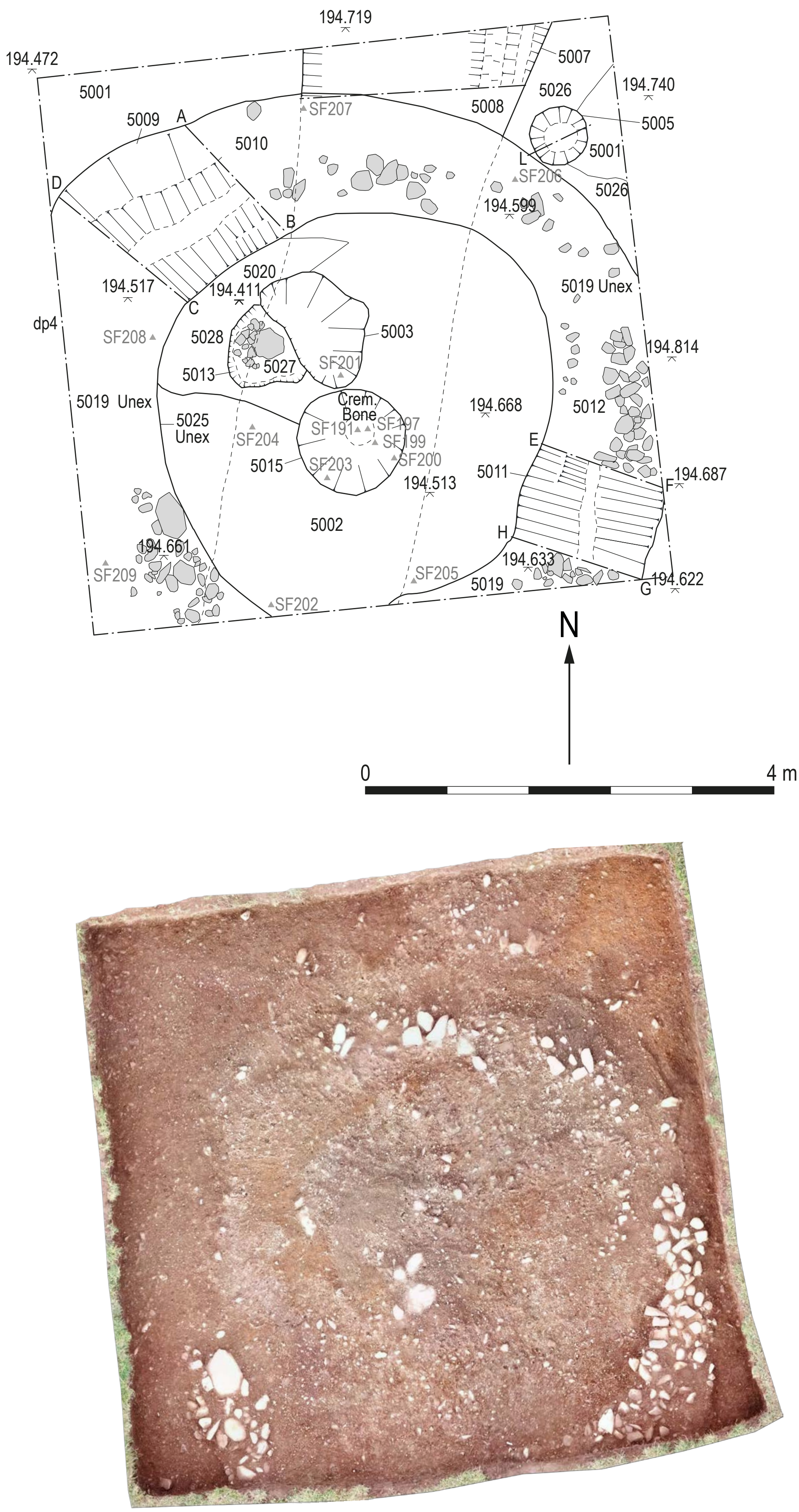


Figure 52: Plan of Trench 5 (drone photo taken pre-excavation).

Figure 53: Barrow ditch (5009), from SSW during excavation.

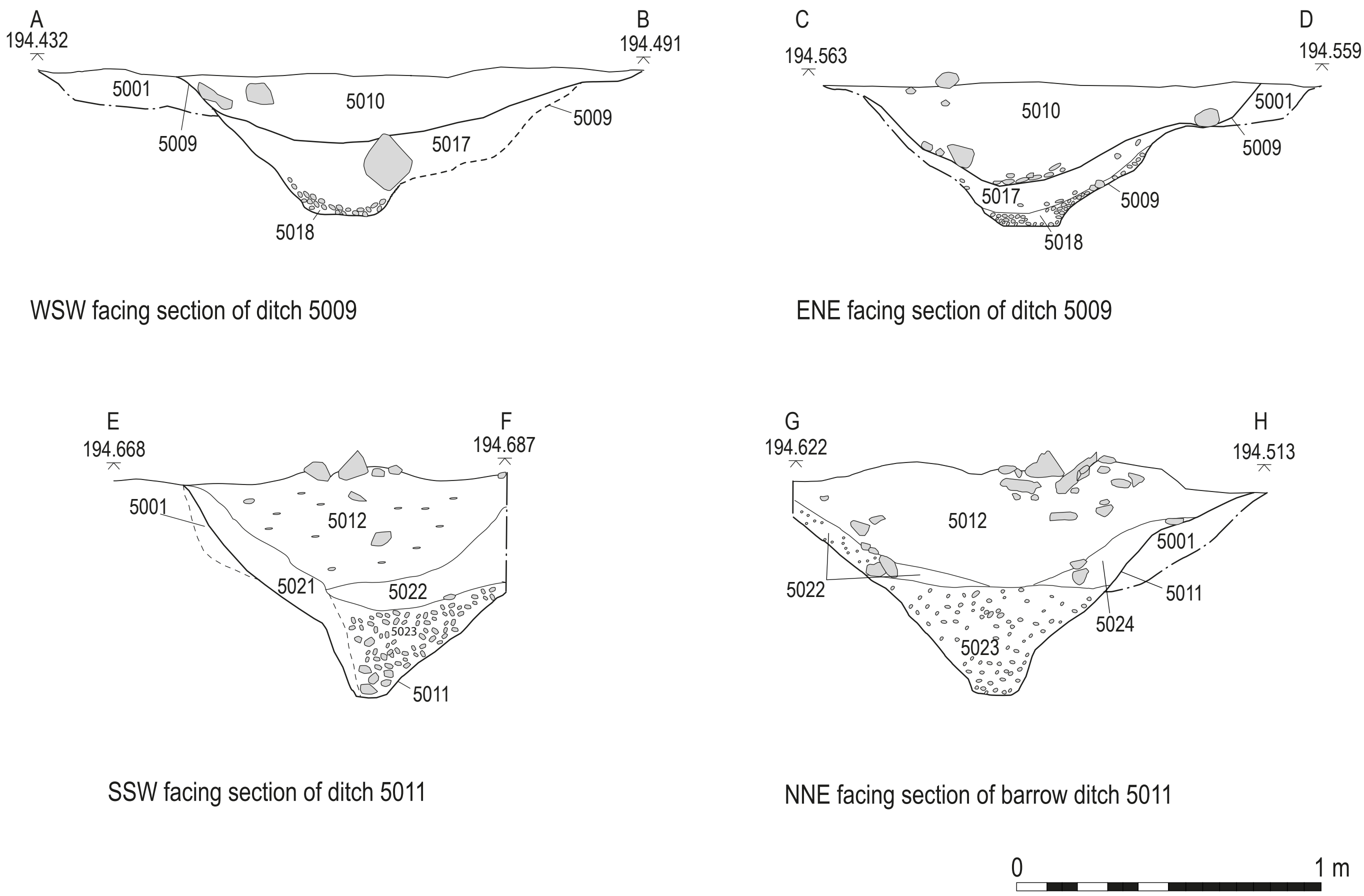


Figure 54: Sections through the Round Barrow ditch, Trench 5.

Inhumation burial (5013) was located in the north-west part of the barrow (Figure 52). Present at a depth of 0.35 m below modern ground level, its surviving extent measured 0.86 m long, 0.68 m wide and 0.3 m deep. It contained a single fill (5014) comprising brownish black silt with frequent small to large sub-angular and sub-rounded stone inclusions and a high concentration of cremated human remains, SF 215, 223 and 224 and at least 25 fragments of prehistoric pottery, SF 221 (Figure 51). Fragments of charcoal, cereal, nutshell, bone, pottery and quartz were recovered during the processing of the soil samples (S 77-79 and 89). The fill deposit (5014) was sealed by one large and five medium capstones (Figure 55).

Inhumation burial (5015) was located in the centre of the barrow mound. Present at a depth of 0.35 m below modern ground level, this was partially excavated to reveal an extent 1.2 m long, 1.1 m wide by 0.3 m deep. It contained a single fill (5016) comprising brownish black silt with frequent small to large sub-angular and sub-rounded stone inclusions and a significant concentration of cremated human remains, SF 216, 218 (Figure 56) and several fragments of prehistoric pottery, SFs 217, 219 and 220. Fragments of charcoal, bone, pottery and quartz were recovered during the processing of the soil samples (S 80-81 and 88). Fill (5016) was sealed by one very large and five medium capstones (Figure 57). Approximately 50 percent of the cremated bones were left in-situ and the very large capstone was re-instated prior to backfill of Trench 5.

Burial fill (5016) and the capstones sealing burial fill (5014) were overlain by barrow mound deposit (5020). This deposit was present at a depth of 0.33m below modern ground level in the north-west of the central barrow location. It was only partially excavated in order to preserve in-situ remains but an extent 0.97 m long by 0.9 m wide was exposed. It comprised light-orange sandy clay with occasional sub-angular and sub-rounded stone inclusions but no artefacts. It was bounded to the north-west by the barrow ditch. The deposit horizon was diffused with the stratigraphically earlier barrow mound deposit (5028) and was truncated by inhumation burial (5003). Probably stratigraphically contemporary with this deposit were secondary ditch fills (5018 and 5023).

Figure 55: Pre-excavation of (5014) from SSE, visible in right of frame.

Figure 56: Excavation of cremated human remains SF 216 & 218 within (5016), from E.

Figure 58: Plan view of Urn SF 211 prior to block-lifting.

Figure 57: Pre-excavation of burial (5016) with capstone (5014) from SW, visible in right of frame.

Figure 59: Urn SF 211.

The final identified inhumation burial (5003) was located in the north of the barrow. Present at a depth of 0.28 m below modern ground level, this burial pit measured 1.98 m long, 1.02 m wide and 0.38 m deep. Inhumation (5003) contained a single fill (5004) that comprised greyish-brown silty soil with frequent small sub-angular and sub-rounded stone inclusions. Fragments of charcoal, cereal, bone, pottery, slag and modern ceramic and glass were recovered during the processing of the soil samples (S 48-49, 54-60, 62-75 and 95). This deposit also contained a large urn with a high concentration of cremated human remains within the urn, SF 211 (Figure 58) and also beneath it, SF 214). The urn was block-lifted for laboratory excavation, which was undertaken after the completion of the excavation (Figure 59). This work revealed it to be a miniature undecorated urn dating to about 1550-1150 BC, containing cremated human bone.

That part of the enclosing barrow ditch on the north-west side (5009) contained three fills (5010, 5017 and 5018) from which no artefacts were recovered (Figure 54). Primary fill (5018) comprised a mid-greyish brown sandy silt matrix 0.10 m deep with frequent very small to small sub-angular and sub-rounded stone inclusions, and occasional fine root bioturbation. Charcoal, was recovered during the processing of the soil sample (S087). The secondary fill (5017) comprised mid-brownish orange sandy silt 0.26 m deep with frequent very small and occasional medium sub-angular and sub-rounded stone inclusions, and occasional fine root bioturbation. Fragments of charcoal and quartz were recovered during the processing of the soil samples (S086). The tertiary and final fill (5010) comprised a mid-orange brown silty clay matrix 0.35 m deep containing frequent inclusions of small to medium sub-rounded and sub-angular stones, a charcoal deposit SF 213 and frequent fine root bioturbation. Fragments of charcoal, slag and quartz were recovered during the processing of the soil samples (S 52 and 61).

That part of the enclosing barrow ditch on the south-eastern side (5011) contained four fills (5012, 5021, 5022/5024 and 5023) from which no artefacts were identified during the excavation (Figure 54). Primary fill (5021) comprising mid-brownish orange sandy clay with frequent very small to medium sub-angular and sub-rounded stone inclusions and occasional fine root bioturbation. It sloped from the interior ditch face surface towards the base of the ditch and was only recorded in the SSW facing ditch section E-F (Figure 52). It extended 0.21 m in width, with a maximum thickness of 0.17m. The secondary fill (5023) comprised a 0.39 m deep mid-greyish brown silty sand matrix containing abundant very small to medium sub-angular and sub-rounded stones and occasional fine root bioturbation, filling the base of ditch (5011). Tertiary fill (5022) comprised 0.35 m deep mid-greyish brown silty sand with abundant small and occasional medium sub-angular and sub-rounded stone inclusions and occasional fine root bioturbation. Fragments of quartz were recovered during the processing of the soil sample (S 92). It sloped from the exterior ditch face surface at the limit of excavation. Tertiary fill (5024) comprised 0.26 m deep mid-brownish orange silty clay with sand and occasional small to medium sub-angular and sub-rounded stone inclusions and occasional fine root bioturbation. Fragments of charcoal and nutshell were recovered during the processing of the soil sample (S 94). It sloped from the interior ditch face and was only recorded in the NNE facing ditch section G-H (Figure 54). The final fill (5012) comprised 0.46 m deep mid-orange brown silty clay matrix with occasional sand inclusions, frequent fine root bioturbation and containing frequent medium to large sub-angular and sub-rounded stones and with an abundance of medium to large sub-angular stones on its top surface (Figure 52). Charcoal, nutshell, bone, worked stone and quartz were recovered during the processing of the soil samples (S 53, 62 and 82).

A small sub-circular feature (5005) was located 0.09m from the north-east edge of the unexcavated barrow ditch (5025), truncating lens deposit (5026). This small pit (5005), measuring 0.74 m long, 0.65 m wide and 0.18 m deep, was sub-circular in plan with a sharp break of slope, steep sides and a flat base (Figures 60 and 61). It contained a single fill (5006), comprising mid-orange brown silty clay with moderate small to large sub-angular stone inclusions. Two cremated fragments of bone, SF 210 and SF 212 were recovered from this fill (5006). Charcoal, bone, quartz and flint fragments were also recovered during the processing of the soil sample (S 50).

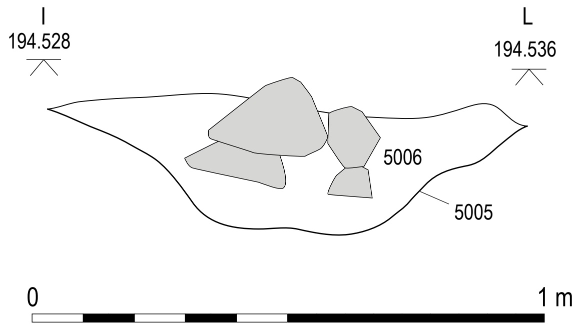


Figure 60: NW facing section of pit (5005), Trench 5.

Figure 61: NW facing section of small pit (5005).

A 2.83 m wide and 0.29 m deep plough furrow (5007) truncated the barrow mound on a north/south alignment. It was 'W' shaped in section with moderately sloping sides and a concave base (Figure 62). The plough furrow contained a mid-orange brown clay silt loam fill (5008) with frequent inclusions of small to medium stones. Fragments of charcoal, nutshell and modern ceramic were recovered during the processing of the soil sample (S 51). Initial hand-cleaning of Trench 5 also recovered a large fragment of pottery SFs 195 and 14, cremated bones SFs 196-201 and SFs 203-205 from that part of the basal mound deposit (5002) disturbed by the plough furrow, comprising mid-brown clayey silt 0.02 m deep. While these artefacts SFs 195-209 were recovered from all four quadrants of the trench,

Figure 62: South facing section of plough furrow through Thirlestane Round Barrow.

the majority of these surface finds were located in the centre and south of Trench 5 (Figure 52). Further fragments of charcoal, bone and pottery were recovered during the processing of the soil samples (S 44-47).

Trench 5 was covered by a 0.29 m deep layer of topsoil (5000) comprising mid-brown silty loam. Six mixed metal finds, SF 194, of modern date were recovered by metal detecting this topsoil. Metal detecting of all features within Trench 5 identified no further metal finds. Fragments of charcoal, seed, nutshell, bone, wood and glass were recovered during the processing of the soil sample (S 84).

Merlin's Grave

by Joseph Lewis Anderson and India Terry

The site of Merlin's Grave is recorded in Canmore a short distance NNW of Drumelzier Kirk, near the north-west corner of a flat field on the eastern bank of the Tweed and the northern bank of the Powsail Burn (NT 1341 3453; Figure 63). The site is bordered by a hedgerow and wire fence to the immediate south-west. The underlying drift geology consists of Kirkcolm Formation - Wacke. The superficial deposits comprise of alluvial silts, sand and gravel (British Geological Survey 2023).

Figure 63: The site of Merlin's Grave, as depicted on the Ordnance Survey six inch to the mile map of Peebles-shire, Sheet XVI, 1859. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

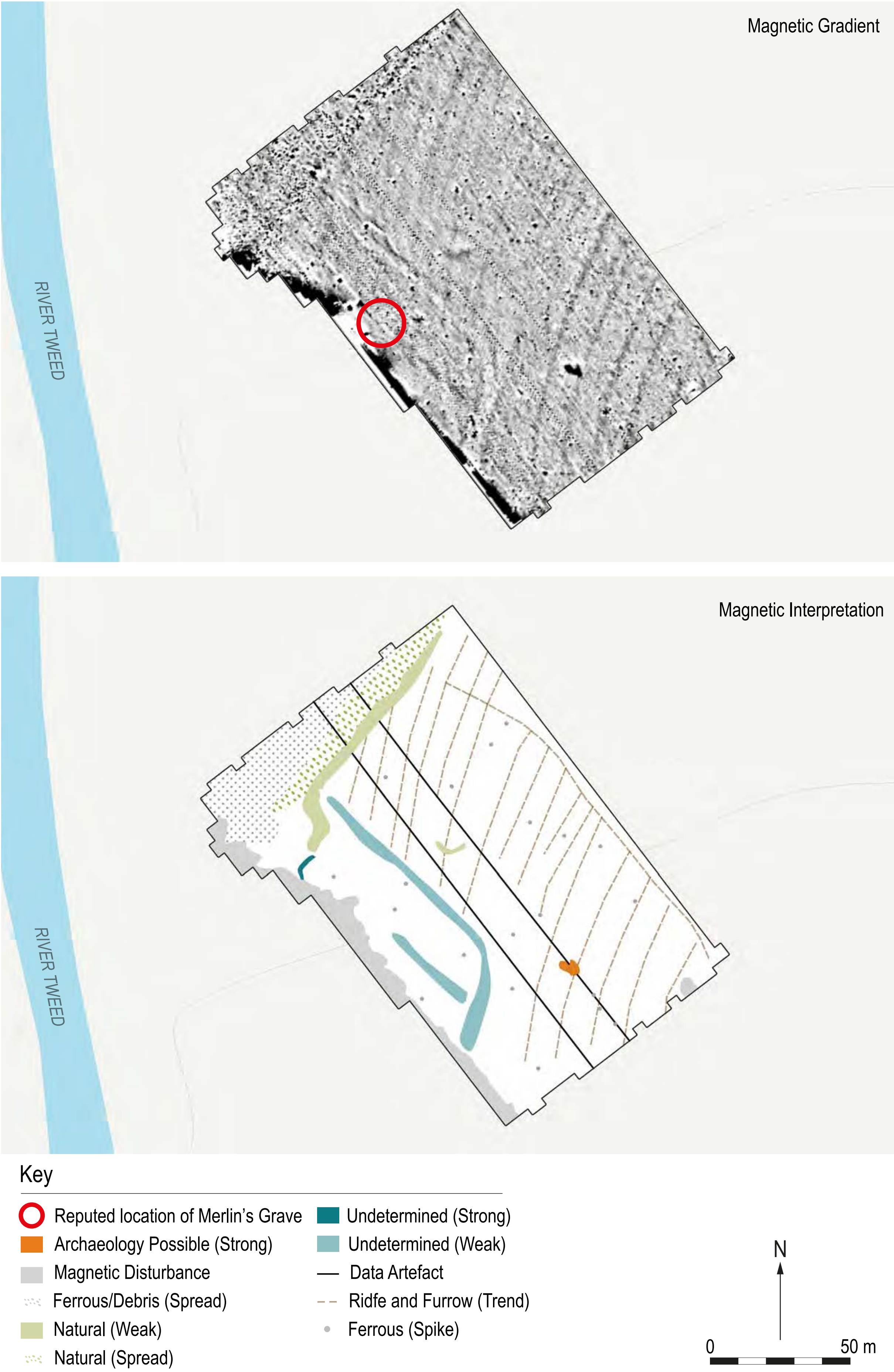


Figure 64: Merlin's Grave Geophysics Survey Results, Magnitude Surveys Ltd 2023, contains Ordnance Survey data, © Crown Copyright and database right 2023.

Geophysics Survey

By Joseph Lewis Anderson and India Terry

A fluxgate gradiometer survey was completed and identified anomalies of an archaeological, agricultural, natural and undetermined origin across the 2.13 ha survey area (Figure 64).

Archaeological activity was identified in the form of one discrete anomaly identified as the most likely candidate for a possible cist grave (Figure 64). This was located at NT 13480 34516, to the south-east of the putative location previously marked on maps. Rig and furrow were also identified. Some other anomalies were also noted but it was not possible to establish whether these were archaeological, agricultural or natural in origin. Modern interference was limited to field boundaries.

Dating Evidence

Radiocarbon Dating

By Ronan Toolis

Eleven samples comprising single entities of charcoal, bone and oyster shell were submitted to SUERC for radiocarbon dating. While ten radiocarbon dates were produced (Table 1), unfortunately the radiocarbon dating of one of the submitted samples, comprising a cattle bone from occupation deposit 2004, was unsuccessful.

The three radiocarbon dates extracted from cremated human bone recovered from the Thirlestane Round Barrow indicate that these burials took place sometime between the fourteenth and twelfth centuries BC.

The seven radiocarbon dates extracted from charcoal, faunal bone and an oyster shell recovered from Tinnis Castle and Fort indicate occupation sometime between the third and seventeenth centuries AD.

Lab code	Context	Feature	Species	Years BP	d^{13}C (‰)	Calibrated 1 sigma 68.3%	Calibrated 2 sigma 95.4%
SUERC-111455 (GU64695)	5016	Thirlestane Round Barrow Cremation Burial	Midshaft Fragment (Human Bone)	3014 ± 21	-25.9‰	1287-1218 cal BC	1382-1133 cal BC
SUERC-111454 (GU64694)	5014	Thirlestane Round Barrow Cremation Burial	Midshaft Fragment (Human Bone)	3039 ± 21	-20.0‰	1380-1260 cal BC	1391-1221 cal BC
SUERC-111450 (GU64693)	5004	Thirlestane Round Barrow Cremation Burial	Tibial Shaft Fragment (Human Bone)	3046 ± 24	-25.9‰	1383-1263 cal BC	1396-1223 cal BC
SUERC-111449 (GU64692)	2010B	Tinnis Fort Vitrified Rampart Core	Cattle fibia (Faunal Bone)	1729 ± 24	-25.0‰	cal AD 255-379	cal AD 250-405
SUERC-111440 (GU64686)	2015	Tinnis Castle Occupation Layer	Betula/Birch (Charcoal)	1500 ± 24	-26.3‰	cal AD 559-600	cal AD 542-638
SUERC-111448 (GU64691)	1004B	Tinnis Fort Rampart Core	Betula/Birch (Charcoal)	1419 ± 24	-27.1‰	cal AD 606-652	cal AD 600-657
SUERC-111447 (GU64690)	3007	Tinnis Fort Occupation Layer	Betula/Birch (Charcoal)	1110 ± 24	-26.1‰	cal AD 895-987	cal AD 890-993
SUERC-111446 (GU64689)	3006	Tinnis Fort Occupation Layer	Corylus/Hazel (Charcoal)	1080 ± 19	-27.8‰	cal AD 899-1014	cal AD 895-1020
SUERC-111445 (GU64688)	3003	Tinnis Castle Occupation Layer	Oyster (Marine Shell)	809 ± 24	-2.7‰	cal AD 1466-1621	cal AD 1404-1695
SUERC-111439 (GU64685)	1007	Tinnis Castle Occupation Layer	Sheep/Goat Mandible (Faunal Bone)	373 ± 25	-22.2‰	cal AD 1460-1617	cal AD 1452 -1631

Table 1: Calibrated radiocarbon dates from Thirlestane Round Barrow and Tinnis Castle and Fort.

Optically Stimulated Luminescence Dating

By Tim Kinnaird[1]

As no suitable material was recovered from the excavation of the Thirlestane Square Barrow for radiocarbon dating, Optically Stimulated Luminescence (OSL) dating was trialled. A single kubiena sample (Sample 76) was recovered from (4004) at the west facing section of the ditch that surrounded the Thirlestane Square Barrow (Figure 65). The fill of the ditch (4004) comprised mid-orange to brown clayey silts, with frequent inclusions of small to medium sub-rounded and sub-angular stones (4005). The ditch was cut into the natural subsoil (4001), which comprised clayey silt lenses interbedded with gravels. The monolith tin was taken across the 4005/4001 boundary, with the boundary at a depth of 0.29 m in section.

The sample was submitted to the School of Earth and Environmental Sciences (SEES) at the University of St Andrews for analysis on the 27th of February 2023. The kubiena tin was opened under subdued light conditions in the luminescence laboratories at SEES, and the outward facing edge, potentially exposed to some light during sample collection, carefully removed and retained for further analysis. The sediment in the monolith was then sub-sampled in 2 cm intervals: 0-2 cm, 2-4 cm, 4-6 cm and 7-8 cm, which were assigned the laboratory codes: 1259/1, 1259/2, 1259/3 and 1259/4. The boundary between contexts 4005 and 4001 was recorded at 0.29 m depth in section; therefore, the depths allocated to the sub-samples were 0.25, 0.27, 0.29 and 0.31 m, respectively.

The luminescence behaviour of the bulk sediment was appraised using a portable OSL reader (Munyikwa *et al*. 2020). The sediment was presented for measurement without any physical or chemical treatments. The readout sequence consisted of an interleaved sequence of system dark count (background, 15s), infra-red stimulated luminescence (IRSL, 60s) and OSL (60s). This data was used to calculate IRSL and OSL net signal intensities, IRSL and OSL depletion indices and IRSL: OSL ratios for the four sub-samples, 1259/1, 1259/2, 1259/3 and 1259/4.

IRSL and OSL net signal intensities increase with depth through the 8 cm interval, consistent with a normal age-depth progression (Table 2). The monolith tin was positioned across ditch (4004), which cuts down at a steep vertical angle, and encloses both its fill (4005) and the subsoil (4001). The vertical cut was not observed in the monolith tin (as viewed under red light): however, one assumes more (4005) and less (4001) in the top two-sub-samples, and vice versa in the bottom two sub-samples. This is replicated in the preliminary screening dataset: the fill (4005) returns the lowest OSL intensities < 1.4 x104 counts, the subsoil (4001) the highest intensities >2.0 x104 counts. Sample 1259/2 was progressed to full quartz quantitative OSL dating.

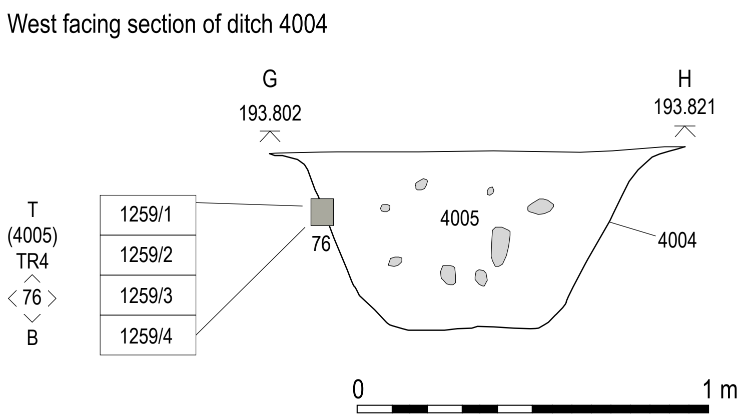


Figure 65: Section drawing of ditch (4004), cross-section G-H. The position of the kubiena tin is shown as a grey box.

1 School of Earth and Environmental Sciences, University of St Andrews

Lab code / CERSA#	Distance from top of monolith /cm	Distance from datum at 0.29 m /m	IRSL net signal intensities / counts	IRSL depletion	OSL net signal intensities / counts	OSL depletion	IRSL: OSL
1259/1	1	0.25	1280 ± 50	1.51 ± 0.10	14080 ± 130	1.81 ± 0.03	0.091 ± 0.004
1259/2	3	0.27	1940 ± 60	1.36 ± 0.07	17320 ± 140	1.62 ± 0.03	0.112 ± 0.003
1259/3	5	0.29	1760 ± 60	1.30 ± 0.07	17260 ± 140	1.62 ± 0.03	0.102 ± 0.003
1259/4	7	0.31	2130 ± 60	1.36 ± 0.06	19740 ± 150	1.59 ± 0.02	0.108 ± 0.003

Table 2: Results from preliminary screening using a portable OSL reader.

Quartz SAR OSL dating

A luminescence age is the quotient of the palaeodose (in Gy) over the effective environmental dose rate (in mGy a-1). Here, equivalent dose (De) determinations were made on sets of 72 aliquots using the single aliquot regenerative dose (SAR) OSL protocol (Murray and Wintle 2000); and dose rates assessed using a combination of low-level environmental radioactivity measurements in the laboratory, and determinations of radionuclide concentrations by mass spectrometry. Further details as follows:

Radionuclide concentrations and Environmental dose rates. Radionuclide concentrations of 232Th, 238U and 40K were determined from inductively coupled plasma mass spectrometry (ICP-MS; U, Th) and inductively coupled plasma optical emission spectrometry (ICP-OES; K; Table 3), performed by X-Ray Mineral Services, Welshpool. Infinite matrix dose rates were calculated from these using the conversion factors of Guérin *et al*. (2011) and adjusted for attenuation by grain size and chemical etching using the datasets of Guérin *et al.* (2012) and Bell (1979) respectively (Table 4). Activity concentrations of 232Th, 238U and 40K, and estimates of beta and gamma dose rate were also obtained from environmental radioactivity measurements using a MiDose Solutions µDose unit (S/N 016: Tudyka *et al*. 2018; Kolb *et al.* 2021) (Table 4). These were combined using weighted statistics with the infinite matrix dose rates obtained from ICP-MS and ICP-OES.

Lab code/ CERSA#	K / %	U / ppm	Th / ppm
1259/1	1.54 ± 0.08	2.16 ± 0.11	8.02 ± 0.40
1259/4	2.06 ± 0.10	2.22 ± 0.11	8.95 ± 0.45

Table 3: ICP-MS and ICP-OES determinations of K (%), U and Th (ppm) concentrations.

Water contents were determined for all samples in the laboratory - as weight received relative to the dried weight, and working values of between ~10-16% adopted to determine effective environmental dose rates. Following Prescott and Hutton (1994), the contribution from the cosmic dose ($\dot{D}_{cosmic}$) was determined from the section's longitude, latitude and altitude, and the depth of overburden.

The dose rates measurements were used in combination with the assumed burial water contents to determine the total effective dose rates for age estimation (Table 5). The total effective dose rate to the HF etched quartz fraction at the position of the dating sample is 2.66 ±0.10 mGy a-1, interpolated from the enclosing samples positioned 2 and 6 cm distant (1259/1 and 1259/4, respectively).

Lab code/ CERSA#	ICP-MS and ICP-OES			Low-level radioactivity measurements		
	Alpha, dry / mGy a-1	Beta, dry / mGy a-1	Gamma, dry / mGy a-1	Alpha, dry / mGy a-1	Beta, dry / mGy a-1	Gamma, dry / mGy a-1
1259/1	11.96 ± 0.42	1.59 ± 0.06	1.01 ± 0.03	12.43 ± 0.41	1.78 ± 0.07	1.11 ± 0.04
1259/4	12.81 ± 0.45	2.00 ± 0.08	1.19 ± 0.04	1.67 ± 0.16	1.94 ± 0.08	1.26 ± 0.05

Table 4: Infinite matrix dose rates determined from (left) ICP-MS and ICP-OES and (right) low-level radioactivity measurements in the µDose instrument.

Lab code / CERSA#	Water content /%	Cosmic dose	Effective dose rates, wet / mGy a-1		
			Beta a	Gamma	Total d
1259/1	16 ± 5	0.21 ± 0.02	1.41 ± 0.06	0.96 ± 0.02	2.58 ± 0.07
1259/4	10 ± 3	0.21 ± 0.02	1.77 ± 0.07	1.04 ± 0.02	3.03 ± 0.07

Table 5: Effective beta and gamma dose rates following water correction. aEffective beta dose rate combining water content corrections with inverse grain size attenuation factors obtained Mejdahl (1979) for K, U, and Th; bincludes a cosmic dose contribution.

Equivalent dose determinations. Mineral separation procedures similar to those used by Kinnaird *et al*. (2017a, b) were used to extract HF-etched 'quartz' from all samples. Samples were wet-sieved to obtain the 90 to 250 µm fractions. These fractions were then treated in 1M HCl for 10mins, 40% HF for 40mins, and a further 1M HCl for 10mins. The 90 to 250 µm, HF-etched fractions were density separated in LST fastfloat solutions of 2.64 and 2.74 gcm-3. The 90-250 µm, HF-etched, 2.64-2.74 gcm-3 fractions were re-sieved at 150 µm, and the 150-250 µm fractions dispensed to 10mm stainless steel discs for measurement.

Equivalent dose (De) determinations were made initially, on sets of 24 aliquots using a single aliquot regenerative dose (SAR) OSL protocol (cf. Murray and Wintle 2000; Kinnaird *et al*. 2017a), subsequently extended by 2 further sets of 24 aliquots each to build statistical power and to identify dose populations. OSL measurements were carried out using a Risø TL/OSL DA-20 automated dating system.

Data reduction and De determinations were made in Luminescence Analyst v.4.31.9 and the package Luminescence in R. Individual decay curves were scrutinised for shape and consistency. Dose response curves were fitted with an exponential function, with the growth curve fitted through zero and the repeat recycling points. Error analysis was determined by Monte Carlo Stimulation. Aliquots satisfying the following criteria were accepted for assimilation of Des: 1) recuperation of less than 5 %; 2) recycling ratio within 10 % of unity, including uncertainties (Murray and Wintle 2003); 3) OSL IR depletion ratio within 10 % of unity (Duller 2003) and 4) test dose signals 3σ greater than background levels. Luminescence behaviour was only moderate, and c. 55-60 % of aliquots were rejected on the basis of this criteria.

Equivalent dose distribution analysis. Figure 66 show the equivalent dose distribution for 1259/2 relative to its position in the stratigraphy. This sample was progressed to full OSL SAR dating as it should enclose, predominantly (4005), and, is less likely to have received daylight exposure than 1259/1 at sampling. The distribution is relatively broad, ranging from ~3-9 Gy, with an over-dispersion of ~30%. The weighted mean estimate of the distribution was used for age assimilation, 4.22 ± 0.37 Gy.

Age assimilation. Table 6 lists the burial dose, environmental dose rate and corresponding depositional age for CERSA1259/2: AD 430 ± 150.

CERSA #	Field ID	Burial dose / Gy	Total effective dose rate / mGy a-1	Age / ka	Calendar years
1259/2	0.27 cm depth; above cut 4004	4.22 ± 0.37	2.66 ± 0.1	1.59 ± 0.15	AD 430 ± 150

Table 6: Burial dose, environmental dose rate and corresponding depositional age for CERSA1259/2.

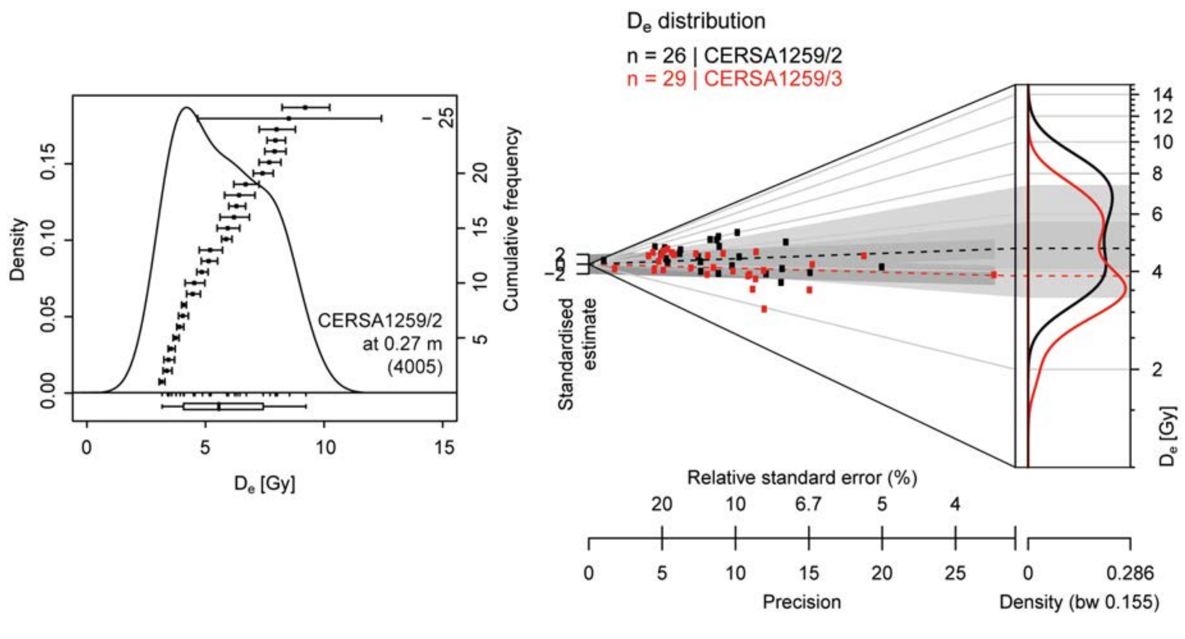


Figure 66: Equivalent dose distribution obtained for 1259/2 – predominantly (4005) of the ditch, as a (left) Kernel Density Estimate (KDE) plot and (right) Abanico Plot.

Discussion

By Ronan Toolis

Thirlestane Round Barrow

The dates from the barrow suggest a relatively short span of burials within this barrow sometime between the fourteenth and twelfth centuries BC, during the middle Bronze Age (Figure 67). It is important to recognise that the primary grave (Figure 68) encountered within the round barrow, which was left unexcavated, is not included in this suite of dates. Nonetheless the dating evidence demonstrates a marked temporal distinction between the chronology of the round barrow and that of the square barrow.

Tinnis Fort

The dating evidence indicates at least two phases of occupation of the fort (Figure 69). The earliest phase, during the late Iron Age, ended with the burning of the timber-laced stone rampart, causing the rubble core of the rampart on the south-east side of the summit to vitrify. This took place sometime between AD 250 and AD 405, which is close to the OSL date from the Thirlestane Square Barrow ditch (AD 280 – AD 580; Figure 67). The OSL date also overlaps with the two mid-late sixth to mid-seventh century AD radiocarbon dates from Tinnis Fort.

The two sixth/seventh century AD dates indicate a second phase of occupation of Tinnis Fort. One of these dates was extracted from birch charcoal recovered from the base of the stone rampart on the eastern side of the summit, suggesting the rebuilding or re-use of the summit rampart. The other date was extracted from birch charcoal recovered from an occupation layer near the south-eastern edge of the summit, which may be residual.

Two further radiocarbon dates, yielded by hazel and birch charcoal recovered from occupation deposits from within the lower enclosure indicate either another phase or the continuation of early medieval occupation into sometime between the late ninth and early eleventh centuries AD. Given that the constricted width of Trench 3 prevented the excavation reaching the primary occupation deposits within the lower enclosure, it is entirely plausible that the lower enclosure originated much earlier during the early medieval period than these two latter dates suggest.

The final two radiocarbon dates, extracted from a sheep/goat bone and an oyster shell recovered from occupation deposits in the summit and lower enclosure, confirm occupation of Tinnis Castle sometime between the early fifteenth and late seventeenth centuries AD.

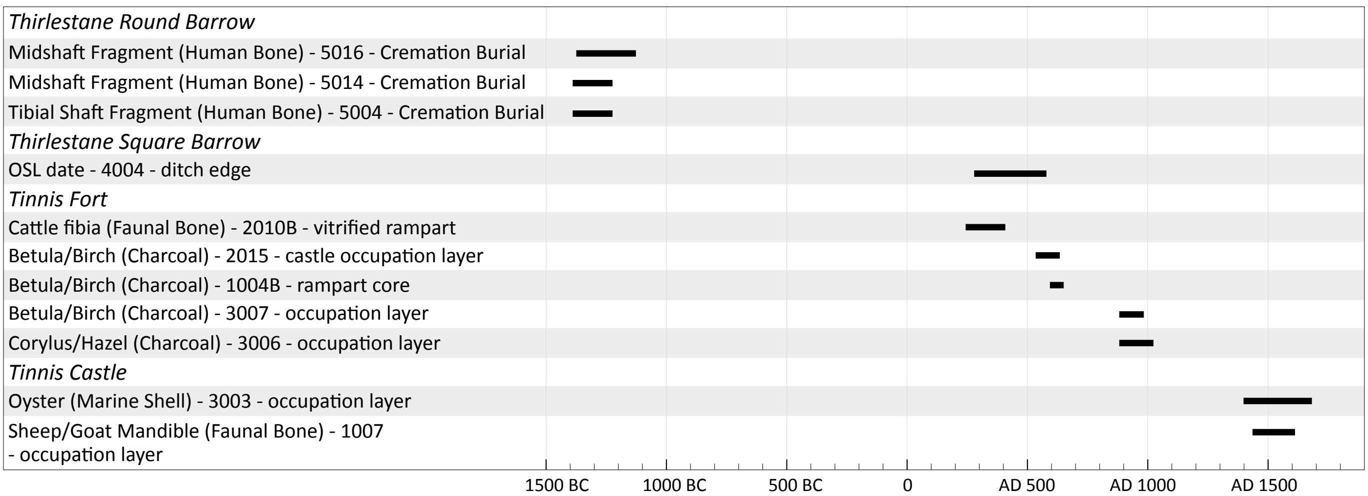


Figure 67: Chronological dates from Thirlestane Round and Square Barrows and Tinnis Castle and Fort.

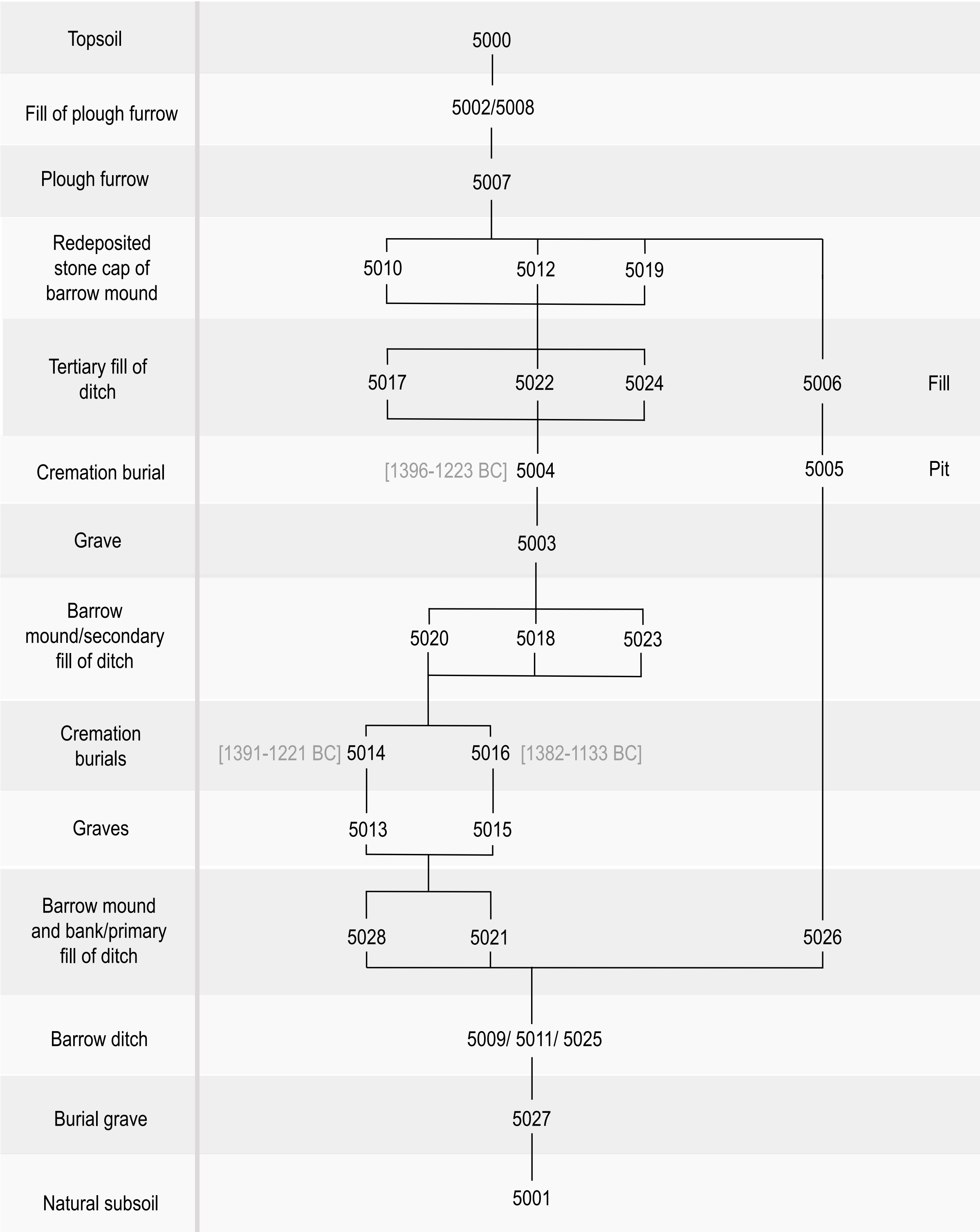


Figure 68: Harris matrix incorporating calibrated (2-sigma) radiocarbon dates for Thirlestane Round Barrow.

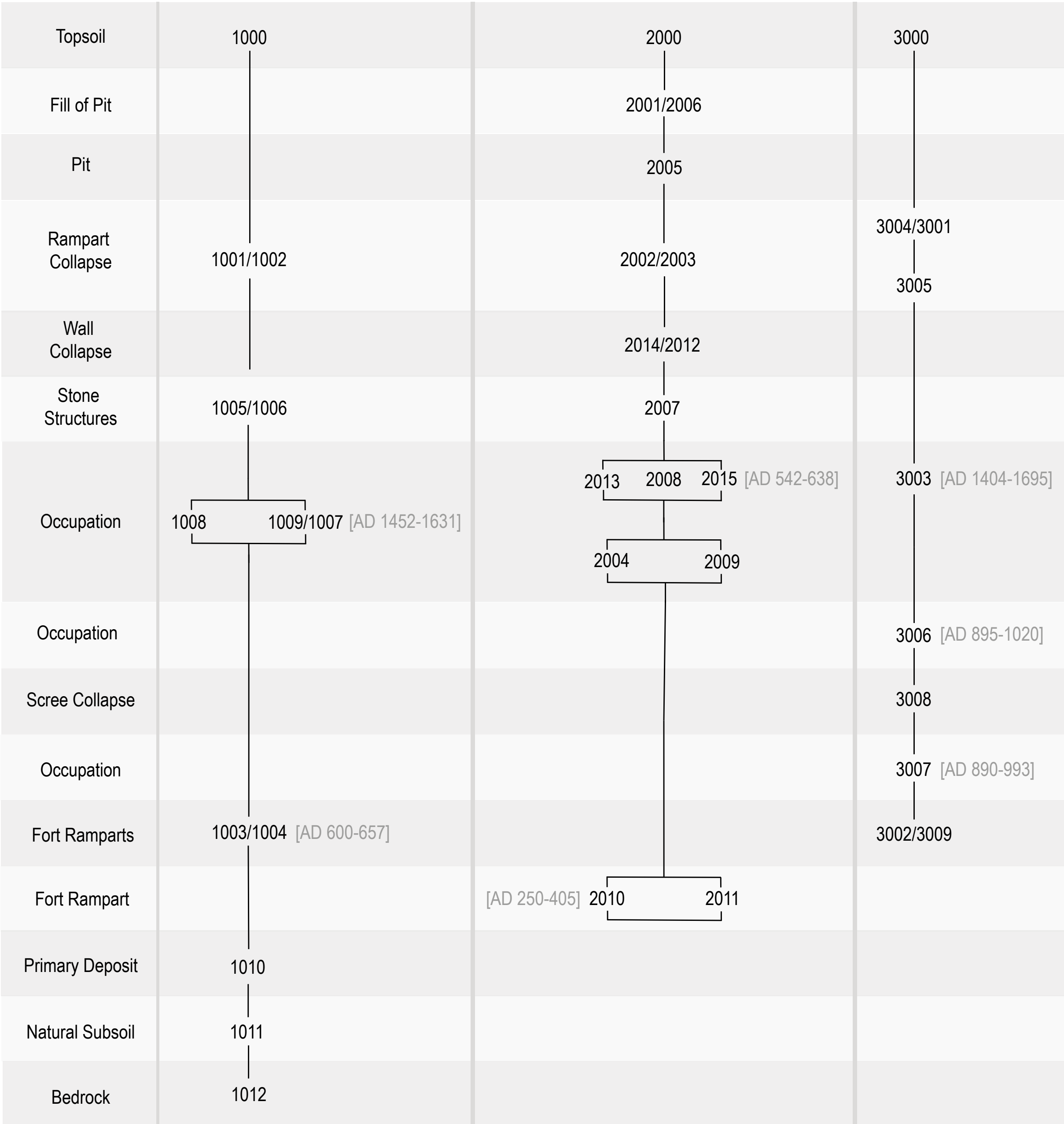


Figure 69: Harris matrix incorporating calibrated (2-sigma) radiocarbon dates for Tinnis Castle and Fort.

Lithics

By Torben Bjarke Ballin[2]

Two numerically small lithic assemblages were recovered from the excavations, 39 pieces from Tinnis Castle and five from Thirlestane Barrows. Apart from one chip and one microlith fragment of flint, all pieces were of quartz.

The purpose of this analysis was to characterize these lithics, with special reference to raw-materials and typo-technological attributes. From this characterization, it was sought to date and discuss the finds to the degree that was possible. The evaluation of the lithic material was based upon a detailed catalogue (Appendix 1) of the lithic finds from the two sites, and in the present report the artefacts are referred to by their number (CAT no.) in this catalogue.

Characterisation

A total of 44 lithic artefacts were recovered from the excavations at Tinnis Castle and Thirlestane Barrows. These are listed in Table 7. In total, 40 pieces were debitage, whereas two pieces were cores and two were tools.

Type	Tinnis Castle	Thirlestane Barrows	Total
Chips	24	4	28
Flakes	7	1	8
Indeterminate pieces	4		4
Single-platform cores	1		1
Bipolar cores	1		1
Frags of microlith/ backed bladelet	1		1
Pieces with edge-retouch	1		1
Total	39	5	44

Table 7: Lithic artefacts list.

Apart from one flint chip (CAT 2) from the fill (5006) of a pit (5005) outwith the Round Barrow, only the microlith fragment (CAT 1) from the primary deposit (1010) at Tinnis Fort was of flint whereas the remainder of the lithics assemblage comprised of white milky quartz. The flint must have been brought from coastal areas, where it may have been washed out of the till bordering the North Sea shores, whereas the quartz could have been collected anywhere in the local area, for example in the form of erratics or pebbles from water-courses.

Only one quartz flake was technologically definable, as a bipolar flake (CAT 4), recovered from a medieval occupation deposit (3003). All the flakes were fragmented, but with all intact and fragmented pieces being no larger than c. 15 mm, the flakes – and thereby probably also their parent cores – were probably fairly small. All are unburnt.

One single-platform core (CAT 32), recovered from the fort rampart (1004), had split from platform to apex, but prior to fragmentation it was clearly roughly conical and had a plain, untrimmed platform. It measured 15 by 17 by 15 mm, and its minuscule size suggests a date in the late Mesolithic or early Neolithic. Conical microblade cores used to be perceived as late Mesolithic, but the radiocarbon-dating of pits with pitchstone artefacts (many of which are microblades) suggests that neat microblades were produced well into the early Neolithic (Ballin 2015; 2017; Ballin *et al*. 2018). A small bipolar core (CAT 33) was also retrieved from the same rampart core (1004). It was a bifacial core with one reduction axis and it measured 13 by 6 by 5 mm.

The author generally defines microliths in the following manner (e.g. Ballin 2021):

> *Microliths are small lithic implements manufactured to form part of composite tools, either as tips or as edges/barbs, and which conform to a restricted number of well-known forms, which have had their (usually) proximal ends removed (Clark 1934, 55). This definition secures the microlith as a diagnostic (pre-Neolithic) type. Below, microliths* sensu stricto *(i.e., pieces which have had their usually proximal ends removed) and backed bladelets (with surviving proximal ends) are treated as a group, as these types are thought to have had the same general function, but backed bladelets are fairly undiagnostic and may be recovered from Mesolithic as well as early Neolithic contexts.*

2 Lithic research

Due to the absence of a proximal end, the microlith fragment (CAT 1) was classified as the fragment of either a microlith or a backed bladelet (Figure 70), and if the latter it could be from the entire late Mesolithic/early Neolithic period, i.e. 8400-3500 BC. It had a width of 2.8 mm and had fine retouch along its right lateral side. CAT 41 was defined as a piece with edge-retouch and it had fine convex retouch across the proximal end. It measured 15 by 9 by 6 mm and may be a minuscule scraper.

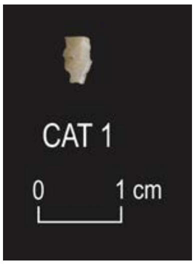


Figure 70: Fragment of flint microlith/backed bladelet CAT 1.

Discussion

As shown in Tables 8 and 9 below, all but one of the 44 pieces were recovered from contexts defining them as redeposited pieces.

Only one small quartz chip (CAT 3), was recovered from subsoil beneath the Thirlestane Square Barrow, and this piece may indicate the location of a small pre-barrow knapping floor, although it could also have formed part of the barrow's lowest turves brought in from the area around the burial monument. All finds from the Round Barrow are redeposited pieces (chips CATs 2, 42, 44 and flake CAT 43). Although two of these pieces are from cremations 5003 and 5015, neither is burnt, and it is therefore most likely that they have nothing to do with the burials but simply ended up in the features with the back-fill.

Context	Chips	Flakes	Indet. pieces	1-platf. cores	Bipolar cores	Micro-liths	Retouch	Total
Tr 1: Occupation (1007)	1		1					2
Tr 1: Rampart (1004)	3			1	1			5
Tr 1: Levelling layer (1010)	1					1		2
Tr. 2: Rampart collapse (2003)		1						1
Tr. 2: Wall collapse (2012)	4		2					6
Tr. 2: Late occupation (2015)	4							4
Tr. 2: Early occupation (2004)		2	1					3
Tr. 2: Fort rampart (2010)	2						1	3
Tr. 3: Late occupation (3003)		2						2
Tr. 3: Scree collapse (3008)	4							4
Tr. 3: Early occupation (3007)	5	2						7
Total	24	7	4	1	1	1	1	39

Table 8: Distribution of lithic artefacts across Tinnis. Contexts sequenced according to Harris matrix (Figure 69).

Context	Chips	Flakes	Total
Tr. 4: Natural subsoil (4001)	1		1
Tr. 5: Redep. cap of mound (5012)	1		1
Tr. 5: Tertiary fill of ditch (5006)	1		1
Tr. 5: Cremation burial 5003 (5004)		1	1
Tr. 5: Cremation burial 5015 (5016)	1		1
Total	4	1	5

Table 9: Distribution of lithic artefacts across Thirlestane Barrows. Contexts sequenced according to Harris matrix (Figure 69).

Human Remains

Cremated Human Bone

By Amanda Gilmore

Trench 5 examined one of the round barrows revealed at Thirlestane by aerial surveys in 2018. Excavation of this round barrow revealed three interred urns dating from the middle Bronze Age. Of these three urns, two were recovered during excavations and the third was left in-situ with only a sample of cremated human remains retained for analysis. A fourth possible cremation was also identified by its cap-stone but left in situ.

Methodology

Bone was passed through three stacked sieves with meshes measuring 10 mm, 5 mm and 2 mm. All the bone over 10 mm and 5 mm was sorted into either specific or main skeletal elements where preservation allowed, catalogued and weighed. The bone material less than 5 mm was visually inspected for any diagnostic skeletal elements and catalogued and weighed. The bone fragments were then weighted, and the largest and smallest bone fragments were measured to identify the range of fragment size. Some fragments were recorded as unidentified; those that could not be identified as specific or main skeletal elements. The bone from the < 2 mm fraction was scanned and any diagnostic fragments recorded.

The bone was recorded in accordance with the British Association of Biological Anthropologists and Osteoarchaeologists/Chartered Institute for Archaeologists standards from human bone analysis (Brickley and McKinlay 2004) and Historic Environment Scotland framework for the treatment of Human Remains in Archaeology [www.historicenvironment.scot].

Preservation

The process of cremation involves dehydration and oxidation of the organic components of the body, leaving only the mineral component of bone in fully oxidised state. The bone combusts and the mineral reaction results in shrinking, distortion, and fracturing of the bone (McKinley 2013).

The bone in the assemblage from the Thirlestane Round Barrow was assessed for preservation based on the following criteria: the surface appearance of the bone and the size of fractions in each sample taken from the cremation deposits.

Factors that may affect the preservation of each sample include the nature of the original cremation ritual, including the collection and burial after burning; post-depositional processes including weathering, for example freeze and thaw cycles and water disturbance that may result in changes to the surface appearance and fragmentation of the bone.

Overall, the preservation of the samples collected were in good condition, with only the final burial (5004) in urn SF 211 significantly disturbed by ploughing activity, spreading the inhumation and fragments of the burial vessel southward across the barrow mound deposit.

Determination of Species

Determination of species can be more difficult when assessing cremated remains. The cremation process warps, shrinks, fragments, and changes the colour of bone which all challenge identification. Size, morphology, density, as well as surface colour and texture can determine the species the bone belongs to, but these are all obscured and altered by the cremation process. However, animal bone retains a greater ratio of cortical to trabecular bone which can remain observable after burning (Spence 1968).

Seven animal bone fragments were identified in the urn SF 211 recovered from the last burial (5004).

Minimum number of individuals

The minimum number of individuals (MNI) was calculated by identifying any repeated skeletal elements from the same side (left/right) or different age categories, where possible.

Of the bone collected taken from each burial context, the MNI has been calculated by considering the bone in the context as a whole. For example, the cremated bone SF 223 from burial (5014) from grave (5013) contained 1 adult and 1 sub-adult. The cremated bone SF 224 from the same burial also contained 1 adult and 1 sub-adult and because these come from the same context (5014), it is considered to have an MNI of 2. Since one collection of cremated bone SF 196 was recovered from the disturbed fill (5002) of a plough furrow rather than an intact grave, it has been excluded from MNI calculations. From the samples retained from the round barrow, there were at least 6 individuals buried at the Thirlestane Round Barrow, excluding the unexcavated fourth cremation (Table 10).

Context	SF no.	MNI	Total (per context)
5004		1 adult, 1 sub-adult	2
5004	211	1 adult, 1 sub-adult	
5014	223	1 adult, 1 sub-adult	2
5014	224	1 adult, 1 sub-adult	
5016	216	1 adult	2
5016	218	1 adult, 1 sub-adult	

Table 10: Minimum number of individuals per context.

Age at death

Methods for determining age at death for cremated human remains are largely the same as those utilised in the analysis of inhumations. For sub-adult remains, dental eruption and the stage of epiphyseal fusion are the most widely used methods. For adult remains, the pubic symphyses, sternal rib ends, and degenerative changes in the auricular surface are the most widely used. Cranial suture closure has, in the past, been used as a method for ageing adult remains but is no longer considered to be accurate (Bass 1971; Brooks and Suchey 1990; Buikstra and Ubelaker 1994; Meindl *et al*. 1985; Scheuer and Black 2016).

Due to the preservation of the bone retained in samples from the barrow mound, only very few of these methods were considered applicable to the cremated remains. Consequently, age at death in this assemblage was based on observations of epiphyseal fusion as well as overall size and thickness of the bone, focusing on skull fragments and cortical bone. No dental elements were observed in the samples.

Because the cremation process can alter the size and shape of bone, the utilisation of narrow age group categories (Table 11) is not useful in this analysis. Instead, a simplified system of categorisation into sub-adult (below the age of 18 years at death) and adult (above the age of 18 years at death) was deemed the most appropriate.

Foetus	< birth
Infant	Birth – 3 years
Child	3-12 years
Adolescent (AO)	12-20 years
Young Adult (YAD)	20-35 years
Middle Adult (MAD)	35-50 years
Old Adult (OA)	50+ years
Sub-Adult	Referring to any individual less than 18 years
Adult	Referring to individuals of adult size and development where there are no more precise age indicators present/observable.

Table 11: Age at death categories commonly used in the analyses of human remains (based on Buikstra and Ubelaker 1994) but not applied to the human remains recovered from Thirlestane Round Barrow

Biological sex determination

Determination of biological sex of human remains is based on pelvic and cranial morphology, as well as post cranial metrics (White and Folkens 2005). The cremated bone SF 223 recovered from cremation burial (5014) contained a fragment from an un-sided ischium, identified as possibly female. The cremated bone SF 218 recovered from cremation burial (5016) contained a fragment from a left ischium, which was also identified as possibly female. No other biological markers of sex were observable on any of the samples retained from the round barrow.

Non-metric traits

Non-metric traits are traits which are simply recorded as being absent or present. They may be genetic or linked to environment, occupation, or lifestyle. Their presence or absence can be utilised to identify and compare different genetic groups.

The presence/absence of non-metric traits, much like the markers for age at death identification and biological sex determination, may be altered or obscured by the process of cremation and the level of preservation. Presence/absence of non-metric traits was not observable in the assemblage of bone retained from the Thirlestane Round Barrow.

Pathology

It is possible to identify the presence of disease and trauma on cremated remains, although initial identification and differential diagnosis can be made difficult due to the cremation process and preservation of the fragmented remains. Pathology and evidence of trauma can suggest possible causes of death either as primary or secondary causes. Pathologies and trauma to bone should only be considered in the context of the osteological paradox, and not be stated as definite causes. We must consider variation in disease, mortality, and population that affect skeletal remains (Wood *et al.* 1992).

No pathologies or evidence of trauma were observable during analysis of the samples retained from the round barrow.

Details of the cremation process as mortuary practice

The process of cremation includes a wide span of temperatures in which the burning of the dead takes place. This can be categorised into grades (Oestigaard 2013):

Grade 0: Unburnt. The bones have been exposed to fire, but at a temperature not exceeding 200 degrees Celsius. Can appear brown or orange in colouration.

Grade 1: Sooting. The bones are slightly and imperfectly cremated due to a lack of oxygen, at a temperature barely exceeding 400 degrees Celsius. Can appear black, blue, or grey.

Grade 2: Slight burning. Bones appear clearly burnt, having reached a maximum temperature of 800 degrees Celsius. May appear pale white in colour.

Grade 3: Moderate burning. Bones appear in similar condition to those described in Grade 2 but may be even paler in colour after reaching a temperature of up to 1100 degrees Celsius.

Grade 4: Hard burning. Bones are almost completely white in colour and may have a chalky consistency. Exposed to maximum temperature of 1300 degrees Celsius.

According to this scale, the bones in the Thirlestane Round Barrow samples appear to be between grades 1 and 2, and therefore cremated in a range of 400 to 800 degrees Celsius due to the variation in grey, blue, black, and pale white colouration. Cremated bone SF 196 from the overlying plough furrow (5002) appears to be grade 2; the cremated bone SF 211) from burial (5004) grade 1 and 2; and the cremated bone SF 223 and SF 224 from burial (5014) and the cremated bone SF 216 and SF 218 from burial (5016) both grade 1.

Additionally, the cremated bone in the samples retained from the barrow mound showed surface cracking. Transverse cracking and U-shaped cracking along the surface of bone is indicative of burning while the bone is still covered in flesh to some degree. Vertical cracking or cracks in a vertical/ horizontal 'mosaic' pattern are indicative of burning when there is no longer any flesh remaining on the bones (Buikstra and Ubelaker 1994). The cremated bone SF 196 from the plough furrow (5002) showed evidence of transverse cracking exclusively, but all other samples from cremations (5004, 5014 and 5016) showed a variety of transverse, U-shaped, and mosaic cracking that suggests the remains in these contexts were 'dry' or without flesh at the time of cremation. Evidence of slight to moderate erosion was observed in all retained samples.

The average weight of cremated remains can theoretically suggest a minimum number of individuals for each deposit. The relatively low mass of the cremated bone from burials (5014 and 5016) support the suggestion of these being secondary burial deposits, with the bone that is present in the deposit representing a 'selection' of bone transported to the barrow site from an unknown location after the primary mortuary rite was completed. This rite is comparable with theories of the dead being 'divided' up among mourners and subsequently transported and possibly re-interred across the Bronze Age landscape (Brück 2006). However, since the cremated remains retained from the barrow mound were either heavily disturbed, secondary burial deposits or only partial samples from larger deposits, assessing MNI from each respective weight would not be appropriate. Table 12 serves only to record the weight of each sample for any future analysis.

Context	Weight (g)
5002	5.3
5004	1657.9
5014	381.8
5016	601.5

Table 12: Weight of cremated remains (g) per context sample.

The animal bone fragments identified in cremation burial (5004) were present in 10 mm and 5 mm fractions, which may suggest they were deposited at the same time as the human cremation, either in the same deposit and originating from the same pyre or burnt separately and mixed with the human deposit before being interred in the mound.

Discussion

A total of three cremation deposits (5004, 5014 and 5016) were positively identified and sampled during the excavation at Thirlestane barrows, with a fourth cremation (5027) identified but left in situ. Radiocarbon dating of the three recovered cremation burials suggests that all inhumations took place within a relatively narrow timespan sometime between the fourteenth and twelfth centuries BC (*Dating Evidence,* above). All cremation deposits showed significant evidence of burial vessels being included in the burial rite, for example, the presence of pottery sherds in varying states of preservation. The identification of a possible food vessel (*Prehistoric Pottery*, below) suggests a continuation of mortuary practice commonly found in early Bronze Age cremations and inhumations in Scotland and Ireland, where an individual (or individuals) is commonly buried with cooking vessels and indeed varied joints of animal meat to accompany them (Sheridan 2004). Although attributed to being a mortuary rite associated with the early Bronze Age, and indeed the vessel was identified as belonging to the early Bronze Age, it is important to acknowledge this burial practice may have persisted for 'several centuries' thereafter and would not be out of place in a middle Bronze Age cremation (Sheridan 2004).

No evidence of burning was found in the immediate area excavated, which may suggest the primary stages of body disposal/mortuary practice took place in a different location. The cremated remains recovered from the overlying plough furrow (5002) represent a spread of an original deposit disturbed by post-medieval or modern ploughing activity. Cremation deposit samples from one burial (5004) contained the remains of one adult of indeterminate sex and one sub-adult; that from burial (5014) contained the remains of one possible female adult and one sub-adult; and that from burial (5016) contained the remains of one possible female adult and one sub-adult. In total, a possible MNI of 6 was established for the cremations in the barrow. No patterns of pathology or non-metric traits were identifiable in the samples.

Conclusions

The presence of cremation deposits in the barrow mound at Thirlestane mark the area as a prominent burial site in the prehistoric landscape, where cremation was a common method of mortuary practice. The presence of burial vessels in some form in all deposits could suggest the barrow as a secondary site of burial/ mortuary rite, with the cremations occurring off-site. Supporting this, bone from the majority of the samples suggests bodies were at least partially de-fleshed or in a skeletonised state prior to cremation. The presence of grave goods, in this case the possible food vessel (Vessel 1) may suggest a specific burial rite that would have been relatively commonplace for the time and location (Sheridan 2004). All deposit contexts showed evidence of containing at least two individuals, with a significant presence of females and sub-adults in double interments.

Strontium Isotope Analysis and geographical spatial assignment of cremated bone from Thirlestane Round Barrow

By Kate Britton[3] and Christophe Snoeck[4]

A sample of calcined bone from one of the individuals in the urn SF 211 recovered from burial (5004) was provided for strontium isotope analysis in order to determine the geographical origins of the individual.

Background

Strontium isotope analysis is a method increasingly used in archaeology to explore the geographical origins and lifetime movements of individuals in the past, often applied in tandem with other approaches (see overviews in Bentley 2006; Britton 2020; Britton *et al*. 2021). This isotope technique is based on the relationship between the strontium isotope ratio of underlying lithology (which is related to the age and composition of that lithology) and that of local soils, plants and ultimately the animals that obtain their food from those areas – including humans. Dental enamel is normally the selected analyte as the densely pack crystalline structure of enamel favours the preservation of *in vivo* isotopic signatures. Bone on the other hand tends to preserve *in vivo* signatures poorly, with contaminating strontium from the burial environment or the leaching of strontium from the sample into surrounding soils overprinting or altering the chemical signature of the sample (Hoppe *et al*. 2003). However, while charred remains generally pose problems for isotope analysis (i.e., due to lack of collagen preservation), and cremation can compromise the integrity of dental enamel (the tissue normally favoured for strontium isotope analysis to investigate childhood mobility), recent studies have demonstrated that the physical alterations that occur to bone during cremation can allow preservation of original strontium isotope ratios (Snoeck *et al.* 2015). These approaches have, for example, been used to determine the origin of cremated individuals from Stonehenge as being from west Wales (Snoeck *et al.* 2018). Unlike dental enamel (which forms during childhood), bone remodels during life, and the strontium isotope signature of charred bone mineral (often referred to as bone apatite) may represent inputs averaged over the last approximately 10 years of life. Strontium isotope analysis of charred bone therefore offers insights into more recent residence in the years prior to death.

Methodology

A single fragment of bone (5004) from urn SF 211 was sent for strontium isotope analysis at Vrije Universiteit Brussel. The cremated bone fragment (c. 50 mg) was mechanically cleaned using a Dremel with a diamond drill bit, and then rinsed three times with milliQ (ultra-pure) water. For each rinsing, the sample was placed for 10 minutes in an ultrasonication bath. The bone fragment was treated with 1M acetic acid for 10 minutes in the ultrasonication bath and then rinsed with milliQ water and ultrasonicated for a further 10 minutes in water (Snoeck *et al.* 2015). Strontium was extracted from the sample and purified following the protocol described in Snoeck *et al.* (2015) and both 87Sr/86Sr and [Sr] were measured on a Nu Plasma 3 MC-ICP Mass Spectrometer (Nu Instruments, Wrexham, UK) at the Vrije Universiteit Brussel. During the course of this study, repeated measurements of the NBS987 standard yielded 87Sr/86Sr = 0.710245±20 (2SD for 40 analyses), which is consistent with the mean value of 0.710252±13 (2SD for 88 analyses) obtained by TIMS (Thermal Ionization Mass Spectrometry) instrumentation (Weis *et al.* 2006). Matrix matched standard SRM1400 (bone ash) returned an average value of 0.713111±36 (2SD for 23 analyses) and a concentration of 238ppm ± 6%RSD. All the sample measurements were normalised using a standard bracketing method with the recommended value of 87Sr/86Sr = 0.710248 (Weis *et al.* 2006). Procedural blanks were considered negligible (total Sr (V) of max 0.02 versus 10V for analyses, i.e. ≈ 0.2%). For each sample the 87Sr/86Sr value is reported with a 2SE error (absolute error value of the individual sample analysis – internal error).

Results and Data Interpretation

The strontium isotope ratio (87Sr/86Sr) of the bone sample (SF 211) was 0.710438 ± 0.000012 (2 standard error). The concentration of strontium in the sample (Sr) was 50.3ppm.

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The 87Sr/86Sr of this individual is consistent with biosphere strontium isotope ratios measured in the proximal area (Figure 71). While median values at the location of the site were determined to be between 0.7098 and 0.7102, biosphere values matching those measured in the bone have also been measured in that local area, with values as high as 0.7116 being determined (Evans *et al.* 2022).

Furthermore, areas predominated by median biosphere values matching that of the individual are found within 2-3 km to the south and east, as well as to the north. The strontium isotope ratios of the bone are therefore consistent with an individual having lived locally in the years prior to death. It should be noted, however, that biosphere values similar to the value determined in this individual are found across many areas of Scotland as highlighted by spatial assignment (50% data range) using the biosphere isotopes domains tool (Figure 72). As no dental material was obtained for analysis, childhood origin cannot, however, be inferred.

Previous studies on Bronze Age Scotland and Britain as a whole have noted a high incidence of movement based on strontium (and oxygen) isotope ratios (when childhood origin and place of burial are compared) particularly in northern Scotland (Parker Pearson *et al*. 2016; Parker Pearson *et al.* 2019; Pellegrini *et al.* 2016). It

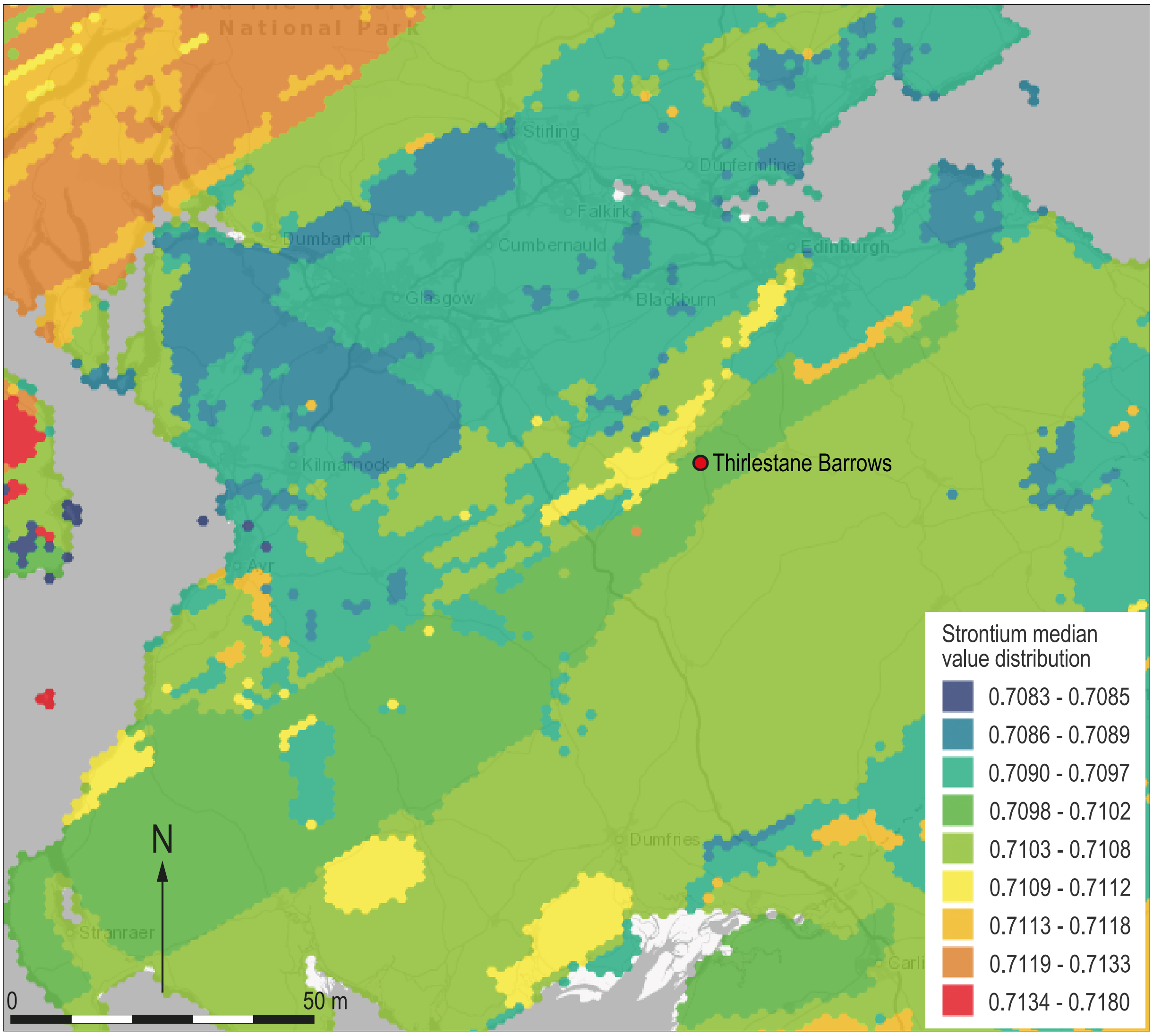

Figure 71: Variations in biosphere strontium isotope (87Sr/86Sr) packages across Central-Eastern Scotland, with the approximate site location of Thirlestane Barrows marked (from Evans et al. 2022).

should be noted, however, that the high variation in biosphere strontium isotope ratios in northern Scotland could account for this pattern (Parker Pearson *et al*. 2016). Of thirteen individuals analysed in southern Scotland, only three (23%) were determined to be of non-local childhood origin. While the childhood origin of the individual from Thirlestane is not known, the lack of movement in later life is perhaps consistent with this lower incidence of lifetime mobility.

Conclusions

Strontium was successfully isolated and analysed in the bone sample SF 211 from cremation burial (5004). Strontium isotope ratios (87Sr/86Sr) for this individual are consistent with having spent the last decade of life in the region prior to death. While isotopic studies on prehistoric Britain, notably those undertaken as part of the Beaker project, have highlighted high mobility amongst Bronze Age populations, the data from this study are consistent with others from southern Scotland indicating that – while mobility was common – the majority of individuals buried at sites had lived their lives local to those areas.

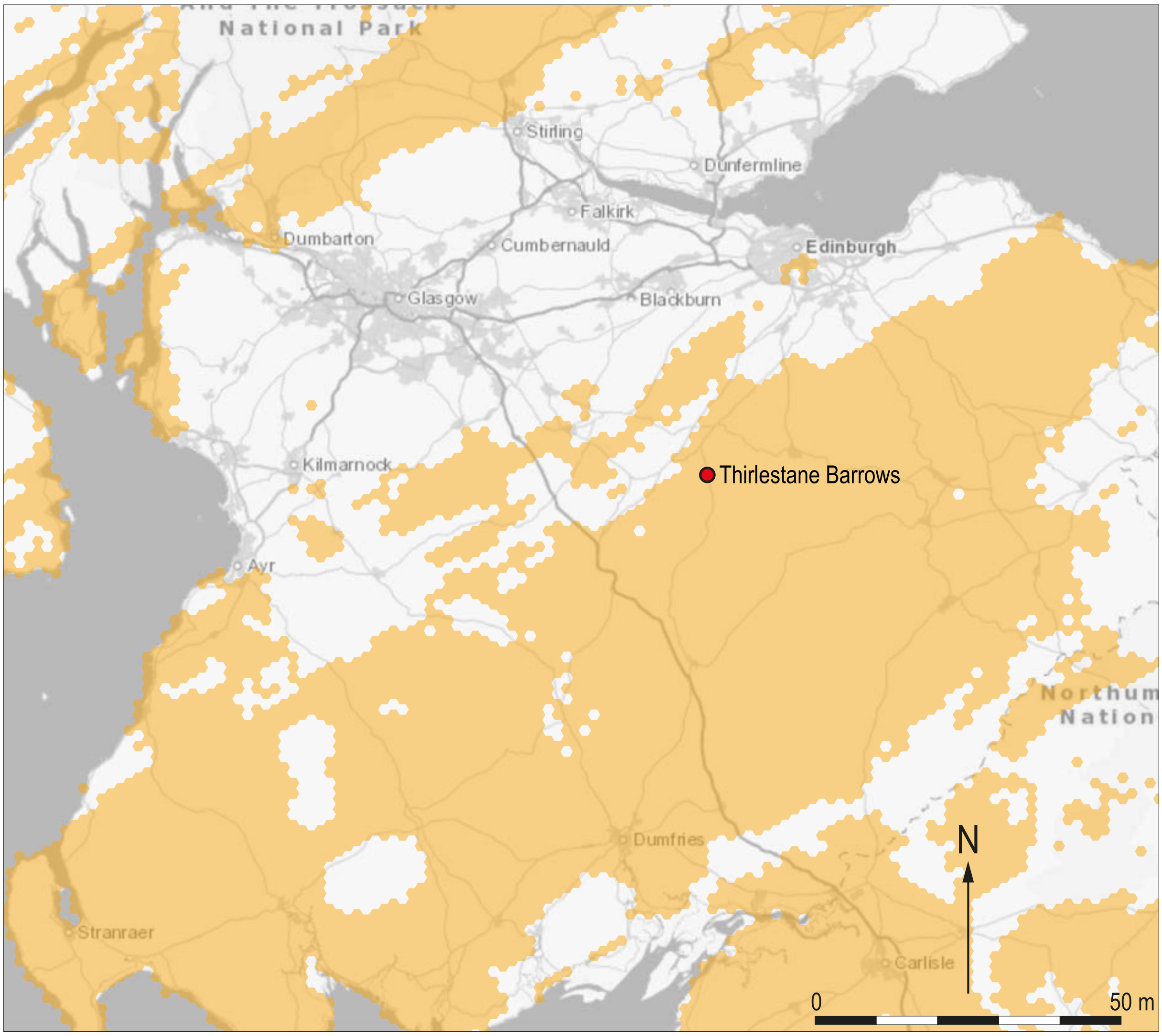

Figure 72: Map of Central and Eastern Scotland, showing the spatial assignment of bone 87Sr/86Sr value of individual SF211 in comparison to local biosphere values (from Evans et al. 2022). The approximate site location of Thirlestane Barrows is marked.

Multi-Element Analysis of grave deposits from Thirlestane Square Barrow

By Dr Clare Wilson[5]

As no human remains were identified within either of the presumed graves within the Thirlestane Square Barrow, the bases of the two graves were sampled for multi-element analysis. The aim was to characterise the chemical composition of the deposits across the base of the graves, in the hope of identifying chemical signatures of burials. The aim was to establish if either of the presumed graves within the Square Barrow were used.

The local bedrock geology of the site is mapped by the BGS as sedimentary Ordovician Wacke part of the Kirkcolm formation. This is overlain by superficial Quaternary alluvial deposits of silt, sand and gravel. The local soils are mapped by the Soil Survey of Scotland as mineral alluvial soils and freely drained brown earths of the Yarrow association, these are characterised by low water holding capacity and moderate phosphate adsorption capacity (Ragg 1960).

Methodology

The fills (4011 and 4013) and bases of the two graves (4010 and 4012) were sampled using a grid system (samples 040 and 043; 041 and 042 respectively) in order to enable analysis of the chemical signatures of the deposits across the base of the graves (Figure 42). 32 small bulk samples were provided from the grave fills and natural grave base of graves 4010 and 4012 (Table 13). Of these 16 were to be selected for multi-element analysis.

Since texture is important in influencing the cation (and anion) exchange capacity of soils and sediments; and hence their capacity to retain anthropogenic elemental signatures; the decision on whether to focus the analysis on the grave base or the grave fills was based on the samples' textural characteristics. Visual analysis of the samples revealed that both the grave bases and grave fills were sandy gravels although with a small quantity of silt and clay. No significant difference in the quantity of clay present was discerned. Given the coarse textured, free-draining nature of the deposits the 16 underlying grave base materials (4001), samples 42 and 43 were selected for multi-element analysis. However, to provide a comparative contrast four samples from each of the grave fills (4010 S40 A, B, E, and H; 4012 S41 A, C, F, H) were also chosen for further analysis.

Samples were oven dried at 105oC and sieved through a 1 mm stainless steel sieve to remove the gravels and coarse sands. Compressed sample pellets 2 cm in diameter were created using a Perking Elmer hand operated press and 10 tonnes of pressure.

For the multi-element analysis, a bench-mounted portable X-ray fluorescence analyser (NITON XL3t-Goldd+, Thermo Scientific was operated in Cu/Zn mining mode with a run time of 60 seconds per analysis. Four analyses were made of each sample (2 on each side of the pellet) with the sample moved between each analytical run so that a representative area of the pressed pellet surface was analysed. Elemental concentrations were calculated using a theoretical calibration model (Hf/Ta) from the resultant spectra.

Sample No.	Context No.	Number of samples	Comments
40	4011	8	Multi-element samples (A-H) for chemical analysis of burial 1, 4010, grave fill
41	4013	8	Multi-element samples (A-H) for chemical analysis of burial 2, 4012, grave fill
42	4001	8	Multi-element samples (A-H) for chemical analysis of burial 2, 4012, natural base of grave
43	4001	8	Multi-element samples (A-H) for chemical analysis of burial 1, 4010, natural base of grave

Table 13: Samples provided from graves 4010 (S 040 and 043) and 4012 (S 041 and 042) for multi-element analysis.

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Mean concentrations were calculated from the four replicate analyses, for all elements within the instrumental limits of detection. Data analysis used SPSS 29.0 and R Studio 3.1.4.0, Kruskal Wallis was used to test for differences between sample groups and Mann-Whitney U tests were applied to test for differences in concentrations between the two graves. Missing values that were below detection limit were replaced with proxy values 10% below the detection limit, rounded to 1 significant figure for the purposes of analysis.

Results

Concentrations of phosphorus (P) were variable and ranged between 830 and over 3000 mg/kg. Calcium (Ca) concentrations ranged between 2333 and 5881 mg/kg, strontium (Sr) concentrations range between 86.5 and 101 mg/kg, and barium (Ba) concentrations ranged between 293 and 655 mg/kg.

The only significant differences in element concentrations between the grave fills and the grave bases (Figure 73) were found for chromium (Cr), manganese (Mn) and Ba which had higher concentrations in the base than in the fill, and Zirconium (Zr) whose concentration was higher in the fills (samples 040 and 041) than in the bases (samples 042 and 043). No significant difference in the concentration of P was identified.

However, when the two grave cuts were considered independently further patterns emerged. Concentrations of phosphorus (P), calcium (Ca), Ba, strontium (Sr), sulphur (S) and potassium (K) within the fill and base of the two grave cuts are presented in Figure 74, with statistically significant pair-wise comparisons indicated to demonstrate significant differences in median element concentrations between the 4 sampled materials: fill material and base material, grave (4010 and 4012). The median concentration of S was 692 mg/kg. There was no statistically significant difference in S concentration between the fill and base of grave (4012), but in grave (4010) S concentrations were significantly higher in the grave fill compared to the grave base. The median concentration of Sr was 91 mg/kg,

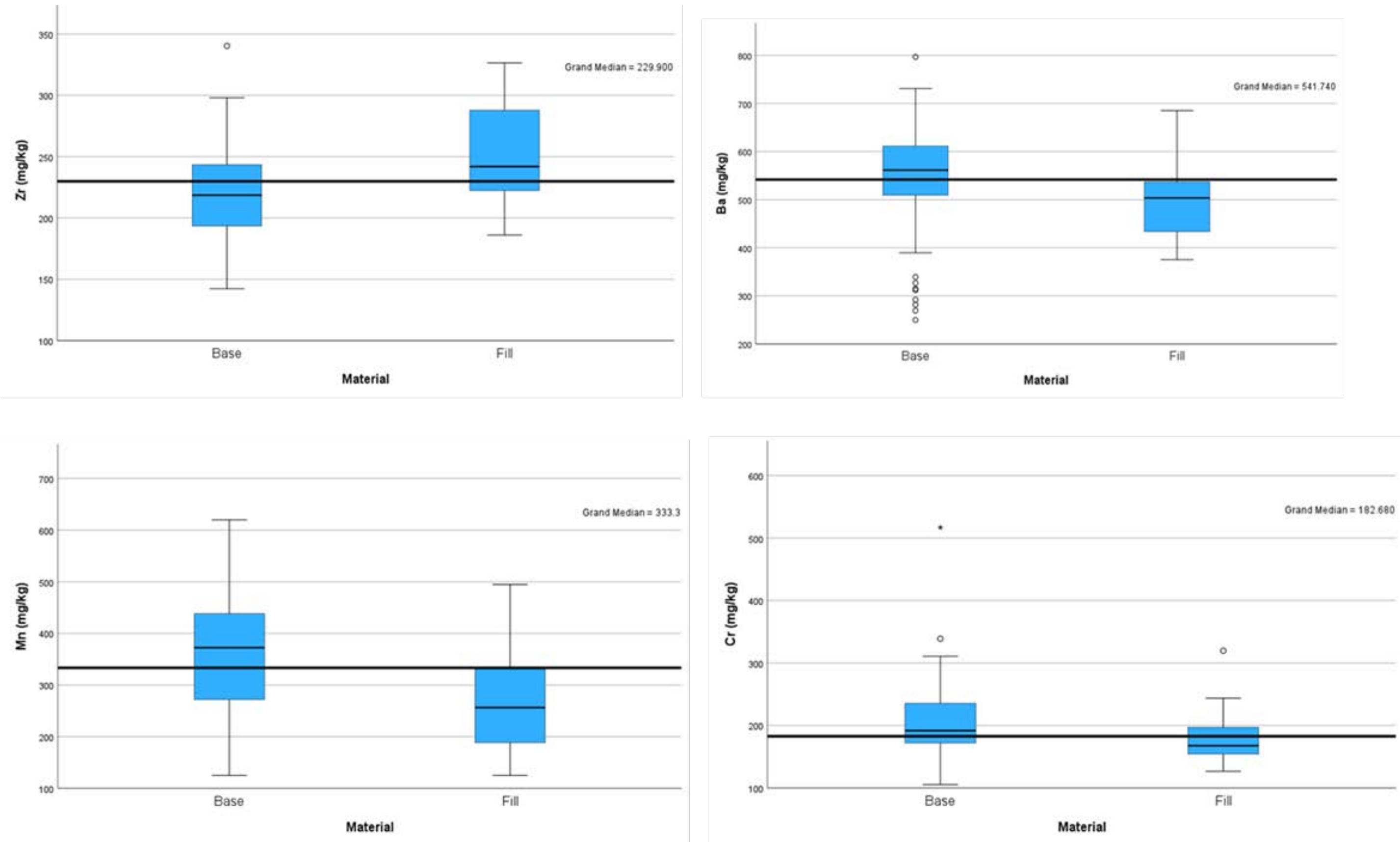

Figure 73: Box plots showing concentrations of Zr, Ba, Mn and Cr in the grave fills and grave bases. All presented elements show significant differences between the median concentrations of the fills and the bases.

and there were no significant differences in its concentration between the four samples. The median concentration of P was 1866 mg/kg. In grave (4012) the concentration of P in the base was significantly higher than in the fill, but there was no difference in concentrations in cut 4010. The median concentration of Ba was 542 mg/kg and whilst there was no significant difference in the concentrations in the fill and grave base of grave (4012), concentrations of Ba were significantly higher in the base of grave (4010) than in its fill. The median concentration of K was 19,483 mg/kg and the median concentrations of the grave base in both cuts was slightly higher (not statistically significant) than the fill. The median concentration of Ca was 3906 mg/kg and whilst there was no significant difference in concentration between the fill and base of cut 4012, Ca concentrations were significantly lower in the base than the fill of grave (4010).

Concentrations also varied across the grave bases although often with no clear pattern. In grave 4010 there was a trend for higher concentrations of P and Mg, as well as Al, Si and K towards the western end of the cut feature. A similar, but less pronounced trend is also seen for the same elements towards the western end of grave (4012). Excavation levels (Figure 42) suggest a slight drop in elevation in this direction.

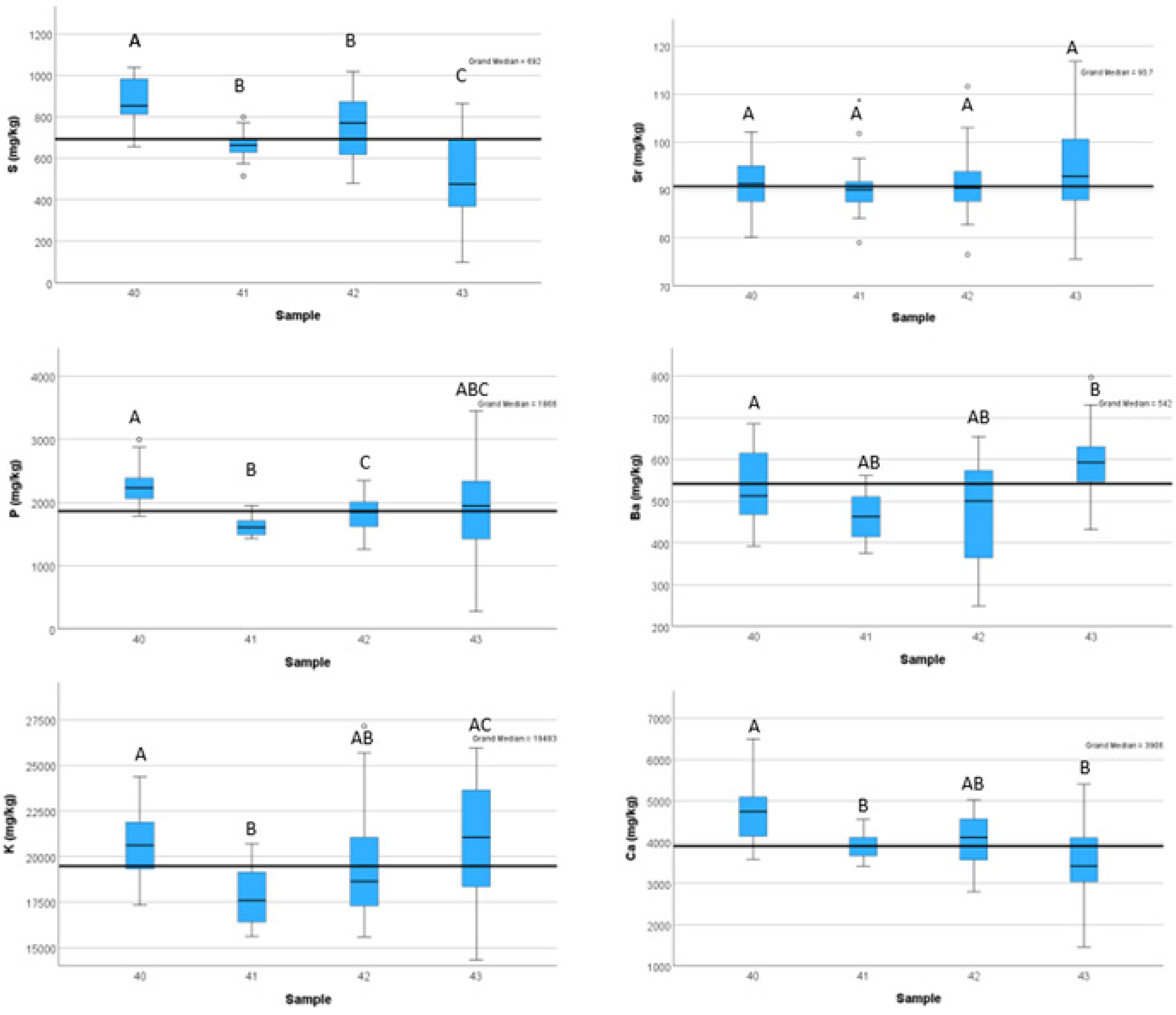

Figure 74: Boxplots of the concentrations of P, Ca, Sr, Ba, S and K in the grave fills (S 40 & 41) and grave bases (S 43 & 42 respectively) at Thirlestane square barrow. Shared letters between pairs of samples indicates no significant difference in samples.

Discussion

The elements most commonly associated with necrosols (soils formed in the presence of a body) are P and Ca (Lambert *et al.* 1984; Usai, *et al.* 2018; Asare 2020; Zychowski 2021). However, a number of other elements -including Sr, Ba, S, K, Mg and heavy metals - have also been shown to be potentially enhanced in graves through either the decomposition of organic materials (Bethell and Smith, 1989; Pickering *et al.* 2018), the presence of grave goods (Usai *et al.* 2018; Madden *et al.* 2022), and / or the impact of decomposition on the soil environment (Lambert *et al*. 1984; Lang, 2014).

Concentrations of P in the local Yarrow association topsoils are described by Ragg (1960) as moderate. However, the concentrations of P recorded in these archaeological sediments range between 275 and 3451 mg/kg with an average of 1902 mg/kg P. This places the average concentration of P in these Thirlestane samples into the 95th percentile for P concentration in modern Scottish topsoils (Paterson 2011). P concentrations in a prehistoric sub-soil, particularly one with such a low clay content, would be expected to be much lower. The lowest concentrations of P were recorded in sample 43 D from the base of grave (4010) where two of the replicate measurements were 275 and 292 mg/kg P and are much more in line with the expected 'natural' concentrations for these materials. The highly elevated P concentrations of the grave base and fill material are consistent with the former presence of a body.

Whilst, not as pronounced for P, other necrosol elements also show evidence of enhancement. The average concentration of Ca (3947 mg/kg) is in the 75th percentile for Scottish topsoils and the highest concentrations are in the 95th percentile. This is unexpected for these free-draining and typically moderately acidic soils. Potassium (K) and Magnesium (Mg) concentrations are enhanced in all samples relative to typical soil concentrations (Paterson 2011). All of these elements are commonly associated with necrosols. However, no enhancement of heavy metals such as Pb, Cu and Zn was present, we might have expected these to be enhanced if metallic grave goods had been present. Typical pedogenic elements such as Fe, Mn, Ti, Si and Zr are also present at expected concentrations for these soils (Paterson 2011) providing confidence in the analysis and the validity of the recorded enhancements.

The post-depositional impacts of waterlogging and leaching on elemental concentrations in the samples is also clear (Figure 75). Concentrations of iron (Fe) and manganese (Mn) are enhanced in the grave base (S 42 and 43) compared to the respective grave fills (S 41 and 40) indicating the effects of periodic waterlogging in the basal deposits probably because of groundwater in these low-lying alluvial soils. Meanwhile these free-draining gravelly soils would be expected to be heavily leached and indications of this can be found in the down profile increases in concentration of some of the most mobile and easily leached elements, for example K and Ba. Leaching and the loss of base cations can produce

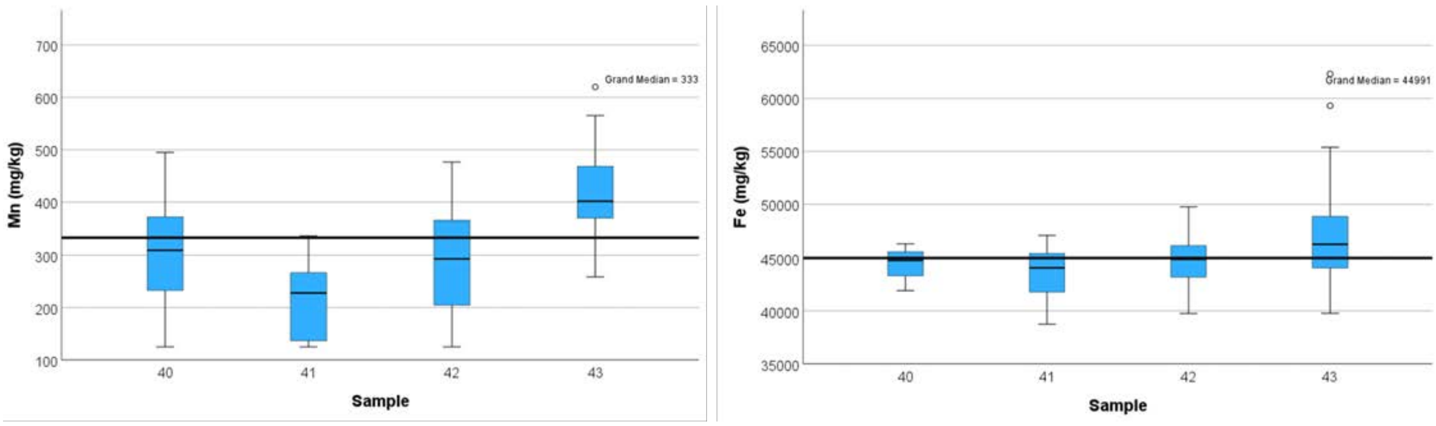

Figure 75: Boxplots of concentrations of Mn and Fe in the grave fills (S 40 & 41) and grave bases (S 43 and 42 respectively) at Thirlestane square barrow.

acidic soils and whilst these soils appear to be periodically waterlogged, they are by nature free-draining and hence also periodically oxygenated. These conditions would not produce a burial environment conducive to organic or bone preservation (Usai *et al*. 2014) and could also affect the retention of geochemical signatures of burial too as elements may be move both up and down through the deposits in solution.

The highest concentrations of P, Mg and K were recorded from the western most samples in the grave cuts. It is possible this may indicate the position of the body in the grave, but it is also very possible that it reflects either the pooling of decomposition fluids in the grave (Lang 2014) or the post-depositional lateral movement of geochemical burial signatures within the soil water following the natural topography of the site.

Conclusion

Whilst it is not possible to definitively prove that the graves at Thirlestane Square Barrow previously contained burials, particularly as the geochemistry of these free-draining alluvial soils appears to be heavily affected by leaching and periodic waterlogging, the enhanced concentration of phosphorus and other elements typical of necrosols (K, Ca and Mg) in the grave fills and bases supports the suggestion these were actively used as graves, the bodies having completely degraded in the free-draining, acidic burial environment.

Prehistoric Pottery

by Beverley Ballin Smith

An assemblage of prehistoric pottery was recovered from the excavation of one of the three Thirlestane Round Barrows (Trench 5). The assemblage comprised three rim sherds of an earlier Bronze Age vessel most likely a Food Vessel (Vessel 1) from a cremation burial (5014); two Middle Bronze Age plain urns (Vessels 2 and 3) from two separate cremation burials (5014 and 5004 respectively); another Middle Bronze Age urn (Vessel 4) from cremation burial 5016 that was only partly excavated and only four sherds recovered from it; and an unstratified rim sherd in the fill (5002) of the plough furrow from another urn (Vessel 5). Vessels 2 and 3 were found in adjacent graves north of the centre of the barrow, with the sparse remains of Vessel 1 in close association with Vessel 2 (Figure 76). The largely unexcavated Vessel 4 lay in a grave in the centre of the barrow, and to the immediate south of the graves containing Vessels 2 and 3. It is not known whether Vessel 5 could actually be part of Vessel 4.

Analysis and description of the pieces

The assemblage of 218 sherds (and fragments or crumbs smaller than 10mm by 10mm) is a collection of hand-built Bronze Age pottery. All the sherds were gently brushed before analysis using a x6 hand lens. The assemblage was analysed according to the revised guidelines for the study of prehistoric pottery of the Prehistoric Ceramics Research Group (2010) and its *Standard for Pottery Studies in Archaeology* (2016), as well as the CIfA's Standards and Guidance for the collection, documentation, conservation and research of archaeological materials (2020).

Almost all the pottery was recovered by hand, with the addition of small amounts of mainly abraded fragments or crumbs that were located in soil samples. The composition of the assemblage is displayed in Table 14.

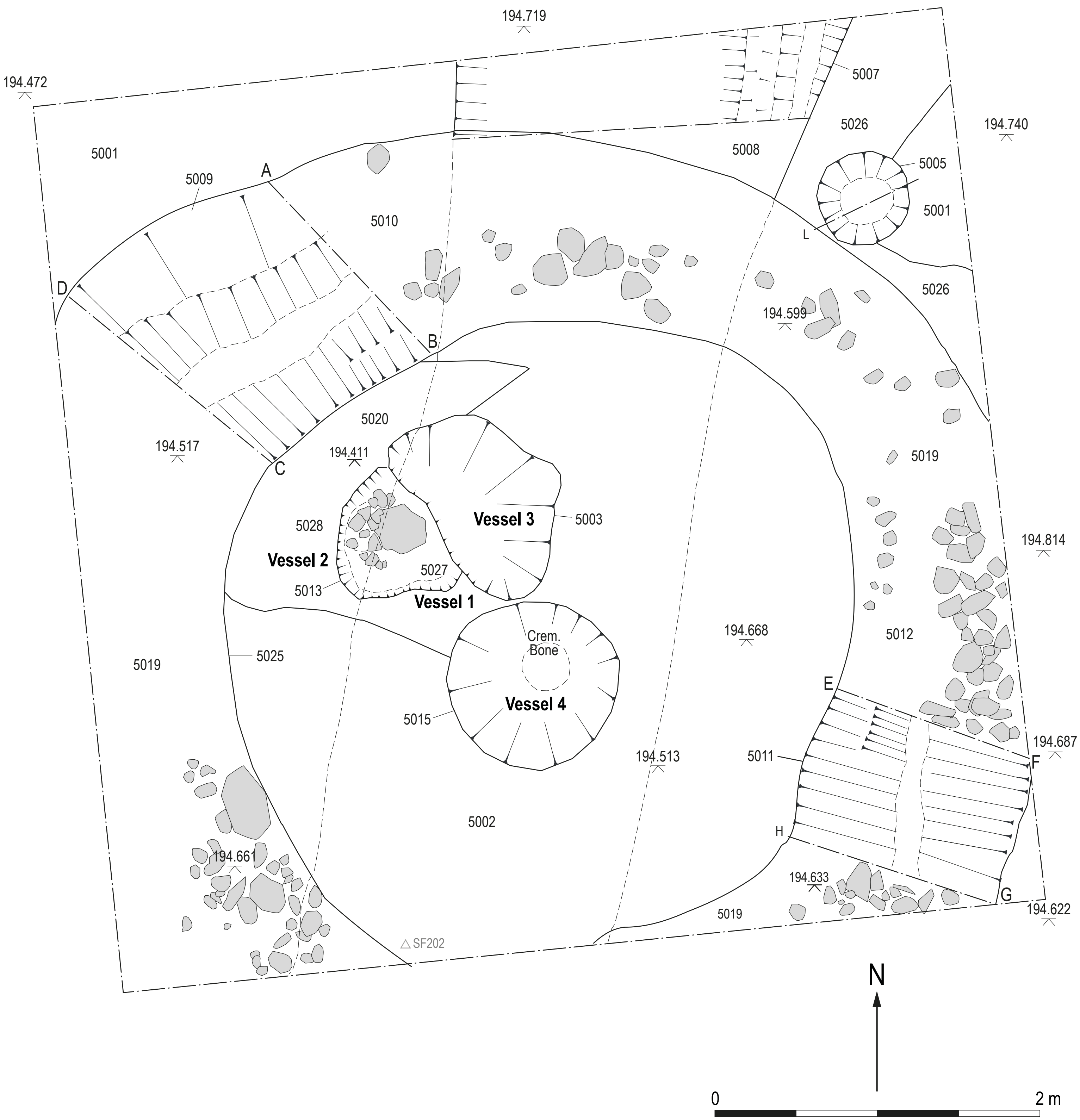

Figure 76: Distribution of pottery vessels in Thirlestane Round Barrow.

The total weight of the assemblage is 7,851 g as recorded in Table 15. The vessels are incomplete as the number of surviving sherds indicates, but a number of trends are noticeable. Vessel 1 was thinner-walled than the urns, and Vessel 2 was a thinner-walled vessel than Vessel 3, but in contrast to the latter, it had a thicker base. This was to a large extent due to the amount and size of stone temper added by the potter to the clay. The sherds of Vessel 3 were on average smaller in size than those of Vessel 2 due largely to manufacturing faults (see below).

Vessel no.	Total no. sherds	Rims	Bases	Bodies	Fragments
1	3	3	-	-	
2	87	12	10	65	*
3	123	7	8	108	*
4	4		-	4	-
5	1	1	-	-	-
Totals	218	23	18	177	*

Table 14: Sherd composition.

Post-depositional changes

Recent organic matter found within some of the pottery sherds indicates that roots from grasses growing in the topsoil had penetrated the fabric of the vessels. This caused fracturing and fragmentation of the pottery. It is also likely that the digging of the grave (5013) for Vessel 2 disturbed the grave (5027) in which Vessel 1 rested, and three rim sherds from that vessel became integrated into the backfilling material of the later grave. The burial pit containing Vessel 3 was dug close to that containing Vessel 2 but its pot was possibly placed less deeply in the pit as it was badly disturbed by ploughing. Vessel 5, although unstratified may have been part of Vessel 4 when it was truncated by these agricultural activities.

Manufacture of the pottery

All the pottery contains ground pieces of rock temper added to the clay to give it strength and also chopped dried organic matter (grasses), which helped make the raw clay workable. The clay used in the manufacture of the pottery could have been easily accessible in the sides of local burns or rivers.

The local geology of the area around the location of the barrow is predominantly that of Kirkcolm Wacke, with Crawford Group Chert to the west (British Geological Survey 2023). The stone or mineral temper in all the sherds examined is dark grey and largely unidentified but could be both chert and grey wacke, a material that was broken up into smaller pieces of up to 5 mm by 5 mm to be added to the clay body. In addition, small and larger rounded pebbles up to 10 mm by 15 mm, including sand and some quartz are most likely derived from gravel beds in either the Bigger Water to the north of the site or from Holmes Water to the south. The stone temper was not well sorted, and the retention of larger pieces of stone, especially in the bases of the urns may have been deliberate.

Vessel descriptions

Vessel 1 Early Bronze Age Food Vessel

This pottery, SF 221, was found in the same cremation burial (5014) of the grave (5013) containing Vessel 2. This pot comprised two conjoined rim sherds with a fragment of a third, which had probably broken off from the end of the one of the others (Figure 77). The rim had a rounded exterior edge to a 26.2 mm broad, flat or slightly concave interior bevel. The bevel formed a rounded protruding lip above the interior surface of the vessel. The exterior surface of the

Vessels	Vessel type	Total sherd Nos	Total weight (g)	Average sherd weight (g)	Average wall thickness (mm)
1	Probable Food Vessel	3	54	18	12.7
2	Middle Bronze Age late Urn	87	3503.1	40.2	13.6 wall, 18.7 base
3	Middle Bronze Age late Urn	123	4108.4	33.5	17.5 wall, 17.5 base
4	Middle Bronze Age late Urn	4	126	31.5	14.5
5	Middle Bronze Age late Urn	1	60	60	12.5
Totals		218	7851.5		

Table 15: Sherd/vessel thickness and weight.

sherds was gently ridged horizontally below the rim edge, with two ridges surviving.

The irregular shaped and dark coloured mineral temper was fine to coarse in size and was poorly sorted. Voids from organic materials were also seen in broken edges of the sherds. Carbon deposits from its contents were noted on the interior surface and finger moulding marks were visible.

These sherds were possibly the remains of an externally ridged Food Vessel with a rim diameter of approximately 250 mm; only c. 1.5% of it was present. It is unlikely that this was the rim of a collared urn as its sherd width was only 12.7 mm.

Vessel 2 Middle Bronze Age Urn

This vessel, SF 221, was found in the cremation burial (5014) of a grave (5013) in the north-west part of the central area of the barrow and was the best preserved of the urns with large body and rim sherds surviving intact (Figure 77). Although only two rim sherds out of a total of 12 conjoined, as much as 90% of the rim survived indicating the pot had a rim diameter of c. 270 mm. Similarly, ten sherds of the base were present (c. 93%), which measured approximately 150 mm in diameter, but again only two base sherds conjoined. The difficulty in joining sherds was due to the amount and size of the mineral temper present in the clay and the abrasion of the sherd edges.

Although the rim was predominantly straight and flat-topped, some sherds were very slightly in-turned. The clay was well-gritted with fine to very coarse stone temper that was poorly sorted and occasionally included a little quartz rock. Most the sherds indicated finger moulding marks made when the potter joined additional coils of clay to the body of the vessel during its manufacture. Many of these marks were not removed during the finishing process and one sherd still retained the curved impression from the edge of a fingernail on its exterior surface. One of the notable characteristics of this pottery was the presence on most rim sherd external surfaces of a prominent horizontal or oblique long grass-mark a centimetre or two below the rim top, followed by another fragmented but similar line two to three centimetres below the first. These lines were presumably the result of wiping the vessel with dry (coarse) grass after it was formed.

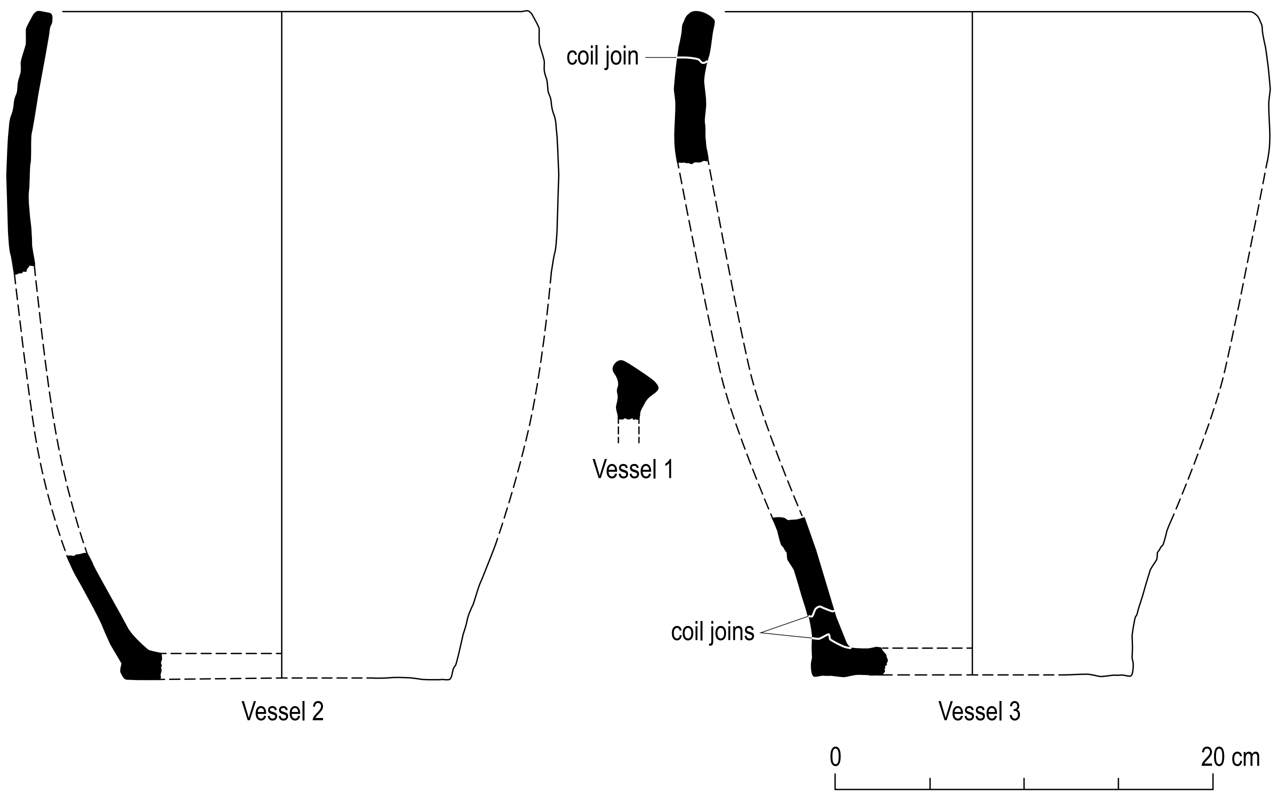

Figure 77: Early Bronze Age Food Vessel - Vessel 1; middle Bronze Age plain urns - Vessels 2 and 3.

The pottery was not well-finished as rough grits showed through the surface, and due to firing conditions, there was some cracking of the clay around them. Also, negative impressions from organic temper were noted as well as sooting around rims and on the interior surface.

The base of the vessel was flat and roughly finished with some sherds exhibiting a slightly pinched or protruding base edge with a slight concavity above before the body of the vessel curved outwards. Whereas the exterior of some of the base sherds was well-preserved, the interior of others was poor, with the loss of the surface and exposure of large pebble temper, possibly from the pottery being burnt, and there was much finger moulding. The base was not symmetrical as part of it was, at over 20mm, almost double the thickness than other parts of the same vessel. It was also made separately (not using the thumb pot method) and the first coil of the pot wall was added to it, identified by the cracking around the join. A finger runnel between the wall and the base on the interior was also present on some sherds to secure the join.

Vessel 3 Middle Bronze Age Urn

This vessel, SF 211, was found in the cremation burial (5004) in a grave (5003) in the north-west part of the central area of the barrow and to the immediate east of the cremation burial (5014) containing Vessel 2. This thick and heavy vessel had the largest number of sherds and the greatest weight at over 4 kg (Table 15; Figure 77). Two rim sherds conjoined to indicate a rim diameter of c. 300mm. In total c. 19% of the rim survived. Approximately 22% of the base was present implying the base measured c. 150 mm in diameter. As Vessel 2, the amount of grit in the clay and subsequent abrasion meant that further joins between sherds were difficult to achieve.

The rim was generally heavy with a rounded edge to a rounded rather than flattened top, although the thickness of the pottery was uneven. The finishing of the rim sherds was poor, with clay protruding to the interior that was not smoothed away; in some examples very large grits were visible and there was some spalling of the clay. The exterior finishing was somewhat better, but in spite of moulding marks around the coil joins there was cracking along them. This was very much a characteristic of this pottery that the coil joins were not well finished. The best example of this was Fragment 17 where the base fragment had parted at the join, and showed how the base and the body were attached. The interior of this particular sherd displayed further and clearly defined coil joins up the body.

In this vessel, in contrast to Vessel 2, the width of the pottery making the body of the vessel was often thicker than that of the base, which potentially made the pot unstable. Grass marks were present throughout the pottery and sooting and carbon deposits were visible on most sherds.

Vessel 4 Middle Bronze Age Urn

This vessel (SF 217, 219 and 220) was buried in a cremation burial (5016) in a grave (5015) in the centre of the round barrow. Although identified on site, and sampled, the majority of this urn remained *in-situ* and its capstone reinstated as there was not sufficient time to fully excavate this cremation burial. Four body sherds were retrieved from this grave (Tables 14 and 15) suggesting that the pot had been damaged by the weight of the capstone, and that the rim was not easily identified. The uneven surfaces of the pottery with noticeable grits showing through the clay, the heavily stone temper, and loss of some of the interior surface through burning of SF 220, indicate that this vessel was little different from Vessels 2 and 3, and possibly contemporary.

Vessel 5

A rim sherd, SF 195 from the fill (5002) of the plough furrow (5007) shared similar characteristics to all the above, with its slightly everted and flattish rim top, poor moulding and visible coil joins. It was possibly part of Vessel 4, as the rim of that vessel was not apparent. The sherd indicated that the measured c. 260 mm in diameter.

Vessel distribution and function

A probable inhumation grave (5027) lay beneath the grave (5013) containing Vessel 2. Disturbance of the former might account for the sherds of Vessel 1 being incorporated into the backfilling of the later grave containing Vessel 2.

It is clear that all the pottery recovered was vessels associated with burials and without doubt the Bronze Age Round Barrow in Trench 5 was constructed specifically for a burial or burials. The location of burial pits in the centre and to the north-west of the centre of the barrow, and their close proximity, indicated that the positioning of the graves marked by their capping stones denoted their importance and locations. The burial pits might have been dug within a relatively short time frame as the radiocarbon date ranges from the three cremation burials overlapped (Figure 67). These events may have been contemporary or near contemporary burials.

Comparison with other sites and chronology

The pottery assemblage comprised four or five Bronze Age vessels – one possible Early Bronze Age Food Vessel and three definite (possibly one other) Middle Bronze Age plain urns. All functioned either as containers for the dead (urns) or as a vessel included in the grave of an inhumation (the Food Vessel), and both are typical of vessels found on other contemporary Bronze Age sites in the south of Scotland and elsewhere.

The small fragments of Vessel 1, the Food Vessel, are not discussed further as the information from it was very limited. The identification is tentative as is the possible grave from which the sherds most likely originated. It may be sufficient to say that a comparable vessel with incised ridges and with a wide bevel is known from Knocken in Lanarkshire (Gibson 2002, illus 45, No.6), although further comparison of attributes and characteristics has not been possible.

Plain urns have not particularly been well studied in comparison with the early Bronze Age suite of often highly decorated vessels displaying a variety of shapes and types. By the middle Bronze Age, c. 1550 to 1150 BC (ScARF 2012), urns had lost their decorative collars and their implied meanings and become utilitarian vessels simpler in form and shape. They were simply containers with no display of belief or customs of earlier styles. Traditionally, plain urns have been described as bucket urns or flat-rimmed ware (Sheridan 2007). The dates of the Thirlestane urns, produced from samples of the human bone contained within them are all from the latter half of the middle Bronze Age (Table 1): 1391–1221 cal BC (Vessel 2); 1396–1223 cal BC (Vessel 3); and 1382–1133 cal BC (Vessel 4).

Other prehistoric burial pottery has been found in close proximity to the Thirlestane barrows. The cairn at Drumelzier (Canmore ID 49902) was earlier in date as it had cists with early Bronze Age vessels, an All-Over Corded Beaker and a Cordoned Urn. Broughton Knowe also in Peeblesshire (Canmore ID 48590) was excavated in 1967 and contained cremated bone but only six small sherds of what was left of its presumed urn.

Two plain urns similar to those from Thirlestane were found together in a pit outside the double linear cremation cemetery at Meldon Bridge in the Scottish Borders. These were fragmented flat-rimmed urns between c. 270-280 mm in rim diameter, each with a flat base, heavy fabric with large grits, grass marks, finger moulding marks, sooting and breakages along the coil joins (Speak and Burgess 1999, 58, Illus 42 and 43). Further afield at Dunragit in Dumfries and Galloway, three flat-rimmed urns were found on Site 10 in 2019. Their size, weights, manufacturing details is very similar to the Thirlestane urns, only differing in one main aspect - they were pierced by a horizontal row of small holes below their rims, in order to receive a leather cover that was sewn on to protect the cremated remains within the vessel (Ballin Smith 2021). Their date ranges of 1446-1302 cal BC and 1416-1281 cal BC are very slightly earlier than the Thirlestane urns. This may indicate that the perforations below the rim of vessels were thought to be an unnecessary feature in later urns especially if the grave itself was capped with a large stone.

A single undecorated 'bucket' urn with a flat rim was the latest type of vessel from the excavations at Luce Sands in Dumfries and Galloway, which produced pottery in large numbers from the early Neolithic through to the early Bronze Age (McInnes 1964, Fig 13, 81). A similar, plain, but smaller sized cremation urn was found at Northbar in Erskine in Renfrewshire, which is undated. Its manufacturing techniques are similar to the urns at Thirlestane, with clearly visible coil joins (Ballin Smith forthcoming), and is also probably from the middle to late Bronze Age period.

The plain flat-rimmed urn may have become smaller over time, especially in the later Bronze Age and denotes that the vessel itself was of lesser importance than earlier in the period. Further identification and analysis of this vessel type is needed to understand the changes towards the end of the middle Bronze Age and what those changes meant to society and the belief systems they held.

The Thirlestane assemblage is very small and the urns indicate a brief continuity of design, especially if they were used in contemporary or near contemporary burials. The manufacturing techniques and the raw materials used in their construction are so similar that it could be implied that a single potter could have made them.

Metalwork and Metalworking

The Metalwork

By Gemma Cruickshanks[6]

An assemblage of 41 metal artefacts was recovered from Thirlestane Barrows and Tinnis Castle (summarised in Table 16). A range of everyday fittings, tools and broken fragments were identified. All the metalwork from Thirlestane Barrows was relatively recent material found in the topsoil. The finds from Tinnis Castle and Fort were from a wider range of contexts, mainly relating to post-medieval or later use of the castle, but also including a fragment of lead casting waste from a ninth-tenth century AD context, and unidentifiable fragments from contexts dating to the third-fourth centuries and fifteenth - seventeenth centuries AD.

Type	Thirlestane	Tinnis
Copper alloy		
Button	1	
Ring fitting		1
Sheet fragment		1
Unidentifiable		4
Lead		
Casting spill		1
Window flash		1
Iron		
Knife/ tang		3
Penknife	1	
Nail/ shanks	1	6
Bolt	1	
Horseshoe		1
Seg	2	
Chain link		2
Collar fitting	1	
Bar, strip, wire fragments	7	1
Sheet fragments		3
Unidentifiable		3
Total	14	27

Table 16: Summary of metalwork assemblage from Thirlestane Barrows and Tinnis Castle and Fort.

The assemblage was dominated by prosaic finds representing everyday fixtures, fittings and broken fragments. All items underwent X-radiography to aid identification. The assemblage is summarised here and a full catalogue is included in the Appendices (Appendix 3).

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A small number of personal items, comprising a copper alloy button, two fragments of iron boot segs and a penknife, all SF 193, were retrieved from the topsoil (4000) overlying the Thirlestane Square Barrow and represent typical recent accidental losses. Indeed, all the metal objects from Thirlestane Barrows were recovered from the overlying topsoil (4000/ 5000) and were either recent or unidentifiable. None of these can be linked to the prehistoric use of the site.

The metalwork from Tinnis Castle and Fort was recovered from a wider range of contexts, though mainly from the topsoil (2000) and the rampart collapse (1002 and 2003) directly beneath. The two finds from the topsoil (2000) comprised an iron nail SF 43 and plain copper alloy ring fitting SF 48, both of which were not closely dateable and could be relatively recent. The finds found amongst the rampart collapse deposits (1002 and 2003) directly beneath the topsoil included a mix of objects which could relate to the medieval use of the Castle. This included a fragment of possible lead window flashing SF 056; (Figure 78), a small pony-sized horseshoe SF 124 and iron nails SF 90 and SF 150. One of the nails SF 150 is a narrow T-headed form (cf Goodall 2011, 164 Type 3) which was typically used where aesthetics mattered, since the T-head was less visible than the more common disc- or square-headed forms. A small scale-tang iron knife SF 75 (Figure 78) and part of another iron knife blade SF 105 from these deposits were multi-purpose tools in daily use. Scale tang knives are generally thought to emerge in the medieval period, from around the thirteenth century AD (Goodall 2011, 107) though the form was also known in the Roman world (Manning 1985, 109, fig.28: types 5 and 7).

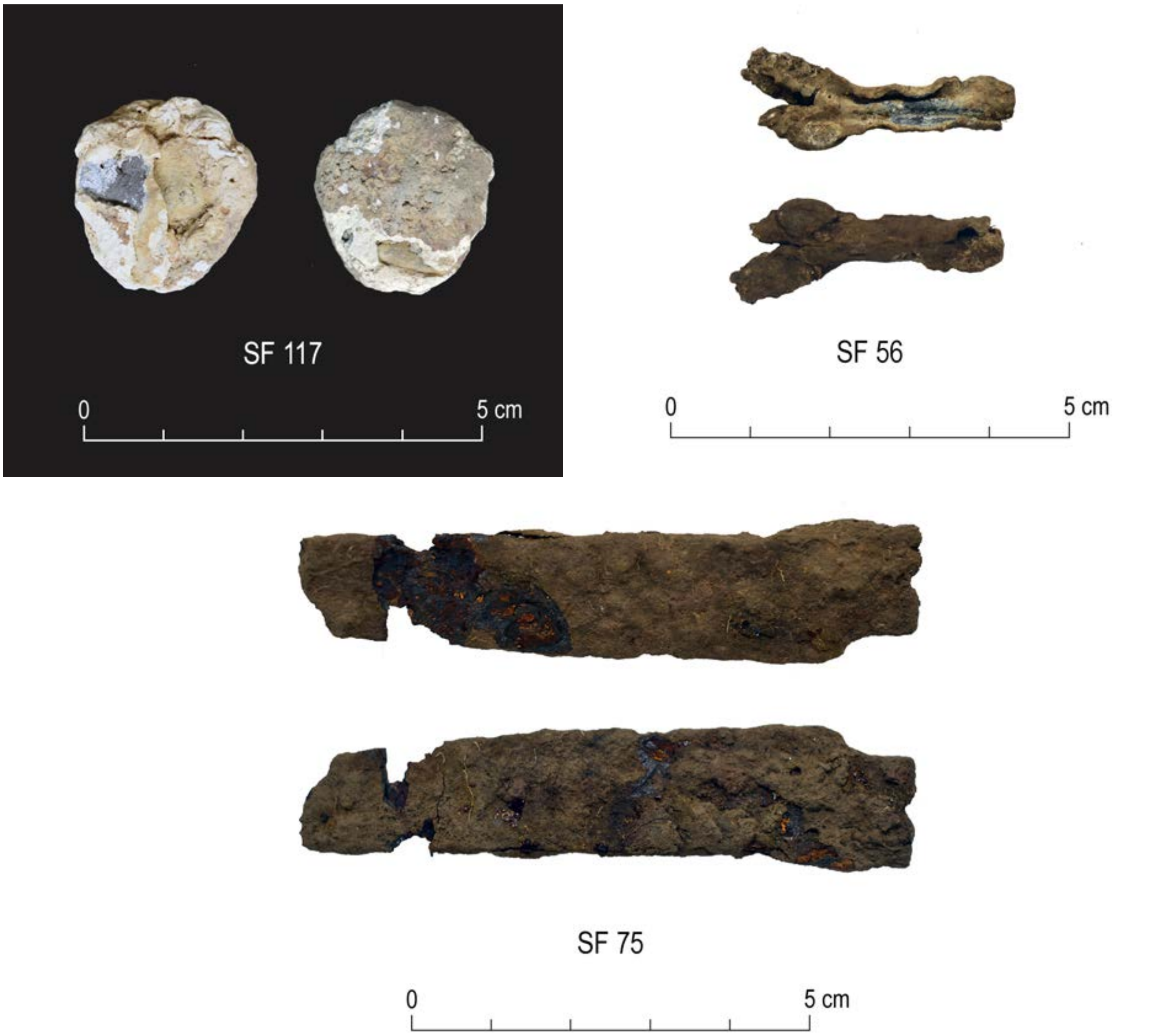

Figure 78: Lead casting waste SF 117, lead window flashing SF 056, small-tang iron knife SF 75.

Four metal finds were recovered from dated contexts, with radiocarbon results spanning over a millennium of the site's use. Unfortunately, the copper alloy fragment (S 31) from a third-fourth century AD deposit within the vitrified rampart (2010) and two flakes of iron and copper alloy (S 13) from a fifteenth-seventeenth century AD deposit under paving (1007) were all unidentifiable. The third dated piece was a sub-circular fragment of lead casting waste SF 117 (Figure 78) from an occupation deposit (3007) in Trench 3, dated to the ninth to tenth centuries AD. Lead casting waste can be a by-product of melting lead to make lead objects.

This early medieval lead casting waste SF 117, along with the fragment of likely medieval window flashing SF 056 from the rampart collapse (1002) underwent isotopic analysis (see Pashley and Evans below). The results showed the two pieces originated from different lead sources, with the early medieval fragment probably from the southern uplands, and the post-medieval piece made from a source in the Pennines. Access to particular metal mines would have fluctuated throughout these periods depending on a range of other political and economic factors, particularly across the England-Scotland border, and these results reflect that.

A group of metal objects, SF 171 and S 22, were retrieved from a charcoal-rich occupation layer (2004) in Trench 2. The group included a small section of copper alloy rod, formed by rolled sheet, an economical technique which could create the same appearance as cast items by using less metal. A cluster of squashed and corroded iron figure of eight-shaped chain links are likely to have belonged to a relatively decorative chain, rather than functional. A probable knife tang was also found in this deposit. All the items are broken, suggesting the context may have been a midden-like deposit.

The prosaic and fragmentary nature of the metalwork assemblage reveals little about the status of the castle, or how this may have changed over time. Rather, a background scatter of everyday debris survives, providing only hints of aspects like carpentry, glazed windows and the use of small ponies.

Lead Isotope Analysis of lead-based artefacts

By Vanessa Pashley and Jane Evans[7]

Two samples, comprising lead window flashing SF 056, and lead casting waste SF 117, excavated from Tinnis Castle and Fort, were provided to the BGS to inform the provenance of the materials.

Methodology

Surface debris was removed from a discrete area of each sample by bathing in Milli-Q water, following which the samples were left to air dry. The same discrete area on each sample was further cleaned by the addition, using a micro-pipette, of ~30ul 2M HNO3. This was left to stand for ~5 minutes before being pipetted off and discarded to waste. This cleaning step was repeated twice more. Finally, a sample was acquired for Pb isotope analysis by the addition of ~20ul 2M HN03 to the cleaned area on each sample. This was left to stand for ~5 minutes before being pipetted into individual Savillex vials. Samples were subsequently evaporated to dryness and converted to bromide form by the addition of ~1ml 0.5M HBr. The Pb fraction was purified from each sample using Eichrom© AG1X8 anion exchange chromatographic resin.

Pb isotope analysis of the samples was conducted using the Thermo Fisher Scientific, Neptune Plus, MC-ICP-MS (multi-collector-inductively coupled plasma-mass spectrometer) at BGS. Prior to analysis, each sample is appropriately diluted (using Teflon distilled 2% HNO3) and spiked with a solution of thallium (Tl), which is added (in a ratio of ~1_Tl:10_Pb) to allow for the correction of instrument-induced mass bias. Samples are introduced into the instrument via an ESI 50µl/min PFA micro-concentric nebuliser attached to a de-solvating unit (Cetac, Aridus II). All isotopes of interest are simultaneously measured using the cup configuration. Each acquisition consists of 75 ratios, collected at 4.2-second integrations following a 60-second de-focused baseline measurement.

The precision and accuracy of the method is assessed through repeat analysis of NBS 981 Pb reference solution, (also spiked with Tl). The

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average values obtained for each of the measured, mass bias corrected, NBS 981 Pb ratios are compared to the known values for this reference, (taken from Thirlwall, 2002: 206Pb/204P = 16.9417, 207Pb/204Pb = 15.4996, 208Pb/204Pb = 36.724, 207Pb/206Pb = 0.91488, 208Pb/206Pb = 2.1677). All sample data are normalised to this reference material. The analytical errors, reported for each of the sample ratios, are propagated relative to the reproducibility of the session NBS 981, to account for the additional error introduced by the normalisation process. A secondary reference material (NBS 982) is also analysed at intervals during the analytical session and is used as a check on the validity of the normalisation process.

Results

The normalised and error propagated Pb isotope ratios from this study are presented in Table 17. For comparison, this table also includes data obtained for a sample from Trusty's Hill previously analysed by BGS (Pashley and Evans 2017, 49-50).

The data are plotted on a mu vs Pb model age (μ-*T*) diagram as described by (Albarede *et al.* 2012) in Figure 79 and are also displayed, for reference, on a conventional 207Pb/206Pb vs 208Pb/206Pb diagram (Figure 80). The μ-*T* values are calculated from the measured Pb data using GlobaLID – Global Lead Isotope Database (Westner *et al.* 2021), and the data used from this program are those derived from the equations of (Albarede and Juteau 1984).

The advantage of this plotting method is that it places the data in a geological context without the requirement for plotting large sets of reference data. Data fields that reference relevant major geological ore-forming events are given for comparison. These data fields have been calculated using data compiled by Blitcher-Toft (2016), with additional data sets from Barreiro (1995), Blaxland et al. (1979), Evans *et al.* (2022), Parnell and Swainbank (1985), Shepherd *et al.* (2000), Tyrrell *et al*. (2006 and 2012), Rohl (1996) and Montgomery (2002).

From Figure 79, the following observations can be made. The two samples are compositionally different. The lead window flashing, SF 056, is consistent with an English origin and plots within the 1SD data range of galena from the Pennines. Conversely, the lead casting waste SF 117 contains, at least in part, an older component of Pb, with compositional similarities to the Scottish ore fields.

Conclusions

There are clear compositional differences between the samples submitted for this study. The lead window flashing SF 056 is consistent with an English (Pennine) origin, whilst the lead casting waste SF 117 contains, at least in part, a much older component of Pb, with compositional similarities to the Scottish ore fields.

For reference, data from a previously analysed sample, a lead ingot excavated from Trusty's Hill Fort (Pashley and Evans 2017), is also plotted in Figure 80. Using this conventional 207Pb/206Pb vs 208Pb/206Pb method of data visualisation, both the lead ingot from Trusty's Hillfort and the lead casting waste SF 117 from Tinnis Fort sit within the range of isotopic values for the Southern Uplands of Scotland (Rohl 1996 – data also plotted on Figure 80 for reference).

Batch Number	Name	Total Pb/ (V)	206Pb/ 204Pb	2s %	207Pb/ 204Pb	2s %	208Pb/ 204Pb	2s %	207Pb/ 206Pb	2s %	208Pb/ 206Pb	2s %
P1025_1	5181_Tinnis Castle_TR1	12.6	18.403	0.005	15.628	0.007	38.418	0.006	0.849	0.002	2.088	0.004
P1025_1_Rpt	5181_Tinnis Castle_TR1	15.8	18.405	0.005	15.630	0.005	38.427	0.009	0.849	0.002	2.088	0.008
P1025_2	5181_Tinnis Castle_TR03	18.5	18.242	0.004	15.573	0.006	38.179	0.005	0.854	0.002	2.093	0.003
P1025_2_Rpt	5181_Tinnis Castle_TR03	23.0	18.243	0.004	15.574	0.005	38.183	0.006	0.854	0.002	2.093	0.005

*Table 17: Pb isotope results for Pb-based artefacts from Tinnis Castle and Fort; and Trusty's Hill Fort. *: Model Age (T) and mu (μ) calculated from this data using GlobaLID (Westner et al. 2021).*

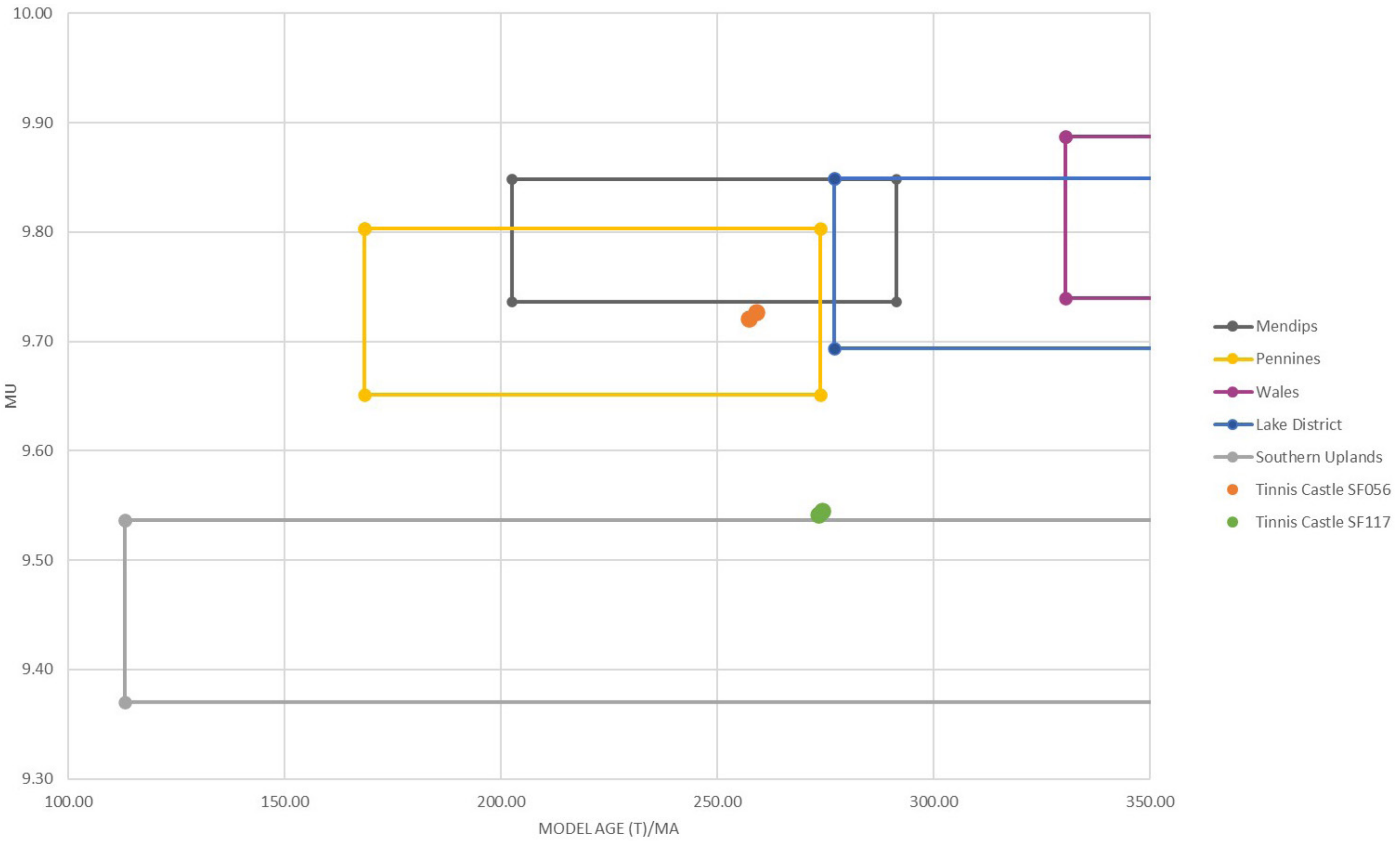

Figure 79: MU-T plot of lead-based artefacts from Tinnis Castle and Fort.

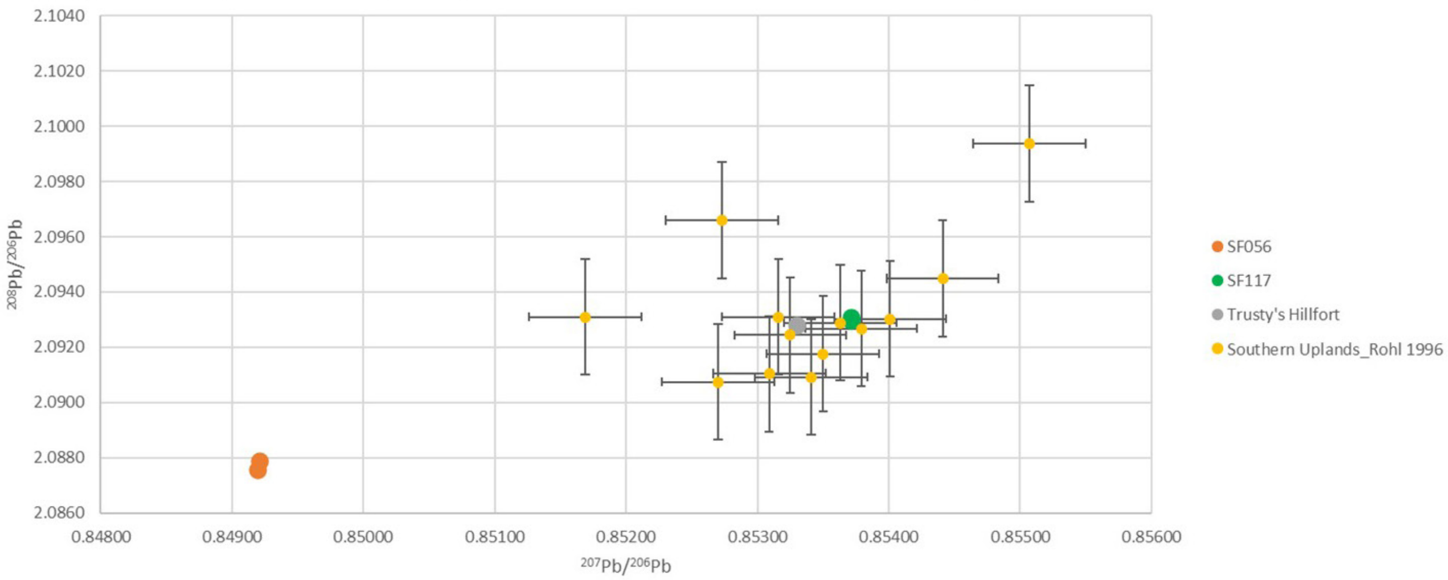

Figure 80: $^{207}Pb/^{206P}b$ vs $^{208}Pb/^{206}Pb$ plot of lead-based artefacts from Tinnis Castle and Fort and Trusty's Hillfort

Vitrified Material

By Gemma Cruickshanks

A total of 2.3 kg of vitrified material was retrieved from excavations which took place as part of Drumelzier's Hidden Heritage Project (Table 18). All of this material was retrieved from Tinnis Castle and Fort, apart from 1.1g from Thirlestane Barrows. Vitrified material can form during a wide range of high-temperature processes, from specialist crafts like metalworking, to simpler domestic hearth activity. The material recovered here comprises fragments diagnostic of ironworking, including a fragment of iron smelting slag, along with a range of undiagnostic material which could have formed during a variety of activities. Fragments were retrieved from secondary contexts dating to the Roman Iron Age, early medieval and medieval periods, and while it is not clear exactly when the ironworking activity took place, the scarcity of early ironworking evidence in the Scottish Borders makes this a valuable assemblage.

The Assemblage

The material was visually examined and classified using common terminology (e.g. Crew and Rehren 2002; Lucas and Paynter 2010; McDonnell and Milns 2015) based upon characteristics such as, colour, size, morphology and density. The assemblage is summarised below and a full catalogue is in the archive.

Ironworking debris

Just over half of the assemblage by weight comprises vitrified material derived from ironworking. Three fairly dense fragments (Sample 144) from the soil matrix (1004) of the rampart base are probably smelting slag but the others are all too small and/or fractured to be diagnostic. The smelting slag was retrieved from the soil matrix (1004) of rampart (1003) in Trench 1, which yielded a radiocarbon date of cal AD 600-657 (SUERC-111448, 1419 ± 24 BP). The undiagnostic iron slag fragments were from a range of contexts around Tinnis Castle and Fort, including the primary deposit (1010) underlying the rampart, the soil matrix (1004B) of the rampart and the soil matrix (1006) of a medieval wall (1005) abutting the rampart, all in Trench 1. Undiagnostic iron slag fragments were also recovered from the Iron Age vitrified core (2010) of the rampart and the medieval occupation layer (2015) in Trench 2 and early medieval and later medieval occupation deposits (3007 and 3003) in Trench 3. A range of radiocarbon dates from four of these contexts (2010, 2015, 3003 and 3007) span the third/fourth centuries through to the fifteenth/seventeenth centuries AD. No ironworking features were identified; the fragments are all in secondary contexts, making it difficult to know exactly when or where the ironworking activity took place.

Some small fragments of undiagnostic iron slag weighing a total of 0.9 g were retrieved from the fill (5004) within a burial pit (5003)

Material	Site		Total (g)
	Tinnis (g)	Thirlestane (g)	
Ironworking			
Smelting slag	185.4		185.4
Undiagnostic iron slag	1094.6	0.9	1095.5
Undiagnostic			
Fuel ash slag	51.3		51.3
Vitrified ceramic	197.3		197.3
Vitrified stone	786.2		786.2
Mineral pan		0.2	0.2
Total (g)	2314.8	1.1	2315.9

Table 18: Summary of vitrified material assemblage from Tinnis Castle and Fort and Thirlestane Barrows.

at Thirlestane Barrows. Given the middle Bronze Age radiocarbon date of 1396-1223 cal BC (SUERC-111450, 3046 ± 24 BP) from this cremation burial, these iron slag fragments must be intrusive, likely owing to the plough furrow (5007) which crossed this barrow.

Undiagnostic vitrified materials

Three main types of undiagnostic vitrified material were retrieved: fuel ash slag, vitrified ceramic and vitrified stone. A range of small fragments of fuel ash slag (0.1-15 g each) were recovered from contexts across Trenches 1, 2 and 3. Fuel ash slag forms during the high-temperature reaction between fuel ash and silicates such as sand or clay and, as such, can form during many different processes.

Two fragments of vitrified ceramic, SF158 and Sample 51, were found within vitrified rampart core (2010) and rampart collapse (1002) respectively. The fragment from Sample 51 is relatively large and preserves some notches and raised lines consistent with being pressed between stones, perhaps as the clay lining of a hearth.

Fragments of vitrified stone weighing 786 g in total were recovered from the topsoil (2000 and 3000) and the soil matrix (1003) of the summit rampart (1004) and rubble collapse (2012). Most of the pieces consisted of a combination of areas of unaltered stone and vitrified zones with a bubbled and/ or flowed morphology. Unlike iron slag, they do not have areas of iron-rich corrosion, charcoal impressions or high magnetic attraction. There were no traces of adhering ceramic or other forms of vitrified debris, which may have suggested they were part of a furnace wall, for example. The characteristics of these fragments are consistent with samples from the ramparts of other vitrified forts. Two of the fragments SF 148 were found within the same soil matrix (1003) of the rampart (1004) that yielded a radiocarbon date of cal AD 600-657.

Discussion

Evidence for Iron Age and early medieval ironworking in the Scottish Borders is very sparse and as such, this small assemblage is a valuable addition to our knowledge. Radiocarbon dates from contexts which produced ironworking debris at Tinnis span the Roman Iron Age, early medieval and medieval/post-medieval periods. With no in situ ironworking features or notable clusters of ironworking debris present, it is difficult to determine when the activity took place. For example, ironworking may only have taken place in the Roman Iron Age phase, with fragments found in later contexts present through later redeposition – a common phenomenon on long-lived sites.

The only diagnostic ironworking evidence was from smelting. There was nothing diagnostic of blacksmithing, though the undiagnostic iron slag could be from either smelting or smithing. Iron smelting is rarer in general on all Iron Age and early medieval settlements, but especially so in the early medieval period.

It is difficult to assess the scale of iron production here since the small assemblage size may reflect the scale of excavation rather than production. Small-scale iron production is known to have taken place on many hillforts, particularly during the early medieval period. Examples include Dunadd in Argyll which produced 23 kg of ironworking debris, predominantly from seventh century AD deposits (Lane and Campbell, 2000; McDonnell 2000, 218). Mote of Mark and Trusty's Hill in Dumfries and Galloway produced around 5 kg and 1 kg of ironworking debris respectively, from fifth to seventh century occupation deposits (Crew 2006, 36; Cruickshanks 2017, 51).

Evidence of early ironworking in southern Scotland, particularly the Scottish Borders is very scarce compared to other regions of Scotland, making it difficult to discuss the Tinnis Castle ironworking in a broader context. While this scarcity may simply reflect the lack of modern and/ or large-scale excavations in the region compared to others, it may also illustrate a real lack of large-scale iron production in the Iron Age and early medieval periods here. Either way, the Tinnis assemblage is therefore an important addition to our knowledge of the craft in this area.

Medieval and Later Pottery

By Bob Will

The small assemblage of pottery recovered from the archaeological investigations at Tinnis Castle consisted of 15 sherds (492.3 g) and includes material from the medieval and modern period (Table 19). All the sherds were examined, weighed and recorded according to guidelines and standards produced by the Medieval Pottery Research Group (MPRG 1998 and 2001). Scientific analysis was not undertaken.

Scottish Medieval Redwares

Seven sherds (74.5 g) Scottish Medieval redware fabrics were recovered from the excavation of Tinnis Castle. This type of pottery is found across most of Scotland and has been the subject of an extensive research programme funded by Historic Environment Scotland (Haggarty *et al.* 2011). The largest assemblages of Scottish Medieval Redwares have been recovered from excavations in Aberdeen and Perth. Two kiln sites are known; one at Rattray near Peterhead that was producing wheel thrown and hand-made vessels; and the other at Stenhouse near Falkirk. These fabrics are thought to date from the thirteenth to fifteenth century although the recent publication of the Perth High Street excavations has identified Scottish redware fabrics from the mid to late twelfth century (Hall, Haggarty and Vince 2012). A small assemblage of Scottish Medieval Redwares (East Coast Redware) was recovered from Peebles and a jug rim sherd is illustrated in the published report (Crowdy and Hall 2003).

The sherds from Tinnis Castle are all in a smooth well-made red fabric with few inclusions with a slightly reduced grey core on the thicker sherds. The sherds have pronounced rilling or throwing marks visible on the interior. The sherds have a full dark green/brown coloured glaze on the external surface. The sherds all appear to be from the same vessel - a glazed storage jar or jug. The rim sherd SF 106 recovered from an occupation deposit (2004) has a rounded rim with a short neck with a thumbed terminal for a handle (Figure 81). All the medieval sherds were recovered from Trench 2 and four of them came from the same occupation layer (2004). The sherds date to the fifteenth century and are typical of locally produced vessels from throughout Scotland.

Figure 81: Rim sherd with thumbed terminal for a handle SF 106 recovered from Tinnis Castle.

Modern

Eight sherds (17.8 g) of factory produced industrial modern ceramics in a white earthenware fabric were recovered from topsoil deposits in Trench 3 at Tinnis Castle and both of the Thirlestane Barrows. White earthenwares tend to be mainly tablewares and these were decorated with blue transfer printed designs and with hand painted bands. There are no diagnostic features from the shape or form of the vessels or the type of decoration. These sherds date to the late nineteenth century or even the twentieth century.

Fabric	Total	Rims	Bases	Handles	Body sherd	Weight (g)
Scottish Medieval Redwares (SMR)	7	1	0	0	6	74.5
Modern	8	2	0	0	6	17.8
Total	15	3	0	0	12	92.3g

Table 19: Tinnis Castle Pottery Assemblage.

Discussion

The assemblage covers a wide date range from the medieval to modern period. The medieval sherds are typical for the fifteenth century and are found throughout Scotland from both urban and rural excavations. The modern earthenwares may have been discarded from visitors picnicking at Tinnis Castle or possibly from manuring the fields at Thirlestane Barrows.

Mortar

By Dr Katie Strang and Roz Artis[8]

Analysis of two samples of mortar collected from Tinnis Castle aimed to ascertain binder composition, aggregate mineralogy and mix proportions; and establish if the two mortar samples were from the same phase of construction.

Sample 1 was recovered from upstanding masonry of Tinnis Castle (0001), SF 130. Sample 2 was recovered from collapsed rubble from the bailey in Trench 1 (1002), SF 061.

Methods

The sample was initially photographed on receipt in the laboratory, logged with its mass and size recorded prior to the sample being submitted to an examination with the aid of a stereo-binocular microscope at a magnification up to x20. During the examination the sample was exposed to a series of *ad hoc* droplet tests employing a range of reagents and indicator solutions to aid the identification of the components present and to assess the condition of the mortar.

A slice was cut through the sample of mortar, with the specimen aligned such that the slice extended through the full thickness of the sample with the largest surface area. The slice was prepared for thin sectioning by drying to a constant weight prior to the vacuum impregnation of the sub-sample with an epoxy resin, to which a blue dye had been added. One side of the resin impregnated slice was polished and mounted onto a glass slide (50 mm by 75 mm), with the mounted sample ground and polished to give an approximate thickness of 30 microns.

The thin section was submitted to a microscopic examination, which was undertaken with the aid of a polarised light microscope, fitted with a digital camera, to permit recording of photomicrographs, some of which are included below. The presence of dyed epoxy resin within the sample enabled an assessment of the mortar fabric to be made, including an assessment of the visual porosity, void size and distribution along with the evaluation of any crack patterns and physical depositional features apparent in the sample under examination.

Sample 1: Mortar examination

Once dried the mortar was found to be 10YR 8/2 – 8/4 'very pale brown' on fresh surfaces and 10YR 5/2 'greyish brown' to 10YR 6/2 'light brownish grey' on soiled surfaces when assessed against the Munsell Soil Colour Charts.

The mortar was firm, requiring significant pressure to disrupt. However, once disrupted it could be powdered further with relative ease. Overall, the mortar appeared well compacted. However, the outer surfaces showed significant voiding (Figures 82 and 83). The aggregate grains were moderately well encapsulated. However, those on the surface tended to protrude significantly from the paste. Redeposited calcite and secondary products were observed to coat some surfaces/voids, suggesting that water penetration through the sample had occurred. There was no obvious coal or burnt fuel fragment noted in the sample examined. There were frequent lime inclusions which were variable in size and shape, with the majority appearing powdery in texture.

Figure 82: Sample 1 showing the outer surface of an intact piece of mortar, as received, which exhibits a soiled outer crust. scale bar = 25 mm.

8 Scottish Lime Centre Trust

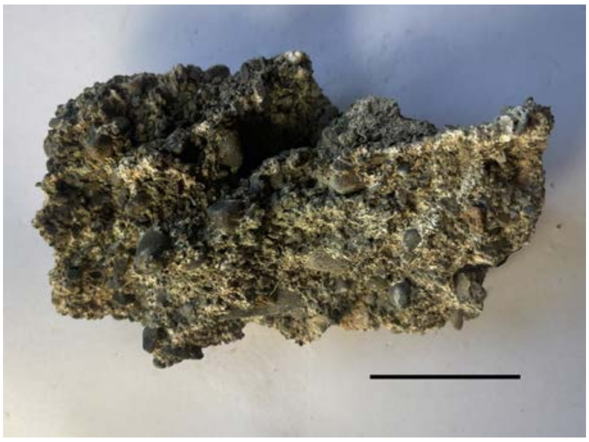

Figure 83: Image showing the inner surface of the sample as received. scale bar = 10 mm.

The aggregate in the mortar consisted mostly of sub-rounded and elongated well-worn lithic fragments (comprised mostly of metamorphic and igneous rock), alongside sub-angular quartz. In response to a phenolphthalein indicator test the material was found to be fully carbonated. The sample exhibited a moderate water absorption rate when subjected to a water droplet test, suggesting a moderately well-connected pore network.

Sample 1: Petrographic analysis

Binder (Figure 84)

The binder was fully carbonated and contained frequent lime inclusions which vary in size and shape, ranging between 0.5 mm to 5.4 mm in diameter. Inclusions commonly showed hydration/shrinkage cracks and had an appearance typical of having been prepared as a putty or a hot mixed quicklime. The majority of lime inclusions had undergone a degree of depletion and leaching and exhibit signs of secondary mineralisation. Most showed a diffuse boundary with the surrounding paste and formed an integral part of the mortar fabric and had not, as commonly seen in lime-based mortars, simply acted as aggregate material. The binder was heterogeneous with apparently dense areas adjacent to extremely porous areas. There was significant evidence of binder depletion and reprecipitation in the thin section examined, with evidence of fluid migration and secondary mineral precipitation in the form of calcite and opaque iron-oxides, which were observed to form linings in voids and shrinkage crack pathways. The mortar appeared to be composed of a non-hydraulic to feebly hydraulic lime, with no visual evidence of hydraulic components observed in the section examined – it must be noted that due to the age of the mortar, and the degree of alteration, any clinker components may have hydrated or leached. Multiple microcracks were present and these also showed signs of fluid migration along these paths and the precipitation of deleterious minerals. The cracks were not restricted to any region, although they were more abundant around aggregate peripheral zones and in/around lime inclusions. A fine-grained opaque gel was seen to be dispersed throughout the paste in some regions but there was no evidence of typical pozzolanic reaction minerals in the thin section, and the localised nature of these particles suggest they were likely a result of post-placement reaction/weathering of iron oxide bearing aggregate grains.

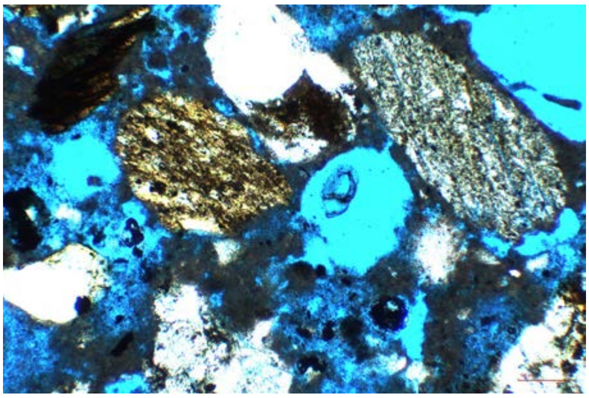

Figure 84: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. Typical view of binder showing well dispersed aggregate and heterogeneous nature, where dense areas are adjacent to extremely porous areas.

Aggregate (Figure 85)

The coarse aggregate fractions were dominated by well weathered lithic fragments, and the finer fractions were composed of sub-rounded to angular quartz grains, along with a smaller proportion of lithic fragments. Lithic fragments tended to be sub-rounded to sub-angular in shape and up to 12.1 mm in size and consisted of a range of lithologies including basalt/dolerite, siltstone, quartzite and other metamorphic rock fragments. Coal fragments were infrequent and small, and displayed sharp boundaries with the binder and were therefore acting as aggregate. The aggregate was generally well bonded within the binder. However, peripheral microcracks tended to be more common around coarser aggregate grains. The binder coated the grains moderately well. However, within localised areas the binder showed depletion around coarser aggregate grains, resulting in poorly cemented areas.

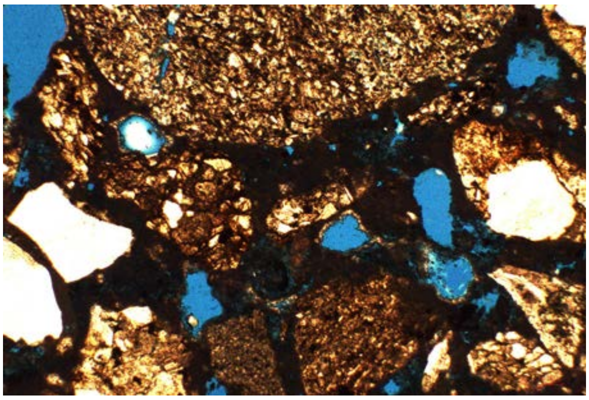

Figure 85: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. The coarser fractions of aggregate are dominated by lithic fragments, and finer fractions are composed mainly of quartz grains and a smaller proportion of lithic fragments. Lithic fragments are composed of a variety of lithologies.

Voids and cracks (Figures 86 and 87)

Voids were occasionally observed and appeared to be from shrinkage and binder dissolution, and they were commonly lined with secondary minerals like calcite. The calcite was scalenohedral (dogtooth) in shape, and formed interlocking clusters along the margins of voids. Microcracks were present in moderate amounts and tended to be concentrated round aggregate grains and the surfaces of the mortar. The mortar had a moderate visual porosity and a moderate permeability.

Sample 2: Mortar examination

Once dried the mortar was found to be 10YR 8/2 – 8/3 'very pale brown' on fresh surfaces and 10YR 5/2 'greyish brown' on soiled surfaces when assessed against the Munsell Soil Colour Charts.

The intact pieces of mortar, although heavily voided, appeared to have been reasonably well compacted, when placed. The mortar was moderately hard but could be broken under firm finger pressure, and once disrupted it was found

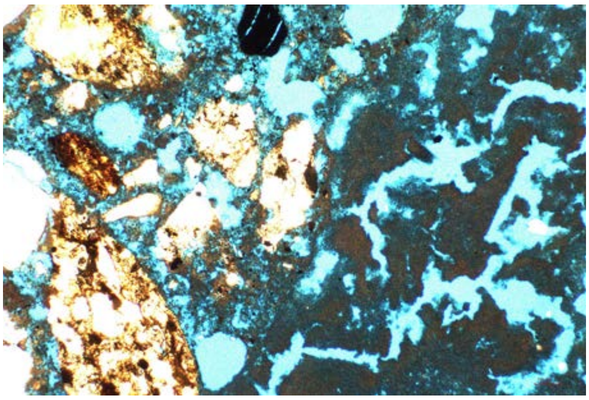

Figure 86: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. Lime inclusions commonly show shrinkage cracks and diffuse boundaries with the surrounding paste. Due to dissolution and leaching, the original structure of any under burnt lime has been lost.

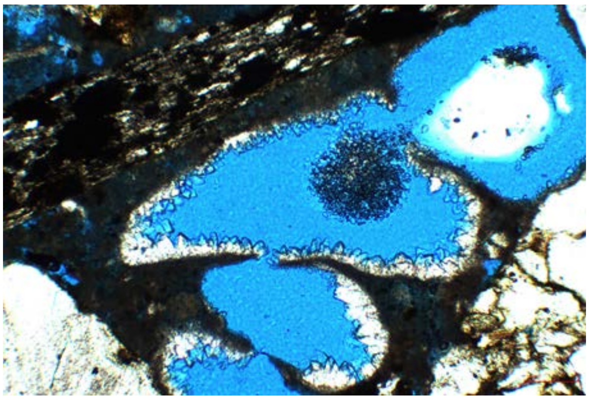

Figure 87: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye). High magnification image showing cracks in the mortar that have been infilled and fringed with secondary calcite.

to friable and easily disaggregated. The aggregate grains were moderately well encapsulated throughout. However, those on the outer surfaces tended to protrude from the paste. The mortar contained an abundance of voids, many of which contained linings of calcite as secondary products, alongside soiling and organic matter (Figure 88), all indicating that water percolation through the mortar had occurred, resulting in leaching, and the re-precipitation, of binder components and the deposition of transported debris. There were infrequent and small coal or burnt fuel fragments noted in the sample examined. There were frequent lime inclusions which were variable in size and shape, with the majority appearing cracked and irregular.

Figure 88: Image showing the outer surfaces of intact pieces of mortar, as received – showing a voided and granular texture and soiling on the outer surfaces (scale bar = 10 mm).

The coarse aggregate consisted mostly of well-weathered lithic fragments, while finer fractions were composed of sub-angular quartz grains, along with smaller proportions of lithic fragments (Figure 89). In response to a phenolphthalein indicator test the material was found to be fully carbonated. The sample exhibited a moderate water absorption rate when subjected to a water droplet test, suggesting a moderately well-connected pore network.

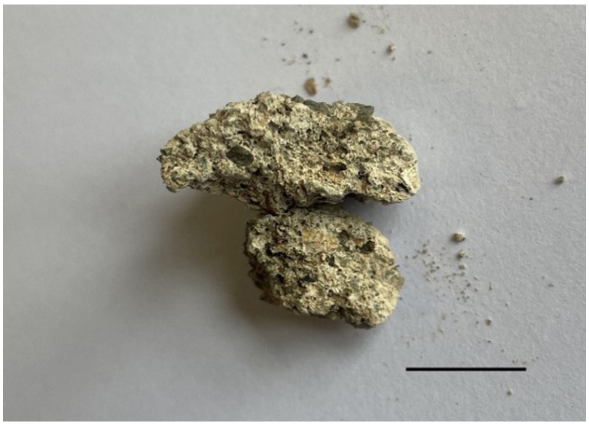

Figure 89: Image showing freshly fractured faces of the sample (scale bar = 15 mm).

Sample 2: Petrographic analysis

Binder

The binder was fully carbonated and contained relicts of lime inclusions up to 4.3 mm in diameter. Lime inclusions commonly contained hydration/shrinkage cracks and are irregular in shape. Most inclusions showed a diffuse boundary with the surrounding paste suggesting they were acting as binder, rather than aggregate. There was significant evidence of binder depletion, fluid migration and secondary mineral reprecipitation in the thin section examined (Figure 90). Calcite was observed to form linings/fringes in voids and shrinkage crack pathways. The calcite tended to be scalenohedral (dogtooth) in shape, and formed tight interlocking layers in these voids. There was no evidence of hydraulic components, such as clinker, observed in the section examined. However, it should be noted that because this mortar had undergone a significant degree of dissolution and reprecipitation, any clinker components may have hydrated and/or been leached. Microcracks were common, and these also showed signs of fluid migration and the precipitation of deleterious minerals. The cracks were not typically restricted to any region, although they were more abundant around aggregate peripheral zones (particularly around coarse aggregate grains) and in/around lime inclusions. A fine-grained opaque material was also seen to be concentrated in several regions of the binder. However, there was no evidence of typical pozzolanic reaction minerals in the thin section or in the XRD, and the localised nature of these particles suggest it was due to post-placement alteration/weathering of iron oxide bearing grains.

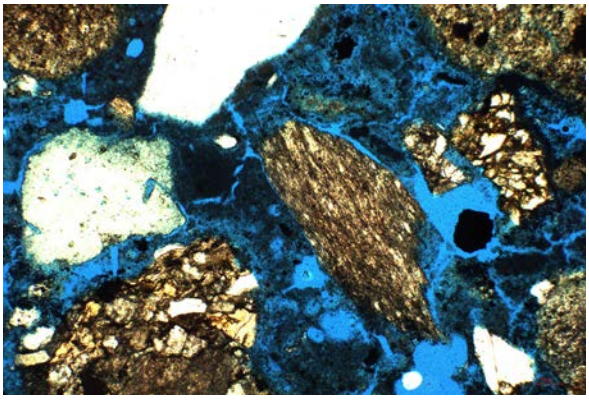

Figure 90: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. Typical view of binder showing well dispersed aggregate and heterogeneous nature, where dense areas are adjacent to extremely porous areas. Aggregate lithology is broadly similar to that observed in S1.

Aggregate

The finer aggregate fractions consisted predominately of sub-angular to sub-rounded quartz grains, along with a smaller proportion of lithic fragments. Coarse aggregate fractions were dominated by lithic fragments which showed a range of lithologies including basalt/dolerite, sandstone, quartzite and other metamorphic rock fragments (Figure 91). Lithic fragments tended to be sub-rounded to sub-angular in shape and up to 6.4mm in size and consisted of a range of lithologies including basalt/dolerite, sandstone, quartzite and other metamorphic rock fragments. Small opaque burnt coal fragments were noted, but these were not abundant throughout the sample examined. The aggregate was moderately well encapsulated by binder. However, within localised areas the binder showed depletion around coarser aggregate grains, resulting in poorly cemented areas with heavy voiding.

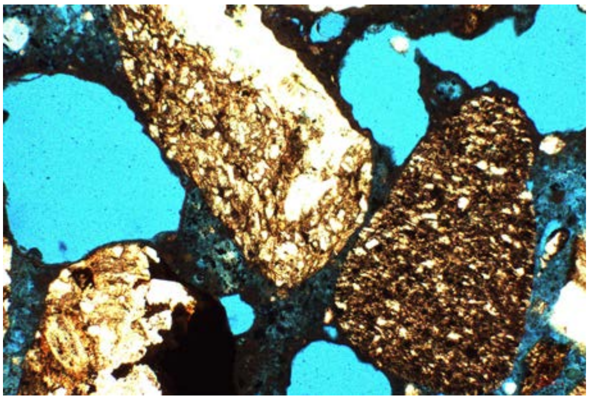

Figure 91: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. The coarser fractions of aggregate are dominated by lithic fragments, and microcracks and voids tend to be found in proximity to these larger grains.

Voids and cracks

Voids were occasionally observed and appeared to be from shrinkage and binder dissolution and they were commonly lined with secondary minerals like calcite. Microcracks were present in moderate amounts and the mortar had a moderate to high visual porosity and a moderate permeability. The permeability was variable throughout, with well-connected and highly permeable regions existing between areas of disconnected pores and cracks (Figures 92 and 93).

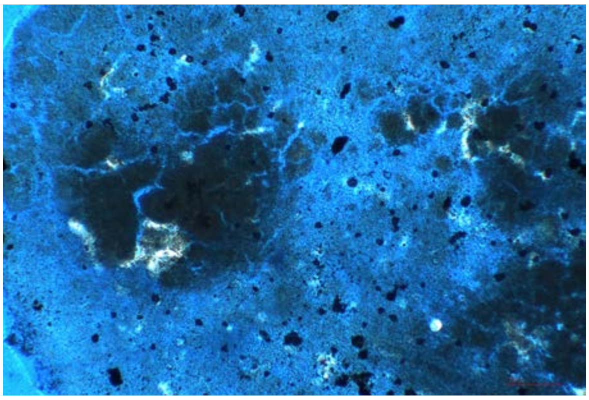

Figure 92: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye. Lime inclusions commonly show shrinkage cracks and diffuse boundaries with the surrounding paste. Due to dissolution and leaching, the original structure of any under burnt lime has been lost. Some microcracks in this inclusion have been infilled with secondary calcite.

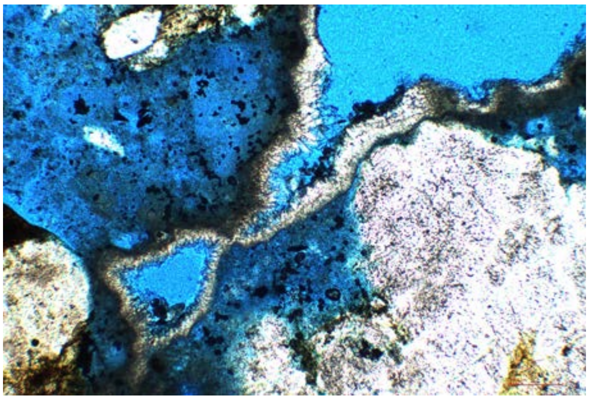

Figure 93: Thin section of the sample under plane polarised light. Pore spaces are highlighted in bright blue, while areas of dark/dull blue indicate the lime binder that has absorbed some of the blue dye). High magnification image showing cracks in the mortar that have been infilled and lined with secondary calcite.

Discussion

In sample 1, on the basis of the volumetric proportions for binder and aggregate determined from the modal analysis, the sample had a mix composition in the region of 1 part lime to 2.3 parts aggregate. In sample 2, on the basis of the volumetric proportions for binder and aggregate determined from the modal analysis, the sample had a mix composition in the region of 1 part lime to 2.2 parts aggregate (Table 20).

Based on the petrographic analysis, both binders appear to be made from a non-hydraulic to feebly hydraulic lime. The lime inclusions observed appear to have formed from a quicklime, but the relatively low abundance of lime inclusions and coal fragments observed in the analysed samples suggest that most of the lime was fully hydrated during slaking, with the mortar most likely having the working properties of a putty mix. It should also be noted that due to the significant degree of post placement binder dissolution and alteration observed in both samples, the original fabric and microstructure of the binder and lime inclusions may have been affected.

Components	Sample 1 total (%)	Sample 2 total (%)
Quartz	22	20
Lithic fragments (including sandstone, quartzite and other metamorphic fragments).	38	40.5
Opaque fragments (inc. coal)	10	8
Total aggregate	70	68.5
Lime Binder	20	22
Lime inclusions	4.5	6
Secondary calcite	5.5	3.5
Total Binder	30	31.5
Total	100	100
Cracks and voids	1	
Porosity (visual)	23%	21%
Mix proportions (by volume)	1 part lime to 2.3 parts aggregate.	1 part lime to 2.2 parts aggregate.

Table 20: Results of modal analysis on samples 1 and 2.

Historically, crude methods of manufacture led to heterogeneous mortars with a high variability of both composition and texture. This variability, along with variations in working practice (i.e., it was normal to have more than one mortar mixer per site) means there is no conclusive way to determine through petrographic analysis whether a mortar is original, or indeed, how old it is. However, based on the context in which the material was found, combined with the nature of the lime inclusions and the consistency between the aggregate mineralogy observed, they are from the same, or a similar, source and period of construction.

There are no close lime sources to Tinnis Castle, albeit there are references to several limestone workings to the north, in and around Carlops (Robertson *et al*. 1949), a distance of 17-18 miles from the site. This distance would not have been unsurmountable in the fourteenth and fifteenth centuries, particularly as armies and cattle drovers covered much more significant distances. It was common practice for landowners to obtain labour in quantity and at very low cost, therefore bringing materials from a distance would have not been a problem – especially considering it was for the construction of a building of note. It is also likely that the stonemasons were brought from further field, potentially from the north (i.e. Edinburgh and the Lothians), or the east (i.e. Berwick-upon-Tweed or Kelso). The presence of coal fragments, and the occurrence of dolomitic fragments, would favour Carlops as a source of lime – it is known that some of the deposits and limestone boulders worked for lime in that area were in part dolomitic (in the region of 6% MgCO3), and the limestones were burnt using coal from the deposits just to the north of Carlops. There were no under-burnt lime inclusions present in the analysed samples, and the majority of lime inclusions were too altered and hydrated to retain original fabric. As a result, this makes identifying the raw lime source difficult and no obvious dolomitic material was observed in the thin sections analysed.

Lime mortars by nature are complex and dynamic materials and the solubility of calcium carbonate in weakly acidic water provides a method for the dissolution and re-precipitation of lime binder, which while potentially affecting the structural stability of a mortar, can also lead to significant changes in bulk chemistry (i.e. sulphate attack, salt efflorescence etc), porosity and permeability. When a masonry structure is saturated, and water diffuses through it then the binder and/or fines in the aggregate from the mortar or limewash may be transported. Certain components within the binder, such as calcium hydroxide and calcite may dissolve and be redeposited within the pores, construction voids or even on the faces of the structure. Both mortar samples analysed from Tinnis castle showed significant evidence of this type of binder dissolution and re-precipitation, and therefore the original fabric of the mortar (in particular the lime inclusions) may have been altered. However, both mortars appear to be consistent in terms of the frequency and microstructure of their lime inclusions which would indicate they have been made using the same or very similar methods.

Animal Bone

By Catherine Smith[9]

Faunal remains recovered from excavations at Tinnis Castle/Fort and Thirlestane Round Barrow were subject to analysis. Material thought to be of recent date was not selected for full analysis but was only briefly examined and not enumerated here.

Results

Thirlestane Round Barrow

Cremated bone fragments were found as retents recovered from sieved soil samples and were therefore of the order of a few millimetres in size only. Sixteen larger burnt or calcined fragments of the order of 10-30 mm in size were extracted from the cremated human remains SF 211 in one of the graves (5004) but unfortunately, none of the fragments was identifiable as anything other than mammalian. Given that the retents were associated with human burials, there is a possibility they may have been human in origin.

Tinnis Castle and Fort

Species

By contrast with the Thirlestane Round Barrow, samples of both bulk and retent bone from Tinnis did contain identifiable elements although most of the fragments were also calcined by heat. Species represented were cattle, cf cattle, sheep/goat and bird cf domestic fowl (*Gallus gallus*; Tables 21 and 22). Bones which could only be categorised as large ungulate (probably cattle), small ungulate (probably sheep/goat) and indeterminate mammal were also present. Most of the fragments fell into the category of indeterminate mammal.

In the bulk assemblage of 205 fragments, seven were from cattle, four cf cattle, seven large ungulate, 18 sheep/goat, one small ungulate, 160 indeterminate mammal and one bird cf fowl (see Table 21). Large and small ungulate fragments are likely to originate from cattle and sheep/goat, respectively. In addition, two cattle, one sheep/goat and two small ungulate fragments were retrieved from occupation and primary deposits (1007 and 1010). Including retents, the assemblage represented a Minimum Number of Individuals (MNI) of one cattle, one sheep/goat and one bird in Trench 1 and one each of cattle and sheep/goat in Trench 2. Somewhat surprisingly, no pig bones were recorded in the Iron Age, early medieval or late medieval - post medieval periods, although a mandible from an immature pig and a possible pig humerus fragment were recovered from topsoil and rampart collapse in Trench 3, SF 037 and SF 070.

Those bones recovered from modern or disturbed contexts which were not selected for further analysis are summarized in Table 23. Species present included cattle, sheep/goat, cf pig, rabbit and small mammal of a size comparable to rat. Rabbits were unknown in Scotland until the medieval period and took some time to establish themselves; the earliest reported so far is from St Andrews, with a radiocarbon date of cal AD 1320–1392 (Hall and Smith 2017, 177). The Tinnis Castle specimens are therefore likely to be of a date later than the fourteenth century.

Bird species in the topsoil and upper deposits were goose, Corvid, medium Passerine and indeterminate bird species. One fish bone, comparable to haddock, was also recovered.

	No. of fragments	No. of fragments	No. of fragments	Total
Species	Trench 1	Trench 2	Trench 3	
cattle	1	6		7
cf cattle	3	1		4
large ungulate		6	1	7
sheep/goat	1	17		18
small ungulate	3	5		8
indeterminate mammal	14	146		160
bird	1			1
Total	23	181	1	205

Table 21: Total number of fragments by trench and species, excluding retents.

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	No. of fragments	No. of fragments	No. of fragments	Total
Species	Trench 1	Trench 2	Trench 3	
cattle	1	6		7
cf cattle	3	1		4
large ungulate		6	1	7
sheep/goat	1	17		18
small ungulate	3	5		8
indeterminate mammal	14	146		160
bird	1			1
Total	23	181	1	205

Table 22: Total number of fragments by species and date range in selected contexts in Trenches 1-3.

	Iron Age	Iron Age	Early medieval	Early medieval	Late medieval	Late medieval	Total	Total
Species	bulk	retent	bulk	retent	bulk	retent	bulk	retent
cattle		1	1		6		7	3
cf cattle	3				1		4	
large ungulate	2				5		7	
sheep/goat	1				17		18	1
small ungulate	4	1	1		3		8	3
indeterminate mammal	61	70	16	124	83		160	520
bird cf fowl			1				1	
Total	71	72	19	124	115		205	527
Species	Trench 1	Trench 2	Trench 3					
cattle	+	+						
cf cattle								
large ungulate	+	+	+					
sheep/goat	+							
pig			+					
?pig			+					
small ungulate	-							
rabbit	+							
large/small ungulate		+						
small mammal	+							
indeterminate mammal	+	+	+					
bird: Corvid	+							
bird: Passerine	+							
bird: goose	-	+						
bird: indeterminate species	-	+						
fish	-	+						
Total no. fragments	56	84	7					

Table 23: Presence/absence of species in non-selected contexts.

Ages of animals at death

Since the overall number of fragments recovered was small and the condition of the bone was fairly poor, with much burning, evidence for the age of animals at death was scarce. However, one cattle bone and two sheep/goat mandibles provided some evidence. Ages at death are based on Payne (1973) and Grant (1982).

In a medieval occupation deposit (2004) in Trench 2, a second phalanx of cattle SF 172 dating to the late–post-medieval period was from an immature or adult animal, based on fusion of the proximal epiphysis. No other cattle bones preserved definite evidence of age.

Two sheep/goat mandibles, which provided fairly reliable evidence of age, based on tooth wear and eruption patterns, were recovered. Both dated to the late–post-medieval period. From the same medieval occupation deposit (2004) in Trench 2, a specimen with an erupting third molar SF 108 was thought to have come from an animal equivalent in age to between one to two years. From another medieval occupation deposit (1007) in Trench 1, a sheep/goat mandible SF 122 with fully erupted dentition came from an animal aged between three to four years at death. This latter specimen was submitted for radiocarbon analysis and gave a late-post-medieval date of cal AD 1452–1631 (SUERC-111439, 373 ± 25 BP).

The only evidence for age at death for pigs came from a mandible SF 037 in the topsoil (3000) in Trench 3. The crypt for the lower third molar was present although the erupting tooth itself was missing. The estimated age at death was between about 13 and 20 months, indicating an immature animal.

Evidence of butchery

Some traces of butchery survived on cattle and large ungulate (probably cattle) bones. Two bones in Trench 2 were chopped using a cleaver or axe. One, recovered from a medieval occupation deposit (2004) dating to the late–post-medieval period, was a cattle calcaneum SF 108, chopped across the shaft in a medio-lateral direction. The other, recovered from the core of the vitrified rampart (2010) dated to the late Iron Age, was a large ungulate vertebral centrum SF 139, probably chopped dorso-ventrally, possibly when dividing the carcass into sides.

In a medieval occupation deposit (1007) in Trench 1, parallel knife cuts were present on a probable cattle tibia shaft SF 121. These knife cuts were presumably inflicted while removing meat from the bones.

In the non-selected material from the overlying rubble spreads in trenches 1 and 2, there was further evidence of parallel knife cuts on a mammalian long bone shaft fragment SF 074 and a large ungulate rib shaft SF 100. Evidence of chopping came from a sheep/goat tibia shaft SF 102, chopped medio-laterally, as well as a cattle metatarsal SF 080 chopped dorso-ventrally and a probable large ungulate tibia shaft SF 081 chopped twice in a sagittal direction. While the metatarsal SF 080 could have been chopped off during preparation of the carcass into joints of meat, the twice-chopped tibia SF 081 more likely represents utilisation of the marrow contained with the bone's internal cavity.

Those few bones which displayed human-made marks, therefore, showed no difference in butchery style (only one Iron Age fragment with possible butchery marks was recovered). This is not surprising since metal butchery tools seem to have remained fairly constant in style and function until the early modern period. In some parts of rural Scotland this meant there was little change until the late nineteenth century, when tools such as saws could be mass-produced. Until that time, cleavers or axes were used in carcass splitting and dressing – saws were too valuable to be used for everyday butchery but were reserved for carefully removing antlers and bones intended to be used for artefact manufacture.

Discussion

At Tinnis, over half of the bulk-collected animal bone assemblage (56.1% or 115 out of 205 fragments) came from deposits dated to the late/post-medieval period and 19 out of 205 (9.3%) to deposits dated to the early medieval period.

However, 71 of the 205 bulk-collected bone fragments were found to date to deposits dated to the Iron Age (34.6%). Comparisons with faunal remains at other sites dating to the late Iron Age/ early medieval period may be made with Mote of Mark (Laing and Longley 2006), Trusty's Hill (Toolis and Bowles 2017), Dundurn (Alcock *et al.* 1989) and Dunollie (Alcock and Alcock 1987). At all of these sites, cattle were the dominant species, while pigs were in second place and sheep/goat less frequent even than pig, based on fragment count. However, at Tinnis Fort, although cattle predominated, sheep/goats were second in frequency and pig bones were absent from the Iron Age assemblage (and indeed from the medieval period). Pig bones were however found in the overlying rubble spreads that may include late medieval material (Table 23). This difference very likely reflects the very small sample size at Tinnis but is worth noting nonetheless.

In other respects, the pattern of animal exploitation is similar, in that horse remains were absent at Tinnis (all periods), Dundurn (Alcock *et al.* 1989) and Mote of Mark (Bourdillon 2006) and present in only a very small quantity at Dunollie (Alcock and Alcock 1987, 138). Wild fauna were similarly scarce at comparable sites. Red deer bones were absent at Tinnis and Trusty's Hill (Toolis and Bowles 2017) although found in small quantities at Dundurn (Alcock *et al.* 1989) and as antler at Dunollie (Alcock and Alcock 1987). Fish bones were similarly scarce – only one fish bone was found at Tinnis, although recovered from a modern deposit – being present only at Dunollie (*ibid*) and absent from Dundurn (Alcock *et al.* 1989), Trusty's Hill (Toolis and Bowles 2017, 118) and Mote of Mark, the last possibly relating to methods of retrieval (Bourdillon 2006, 133). There were no bird bones from the Iron Age contexts at Tinnis, although a possible domestic fowl bone was noted in the early medieval rampart core (1004) in Trench 1. This low frequency is comparable to Mote of Mark, where only two bones of fowl were noted (Bourdillon 2006). Fowl was absent from Dunollie (Alcock and Alcock 1987, 138), Dundurn (Alcock *et al.* 1989) and Mote of Mark (Toolis and Bowles 2017, 118). Wild birds were also conspicuous by their absence at Tinnis in the Iron Age contexts (although Corvid, Passerine and goose bones were present in the more recent contexts). Similarly low incidences of wild bird species were noted at Mote of Mark, where however one bone of white-tailed eagle (*Halieetus albicilla*) was present (Bourdillon 2006, 140). Wild birds were absent from Trusty's Hill (Toolis and Bowles 2017, 118).

Similarly to Tinnis, a high rate of calcination or burning of bone was noted at Dunadd (Deighton 2017, 68) and Dundurn (Alcock *et al.* 1989, 214), which adversely impacted the identification rate. Small species with fragile bones (for example small mammals, fish and birds) were probably affected more severely than large species with robust bones, for example cattle. In addition, the age of the animal at death can affect the survival rate of its bones - younger bones contain proportionally more organic material and are therefore less resistant to decay and soil acidity than those of mature beasts.

The very small assemblage of early medieval animal bones is similar in nature to those from other sites such as Dunollie, Dundurn, Mote of Mark and Trusty's Hill in both the dominance of cattle over other domestic species, such as sheep/ goats, and the relative absence of wild mammals, birds and fish. The late medieval – post-medieval assemblage from Tinnis was also relatively small and allows little to be said other than that cattle and sheep/goats were still the favoured domestic species. The absence of pigs from the Iron Age and medieval periods is probably due to this small sample size.

Marine Shells

By Laura Muser

The shell assemblage recovered during the excavation initially comprised seven shell fragments, exclusively from Tinnis Castle, weighing a total of 71 g. The weights ranged from 0.5 g up to 30.5 g and the size ranged from just over 20 mm by 10 mm up to 70 mm by 60 mm.

A further total of 7 g of potential shell fragments from eleven soil samples from both Tinnis Castle and the Thirlestane Barrows were recorded during the post-excavation sieving of soil samples and subsequently entered for analysis. The majority of sample retents were small fragments measuring less than 5mm in size and the majority weighing less than 0.1 g.

Results

The shell fragments were inspected to confirm whether each was indeed marine shell material, followed by weight measurements and species identification where possible, as well as a quantification of a minimum number of individuals (MNI) present. Identification of the marine shell material was based on Fish and Fish (2011). The shells were also closely inspected for any marks that could be identified as to whether they had been worked in any way.

For larger shell assemblages, an MNI value is usually either established via the count of a non-repetitive element (NRE) or by weighing the shell material. For smaller assemblages, such as this, neither method is entirely definitive. The NRE often used for bivalves, such as oysters, is the umbo of the oyster, an element of which each individual has a right and a left one, which is why they have to be sided to be properly used as an NRE to establish MNI (Bowlder 2013).

Based on the layering and calcification, the majority of shell fragments from Tinnis Castle were identified as oyster shell fragments. Due to the size of the fragments, no NRE was identified within the marine shell material. The eight marine shell fragments from Tinnis Castle and Fort were all identified as common European flat oyster, *Ostrea edulis.* Five of these small finds originated in Trench 3, two in Trench 1 and one in Trench 2. All small finds are fragments and no signs of working has been identified. A total MNI of eight was established.

One single fragment of oyster shell (SF 088) weighing 0.5g was chosen for radiocarbon dating, based on its size and secure context. The shell, which was found in an occupation deposit (3003) within the lower enclosure, was dated to cal AD 1404-1695 (SUERC-111445, 809 ± 24 BP).

None of the putative shell fragments from the sample retents from the Thirlestane Barrows were shell, neither terrestrial nor marine.

Discussion

All the identifiable marine shells recovered from Tinnis Castle were identified as oyster shell, *Ostrea edulis.* Oysters were used in a variety of ways, one of which could have been in the production of mortar (Allen 2017, 251). However, none of the oyster shell fragment had any traces of mortar, nor were any work marks identified. The oyster shells from Tinnis are therefore more likely to derive from the consumption of oysters in the diet of the castle's occupants.

Within the stratigraphy of Tinnis Castle, the marine shell material was all recovered from context layers which were dated to the late medieval occupation of the site. The earliest shell find (SF 013) in Trench 1 was found in an occupation deposit (1007) that was radiocarbon dated to cal AD 1452-1631 (SUERC-111439, 373 ± 25 BP) while the afore mentioned shell SF 088 from an occupation deposit (3003) in Trench 3 yielded a closely comparable radiocarbon date.

Along with Tinnis Castle, medieval marine shell assemblages from Edinburgh Castle, the Holyrood Parliament Site and Kelso are consistently dominated by oyster shells and equally consistently in relatively small amounts in comparison to the principal faunal assemblages apparent on these sites (Driscoll and Yeoman 1997; HAPT 2010; Perry *et al*. 2010).

Archaeobotany

By Diane Alldritt

Twenty environmental samples taken during archaeological excavations at Tinnis Castle and Fort, and a further 44 samples from the Thirlestane barrows, were fully analysed for carbonised plant macrofossils and charcoal. Material sorted from 54 of the sample retents together with 31 small find items taken on site were also examined for the presence of any identifiable charred remains. Only thirteen of the small finds consisted of charcoal, with the remainder of material collected on site proving to be geological remains and clinker.

Methodology

Bulk environmental samples were processed by project volunteers working under the close supervision of GUARD Archaeologists using a Siraf style water flotation system (French 1971). The samples were from 1.5 litres up to 37 litres in volume. The flots were dried before examination under a low power binocular microscope typically at x10 magnification. All identified plant remains including charcoal were removed and bagged separately by type.

Wood charcoal was examined using a high-powered Vickers M10 metallurgical microscope at magnifications up to x200. The reference photographs of Schweingruber (1990) were consulted for charcoal identification. Plant nomenclature utilised in the text follows Stace (1997) for all vascular plants apart from cereals, which follow Zohary and Hopf (2000). The term 'seed' is used in the broadest sense to include achenes, nutlets and so forth.

Results

The environmental samples produced small amounts of carbonised material <2.5 ml up to 200 ml in volume with the majority of recovery at the lower end. The remains consisted primarily of charcoal fragments <0.5 cm up to 4.0 cm in size in amongst a general background matrix of crushed charred detritus below the level of identification. Trace finds of crushed and degraded hazel nutshell were recorded from six samples, whilst only one deposit contained cereal grain, mostly in abraded condition. Modern material was present <2.5 ml to 600 ml mainly root detritus with occasional finds of modern seeds and earthworm egg capsules indicating bioturbation was occurring. Clinker fragments were found in seven samples from the square and round barrow features and in eight of the small finds taken from the castle and fort and this material probably originated from Post Medieval activity and disturbance.

Results are given in Appendix 3 and discussed below. Radiocarbon dates are quoted at the 95.4% (2-sigma) calibration level.

Discussion

Tinnis Castle and Fort

Twenty samples were taken from three trenches excavated in the SE and SW corners of the summit rampart walls and across the lower south-westr drystone rampart, with at least four phases of occupation from the late Iron Age to early medieval, into medieval and post-medieval periods indicated by the radiocarbon dates.

The primary deposit (1010) produced a discrete concentration of *Quercus* (oak) and *Corylus* (hazel) charcoal, perhaps representing an earlier pre-fort phase of burning activity, possibly related to prehistoric settlement activity or woodland clearance work. The vitrified core of the rampart (2010 and 2011), which was radiocarbon dated to the Late Iron Age, produced concentrations of oak charcoal, possibly remains of structural timbers burnt in situ, with traces of degraded *Corylus avellana* (hazel) nutshell, likely to be food waste, also present. A subsequent occupation layer (2015) was found to contain *Betula* (birch) charcoal that was radiocarbon dated to a slightly later phase of activity at cal AD 542 – 638 (SUERC-111440, 1500 ± 24 BP). Similarly, the base of the rampart core (1004) in Trench 1 also contained birch charcoal which returned a date of cal AD 600 – 657 (SUERC-111448, 1419 ± 24 BP). This rampart core also contained a few fragments of oak charcoal likely to be fuel waste.

The lower enclosure of the fort (Trench 3) produced two radiocarbon dates indicating late ninth - early eleventh century AD occupation activity. The lower of these occupation layers (3007), which underlay scree collapse (3008) contained degraded oak and birch charcoal together with a few crushed fragments of hazel nutshell, possibly trampled and mixed hearth sweepings from domestic burning activity. The birch charcoal returned a radiocarbon date of cal AD 890 – 993 (SUERC-111447, 1110 ± 24 BP). The occupation deposit (3006) overlying the scree collapse (3008) was interesting as it produced the only finds of carbonised cereal grain from the site, consisting of a small cache of degraded *Hordeum vulgare* sl. (barley), mixed with birch and hazel charcoal, likely to be waste sweepings from a nearby domestic hearth. The hazel charcoal from this context was radiocarbon dated to cal AD 895 – 1020 (SUERC-111446, 1080 ± 19 BP).

Occupation layers (1007 and 3003) from the later medieval castle produced sparse quantities of carbonised remains. These consisted of trace finds of oak and hazel charcoal with crushed hazel nutshell, likely to be residual occupation debris, mixed with clinker, geological remains and modern plant detritus, typical of post-medieval activity and disturbance.

Thirlestane Square Barrow

Four samples were examined from the square barrow and three of these contained trace charred remains, probably mostly residual material.

The fill (4005) of the ditch (4004) produced a few crushed and degraded fragments of hazel nutshell, whilst the fill (4008) of another slot through the ditch (4007) and the fill (4011) of one of the graves (4010) contained trace charred detritus with nothing identifiable, probably residual remains, indicating little or no burning activity likely to be associated with this feature.

Thirlestane Round Barrow

Forty-two samples taken from the ditch and mound deposits of the round barrow were largely sterile. However, small quantities of charcoal likely to be fuel waste were recovered from the three excavated cremation burials (5004, 5014 and 5016) within the graves (5003, 5013 and 5015) together with trace finds of hazel nutshell in the cremation burial (5014) within grave (5013).

Cremation urn burial (5004) within grave (5003) contained a few fragments of birch charcoal, mostly crushed remains of fuel waste probably gathered up from the funeral pyre along with bone fragments. The cremation burial (5016) within grave (5015) contained a small amount of alder charcoal, probably fuel waste. The charcoal in cremation burial (5014) within grave (5013) was too small to identify but a few 2mm pieces of crushed hazel nutshell fragments were present, possibly residual food waste or material re-used as fuel, as nutshell produces a high heat when burnt (Mithen *et al*. 2000). The presence of alder and birch charcoal suggested opportunistic use of locally growing scrub and wetland resources for fuel during the middle Bronze Age phases of cremation activity.

The re-deposited stone cap (5012) of the barrow mound contained a single fragment of Prunoideae (cherries) type charcoal, together with crushed and abraded alder charcoal, likely to be mixed residual material.

Conclusions

The environmental samples from Tinnis fort and castle produced small quantities of carbonised remains mainly consisting of charcoal fragments with only one deposit found to contain cereal grain. The charcoal remains were primarily identified as oak type with hazel and birch also present, likely to be mostly fuel waste sweepings from occupation activity. The oak from the late Iron Age vitrified fort rampart (2010 and 2011) may have been remains of structural timbers burnt in situ, and indicate the timber-laced element of this stone-faced rubble core rampart. An early medieval occupation layer (3006) was the only deposit to contain any cereal grain with all identified as barley type, mixed with birch and hazel charcoal, providing evidence of cooking waste from domestic settlement, albeit with the grains in very degraded condition. This is a rare example of cereal grain evidence from an early medieval deposit in the Scottish Borders, and may contribute toward ScARF recommendations on further research in SE Scotland, in particular with reference to crop regimes and agricultural practice (c.f. Hastie ScARF n/d. 9.4.6).

The samples from the Thirlestane square barrow were largely found to be sterile, indicating little burning activity associated with this feature. Thirlestane round barrow was equally sparse from the structural deposits but did produce small amounts of identifiable charcoal remains from two of the cremation burials (5004 and 5016), which provided evidence for the use of birch and alder wood as fuel for cremation processes.

Discussion

Thirlestane Round Barrow

By Amanda Gilmore and Ronan Toolis

The excavation of Trench 5 revealed a 3.80 m diameter multi-phased round barrow encircled by a 0.51 m deep ditch with an exterior bank. Fitting the description of similar round barrows, where a grave or graves were centrally enclosed by an earthen mound cast from the ditch encircling it, the remains of three interred cinerary urns with cremated human remains were identified within the Thirlestane Round Barrow. Two of the urns were recovered for analysis and the third left largely in-situ with a sample of human remains retained for analysis. A fourth possible cremation was identified by the presence of a cap-stone and left in-situ. A stratigraphic sequence of at least four sub-circular cremation deposits were identified within the round barrow (Figure 68). Three of the cremation deposits were sealed by capstones while the fourth may also have been sealed by a capstone that was later removed by subsequent ploughing activity.

Excavation of the ditch that encircled the round barrow indicates that the ditch was dug in a single event with spoil cast to the outer and inner sides of the ditch, forming a probable outer bank and the barrow itself. An unexcavated capstone was itself sealed by this inner mound material suggesting that this primary burial may have been interred prior to excavation of the ring ditch. Neither was this primary grave centrally located within the barrow. Instead, the central burial was one of two secondary burials (Figure 94), both cut into the inner mound deposit and sealed by redeposited barrow mound material. The final burial was cut into this secondary mound deposit, truncating one of the other secondary burials, which itself overlay the location of the primary burial towards the north-west edge of the barrow. The final cremation was contained within an undecorated miniature urn, which along with the other pottery recovered from the barrow, was middle Bronze Age. The burials were concentrated within the north-western quadrant of the round barrow with no burials evident in the southern or eastern quadrants.

Several instances of slumping of the barrow mound and external bank were evident within the barrow ditch indicating that the ditches were open for a sufficient period of time to allow natural erosion to occur. The final fill within the ditch contained an abundance of large stones on its surface in the south-west, south-east and frequent large stones in the north-east. This suggests that after placement of the final burial, the mound was capped with stone. No angle of spill was detected in the ditch fills.

The barrow had evidently been heavily truncated, not least by the north/south aligned plough furrow. This is supported by the truncation of the urn in the final burial and the southward spread of pottery and cremated bone in the fill of the plough furrow. Both the outer bank deposit and a small pit cut into it had also been heavily truncated by ploughing activity. It is reasonable to infer that the bank was much higher and that the pit may be the basal remains of a post-hole; the large stones within perhaps packing for a post.

Radiocarbon dating confirms that the cremation burials interred within the barrow date from the middle Bronze Age (Table 24). Though the primary burial remains largely undated as it was left *in situ*, the secondary and final burials appear to date to sometime between the early fourteenth and late thirteenth centuries BC, which is somewhat later than the general concentration of round barrows between 2000 and 1500 BC (Historic England 2018, 3). Barrows were constructed in Britain from about 2400 BC, with the earliest known form of burial within them being crouched inhumations, often interred inside a stone cist within the barrow and turf and/or stones deposited above (*Ibid*.; Downes n.d., 133). By about 2100 BC they became the near sole form of burial in Britain, with cremation largely replacing or at least outnumbering inhumations by 1800 BC (*Ibid*.).

Burial in order of sequence	Date
Primary burial	Date unknown
Secondary burial	1391-1221 BC
Secondary burial	1382-1133 BC
Final burial	1396-1223 BC

Table 24: Sequence of burials and associated radiocarbon dates.

The relatively short sequence of burials within the Thirlestane Round Barrow suggests a narrow timespan for its use. During analysis of the cremated human remains, it was determined that the known minimum number of individuals in the assemblage was six. The cremated bones from the secondary burials comprised one adult female and one child in each of the graves, while the cremated bone from the final burial originated from one adult of unknown sex and one child. These results suggest a dominant pattern of female and child burials. Although no dental material was recovered from the cremated remains for isotope analysis to determine childhood origin, a sample analysed from bone taken from the final burial revealed that one of the individuals in this burial spent the last decade of their life living in southern Scotland (Strontium Isotope Analysis, above). While for other populations across prehistoric Britain a high mobility rate during life may have been common, for the individual in the final burial at Thirlestane a pattern consistent with other cases from southern Scotland during the Bronze Age emerges (Parker Pearson *et al.* 2019, 628-629; Pellegrini *et al.* 2016, 3 and 6). With a significant lack of mobility in their last decade of life, it can perhaps be theorized that this individual lived local to this region since birth.

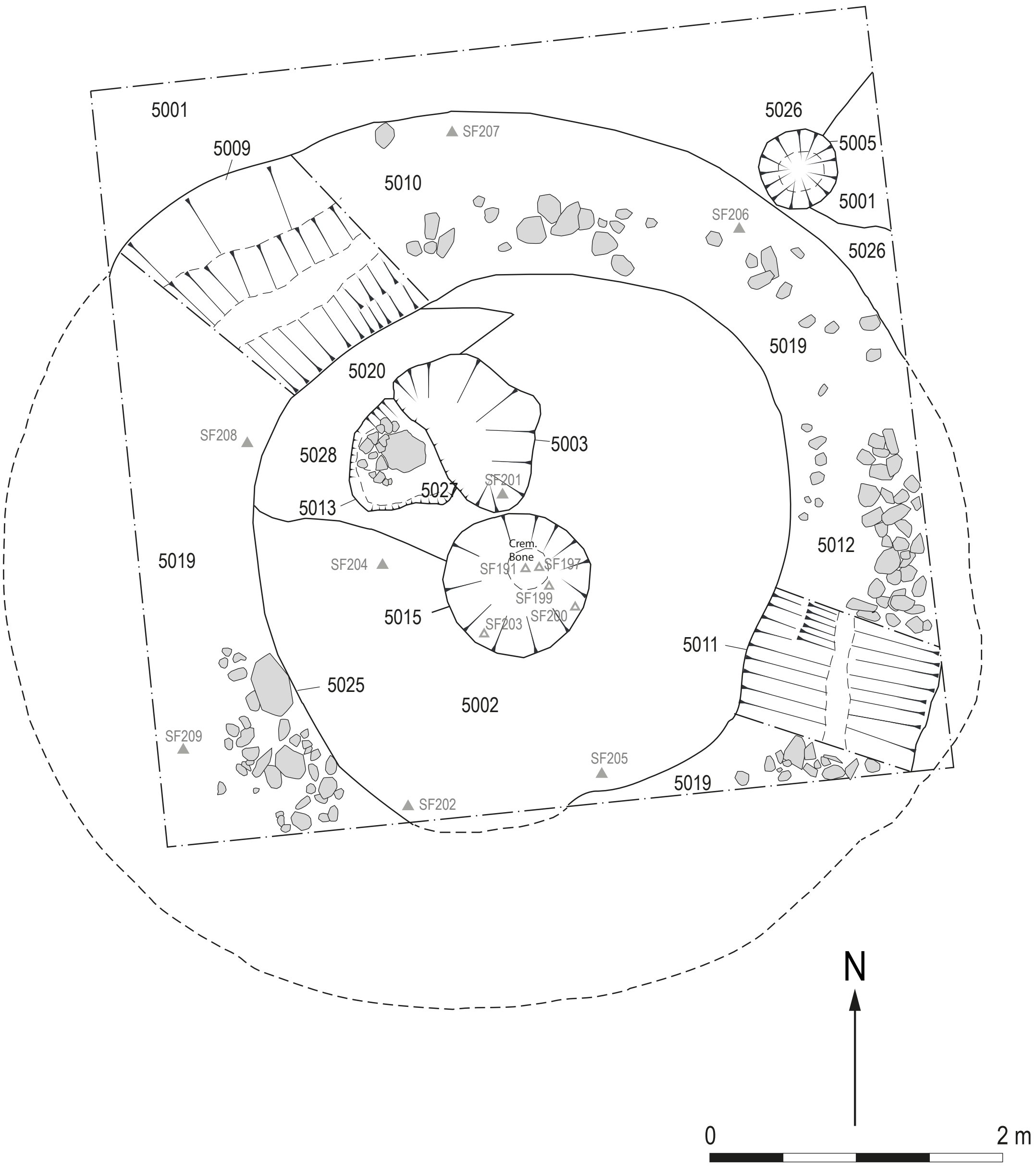

Figure 94: Thirlestane Round Barrow.

Analysis of the cremated human remains also revealed insights to the cremation process as a mortuary practice. The process of cremation includes a wide span of temperatures in which the burning of the dead takes place, from largely unburnt at a temperature of less than 200°C to hard burning at a maximum of 1300°C (Oestigaard 2013, 501-502). The bones from the Thirlestane Round Barrow appear to have been cremated in a range of 400 to 800°C due to the variation in grey, blue, black, and pale white colouration. Additionally, the cremated bone predominantly showed a variety of transverse, U-shaped, and mosaic cracking that suggests these bones were without flesh at the time of cremation, indicating a pre-cremation rite of exposure. The relatively low mass of the cremated bone from the secondary burials suggests these were token burial deposits too (Brück 2004, 180-181; Downes n.d.).

A maximum total of five pottery vessels were recovered from the round barrow, all containing ground pieces of rock temper to strengthen the material and chopped dried grasses to increase its workability (Ballin Smith above). The small fragment of Vessel 1, found in one of the secondary burials, was the only vessel not identified as a Middle Bronze Age urn but was instead an Early Bronze Age food vessel. Alongside this, the same secondary burial contained Vessel 2, a Middle Bronze Age urn. When considering the contents of this secondary burial, it is important to acknowledge that although the presence of a food vessel was common practice for contemporary burials, it was probably interred with the individual(s) within the primary burial as part of the mortuary rite and subsequently disturbed by the overlying secondary burial where it was redeposited. The other secondary burial and the final burial also each contained Middle Bronze Age urns, Vessels 4 and 3 respectively. Although the majority of Vessel 4 was left *in situ*, analysis suggests that its material and construction were extremely similar to that of the other vessels. This was also the case for the fragment of Vessel 5, recovered from the plough furrow that had truncated the barrow. The similarity of manufacturing techniques and raw materials in all the middle Bronze Age Urns recovered from the round barrow suggests that these were all made by the same potter (Prehistoric Pottery, above). This supports the dating evidence for a short sequence of burials within the barrow.

Only a small amount of lithics were recovered from the round barrow and comprised three quartz chips, one quartz flake and one flint chip (Lithics, above). The flint chip was recovered from the fill of the external post-hole, where it had probably been redeposited. The two quartz lithics, a chip from the final burial and a flake from one of the secondary burials, were not burnt – and therefore probably not original to the burial contexts, but instead associated with the backfill over the burials from the surrounding ditch.

A small amount of possible animal bone was recovered from the final burial within the barrow but were too small to be identified as anything other than mammalian, with the possibility they could be human (Animal Bone, above). If animal, then it may be that animals were included on the same funeral pyre given comparisons with Bronze Age mortuary rites across Britain where the inclusion of animals in burials was commonplace (Sheridan 2004, 261).

Burnt hazel nutshells in one of the secondary burials may indicate a residual food waste re-used as fuel, as nut shells are known to produce a high heat when burnt. Alder and birch appear to have been the predominant fuel used for the funeral pyres and suggest opportunistic use of locally growing scrub and wetland resources (Archaeobotany above).

It is important to remember that the excavated round barrow at Thirlestane was part of a cemetery of three such round barrows and that within the immediate vicinity were several more barrow groups such as at Langlaw Hill, Rachan Mill and Broughton Knowe as well as isolated barrows at Parkgatestone and Cardon (Figure 95). There are more than twenty round barrows recorded in Peeblesshire, as well as many cairns and ring cairns from the Bronze Age.

However, although the local Bronze Age landscape held a significant funerary aspect, this was a reasonably densely inhabited landscape too as the hillside settlements at Cloverhill, Burnetland Hill, Laigh Hill and Hopekist Rig, the hut circles at Cowiemuir Hass and Stobo Hope, the extensive spread of unenclosed settlements below the summit of Dreva Craig and the numerous burnt mounds and Bronze Age findspots demonstrate (Figure 95). It should be considered too that the predominantly upland locations of visible Bronze Age settlement reflect only the surviving record; surface traces of settlements in lower-lying areas of the local landscape having been obliterated by millennia of farming as elsewhere in Scotland (Toolis 2005, 497-499). Excavations of middle Bronze Age roundhouses at Green Knowe and more recently Lee Burn head in Peeblesshire demonstrate the type of substantial timber roundhouses likely inhabited by those buried at Thirlestane (Jobey 1981, 77-79; Barrett 2023, 71).

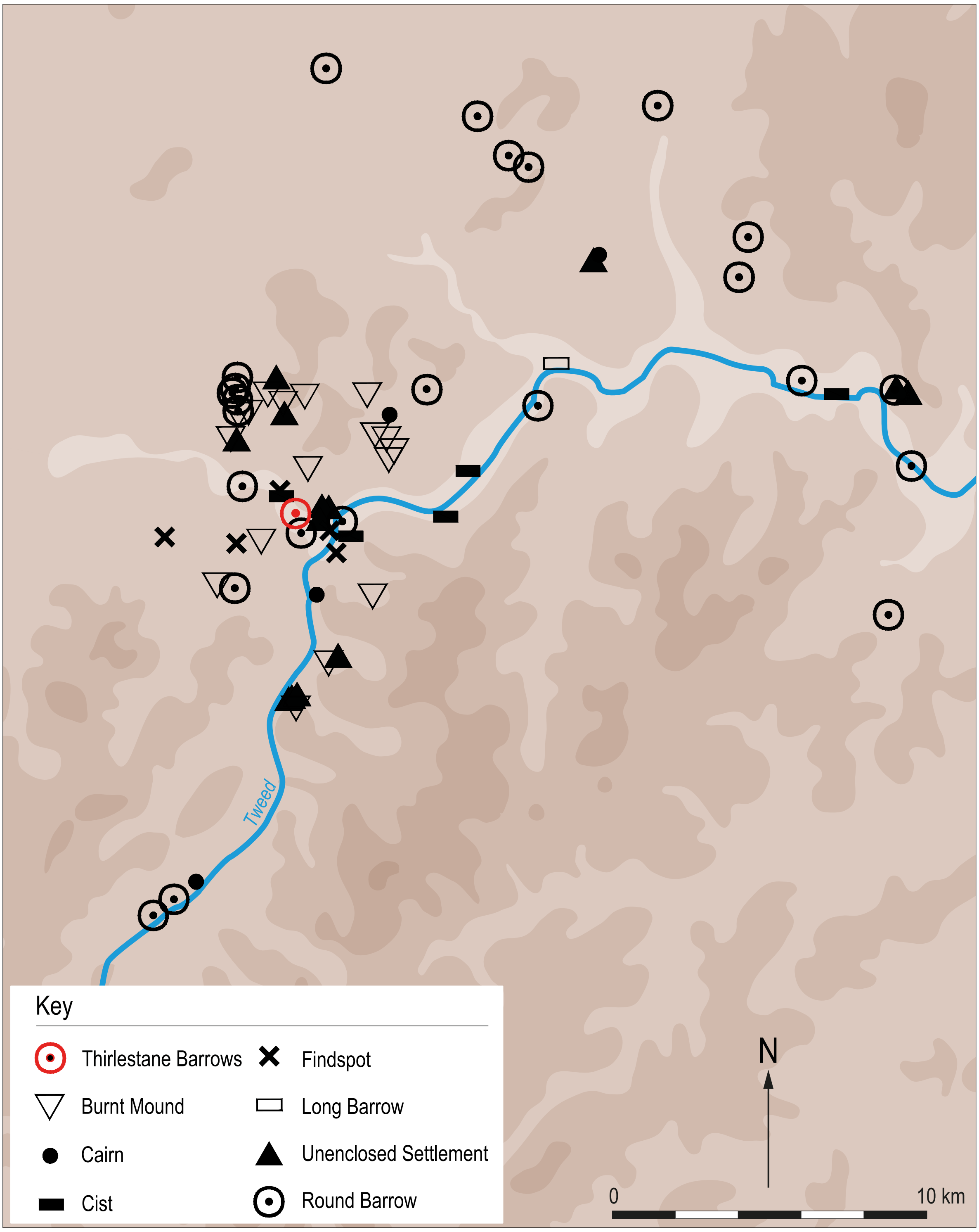

Figure 95: Distribution of Bronze Age sites located around Thirlestane Barrows. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

The precise settlement of the Bronze Age community that placed their dead within the Thirlestane Round Barrows is unknown but it is likely that the individuals came from any of these aforementioned local settlements. Recalling the result of the isotopic analysis of the cremated remains, we know that at least one individual buried at Thirlestane had been living in the area for at least the last decade of their life. The abundance of nearby settlements and burial sites suggest this was by no means an isolated site in the Bronze Age landscape, and when visiting Thirlestane Barrows it becomes apparent why it was chosen as a resting place for members of possible nearby settlements. Surrounded by hills in a lush valley, visible from all surrounding high points in the landscape, especially the settlements on Dreva Craig, the barrows at Thirlestane occupy a crucial visible position in the valley, presumably so those in the nearest settlements and those passing through the valley would recognize and revere those buried there.

In addition to the position of the barrow within the landscape, the construction and order of deposition within the barrow itself was just as essential to the funerary rites of the individuals buried within, and may suggest how patterns of status were reflected in death as they were during life. The primary inhumation or cremation deposit is usually central to the barrow, with additional burials or deposits being interred around it. However, at Thirlestane what was the primary burial is situated in a north-westerly position within the barrow, with secondary burials and the final burial positioned more centrally. The lack of grave goods within these cremations fits the characteristics of most Bronze Age burials in Scotland, where expressions of personal status were not necessarily communicated via material goods, and may have been instead suggested by the position and order of depositions within the barrow. Additionally, the multiple burials within the barrow at Thirlestane reflects a shift from the single inhumations of earlier Bronze Age Britain, to a collective burial site common to the middle Bronze Age when cremations were dominant (Caswell and Roberts 2018, 343-344).

Dating evidence from each of the burials at Thirlestane suggests they were all buried within a very narrow timeframe. Interestingly, at Horsbrugh Castle Farm in Peeblesshire, one crouched cist burial and three cremation burials unearthed at the summit of a natural round knoll revealed evidence suggesting all four individuals buried within days or weeks of each other (Petersen *et al.* 1975, 52). Further afield at Cnip by Uig on the Isle of Lewis, closely correlating radiocarbon dates indicate a quick succession of interments of one cist inhumation and one cremation within a Bronze Age cairn (Dunwell *et al.* 1995, 287). Back in Peeblesshire at Harehope Cairn, excavations uncovered four inhumations and a further seven cremation deposits, all Bronze Age in date, with dating evidence suggesting at least four of the burials (one inhumation and three cremation deposits) took place over a much wider timeframe, from about early third millennium to the mid second millennium BC (Jobey 1981, 98-103).

While there may not be enough local evidence to establish a pattern of close successive burials taking place within round barrows or cairns within the area, the idea of the barrow as a secondary or 'token' funerary site is worth exploring and may explain the narrow timeframe in which individuals were deposited within the barrow. At Broughton Knowe, two of the round barrows were excavated revealing evidence for Bronze Age date (MacLaren 1968, 102-103; Ward 1973, 103-104); for one of these, the primary function of its ditch was suggested as protecting a temporary covering over the corpse for some time before cremation, allowing it to decompose either fully or partially before going to the pyre (MacLaren 1968, 102). While there was no evidence for cremation at the Thirlestane Round Barrow, the human remains at Thirlestane had either fully or partially decomposed before cremation. Here we see an insight to the mortuary rites of the Bronze Age peoples of the area, wherein they ensured a body was in some state of decomposition either at the site of the final interment or elsewhere before cremation and deposition within the barrow. Additionally, the average weight of cremated remains can theoretically suggest a minimum number of individuals for each deposit. The relatively low mass of the cremated bone from the secondary burials demonstrates these were token burial deposits, with the bone present in the burial representing a selection of bone taken from an unknown location after the mortuary rite was completed. Token burials in Bronze Age Scotland were common, wherein only partial inhumations or cremated bones were deposited in a burial (Downes n.d.; Petersen *et al.* 1975, 51; Arabaolaza 2023, 29). It is not possible to know where the excluded portions of cremations and inhumations were deposited, but this rite is comparable with theories of the dead being divided up among mourners and subsequently transported and re-interred across the Bronze Age landscape (Brück 2004, 180-181). It is possible that some of the individuals interred at Thirlestane may have been brought from other settlements, some near and perhaps some further afield, in order to join other significant members of their society in death. This remains an interesting possibility to consider within the Bronze Age mortuary tradition.

Of the six individuals interred at Thirlestane, a pattern of adult female and child double interment was evident. Interestingly, a pattern of adult and child cremations is apparent at other Bronze Age burials within Peeblesshire. One of the Bronze Age cremation deposits at Horsbrugh Castle Farm contained one adult and child, while the associated cist inhumation was confirmed male (Petersen *et al.* 1975, 46-47); and at Harehope Cairn, two of the cremations were confirmed to contain remains of one adult and one child each (Weyman 1981, 109). Nor was this just a local tradition as a pattern of adult female and child double burials is evident across western Europe during the early Bronze Age including Britain where 30-40% of child burials were buried with an adult and with a bias towards burial with females (Zedda 2023). But while patterns of double inhumations are clear, due to the poor preservation of cremated remains prevalent during the middle Bronze Age, biological sex determination is not always possible. Though it might be tempting to consider that cremation was a funerary rite reserved for females and children (Brück 2009, 4), while males were instead buried, as seen at Horsbrugh (Petersen *at al*. 1975, 46), it seems more likely that this pattern was a reflection of death across a wider Bronze Age population, where females and children were subject to a higher mortality rate (Goodman and Armelagos 1989, 227).

The material objects identified within the cremation deposits are characteristic of Bronze Age burials across Scotland, which often have little to no grave goods. The small chips and flakes of lithics in the cremations at Thirlestane were not thought to be associated with the burials since they were unburnt (Lithics above), similar to the flint lithics recorded in the cremations in one of the barrows at Broughton Knowe (MacLaren 1968, 102). Cinerary urns were also common for Bronze Age Scotland, where cremated remains were most typically placed inside such a vessel before being interred in a cist, barrow, or cairn (Sheridan 2004, 260-261). The presence of a food vessel, such as vessel 1 at Thirlestane, in burials and cremation deposits was common in Bronze Age Scotland from c. 2100-1800 BC when they largely replaced Beakers (Wilkin 2011, 27).

Both the quartz lithics and the pottery recovered from the cremations at Thirlestane were of local origin. The theory that the vessels were made by the same potter also suggests a lack of need for imported materials for the completion of funerary rites, and may suggest that the people in the settlements surrounding Thirlestane Barrows relied heavily on local resources in multiple aspects of life and death. Comparison of the archaeobotanical evidence of fuel waste – alder and birch - at Thirlestane (Alldritt above) with the oak found at Drumelzier Cairn (Craw 1931, 370) and oak, hazel, alder, willow, elm, aspen/poplar and wild cherry at Harehope Cairn (Dickson 1981, 109-110) suggest that local arboreal resources were exploited opportunistically for funeral pyres rather than a ritualised choice of funerary fuel.

Combining the evidence of a reliance on local materials, a single presumably local potter, and that at least one of the individuals lived locally for at least a decade prior to burial, it may be suggested that the Thirlestane Round Barrows held significance to the local communities. But, as the local findspots of bronze axes imply, this does not mean these communities were isolated but had access to specific objects requiring much wider resourced raw materials. When considering Thirlestane within the wider Bronze Age landscape of Scotland, what it reveals in its similarities to other barrows, cairns and burial sites are patterns of mortuary rites, and that these were shared among a vast number of communities and over the course of many preceding centuries across the entirety of Scotland and beyond. This suggests that these peoples were close to one another in the way they mourned, celebrated and remembered their dead.

Thirlestane Square Barrow

By Alun Woodward and Ronan Toolis

Excavation of Trench 4 revealed the footprint of a barrow overlying two parallel graves defined by a 0.36-0.39 m deep rectilinear ditch. While the full extent was not revealed, it can be surmised from the aerial photograph that the barrow was enclosed within an area measuring approximately 5.20 m by 7.30 m (Figure 96). The consistency of the excavated ditch sections, comprising steep sides and a flat base, indicated that this square barrow was created in a single event. The infill of the ditch was also consistent across each section. It was therefore surmised that the ditch and graves were created during a single barrow construction event for the creation of a significant funerary monument and subsequently infilled naturally as the barrow eroded over time.

The northern grave measured 2.30 m by 0.65 m, slightly longer and deeper than the southern grave which measured slightly wider, 2.10 m by 0. 80 m. Both graves were aligned ENE/WSW. Though no skeletal remains or grave goods were encountered in either grave, that this was a funerary monument is demonstrated by the convincing chemical signature consistent with human remains decomposing and leaching into the soils within the graves (Multi-element analysis, above).

No material culture or suitable environmental evidence was recovered from the square barrow ditch to allow radiocarbon dating but a soil sample from the outer side of the ditch enabled an optically stimulated luminescence test to return a date of AD 430 +/- 150 years giving a date range of between AD 280 and AD 580 for when the soil at the outer ditch face was last in contact with sunlight (Kinnaird above).

This date range places the Thirlestane Square Barrow around the cusp of the Late Iron Age into the early medieval period. This overlaps with the destruction of the Iron Age Fort at Tinnis, just under two miles away, which occurred sometime between mid-third and early fifth centuries AD, and the reoccupation of Tinnis fort in the sixth century AD. The square barrow may have therefore been contemporary with either phase of Tinnis Fort or indeed neither if constructed in the intervening abeyance. And it is important to consider that the ditch face that yielded the OSL date may have remained open for some time after the ditch was cut and therefore in contact with sunlight long after the graves themselves had been filled in and the barrow raised. It is thus perhaps more likely that the construction of the square barrow happened towards the earlier part of the date range of AD 280-580. It is also not Tinnis Fort that overlooks the Thirlestane Barrows but the unexcavated fort atop Dreva Craig and it is possible that those buried under the Thirlestane Square Barrow once resided there instead.

The dating of Thirlestane Square Barrow sits well within the chronology of other square barrows and their complexes in Scotland. One of the square barrows was dated to AD 400-570 while three of the square barrows at Redcastle in Angus yielded radiocarbon dates of AD 400-590, AD 550-665 and AD 560-770 and skull fragments from one of the square barrows at Bankhead of Kinloch in Perthshire were dated to AD 350-540 (Noble *et al.* 2019, 69; Alexander 2005, 106; Mitchell *et al.* 2020, 24). Although the single ENE/WSW aligned graves within each of the two square barrows at Thornybank in Midlothian could not be dated directly themselves, the graves from the associated and similarly aligned long cist cemetery were dated between AD 230 and AD 680 (Rees 2002, 343). Looking at this chronology we can begin to see a Late Iron Age funerary tradition that extended into the early medieval period across Scotland. This was part of a broader tradition across Britain and Ireland albeit with distinctive regional concentrations and variations (Noble and Evans 2022, 196).

The tradition and morphology of square barrow funerary monuments in early medieval Scotland and beyond is not uniform in the way that later ecclesiastic cemeteries became. At Thirlestane the square barrow had a continuous ditch without evidence of cornerstones or postholes, timbers or entrances. At Thornybank in Midlothian for instance the two early medieval square barrow ditches were also continuous but one had a slot that once held the foundations of a timber structure (Rees 2002, 335-337). This was also seen in Plas Gogerddan in Dyfed in Wales where rectangular timber structures were set into enclosing square ditches (Arnold and Davies 2000, 185). These continuous ditches contrast with Pictish square barrows such as Redcastle in Angus or Bankhead of Kinloch in Perthshire where the ditches were not continuous (Alexander 2005, 44; Mitchell *et al*. 2020, 23). At Greshop in Moray two of the square barrows were defined by four segmented ditches while a third square barrow was defined by a continuous ditch. The graves within the square barrows at Redcastle were mostly cists with stone caps whereas the Thornybank, Bankhead of Kinloch and Thirlestane barrows overlay unlined graves. There was some evidence from Thornybank that a stone cairn was placed over one of the square barrows (Rees 2002, 337) but no such evidence was encountered at the Thirlestane Square Barrow.

The internal dimensions of the Thirlestane Square Barrow, 5.20 m by 7.30 m, is somewhat greater than the larger of the square barrows at Thornybank, which was 4.80 m by 3.45 m; the smaller barrow ditch at Thornybank enclosed just 2.2 m by 1.6 m (Rees 2002, 335-337). The clearer of the two barrows at Lochbrow in Annandale

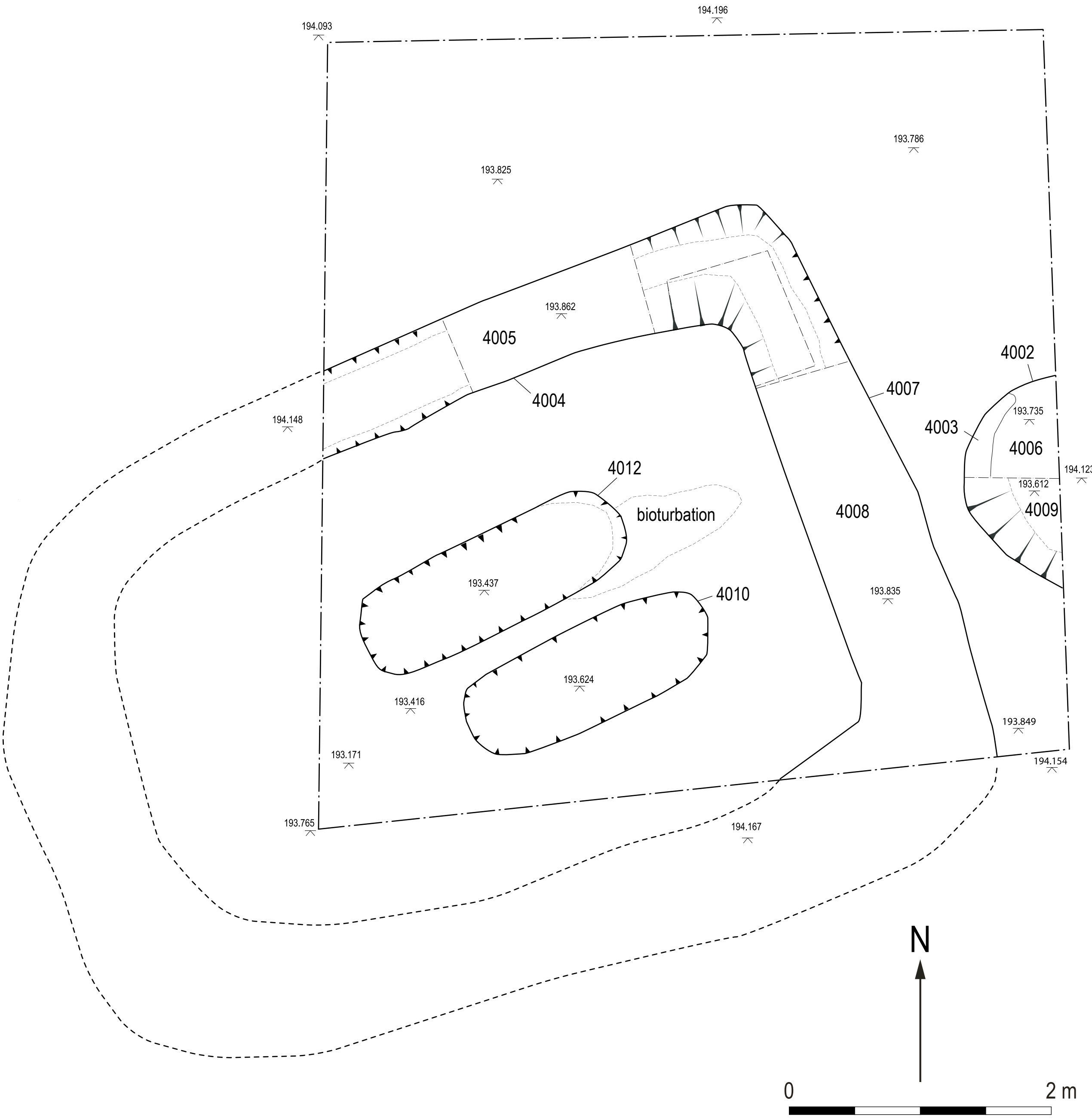

Figure 96: Thirlestane Square Barrow.

measured 4 m by 4 m while the rectilinear barrows at Home Plantation in Nithsdale largely measured between 3m-5m across except for one which measured 6m by 3.5 m (Cowley 1996, 109-110). In contrast, the square barrows at Redcastle varied between 6m by 6 m and 9 m by 9 m (Alexander 2005, 44) while the square barrows at Bankhead of Kinloch varied between 4.7 m by 4 m and 6.25 m by 6.25 m, and the square barrows at Greshop in Moray varied between 4.5 m and 6.8 m across (Mitchell *et al.* 2020, 23 and 26). The square barrows at Rhynie measured around 4 m - 4.5 m across (Noble *et al.* 2019, 69). While square barrows were used for monumental burials across late Iron Age and early medieval Scotland, there was a fluidity and looseness to the specific forms applied.

Although larger cemeteries involving square barrows exist such as Garbeg, Whitebridge and Croftgowan all in the Highlands, Redcastle in Angus and Lundin Links in Fife (Alexander 2005, 44; Ashmore 1981, 351; Noble *et al*. 2022, 85; Greig *et al.* 2000, 591), the tradition across northern Scotland seems to be predominantly smaller cemeteries with less than six monuments (Mitchell and Noble 2019, 90). The same case is apparent across southern Scotland. At Lochbrow in Annandale two single square barrows are evident (Cowley 1996, 110). At Barwhill in Dumfries and Galloway there survive traces of a group of five barrows arranged either side of a Roman road and which cuts through the ditch of a square enclosed settlement, suggesting a Late Iron Age or early medieval date (Cowley *et al.* 2019, 13-15). At Thornybank there were only two square barrows, located within a much larger cemetery of long cist graves (Rees 2002, 327). The small numbers of barrows at these sites imply that such funerary monuments were reserved for a few select individuals (Winlow 2011, 349; Noble and Evans 2022, 196). The building of burial mounds in Anglo-Saxon England during the sixth and seventh centuries was undertaken in tandem with the emergence of kings and aristocracies (Carver 2002, 134-136) and the same connection was likely the case in Scotland. The single square barrow at Thirlestane therefore implies that this funerary monument was constructed for a pair of significant individuals from the local elite of the Tweed Valley during the late Iron Age or early medieval periods.

The Thirlestane graves like almost all burials in the early medieval period were orientated broadly east/west and together with the lack of grave goods is consistent with early Christian burial customs. At Thirlestane the acidic soils had removed all physical skeletal evidence but we can surmise that the burials represent two people of different sizes but broadly equal status, perhaps a husband and wife, mother and daughter or father and son. Each of the square barrows at Thornybank, which were about 10 m apart, contained only one grave but though negligible skeletal remains survived, the small size of one of the graves indicated that this held a child (Rees 2002, 337). Of the five interred persons within the square barrows at Redcastle, skeletal traces of only three survived, two were identified as female adults while the sex of the other adult could not be identified (Alexander 2005, 102). An adult female was buried within one of the square barrows at Rhynie (Noble *et al*. 2019, 69).

Cemeteries containing both round and square barrows were constructed across Scotland and excavations such as at Redcastle and Bankhead of Kinloch have demonstrated that these were broadly contemporary (Alexander 2005, 106; Mitchell *et al.* 2020, 24). However, the Thirlestane Square Barrow was around 1500 years after the final burial within the excavated round barrow, and presumably the other two round barrows too. This implies that these three round barrows were still upstanding and visible when the square barrow was added on to the eastern end of this group (Figure 97). This reuse of a landscape for funerary purposes is not uncommon. A substantial proportion of early medieval cemeteries and burials in Wales and England are located at sites of prehistoric ritual and funerary activity (Longley 2009, 120). The early medieval square barrows and graves at Tandderwen in Wales were constructed close to a Bronze Age barrow while the early medieval barrows and graves at Plas Gogerddan in Dyfed were also dug in the vicinity of Bronze and Iron Age burials (Arnold and Davies 2000, 184-185). Numerous references in the *Englynion y Beddau* - Stanzas of the Graves - in the Black Book of Carmarthen suggest that burial mounds were associated with heroic figures in the early medieval period (Longley 2009, 115).

Thirlestane Square Barrow shares many features with other late Iron Age and early medieval funerary monuments across Scotland and beyond. But while early medieval barrows are concentrated north of the Forth, the dating of the Thirlestane Square Barrow confirms that this monumental burial tradition was also practiced in southern Scotland too. Moreover, the location of the square barrow adjacent to a group of Bronze Age round barrows was likely no accident but an important factor in choosing this final resting place.

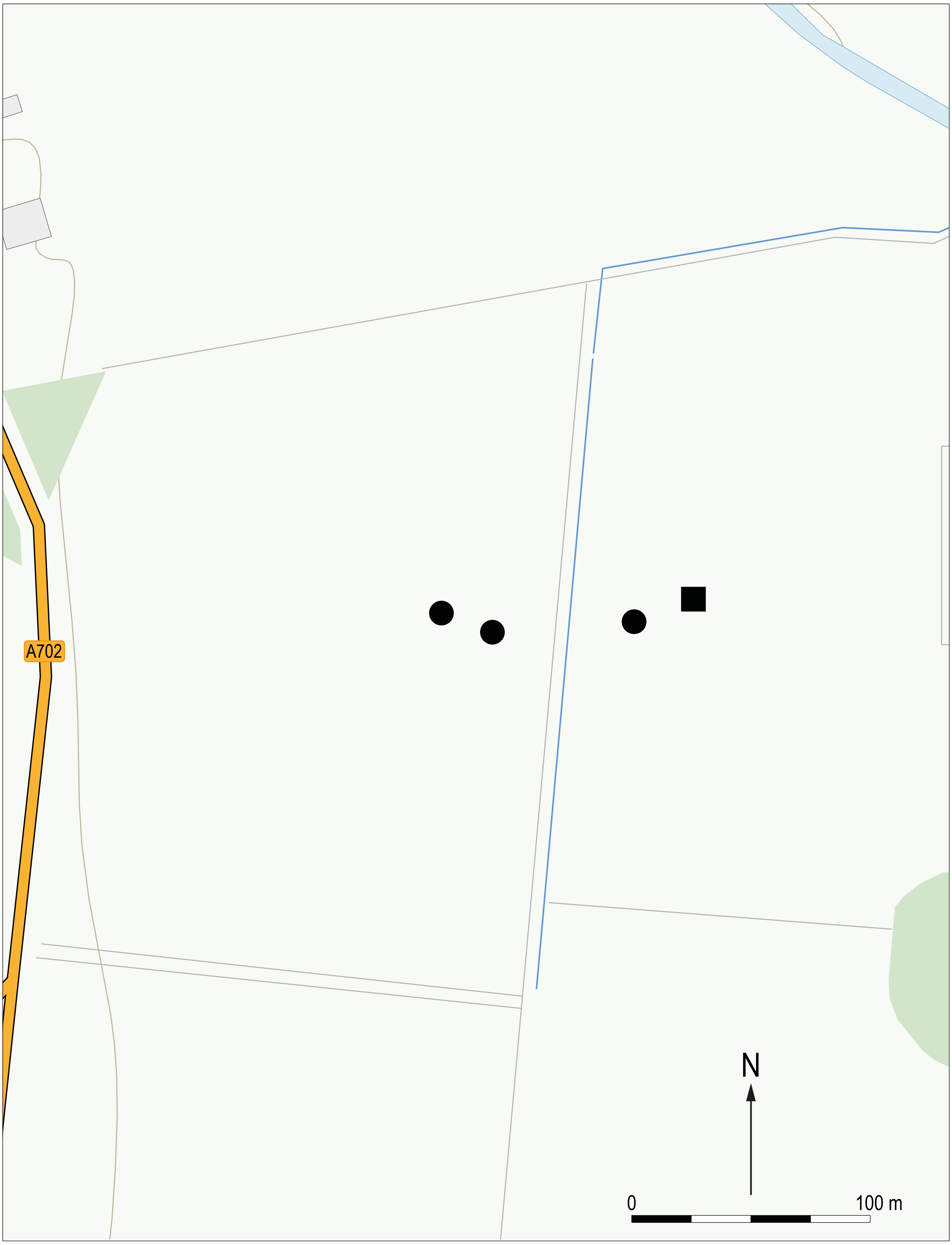

Figure 97: Thirlestane Barrows Cemetery. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

Tinnis Fort

By Thomas Muir and Ronan Toolis

The inhabitation of Tinnis Fort comprised at least two phases of occupation; one that comprised a fortified settlement on the summit (Figure 98) and which ended with a conflagration and vitrification of the south-west part of the summit rampart in the late Iron Age; and a second prolonged phase of re-occupation of the summit and expansion to lower-lying terraces during the early medieval period.

However, the site also yielded tantalising evidence for occupation of the summit long before the fort was constructed (Lithics above). A core of quartz recovered from the rubble core of the early medieval fort rampart and bipolar flake of quartz recovered from a medieval occupation deposit on the lower-lying southern terrace represented residual late Mesolithic or early Neolithic remains. While these could have conceivably been brought to site much later, the fragment of a Late Mesolithic/early Neolithic flint microlith recovered from the lowermost and primary deposit beneath the summit rampart may more plausibly be an in-situ deposit. While only three such early prehistoric lithics may seem rather insignificant, only 0.87% of the site was excavated. The nearest sources of flint are the easternmost part of the Lammermuirs and the North Sea coast (Wickham-Jones and Collins 1980, 10). This provides evidence for either an extensive exchange network or the movement of people throughout south-east Scotland during the late Mesolithic/early Neolithic era, perhaps in the hunting of game which this microlith was probably purposed for. Unfortunately, none of the oak and hazel charcoal identified in this same primary deposit were radiocarbon dated so while these may relate to early prehistoric settlement (Alldritt above), given the presence of iron smelting slag in this same deposit, some of this charcoal assemblage may comprise later intrusions. Nonetheless, the sparse scattering of lithics at Tinnis indicates a likely Late Mesolithic or Early Neolithic presence on this hill sometime between 8400 BC and 3500 BC. While not sufficient to define anything specific about the nature of this earliest phase of occupation, it is apparent that this hilltop location was probably used by groups of hunters moving through the early prehistoric landscape of southern Scotland. As the excavation of Trench 1 revealed that much of the summit here had been subsequently scraped down to bedrock, it is fortunate that evidence for such early activity survived at all.

Indeed, its survival may be because that section of the summit rampart exposed in Trench 1 protected the underlying deposit of soil. However, it was in the section of the summit rampart exposed in Trench 2 that yielded the earliest evidence for the fort itself. This was the only part of the site where evidence for *in situ* vitrified, burnt and discoloured stone was encountered and lies close to where vitrified stone was previously recorded (RCAHMS 1967, 142-144; marked 'x' on Figure 4). The burnt and vitrified rubble core here demonstrated that the original boundary encircling the summit was a timber-laced stone rampart. This type of wall construction is more often recognised by the presence of vitrified stone, which can only occur as a result of the burning of this type of rampart (Mackie 1976, 208-209; Ralston 1986, 18 and 38). Stone ramparts do not burn and timber ramparts burn to ash. The phenomenon of vitrified forts stretches across western, central and northern Europe (Audouze and Büchsenschütz 1991, 97; Ralston 2006, 143-145) but it is remarkably concentrated in the Massif Central of France and in Scotland where vitrification is apparent on over 100 hillforts across the country that can date to anywhere between 800 BC to AD 1000 (Mercer 2018, 220-223). Radiocarbon dating of a burnt cattle bone recovered from amongst the burnt rubble core of the rampart in Trench 2 indicated that the fort was burnt sometime between the mid-third and early fifth century AD.

The scant evidence for late Iron Age activity at Tinnis was surprisingly informative. The burnt and vitrified rubble core of the rampart produced concentrations of oak charcoal, likely from the structural timbers burnt *in situ*, with traces of hazel nutshell food waste also present (Archaeobotany, above). Typically for a Scottish site, only a small assemblage of animal bones was recovered and what was found was in poor condition. The large cattle bone, that yielded the Late Iron Age radiocarbon date, showed evidence of butchery and as almost 35% of the bone

Figure 98: Site plan of Tinnis late Iron Age Fort.

assemblage related to the Iron Age occupation of the site, was perhaps related to feasting. Cattle predominated the bone assemblage, sheep/goats were second in frequency while pig bones were entirely absent from the Iron Age assemblage (Smith above). The dominance of cattle bones is very typical of excavated Iron Age sites in Scotland but the lack of pig is striking in comparison with forts such as Broxmouth in East Lothian where a sizeable assemblage of pig bones was recovered (Cussans 2013, 437).

From the vitrified rampart were also recovered fragments of a clay hearth that may have related to domestic activities or metalworking. An unidentifiable fragment of copper alloy offers another tantalising trace of non-ferrous metalworking, or perhaps even jewellery. Iron slag from the same context demonstrates that ferrous metalworking was certainly being undertaken prior to the Late Iron Age fort's demise. It might even be tempting to attribute the vitrification of the rampart at this spot to an ironworking furnace where a blaze had got out of hand. But as excavated evidence together with experimental archaeology have demonstrated, vitrification of timber-laced stone walls requires substantial resources and time to accomplish and only then affecting the rubble core of ramparts, not the outer stone faces (Childe and Thorneycroft 1938, 53-55; Ralston 1986, 25-38; Close-Brooks 1986, 132; Toolis and Bowles 2017, 132-133). Vitrified ramparts are most convincingly explained as the result of deliberate acts of destruction carried out by hostile assailants after the capture of a settlement (Audouze and Büchsenschütz 1991, 97; Ralston 2006, 163). Such violent destruction of settlements and fortifications is the most compelling evidence for warfare during the Iron Age (Toolis 2007, 309). The purpose of burning ramparts in such a prolonged manner was not only to slight the defences but to do so in a spectacular display that communicated an unambiguous message to surrounding communities (Ralston 1986, 38; Toolis and Bowles 2017, 134; Figure 99).

Figure 99: Reconstruction of Tinnis late Iron Age Fort ablaze.

As to where these communities resided, one might think to look amongst the many other hillforts within the vicinity of Tinnis (Figure 100). But occupation of hillforts in Scotland occurred sporadically over the best part of two millennia beginning in the Late Bronze Age. Forts dated to the Late Iron Age are indeed rare, with only a handful known in south-east Scotland (Figure 100). It is therefore doubtful that many of the local forts were inhabited as Tinnis burned. Increasingly, Iron Age settlement patterns in Scotland are being revealed as dynamic and sequential, such as at Cults Loch in Galloway, where households resided in one place for a generation or two then moved on to another type of settlement in the nearby vicinity (Cavers and Crone 2018, 241 & 245). So too in the Lothians, where the palisaded settlement at Ravelrig was abandoned around 400 BC, just when occupation at the nearby Kaimes hillfort began (Rennie 2013, 154-155). And in East Lothian the dense settlement pattern of the later centuries BC grew distinctly sparse during the passage of time through the early centuries AD (Lelong 2007, 243-244; Hunter 2009, 151; Hamilton and Haselgrove 2009). It is therefore highly unlikely that the adjacent and much larger hillfort at Henry's Brae was contemporary with Tinnis, the varying sizes reflecting different resident populations and associated social dynamics. It is probably safe to say that Tinnis Fort succeeded Henry's Brae, though whether this was at some remove in time, only excavation of Henry's Brae may tell. The fort at Dreva Craig across the valley on the other hand may be a different story.

Interestingly, the mid-third to early fifth century AD date range for the vitrified rampart at Tinnis overlaps with the earlier part of the date range for the Thirlestane Square Barrow indicating potential contemporaneity. But the square barrow is not intervisible with Tinnis. Instead, it is quite starkly overlooked by Dreva Craig, which sits between the two. The date range for Thirlestane Square Barrow also spans the gap between the demise of the Late Iron Age fort at Tinnis and its re-occupation in the sixth century AD. It is conceivable that Dreva Craig Fort lies in the chronological gap between these two phases too, especially as its defences shares a characteristic, *chevaux de frise*, seen only in Peeblesshire at Cademuir Hill 2, considered likely to be an early medieval nucleated fort (Toolis 2021, 262). Nevertheless, in the absence of any dating evidence from the unexcavated fort at Dreva Craig, Tinnis Fort is the only site that has actually been demonstrated to be contemporary with the Thirlestane Square Barrow. The significance of the barrow, by its uniqueness in the locality together with the selective use of square barrows across Scotland, is that it demonstrates the presence of two individuals of exceptional elite status within the vicinity of Tinnis sometime between the late-third and late-sixth centuries AD.

This may or may not be pertinent as to why the late Iron Age fort at Tinnis was worth destroying in such a protracted and visible way. There was little in the way of material evidence recovered from the excavation to indicate especially significant status of its inhabitants. The ferrous metalworking is just one in a range of distinctive attributes, comprising exotica, ornamental metalwork, ironworking, shale working and non-ferrous metalworking, recognised in Iron Age settlements elsewhere in south-east Scotland, but this places Tinnis amongst just around quarter of excavated sites where evidence for metalworking is recorded (Hunter 2009, 144-150). The occupation of Tinnis Fort during the mid-third to early fifth century AD does set this settlement apart within southern Scotland, when very few forts appear to have been occupied (Figure 100). Its sparse assemblage may reflect more the scale of excavation and the impact of post-Iron Age activity upon the archaeological record than the original material wealth of its late Iron Age inhabitants. The material culture recovered during the excavation resulted simply from what was thrown into the fire that burnt and vitrified the rampart at this spot; anything of value is likely to have been looted beforehand. And south-east Scotland possesses very few vitrified forts in any case (Figure 100). The only other vitrified fort recorded in the Scottish Borders is Black Hill near Earlston and only two others across the Lothians (MacKie 1976, 233-235; Mercer 2018, 220-223); to date no excavations have been undertaken upon any of them.

As to who burnt Tinnis Fort, one can only speculate. The destruction and vitrification of the early medieval forts at Trusty's Hill and Mote of Mark in Galloway during the early seventh century AD, along with potentially Edgarton Mote, Castlegower and Mochrum Fell too, has been postulated as the result of campaigns of violent

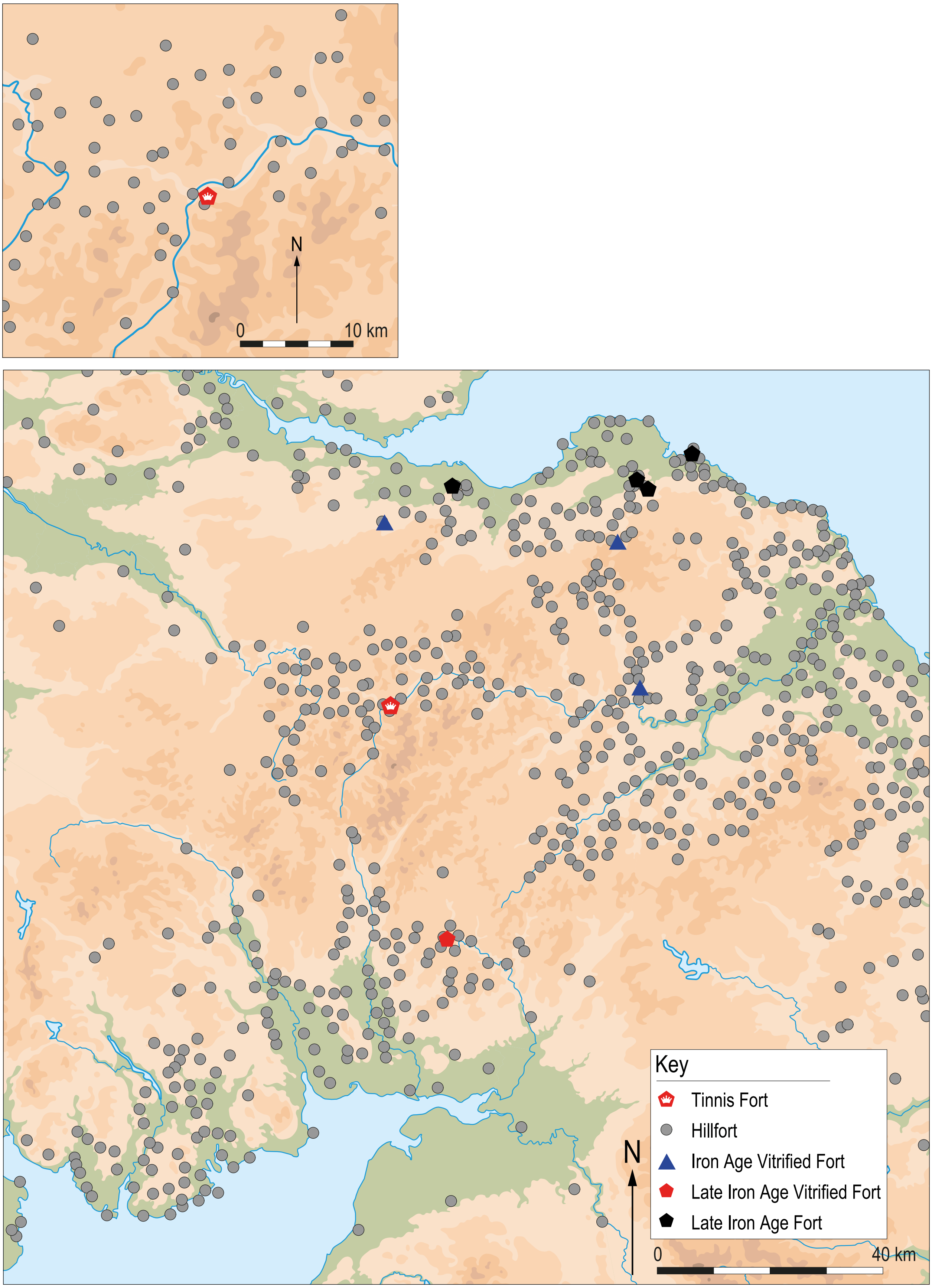

Figure 100: Map of Iron Age forts in south-east Scotland; inset – Distribution of forts nearby to Tinnis. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

subjugation at the hands of the Northumbrians, heralding their hegemony over much of southern Scotland during that time (Toolis and Bowles 2017, 134). The demise of Tinnis occurred during another fairly unstable period. The Roman Frontier, Hadrian's Wall, some 60 miles to the south did not hold back Roman armies from venturing north, and the Romans from the time of Caesar's conquest of Gaul were acquainted with assaulting and sacking settlements enclosed with timber-laced stone ramparts (Wiseman and Wiseman 1980, 145-147). Compelling evidence for Roman assaults has been recovered from Burnswark Hillfort in Dumfriesshire and from Leckie Broch in Stirlingshire, both during the second century AD (Reid 2023, 115-122; MacKie 2016, 15 & 25). Following the Roman retreat to Hadrian's Wall, strife plainly continued and Pictish wars continued to be fairly regular events throughout the course of the fourth century AD (Hamilton 1986, 185, 342-343, 356-357; Reid 2023, 186). While it may have been this turmoil that led to the burning of Tinnis Fort, the perpetrators may equally well have been closer to home. The Britons of the fort of Dumbarton Rock, *Alt Clut* - the Rock of the Clyde, for instance, were evidently raiding as far as Ireland during the mid-fifth century AD, given St Patrick's excoriation of them from this time (Hood 1978, 55-59). It is just as likely that the burning and vitrification of the Late Iron Age fort at Tinnis was at the hands of fellow Britons as Roman troops.

After a break of about 200 years, the fort at Tinnis was rebuilt. From the base of the drystone rubble core of the 1.7m wide stone-faced rampart exposed in Trench 1, birch charcoal was radiocarbon dated to AD 600-657. This evidence for early medieval re-occupation of the summit was corroborated by birch charcoal in Trench 2 radiocarbon dated to AD 542-638, albeit residual material recovered from a later medieval occupation deposit. In addition to the rebuilding of the summit rampart, the early medieval fortifications were expanded to the lower sides of the hill. Birch and hazel charcoal from occupation deposits in Trench 3, in the lower-lying enclosed terrace, indicated that occupation of Tinnis continued into sometime between AD 890 and AD 1020. What is important to realise is that the excavation of Trench 3 did not reach the base of, nor the deposits that abutted, the enclosing drystone wall, the face of which was exposed to a depth of over 1.6 m from the current ground surface. It is therefore possible that the enclosure of this lower terrace, and probably the other unexcavated terrace further downslope, and the two enclosed terraces on the northern side of the hill, took place much earlier - perhaps also around AD 600 when the summit was refortified. The early medieval settlement at Tinnis, adapted as it was to the shape of the hill (Figure 101), adhered to the layout of a nucleated fort, comprising a central citadel on craggy hill with lower non-concentric enclosures looping out utilising natural terraces (Stevenson 1949, 190-191). It is tempting to see the possible continuation of the middle rampart along the western flank of the hill to join the rampart defining the northern middle terrace suggesting a more concentric layout than is apparent from the previous RCAHMS survey (Figure 4). However, the break of slope apparent here is not quite on a continuous course from the southwestern rampart and is also apparent on the precipitously steep eastern flank of the hill indicating that this was probably a natural break of slope. The nucleated fort at Tinnis is thus comparable in scale and layout to other nucleated forts in southern Scotland (Figure 102).

The small assemblage of early medieval material culture is unsurprising given the limited scale of the trenches and the subsequent construction which had evidently scraped clear much of the summit. While the base of the rampart exposed in Trench 1 provided a reasonably secure context, the bulk of early medieval material culture was recovered from Trench 3 in the lower enclosure. And while modest in quantity, what was found altogether gives us a valuable glimpse into the early medieval occupation of Tinnis, including latterly during the late ninth - early eleventh century AD when upper Tweeddale may have been part of the kingdom of Strathclyde.

From the same rampart core that yielded a radiocarbon date of AD 600-657 was recovered three fragments of iron smelting slag. This derives from the first stage of the manufacture of iron objects, the smelting of iron ore to produce the bloom, which was then fashioned by blacksmithing into objects (McDonnell 1986, 177). Cruickshanks above is quite right to caution against attributing the smelting slag at Tinnis unreservedly to the early medieval phase of the site as no in situ evidence was encountered indicating where ironworking activity took

Figure 101: Site plan of Tinnis early medieval fort.

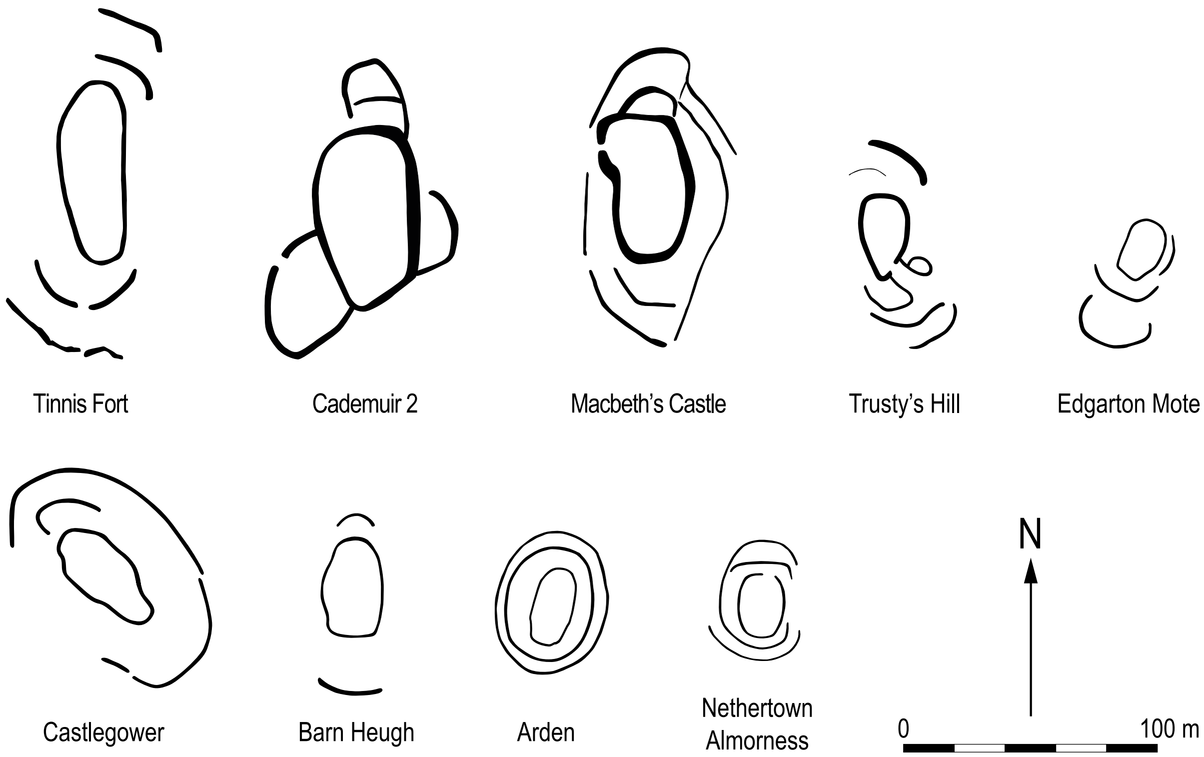

Figure 102: Comparative plans of Tinnis early medieval fort and other selected nucleated forts in southern Scotland.

place. Iron slag fragments were also recovered in Trench 1 from the soil underlying the rampart and the soil matrix of a medieval wall abutting the rampart; as well as from the Late Iron Age rampart and also a medieval occupation layer both in Trench 2; and early medieval and later medieval occupation deposits in Trench 3 too. Much of this slag was evidently residual and originated somewhere outwith the excavation trenches. Within other Iron Age settlements in Scotland, similar wide scatters of iron smelting debris found spatially and stratigraphically across sites have often originated from one specific smelting hearth (McLaren 2023, 143-144). But regardless of whether the smelting slag originated in the Late Iron Age or the early medieval period, this is extremely uncommon amongst sites of either period in Scotland. Iron smelting tends to be evident only in fairly complex Iron Age settlements such as Broxmouth hillfort in East Lothian or specialised craftworking centres such as Culduthel in the Highlands (McDonnell 2013; Dungworth and McLaren 2021). If it belonged to the Iron Age phase at Tinnis Fort, it is especially atypical as iron smelting was largely undertaken off-site during the Late Iron Age (McDonnell 2016, 399).

Amongst excavated early medieval forts, blacksmithing is relatively common but iron smelting much rarer. It was evident at Trusty's Hill and possibly at the Mote of Mark also in Galloway, and Clatchard Craig in Fife but absent from Edinburgh Castle Rock and Dunadd (Cruickshanks 2017, 51-52; McDonnell 1986, 177-178; Crew 2006, 36-38; Spearman 1997, 166; McDonnell 2000, 218). The iron bloomery site of Glenshee in Galloway indicates that a near industrial scale of iron smelting was undertaken at specialised sites during the early medieval period (McLaren 2023a, 24). But given Trusty's Hill's status as a royal site where control over the production of metalwork was integral to the status and power of its inhabitants (Toolis and Bowles 2017, 132 & 135), the significance of iron smelting at Tinnis should not be underestimated. Albeit that no diagnostic evidence for blacksmithing was recovered from Tinnis (Cruickshanks above), the iron smelting here nonetheless gave the household here the means of producing the raw materials for weapons and tools not only for their own use but also the potential for patronage over other households. This was a significant means of exercising power and status within the system of kinship and clientship that formed the basis of social hierarchy in Scotland during the early medieval period and probably the Late Iron Age too (Nieke 1988, 11; Karl 2008, 73-74; Blackwell 2012, 19-21).

The other direct comparison that can be drawn with Trusty's Hill is the source of the early medieval lead recovered from Tinnis. While this fragment of lead casting waste was excavated from an occupation deposit in the lower enclosure dated to the ninth-tenth century AD, and therefore much later than Trusty's Hill, lead isotope analysis demonstrates that the lead originated from the southern uplands of Scotland (Lead Isotope Analysis, above). The lead ingot recovered from Trusty's Hill yielded a similar lead isotope signature, demonstrating a southern uplands origin too (Pashley and Evans 2017, 50). While separated by perhaps as much as three centuries, the two households evidently shared similarities in accessing regional mineral sources. This is unsurprising, given that the region has an abundant supply of natural lead veins, not only the Leadhills but also the Manor Valley, just over the adjacent hills from Tinnis, and where lead smelting has been radiocarbon dated to between the ninth-eleventh centuries AD (Cowie 2000, 41; Pickin 2010, 81-83). This indeed may have been the very source of the lead found at Tinnis.

The traces of early medieval food waste indicate the consumption of barley and beef (Archaeobotany above; Animal Bone above), which is consistent with the predominant diet apparent amongst other early medieval households across Scotland (Toolis and Bowles 2017, 115). The presence of barley may suggest local cultivation, though this need not necessarily entail cultivation by the inhabitants themselves (Alcock 1988, 26-27). The barley may well have been brought to Tinnis as food renders, perhaps from contemporary farming settlements similar to those excavated at Garvald 12 miles to the north and Gogar and Burdiehouse on the outskirts of Edinburgh (Cook 2002, 76-79; Will and James 2017, 33-34; MacIver and Paton 2023, 43-47). The domination of cattle in the faunal assemblage may also reflect the wealth of the inhabitants, the measure of which was by the size of the cattle herds that a household possessed in the pre-monetary economy of early medieval Scotland (Alcock 2003, 114; Toolis and Bowles 2017, 117) and may be the underlying meaning behind the toponym Drumelzier – *Fort of the Meadows* (see History of Tinnis Castle above).

It is possible that this modest assemblage includes slight traces of the social bonds that linked the household at Tinnis to other households, the production of metal for dispersing out, the food renders collected in. However, while the nucleated layout of the enclosing ramparts provides an undeniable mark of the elevated status of Tinnis fort during the early medieval period, the site lacks any of the other key indicators of status – imported pottery and glass, gold and silver, jewellery production, weapons and royal inauguration features / historical references – apparent in the royal seats of power and princely households of this time (Table 25). These are identifiable traits by which specific households attained and consolidated their pre-eminence amongst their peer groups enabling some households, such as at Dunadd, Rhynie, Trusty's Hill and Dumbarton Rock, to claim royal status. Much of this is down to targeted excavations and the survival of archaeological remains. Edinburgh Castle Rock is considered to be an early medieval royal site but the actual archaeological evidence for this is slight (Driscoll and Yeoman 1997, 29, 43, 45 and 227; Koch 1997, xiii-xiv; Clancy 1998, 46). Especially in comparison with other early royal strongholds such as Dumbarton Rock which has a large archaeological assemblage to corroborate the numerous historical references to it (Alcock and Alcock 1990, 113-119). So too in comparison with the range of material wealth recovered from nucleated forts like Trusty's Hill which has no known historical references but the full range of archaeological markers (Toolis and Bowles 2017, 141; Table 25). It is also worth noting that excavations of the site of Partick Castle, long touted as the royal centre on the Clyde after the sack of Dumbarton Rock in AD 870 (Driscoll 2014, 5-6), revealed only small residual traces of occupation from the first-third and eighth-tenth centuries AD from the ditches of a much later medieval site (Green 2019, 4; Spence and Atkinson 2022, 40).

Nevertheless, it is essential to recognise the early medieval context of Tinnis Fort to truly understand its archaeological significance.

Site	Imports (pottery/ glass)	Fortified/ Enclosed	Gold/ Silver	Jewellery production	Weapons	Royal
Scotland						
Tinnis Fort		■				
Trusty's Hill	Cont.	■	■	■	■	■
Mote of Mark	Cont.	■	■	■	■	
Tynron Doon		■	■			
Whithorn	Cont. Med.		■			
Dunadd	Cont.	■	■	■	■	■
Dumbarton Rock	Cont. Med.	■		■	■	■
Edinburgh Castle Rock		■			■	■
Rhynie	Cont. Med.	■		■		■
Clatchard Craig	Cont.	■	■	■		
East Lomond	Cont.	■		■		
King's Seat Dunkeld	Cont.	■		■	■	
Dundurn	Cont.	■	■	■		
Buiston Crannog	Cont.	■	■		■	
Garvald						
Gogar						
Burdiehouse						
Ireland						
Clogher	Cont. Med.	■	■	■		■
Lagore	Cont.	■	■	■	■	■
Garranes	Cont. Med.	■		■		■
Garryduff	Cont.	■	■	■	■	
Wales						
Dinas Powys	Cont. Med.	■	■	■	■	■
Longbury	Cont. Med.		■	■		
SW England						
Cadbury Congresbury	Cont. Med.	■	■	■		
Cadbury Castle	Med.	■				
Tintagel	Med.	■				

Table 25: Key indicators of status of fifth-seventh century AD sites in Celtic Britain and Ireland (Adapted from Campbell 1996, 85; Toolis and Bowles 2017, 137). Cont. = continental; Med. = Mediterranean

Nucleated forts in the Scottish Borders appear to form two distinct clusters roughly 40 km apart (Figure 103). It is within the western cluster of nucleated forts, comprising Cademuir Hill 2 and Macbeth's Castle, that Tinnis is found, within a 100km² area of Peeblesshire that also includes two Romano-British Christian monuments (RCAHMS 1967, 105, 144, 154 & 176-177). While not all early medieval nucleated forts occur in clusters, it is nevertheless apparent that several clusters of nucleated forts exist in Scotland (Toolis 2021, 259-262). To the south-east lies a 400km² cluster, comprising Rubers Law, Moat Knowe Buchtrig, Castle Hill Ancrum and Burnt Humbleton. Rubers Law yielded Roman masonry suggesting a post-Roman date (Curle 1905, 225; RCAHMS 1956, 35). To the south-west are another cluster of nucleated forts within a 700 km² area of the Stewartry district of Galloway; to the north-west is another 400 km² cluster centred upon Dunadd in Argyll. It remains to be demonstrated whether early medieval forts and settlements are clustered around other royal sites such as Dumbarton Rock and Edinburgh Castle Rock, but the 90km distance between these two prominent sites falls within the 40km and 100km distances that separate other clusters of nucleated forts (Figure 103). This pattern indicates the scale of the various minor kingdoms that were emerging in Scotland during the fifth, sixth and seventh centuries AD and that this same cultural process occurred in the Scottish

Figure 103: Map of nucleated forts and other early medieval sites. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

Borders too, whereby some households attained and consolidated their pre-eminence among their peer groups. It may be that Tinnis Fort along with Cademuir Hill 2, Macbeth's Castle and the associated cluster of early Christian monuments represents one of the small kingdoms swallowed up by Strathclyde in the ninth and tenth centuries (Driscoll 2014, 6), itself in turn absorbed into the kingdom of Scotland over the course of the eleventh and twelfth centuries.

This also provides some context to the Thirlestane Square Barrow. It is probably doubtful that the square barrow there was contemporary with the floruit of the early medieval fort at Tinnis. It was not the graves themselves that yielded the optically stimulated luminescence date of AD 430 ± 150 years but the outer side of the enclosing ditch. This ditch face probably remained open for some time after it was cut and therefore in contact with sunlight long after the graves themselves had been filled in and the barrow raised. It is thus more likely that the construction of the square barrow happened towards the earlier part of the date range of AD 280-580. Nonetheless, this funerary monument, two miles distant from Tinnis, attests to the presence of elite individuals likely from a predominant household of the Tweed Valley during the late Iron Age. Comparisons can be drawn with other nucleated forts, such as Trusty's Hill in Galloway, which is located around one mile from a post-Roman barrow cemetery at Barwhill (Cowley *et al.* 2019, 13-15, 4). Another barrow cemetery is located about three miles from the early medieval fort at Tynron Doon in Nithsdale (Toolis and Bowles 2017, 143). Undated barrow cemeteries at Swanlaws, Langside Law and Kale Water are in comparable proximity to the nucleated fort at Moat Knowe Buchtrig near the Scottish Border (Figure 103). This potential association between early medieval nucleated forts and barrow cemeteries is therefore a trait observed across southern Scotland. That no barrow cemeteries have as yet been discovered near the nucleated forts at Cademuir Hill 2 or Macbeth's Castle in Peeblesshire makes the potential association of Tinnis Fort with the Thirlestane Square Barrow all the more compelling. But it may be that it was not so much the early medieval occupation of Tinnis Fort that the Thirlestane Square Barrow relates to, but rather the preceding development of a local elite that *led* to the construction of a nucleated fort here.

The re-emergence of fortified high-status hilltop settlements such as Tinnis Fort (Figure 104), in the post-Roman centuries, reflects wider social trends apparent across areas peripheral to the Roman Empire around the middle of the 1st millennium AD (Noble *et al.* 2013, 1144-45). However, while a few examples loosely similar to nucleated fort

Figure 104: Reconstruction of Tinnis early medieval fort (illustration by Chris Mitchell).

layouts are perhaps visible in northern Wales and continental Europe, there are none in England nor are nucleated layouts evident at the Anglian settlements north of the border at Kirk Hill near St Abb's Head and Castle Park Dunbar (Alcock *et al*. 1989, 211-13; Alcock *et al*. 1986, 273; Perry 2000, 21-50). The significance of nucleated forts, such as Tinnis, is that alongside Pictish symbols and massive silver chains these define profound cultural expressions of status and prestige unique to early medieval Scotland and distinguishing it from other European cultures (Toolis 2021, 265).

However, in some areas of Scotland such as Galloway, the hierarchical settlement pattern was arrested in development during the seventh century AD, probably as a result of Northumbrian conquest (Toolis and Bowles 2017, 134; Laing and Longley 2006, 10, 22-4). In other areas of Scotland, such as the north-east the settlement pattern evolved from multiple small foci in the fifth-seventh centuries AD into significantly fewer but larger fortified and nucleated settlements in the eighth-ninth centuries AD (Cook 2013, 345-6). The occupation of Tinnis Fort into the ninth-eleventh centuries AD demonstrates that this hierarchical settlement pattern continued in Peeblesshire, perhaps reflecting the hegemony of the kingdom of Strathclyde within this western part of the Scottish Borders, as opposed to that of Northumbria to the east.

The fate of Tinnis Fort is unclear however. There was no evidence for the occupation of Tinnis between the early eleventh century and the fourteenth century, nor indeed if, how or when Tinnis was abandoned until the Tweedies constructed their first castle of Drumelzier here.

Tinnis Castle

By Laura Muser and Ronan Toolis

Tinnis Castle was a medieval fortalice overlying the earlier fort and overlooking the Tweed valley 60m below (Figure 105). Today only two partially standing circular towers and an incomplete connecting wall survive together with a spread of collapsed masonry walling and mounds of rubble. The tower in the northeast is the best-preserved part of the building and has an external diameter of 5.62m enclosing an internal diameter of 3.30m with walls ranging from 1.05m to 1.24m thick. It stands up to 1.80m tall and there are two arrow-slits facing north and north-northwest. Very little of the foundations of the tower in the southwest remains. The connecting wall between the towers is 0.85m thick and is made from large, lime mortar bonded stones. Several large blocks of the structure can be found across the top of the knoll.

Figure 105: Reconstruction of Tinnis Castle (illustration by Chris Mitchell).

Due to the few structural elements of Tinnis Castle remaining, its original form has been debated (Figure 106). While MacGibbons and Ross ascribed two matching circular towers on the south-east side opposite the two partially remaining towers on the north-west side (1889, 159-160), the two rubble mounds on the south-east side have since been interpreted as more likely the remains of a rectilinear range of residential buildings (RCAHMS 1967, 272-273; Maxwell-Irving 2014, 49). This range seemed to have formed the south-east side of a courtyard that measured 20 m by 20 m encompassed by a quadrangular wall and covering a total area of 354m^2.

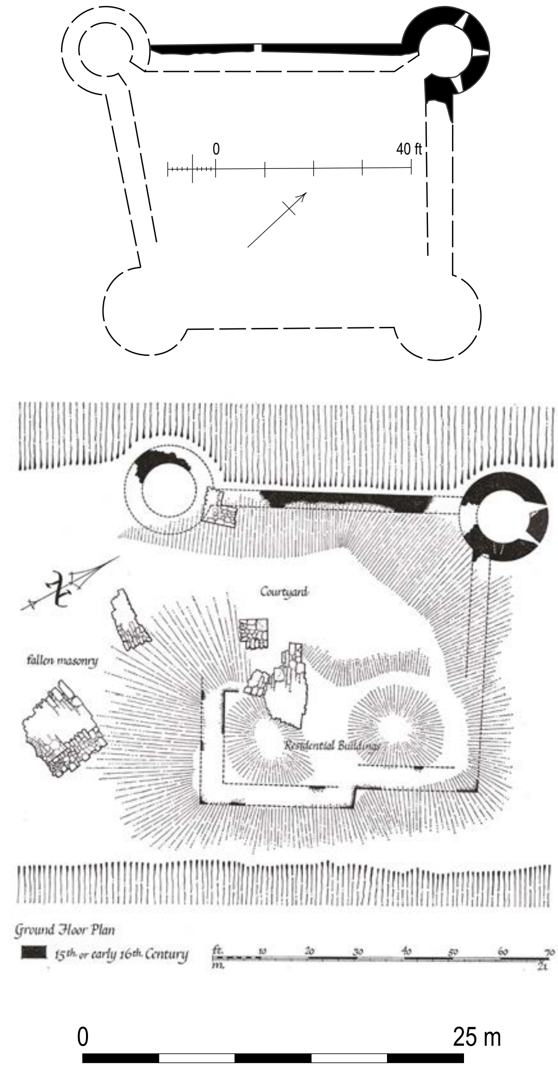

Figure 106: McGibbons and Ross (top) and RCAHMS (bottom) plans of Tinnis Castle © Crown Copyright: HES (Ordnance Survey Archaeology Division Collection).

The 2022 excavations at Tinnis Castle revealed that the medieval castle also comprised a bailey encircling the rest of the summit to the south of the inner castle courtyard. This appeared to re-use the dry-stone base of the early medieval rampart around the edge of the summit. The bulk of the occupational deposits encountered in trenches 1 and 2 contained medieval artefacts and together with their position in the stratigraphic sequence of deposits, likely originated from the occupation of the castle bailey (Figure 69). In some places such as Trench 1, the late medieval occupation layers were directly overlying the natural bedrock and subsoil, suggesting clearance of earlier deposits across the summit before the construction of the castle.

The south-western area of the summit exposed in Trench 2 contained the most substantial medieval remains encountered during the excavation. A faced, intermittently mortar bonded stone wall forming two sides of a 3.10 m by 2.20 m building that abutted the inner face of a segment of an earlier drystone rampart was exposed here. While its construction style suggests a later date than the original ramparts and was likely one of the buildings within the medieval bailey, birch charcoal from an occupation deposit within the building yielded a sixth/seventh century AD radiocarbon date. This was probably residual material from the early medieval phase fort that preceded the castle. The southwestern rampart also showed signs of modification to level and cap a portion to create what was interpreted as an observation post.

Though some medieval remains were recovered from the lower enclosed terrace exposed in Trench 3, this was probably discarded from the summit, where medieval occupation appears to have been concentrated. While the medieval castle re-used the stone rampart encircling the summit, probably rebuilding it with mortar, no such rebuilding was evident in the lower southern enclosure (Figure 107).

The entire summit as well as the encircling ramparts were covered by layers of rubble, some fragments with mortar still attached, which suggests that the once upstanding bailey and interior buildings were bonded with mortar. Indeed, analysis of a mortar sample taken from rubble in Trench 2 and a comparative sample

Figure 107: Site plan of Tinnis Castle.

taken from a structural block of the castle show that they were indeed very similar (see Mortar, above). The matching composition indicates that both the bailey and the castle itself were built around the same time and that the limestone used in the mortar was likely from the same place, possibly Carlops which lies approximately 17 miles north of Drumelzier (Figure 107).

As to when the castle and bailey were constructed, the historical and radiocarbon dating evidence are not entirely clear. Two of the radiocarbon dates both indicated occupation of Tinnis sometime between the fifteenth and seventeenth centuries (Table 1). These were extracted from a fragment of a sheep/goat mandible lying on the mortared stone flagged surface in Trench 1 and an oyster shell from occupation debris in the lower enclosure down the southwestern flank of the hill in Trench 3. However, these radiocarbon dates present a more extensive timespan than the historical evidence provides.

The historical evidence suggests that Tinnis Castle was built by the Tweedies, either around 1360-65 or in the earlier fifteenth century (see History of Tinnis Castle above). Drumelzier was made a barony around the mid-thirteenth century, as implied when Laurence Fraser was referred to as 'late Lord of Drumelzier' in a charter from the late thirteenth century regarding passage rights for monks from Melrose Abbey (Ibid.). The Frasers were eventually superseded by the Tweedies in 1326 and it is sometime after this that Tinnis Castle may have been constructed. The royal visit of David II to Drumelzier in 1366 required suitable and secure quarters for the king and his court, and Tinnis Castle seems the most likely location for this. Tinnis Castle was certainly established before 1455 when a bond of maintenance and manrent between James II and James Tweedie mentions 'his [James Tweedie] house of Drummellioure' (*Ibid.*). The 'house of Drummellioure' in this document was referring to the caput of the barony and the seat of the Tweedies. The defensive nature and commanding location of Tinnis Castle supports the notion that this was the caput of the barony at this time, as James II was issuing such bonds to strengthen his support in the borders against the English. The construction of Tinnis Castle was thus part of the castle boom in Scotland through the course of the fifteenth century as the Scottish Crown wrestled land and patronage from the once-dominant magnates (Tabraham 1997, 78).

The name of Drumelzier Castle or House was likely transferred to the more comfortable, and adaptable, site of Drumelzier Castle or Towerhouse when the barony was split into two and the Tweedies adopted this as their main seat of the western barony around the 1520s, and certainly by 1537. This may explain why the first mention of Tinnis Castle per se, spelled 'Tynnes', only appeared in August 1525, probably to differentiate it from the Tweedies new seat (see History of Tinnis Castle above). Unfortunately, the remains of Drumelzier Castle were demolished in modern times (Maxwell-Irving 2014, 49), which makes it harder to gather any additional information regarding its construction date or to help differentiate between the two ruins.

In the same way that it is not possible to establish an exact date for the construction of Tinnis Castle, it is not possible to determine a date for when Tinnis Castle was eventually abandoned. The commonly accepted narrative puts the destruction of Tinnis Castle down to a gunpowder explosion enacted by Malcolm Fleming, 3rd Lord of Biggar in revenge for the Tweedies' murder of his father (RCAHMS 1967, 272; Maxwell-Irving 2014, 49). The Flemings and Tweedies had been in a bitter dispute for generations and countless documents refer to their raids and depredations (see History of Tinnis Castle above). The dispute escalated when John Fleming, cousin of James V and chamberlain to the king, was murdered in 1524. However, while the well documented dispute continued for several decades after the murder, there is no contemporary reference to the destruction of Tinnis Castle (*Ibid*). The first time the destruction of Tinnis Castle at the hands of the Flemings was mentioned was by Alexander Pennecuick in a 1690 draft of his 'Description of Tweeddale' but that was only published long after his death. Significantly this was not mentioned in the version published in his lifetime in 1715 nor did he name a source (*Ibid*). Therefore, while the substantial layers of rubble and larger structural blocks strewn across the summit of Tinnis may be tempting to attribute to an explosion there is no evidence for this. It is also worth pondering whether the denuded state of Tinnis Castle was due not just to the weathering of such an exposed location but also to the robbing of materials for later additions to Drumelzier Castle, such as between 1580 and 1605 (Maxwell-Irving 2014, 49).

During the 2022 excavations, a limited quantity of material culture was recorded but the finds do support the case for the occupation of Tinnis Castle around the fifteenth and early sixteenth century. An assemblage of seven sherds of late medieval green and brown glazed pottery was recovered from a likely midden layer within the southern-most part of the bailey. These may have all come from the same vessel, a storage jug or jar. This was of a type typical of fifteenth century rural and urban settlements in the southern and eastern parts of Scotland (Will above).

The assemblage of metalwork is also consistent with this period and dominated by prosaic finds representing everyday fixtures, fittings and broken fragments (Metalwork and Metalworking, above). These included the horseshoe of a small pony, knives and iron nails. One fragment of metalwork that stood was a piece of lead window flashing, recovered in the eastern part of the bailey and demonstrating the presence of glazed windows at Tinnis Castle, comparable with the contemporary phase at Cruggleton Castle in Galloway, where lead window flashing was also found (Caldwell 1985, 66). Unlike the lead casting recovered from the early medieval occupation at Tinnis, the isotopic analysis of the lead window flashing from Tinnis Castle shows that the raw material originated from a lead mine in the Pennines (Lead Isotope Analysis, above), despite the proximity of local sources of lead. While only a modest assemblage of metalwork was recovered from an equally modest scale of excavation, the assemblage of everyday items is largely consistent with other medieval castles both near and far across Scotland such as Skirling Castle, Edinburgh Castle, Cruggleton Castle and Cathcart Castle (Dunbar 1965, 244-245; Clark 1997; Caldwell 1985; Cox 2016).

Equally sparse quantities of carbonised botanical remains were recovered from the medieval occupation layers at Tinnis. These consisted of trace finds of mostly oak and hazel charcoal with crushed hazel nutshell, mixed with clinker (Alldritt above). Oak and hazel are very commonly recovered from castle sites in southern Scotland, as both were often collected for firewood, and larger pieces of oak also being used for timber constructions. What is however interesting in comparison to other castles is the absence of any grain species, such as barley or wheat, which were both recovered from Edinburgh Castle and Caerlaverock Old Castle (Boardman and Ramsay 1997; Hastie 2004). This could suggest that the processing and consumption of grain at Tinnis Castle took place well away from the southern side of the bailey.

Of the small assemblage of faunal remains recovered during the excavations in 2022, 56% originated from the medieval occupational deposits (Animal Bone, above). The two dominant species present in the medieval faunal assemblage were sheep/goat and cattle. This relatively small assemblage represented a more diverse livestock than in the preceding Iron Age and early medieval phases of the site. The analysis of the sheep/goat and pig bones suggests they were butchered for meat (*Ibid*). The faunal assemblage was consistent with contemporary Scottish sites, such as Peebles, Cruggleton Castle and Cathcart Castle which were also dominated by sheep/goats and cattle (Smith 2003; Barnetson 1985; Smith 2016). The almost complete absence of pig bones could be due to the limited scope of the 2022 excavations but these are also very low in numbers from excavations of urban sites in Scotland suggesting that the rearing of pigs was little more than a cottage industry until the modern era (Smith 2003, 127).

In addition to the small faunal assemblage, several common oysters were also recovered from late medieval deposits; one of these was radiocarbon dated to sometime between the early fifteenth century and late seventeenth century. Marine shells have been recovered from Edinburgh Castle and Holyrood Parliament excavations (Russell 1997; Smith 2010, 94-105). Considering how close to the coast these two other sites are, this may seem of little significance. In contrast, given how far inland Drumelzier is from the closest oyster bed, on the Firth of Forth, and that no oysters have been recorded at contemporary inland sites, the presence of oyster shells at Tinnis Castle illustrates the wider connections and comparative wealth of the Tweedies of Drumelzier.

It is likely that Tinnis Castle served as the seat of the Barony of Drumelzier, before its split in the 1520s (See History of Tinnis Castle above). With its two circular bastions, thick walls and prominent location, Tinnis Castle was a commanding sight in the Upper Tweed valley and a much more defensive location than Drumelzier Castle. The historical records attest to it hosting the highest-ranking members of medieval society (*Ibid*.). The analysis of the mortar, lead and oyster shells demonstrates that the medieval household here had wider regional connections than the preceding early medieval and Iron Age households. The consumption of a wider diet was also evident. But in contrast, there was no metalworking or other specialised activities or production apparent during the medieval period, which the historical records may indicate were undertaken within the village below, at least immediately prior to the building of the castle (*Ibid*.).

Tinnis Castle was inhabited within a landscape populated by numerous late medieval towerhouses and castles, though few as prominent and early as itself (Figure 108). Not all of them remain today and very few have been excavated. Two contemporary castles of interest in the region are Boghall Castle, which was the family seat of the feuding Flemings of Biggar, and Skirling Castle, the seat of the Cockburns of Skirling. Skirling Castle was excavated in early

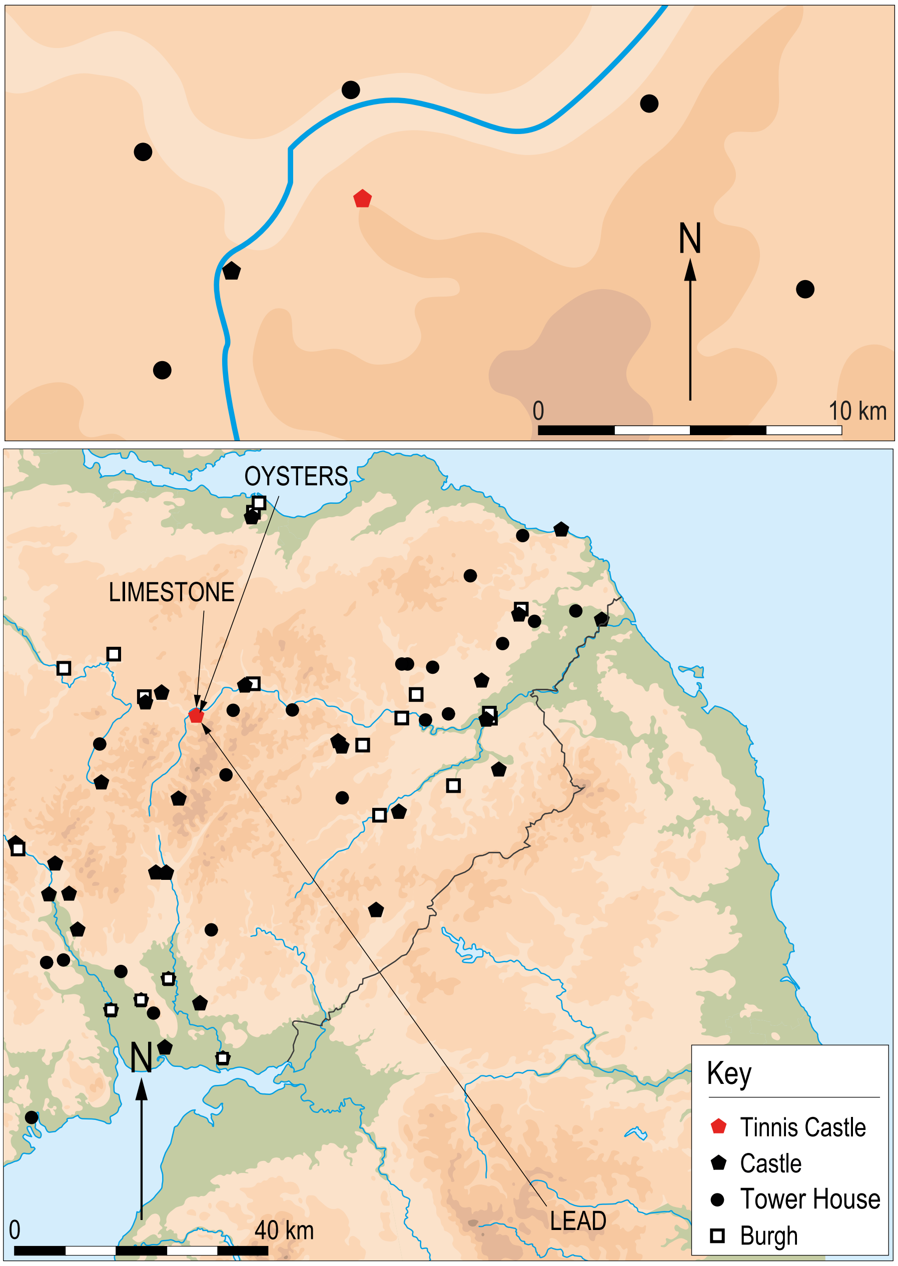

Figure 108: Distribution of medieval burghs, towerhouses and castles across and near the Scottish Marches in the fourteenth and fifteenth centuries; inset - towerhouses and castles in the immediate environs of Tinnis Castle during the fifteenth-sixteenth centuries. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

1960s and though no evidence for specialist craft-working was apparent and the material culture mostly comprised prosaic everyday items like that recovered from Tinnis Castle, two pottery finds were identified as imports from France and Germany (Dunbar 1965, 242-246).

Examining the wider context, excavations at Edinburgh Castle showed that one of the excavated buildings had been used as a smithy though this may have been adapted for an unknown purpose around the fourteenth and fifteenth century (Spearman 1997, 167). Significant iron working debris including slag and fragments of furnace lining suggest that Inverlochy Castle on Lochaber contained a smithy too (Cullen 1998, 638). Aside from that, a similar range of prosaic everyday iron objects to Tinnis was recovered from excavations there (Franklin 1998, 633) and where cattle were the dominant species within the faunal remains assemblage (Thoms 1998, 639).

Excavations at Caergwrle Castle in Flintshire in north-east Wales encountered a large amount of slag, suggesting that on-site metalworking comprised not just smithing but also the purification process of bloom after initial smelting of iron ore (Courtney 1994, 114). However, the smithy may only have been in use during a major construction phase of the castle during the thirteenth century to meet construction demand for items such as nails and was not necessarily a permanent fixture at the castle (*Ibid*.).

The excavation of Halton Castle in Cheshire produced similarly limited medieval material culture to Tinnis Castle, the assemblage generally dominated by local pottery with the occasional sherd of imported ware (Whittall 2016, 138-144). The excavation of another contemporary castle, Ballymote Castle in County Sligo in Ireland also yielded a similarly limited material culture to Tinnis Castle, which was interpreted as reflecting factors concerning the survival of archaeological remains (Sweetman 1985, 122-123). Along with the limited scale of excavations, this too may have been the case with Tinnis Castle.

Aside from local, national and supranational comparisons of castles, it is also useful to compare the material culture at Tinnis Castle with that of the nearby burgh of Peebles. Whilst Peebles did originally have its own castle, which had served as a royal seat in the twelfth century, this was destroyed around the early fourteenth century during the Wars of Independence (RCAHMS 1967, 263; Murray and Ewart 1981, 520). Excavations at the Peebles Tolbooth site revealed the dominance of sheep and the wool trade to the local urban economy throughout the medieval period in contrast to the dominance of cattle and the hide trade within burghs north of the Forth (Smith 2003, 127). The more numerous occurrences of sheep bones at Tinnis may reflect the importance of the wool trade to the local medieval economy in contrast to the early medieval and Iron Age; and corresponding to the historical evidence from medieval Drumelzier. In addition, the Bridgegate site excavated during the 1980s produced deposits indicative of blacksmithing from the thirteenth to the early fourteenth centuries (Dixon and Perry 2003, 60). Evidence from Perth suggests that a considerable scale of metalworking, including iron smelting as well as blacksmithing, was concentrated in medieval burghs from the thirteenth century onwards (Photos-Jones 1998, 902). So too from the medieval burgh of Ayr where a range of specialist industrial activity was undertaken (Perry 2012, 127).

It may be that the evidence from Tinnis Castle, however small the assemblage of material culture, reflects the changing nature of the rural agricultural economy from the earlier medieval era. The establishment of burghs in lowland Scotland during the twelfth century and the resulting establishment of specialist trades and markets within these urban settlements throughout the thirteenth and fourteen centuries, integrated the local agricultural economies into a wider trade network (Dennison 2017, 13). In practice the move away of craftworking entirely from localised seats of powers and solely towards local burghs meant that households such as the Tweedies of Tinnis Castle may have had access to a wider network of resources than their early medieval forebears but this came at a price of self-sufficiency and direct production of material objects.

Merlin's Grave

By Ronan Toolis

While the geophysical survey indicates that there are no archaeological remains at the spot marked on maps as the site of Merlin's Grave, a distinct anomaly to the south-east represents the most likely candidate for a possible grave near this location (Figure 109). Only excavation may determine if this is indeed a grave, and what period it belongs to, but the geophysics evidence at least suggests that some form of archaeological remains may have given rise to the association of this location with the local legend.

The context of this site is relevant too. The excavations at Tinnis Fort have revealed evidence for occupation from the mid-sixth to early seventh century AD. This is exactly the same period that the story associated with Merlin's Grave is set, as reiterated in the *Vita Merlini Sylvestris*. While an earlier date sometime around the early fifth century AD seems more likely for the Thirlestane Square Barrow, this was nonetheless a burial mound of two people of evidently high status in the locality. Altogether, this activity is consistent with the setting of the two Drumelzier Merlin legends; namely high-status activity in and around this part of Peeblesshire, consistent with Tinnis being the stronghold of a local potentate. Furthermore, the evidence for continued occupation of Tinnis nucleated fort into the late ninth – early eleventh century AD, when this part of Scotland was probably at the heart of a district, or former sub-kingdom, within the Kingdom of Strathclyde, provides a context to the transfer of the story to the Clyde around this same period too (Clarkson 2016, 40-47).

Together with the emerging archaeological record, the Cumbric language origins of many of the local place-names, Tinnis - *Fort*, Drumelzier - *Fort of the Meadows*, the neighbouring fort at Dreva – *Homestead* or *Steading* and Peebles

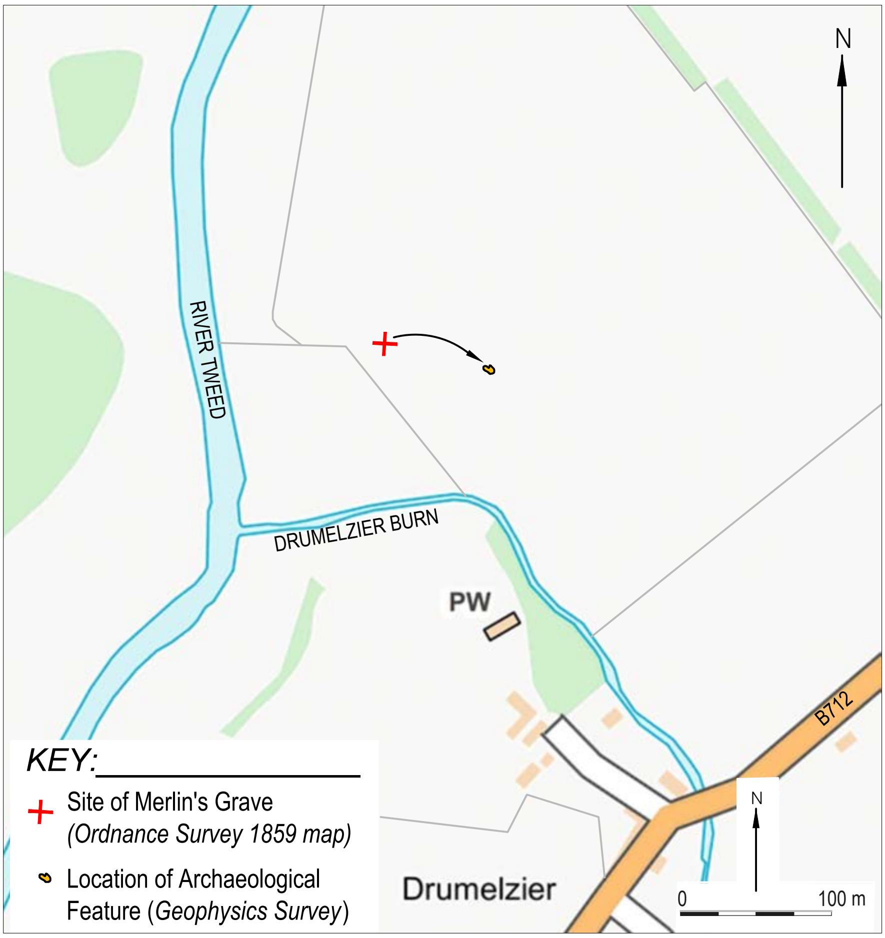

Figure 109: The site of Merlin's Grave. Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699.

itself – *Shielings* (Watson 1926, 383) offers a counterpoint to the Anglocentric focus on the Northumbrian occupation of the eastern parts of the Borders and Lothian regions. The early medieval history of south-east Scotland was more complex with western areas such as Peeblesshire containing little evidence of Northumbrian influence (RCAHMS 1967, 4). It was not until much later in the twelfth century that local English place-names such as *Edulfstun* (Eddleston) replaced the previous Gaelic *Gilmorestun* and earlier Cumbric *Pentciacob* (Watson 1926, 135). The survival of the Cumbric language in these parts may explain why the Cumbric name of the Drumelzier legend's protagonist, Lailoken – *little one* - survived into the twelfth century when the *Vita Merlini Sylvestris* was probably initially written (MacQueen and MacQueen 1989b, 77).

The earliest surviving copy of the *Vita Merlini Silvestris* however dates to the early fifteenth century while the *Scotichronicon*, which contains an abbreviated version, was written by Walter Bower, the Abbot of Inchcolm Abbey in the 1440s (*Ibid*.; MacQueen and MacQueen 1989a, xiii). This is significant to understanding the unwritten cultural context of Tinnis Castle because the construction of the castle from the late fourteenth or early fifteenth century was undoubtedly undertaken in the knowledge that Tinnis was associated with a place that figured in what was plainly a widely known legend.

Along with its naturally prominent and defensive attributes, this cultural heritage may even have played a part in the choice of Tinnis as a medieval stronghold of the Tweedies. There are numerous examples across Britain, Ireland and Europe where the association with an illustrious mythical past bestowed legitimacy upon later medieval sites (Rollason 2016, 324-335; Bradley 2002, 120-121). Tinnis would not be the only early medieval fort to have been re-occupied by a much later medieval castle (Morrison 1974, 68-70). While some such as Edinburgh Castle, the setting of the year-long mead-fuelled feast the Gododdin (Koch 1997, xiii; Driscoll and Yeoman 1997, 227) have such intrinsic topographic attributes to have merited a castle regardless of any early medieval associations, the choice of other less functional sites such as Tintagel Castle were explicitly due to their association with Arthurian legend (Thomas 1993, 17-18; Barrowman *et al.* 2007, 333). While few surviving historical records relate to the history of Tinnis Castle over the course of the fourteenth century (see History of Tinnis Castle above), it would be a mistake to presume that the Tweedies were ignorant of the stories embedded in the surrounding landscape and beneath their feet.

That the reputed site of Merlin's Grave, depicted in maps since 1775 and recorded even to the present day in the National Record of the Historic Environment, is at an incorrect location is perhaps less surprising than that the reputed site survived at all, if this story had not been kept alive in local folklore.

Conclusions

By Ronan Toolis

The *Drumelzier's Hidden Heritage* project set out to reveal the archaeological roots of the local Merlin legend by examining those aspects of the story - the time, place and context - that could be tested archaeologically.

The geophysics survey revealed that there is indeed an archaeological feature resembling a pit or grave near the reputed location of Merlin's Grave at Drumelzier.

The radiocarbon dates demonstrate that the hillfort that underlies Tinnis Castle was indeed occupied around AD 573-614 when the story was set. The excavation revealed that the fort had a nucleated layout consistent with elite households in early medieval Scotland. The excavation also revealed evidence for the production of metalwork. In an age when there were no coins, a household with control over the production of metalwork could decide whom to bestow gifts such as weapons, tools and jewellery, and whom not to. Furthermore, Tinnis lay within a cluster of pre-eminent secular and ecclesiastical sites that offers a fair comparison to the evidence for small kingdoms elsewhere in early medieval Scotland.

The two graves enclosed within the Thirlestane Square Barrow demonstrate the presence of two individuals of exceptional elite status within the vicinity of Tinnis sometime between the late-third and late-sixth centuries AD.

None of this, of course, offers historical veracity to the local Merlin legend.

Instead, what the findings do offer is compelling evidence that the story *originated* in Drumelzier.

Early medieval forts are uncommon in Scotland with the vast majority of hillforts dating to the Iron Age; early medieval barrows are even rarer. The archaeological evidence recovered from Tinnis and Thirlestane, consistent with a prominent household of a local potentate in the same time and place as the legend, is thus hard to accept as a mere coincidence. Instead, it offers a credible context for a local storyteller's account of where the sub-king Meldred held Lailoken prisoner.

That there is indeed an archaeological pit or grave beneath the ground near the reputed site of Merlin's Grave, again provides a credible context to a local storyteller's account of where Lailoken was buried after he was killed on the banks of the Tweed.

Furthermore, the Cumbric name *Lailoken*, rather than the Welsh *Myrddin* and twelfth century *Merlin* that later Welsh and Norman storytellers transformed the protagonist into, indicates that the story was not brought to Drumelzier by a wandering medieval minstrel. That the story includes the Cumbric names of the ancient language once spoken in these parts, contains elements of pre-Christian customs and was located at local sites where archaeology now shows they could credibly have taken place, surely demonstrates that it originated in Drumelzier itself from a much earlier oral source.

The story had no doubt been embellished over the centuries probably even before it had travelled far and wide where it was adapted to such an extent that the main protagonist had changed out of all recognition, from a gibbering fool to wise sage. Almost. The story retained just enough details to remain unique to Drumelzier and enable the anonymous author of the *Vita Merlini Silvestris* to acknowledge the similarities between this story and the more widely known versions common across medieval Europe. As such this is a startling survival of the early medieval cultural heritage of the Britons of southern Scotland.

But this was not the only trace of local stories that the *Drumelzier's Hidden Heritage* project discovered.

The scatter of late Mesolithic/early Neolithic flint blade fragments, the barest traces of perhaps some of the earliest groups of people to ever climb Tinnis and from its vantage point gaze across a Tweed Valley that looked very much different from the present.

The vitrified ramparts at Tinnis attest to the fall of a late Iron Age hillfort, the forgotten victims of a forgotten conflict when prominent households vied for power and the foundations for petty kingdoms were being laid.

Whether it was folk memory or stories that clung to the group of Bronze Age round barrows at Thirlestane, these monuments evidently had some meaning in the landscape for the square barrow to be sited so close after an intervening two millennia. We should not forget that the people of ancient Tweeddale were aware of the history beneath their feet and the people that came before and it was through local folklore that stories about their past were passed on.

And it is no surprise that the prominent location of Tinnis Castle led to its association in local lore with the brutal feud between the Tweedies of Drumelzier and the Flemings of Biggar. But the bulk of the records attest to events after Tinnis Castle had been supplanted by Drumelzier Castle as the chief seat of the Tweedies. Nor is there evidence that Tinnis Castle was blown up by gunpowder during this feud or indeed at any other time in its history.

If nothing else, the *Drumelzier's Hidden Heritage* project has demonstrated that while careful examination of archaeological evidence and historical records can invalidate some stories, it can validate others, and find some unlooked-for stories too.

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The Arthur Trail Association seeks to promote Scotland's Dark Age heritage (between the end of Roman Britain and the coming of St Columba). This was a dynamic period, when literacy, international trade, the Church and secular statehood first took root in Scotland. In 2018, the Association launched the Merlin Trails to begin the work of promoting access to all the major sites of this period across southern Scotland. As one of the sites on the trail, Tinnis Castle and Fort was chosen to enable public participation in discovering new evidence for Scotland's Dark Age heritage.

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Appendices

Appendix 1: Lithics Catalogue

CAT No	Sample	Area	Trench	Context	Other	Artefact type	Blank type	Fragment
1	027	Tinnis Fort	1	1010	Primary deposit/ levelling layer	Frag. of microlith/ backed bladelet	Microblade	Medial
2	050	Thirlestane Round Barrow	5	5006	Tertiary fill of ditch		Chip	
3	083	Thirlestane Square Barrow	4	4001	Natural subsoil		Chip	
4	007	Tinnis Castle	3	3003	Late occupation		Flake	
5	008	Tinnis Castle	3	3003	Late occupation		Flake	Fragmented
6	009	Tinnis Castle	2	2003	Rampart collapse		Flake	Fragmented
7	010	Tinnis Castle	2	2004	Late occupation		Flake	Fragmented
8	010	Tinnis Castle	2	2004	Late occupation		Flake	Fragmented
9	010	Tinnis Castle	2	2004	Late occupation		Indet. piece/chunk	
10	013	Tinnis Castle	1	1007	Occupation		Chip	
11	013	Tinnis Castle	1	1007	Occupation		Indet. piece/chunk	
12	016	Tinnis Fort	3	3008	Scree collapse		Chip	
13	016	Tinnis Fort	3	3008	Scree collapse		Chip	
14	016	Tinnis Fort	3	3008	Scree collapse		Chip	
15	016	Tinnis Fort	3	3008	Scree collapse		Chip	
16	018	Tinnis Castle	2	2012	Wall collapse		Indet. piece/chunk	
17	018	Tinnis Castle	2	2012	Wall collapse		Indet. piece/chunk	
18	018	Tinnis Castle	2	2012	Wall collapse		Chip	
19	018	Tinnis Castle	2	2012	Wall collapse		Chip	
20	018	Tinnis Castle	2	2012	Wall collapse		Chip	
21	018	Tinnis Castle	2	2012	Wall collapse		Chip	
22	020	Tinnis Fort	3	3007	Early occupation		Flake	Fragmented
23	020	Tinnis Fort	3	3007	Early occupation		Flake	Fragmented
24	020	Tinnis Fort	3	3007	Early occupation		Chip	
25	020	Tinnis Fort	3	3007	Early occupation		Chip	
26	020	Tinnis Fort	3	3007	Early occupation		Chip	
27	020	Tinnis Fort	3	3007	Early occupation		Chip	
28	020	Tinnis Fort	3	3007	Early occupation		Chip	
29	024	Tinnis Fort	1	1004T	Fort rampart		Chip	
30	024	Tinnis Fort	1	1004T	Fort rampart		Chip	
31	024	Tinnis Fort	1	1004T	Fort rampart		Chip	
32	024	Tinnis Fort	1	1004	Fort rampart	Single-platform core		Split
33	025	Tinnis Fort	1	1004L	Fort rampart	Bipolar core		
34	027	Tinnis Fort	1	1010	Primary deposit/ levelling layer		Chip	
35	028	Tinnis Fort	2	2010B	Fort rampart		Chip	
36	029	Tinnis Castle	2	2015	Late occupation		Chip	
37	029	Tinnis Castle	2	2015	Late occupation		Chip	
38	029	Tinnis Castle	2	2015	Late occupation		Chip	
39	029	Tinnis Castle	2	2015	Late occupation		Chip	
40	031	Tinnis Fort	2	2010	Fort rampart		Chip	
41	031	Tinnis Fort	2	2010	Fort rampart	Piece w edge-retouch	Flake	
42	053	Thirlestane Round Barrow	5	5012	Redep. cap of mound		Chip	
43	056	Thirlestane Round Barrow	5	5004	Cremation burial 5003		Flake	Fragmented
44	081	Thirlestane Round Barrow	5	5016	Cremation burial 5015		Chip	

CAT No	Perc type	Ret type	Ret extent	Ret position	Reduction sequence	Raw-material	Burnt	Length, mm	Width, mm	Thickness, mm	Gr dim, mm
1	Uncertain	Fine retouch	Continuous	Right lateral side	Tertiary	Flint	0	0.00	2.80	0.00	0.00
2		Unretouched				Flint	0	0.00	0.00	0.00	0.00
3		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
4	Bipolar	Unretouched			Tertiary	Quartz	0	14.00	7.00	4.00	0.00
5	Uncertain	Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	16.00
6	Uncertain	Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	11.00
7	Uncertain	Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	12.00
8	Uncertain	Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	13.00
9		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	10.00
10		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	0.00
11		Unretouched				Quartz	0	0.00	0.00	0.00	15.00
12		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
13		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
14		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
15		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
16		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	14.00
17		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	17.00
18		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
19		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
20		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
21		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
22		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	12.00
23		Unretouched			Tertiary	Quartz	0	0.00	0.00	0.00	11.00
24		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
25		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
26		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
27		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
28		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
29		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
30		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
31		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
32					Tertiary	Quartz	0	15.00	17.00	15.00	0.00
33					Tertiary	Quartz	0	13.00	6.00	5.00	0.00
34		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
35		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
36		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
37		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
38		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
39		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
40		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
41	Uncertain	Fine retouch	Continuous	Proximal	Tertiary	Quartz	0	15.00	9.00	6.00	0.00
42		Unretouched				Quartz	0	0.00	0.00	0.00	0.00
43	Uncertain	Unretouched			Secondary	Quartz	0	0.00	0.00	0.00	16.00
44		Unretouched				Quartz	0	0.00	0.00	0.00	0.00

Appendix 2: Metalwork Catalogue

Find No	Sample	Area	Site	Context No	Context Description	C14 (1 sigma)	No of Pieces	Type	ID	NEW ID (NMS)	Catalogue
043		T2	Tinnis Castle and Fort	2000	Topsoil		1	Iron	Nail	Nail	SF43 Intact disc-headed nail with straight, tapering shank. L 64.5; head D 19, T 4; shank T 7.
048		T2	Tinnis Castle and Fort	2000	Topsoil		1	Unknown	Ring element/ link	Ring	SF48 A small, intact copper alloy ring with slightly open butt-join. Could have been attached to a wide range of fittings. D 7.5, T 1.
059		T1	Tinnis Castle and Fort	1002	Rubble matrix (below topsoil)		3	Iron?	3 pieces of metal	Sheet	SF59 Fragments of iron sheet. One rounded corner present - the other edges broken. Largest fragment 26 x 22 x 2mm.
124		T1	Tinnis Castle and Fort	1002	Rubble matrix (below topsoil)		1	Fe	Iron horseshoe	Horseshoe	SF124 Small intact iron horseshoe with shallow plano-convex section, tapering to blunt ends. Ten rectangular perforations for nails, with one clenched nail still present. Fairly small - likely a pony rather than a horse. L 107, W 106, T 8mm; perf c. 5 x 3mm.
086		T1	Tinnis Castle and Fort	1002	Rubble matrix (below topsoil)		1	Fe	Iron nail (?)	Bar	SF86 Small bar fragment, tapering to both ends, one broken (but only spalled?). Possible offcut/ stock? L 40, W 8, T 5.
090		T1	Tinnis Castle and Fort	1002	Rubble matrix (below topsoil)		1	Fe	Iron nail (?)	Nail	SF90 Intact nail with flat, oval head and straight shank. L 41; head 20 x 17; shank T max 9mm.
056		T1	Tinnis Castle and Fort	1002	Rubble matrix (below topsoil)		1	Lead	Lead fragment	Lead window flashing	SF056 'Y'-shaped strip of lead comprising two narrower strips joined at 90˚, the underside has a 'W' profile. Likely to be flashing from a decorative window. 34 x 6.5 x 5mm. 4.2g. C.1002

Find No	Sample	Area	Site	Context No	Context Description	C14 (1 sigma)	No of Pieces	Type	ID	NEW ID (NMS)	Catalogue
075		T2	Tinnis Castle and Fort	2003	Deposit matrix amongst rubble 2002 (below topsoil)		1	Iron	Flat strip	Knife	SF75 Most of a knife blade with straight back and blade gently sloping up to missing tip. Steps into a flat-sectioned scale tang, broken across a perforation (two organic plates would have been fixed either side of the handle). L 77; blade H 7, T 4; tang H 14, T 4; perf D 2.5mm.
150		T2	Tinnis Castle and Fort	2003	Deposit matrix amongst rubble 2002 (below topsoil)		1	Iron	Nail	Nail	SF150 Intact T-headed nail with clenched tip. L 47; head W 18, T 7; shank T 6; thickness of wood 36mm.
105		T2	Tinnis Castle and Fort	2003	Deposit matrix amongst rubble 2002 (below topsoil)		1	Iron	Strip	Knife blade?	SF105 Iron strip with triangular section, stepping in towards one end (the tang?) before breaking. Tip missing. Probably a small knife blade. L 75.5, H 12, T 4.
	9	T2	Tinnis Castle and Fort	2003	Deposit matrix amongst rubble 2002 (below topsoil)		3	Metal		Fragments	Sample 9 A tiny copper alloy fragment and two small fragments of ?iron slag or spalls from iron objects. 0.2g in total.
	13	T1	Tinnis Castle and Fort	1007	Deposit under stone slab surface 1009	AD 1460-1617	2	Metal		Fragments	Sample 13 A flake of iron, probably spalled from a larger object, and small unidentifiable fragment of copper alloy.
045		T2	Tinnis Castle and Fort	2001	Mortar-rich deposit matric amongst rubble 2006 in possible pit 2005		1	Iron	Nail	Nail	SF45 Intact nail with flat, diamond-head (though spalled) and shank bent c. 45° around half-way along. L 55; head D 14; shank T max 7.

Find No	Sample	Area	Site	Context No	Context Description	C14 (1 sigma)	No of Pieces	Type	ID	NEW ID (NMS)	Catalogue
	22	T2	Tinnis Castle and Fort	2004	Charcoal rich deposit		6	Various	2 copper pieces and other non copper metal objects, incl. a possible small chain segment and round clasp	Various	Sample 22 A range of small fragments. A) Small section of thin copper alloy rod formed from rolled sheet (L 19.5, D 2). B) Two iron fragments which seem to have been from the same tapering shank. Total L 22, max D 6. C) Two fragments comprising small chain links, possibly composed of '8'-shaped links? A group of 3 are now squashed and corroded. The other has an external D of 7mm, T 1.5mm. D) Small flake of copper alloy, probably broken from a larger object 9 x 9 x 0.5mm.
171		T2	Tinnis Castle and Fort	2004	Charcoal rich deposit		1	Iron	Nail?	Tang?	SF171 Tapering rectangular-sectioned bar with rough point at one end, broken at the wider end. L 43, max W 10, T max 8mm.
	31	T2	Tinnis Castle and Fort	2010	Possible rampart - Stone rich deposit S of 2011	AD 255-379	1	Metal		Fragments	Sample 31 Small, rounded/ corroded copper alloy fragment. Undiagnostic. 7 x 5mm (0.2g)
117		T3	Tinnis Castle and Fort	3007	Possible original occupation deposit in Tr3, base not reached due to extent of excavation	AD 895-987	1	Lead	Misc.	Lead casting spill	SF117 Roughly discoidal piece of lead, mainly plano-convex in section. Coated in pale cream-coloured chalky corrosion. Likely to be a casting spill. 24 x 22 x 8mm; 12.7g

Find No	Sample	Area	Site	Context No	Context Description	C14 (1 sigma)	No of Pieces	Type	ID	NEW ID (NMS)	Catalogue
193		T4	Thirlstane Barrows	4000	Topsoil		7	Mixed	Misc topsoil finds	Various	SF193 A) two fragments of iron boot segs (77 x 13 x 8; 57 x 11.5 x 6mm). B) Large iron round-sectioned bolt, intact, modern (L 147; head D 22.5; shank D 11). C) Modern penknife or folding knife handle. Enamelled shield decorating on of the copper alloy side plates (L 90, W 9, T 8). D) Two iron bar fragments (66.5 x 11 x 9; 35.5 x 7 x 4.5mm). E) Small copper alloy tombac button, post-medieval. Loop missing (D 16, T 1.5)
194		T5	Thirlstane Barrows	5000	Topsoil		7	Fe	Misc. topsoil finds	Wire, strips and collar	SF194 Three fragments of round-sectioned wire (one bent at 90° could be a modern nail shank) L 77, D 6; L 51, D 6; L 62, D 5.5; one tapering square-sectioned shank, L 31, W 7; Two tapering rectangular-sectioned strips, L 36, W 9-11; L 35, W 7-12.5 (All wire, bar and strips are missing both ends). An intact modern cylindrical collar H 28, external D 19, internal D 14mm

Appendix 3: Archaeobotanical Catalogue

5181px	Tinnis Castle and Fort	Plant Remains								
Context (Fill)	Feature	Cut	Sample	Volume (litres)	Flot CV/ Mod	Species ID	Common Name	Plant Part	Quantity	Radiocarbon 95.4%
1004	Tr.1 fort rampart wall (B)	[1003]	26	12	20ml / 150ml	Quercus	oak	charcoal	4 (0.71g)	
						Betula	birch	charcoal	1 (0.29g)	AD 600-657
1004	Tr.1 fort rampart wall (B)	[1003]	SF 192	N/a	5ml / 0	Quercus	oak	charcoal	2 (0.49g)	
1004	Tr.1 fort rampart wall (L)	[1003]	25	13	<2.5ml / 500ml	No Id				
1004	Tr.1 fort rampart wall (L)	[1003]	SF 149	N/a	5ml / 0	Alnus	alder	charcoal	1 (0.26g)	
1004	Tr.1 fort rampart wall (T)	[1003]	24	1.5	0 / 600ml	Sterile				
1006	Tr.1 stone structures	[1005]	11	6	5ml / 20ml	Betula	birch	charcoal	1 (0.16g)	
1007	Tr.1 occupation layer		13	5.25	10ml / 25ml	Corylus avellana	hazel	nutshell	10 (0.15g)	
						Indeterminate	not id	charcoal	1 (0.11g)	
1010	Tr.1 primary deposit		27	23	60ml / 100ml	Quercus	oak	charcoal	6 (1.73g)	
						Corylus	hazel	charcoal	1 (0.36g)	
1011	Tr.1 natural subsoil		23	5.5	<2.5ml / 30ml	No Id				
2003	Tr.2 rampart collapse	[2002]	SF 137	N/a	5ml / 0	Alnus	alder	charcoal	1 (0.09g)	
2004	Tr.2 occupation layer		10	6.5	45ml / 50ml	Corylus avellana	hazel	nutshell	2 (0.08g)	
						Quercus	oak	charcoal	7 (0.89g)	
2004	Tr.2 occupation layer		22	8	200ml / 400ml	Corylus avellana	hazel	nutshell	4 (0.09g)	
						Quercus	oak	charcoal	5 (2.50g)	
2004	Tr.2 occupation layer		SF 107	N/a	50ml / 0	Quercus	oak	charcoal	1 (0.55g)	
						Betula	birch	charcoal	2 (0.97g)	
2004	Tr.2 occupation layer		SF 152	N/a	5ml / 0	Corylus	hazel	charcoal	2 (2.99g)	
			SF 173			Quercus	oak	charcoal	1 (3.09g)	
2008	Tr.2 occupation layer		15	4.5	5ml / 20ml	Corylus avellana	hazel	nutshell	1 (0.02g)	
2008	Tr.2 occupation layer		SF 154	N/a	20ml / 0	Betula	birch	charcoal	1 (1.05g)	
2010	Tr.2 fort rampart (B)		28	11	10ml / 10ml	Quercus	oak	charcoal	8 (1.00g)	
2010	Tr.2 fort rampart		31	16	<2.5ml / 600ml	Corylus avellana	hazel	nutshell	1 (<0.01g)	
2010	Tr.2 fort rampart		SF 160	N/a	25ml / 0	Quercus	oak	charcoal	6 (1.77g)	

5181px	Tinnis Castle and Fort	Plant Remains								
Context (Fill)	Feature	Cut	Sample	Volume (litres)	Flot CV/ Mod	Species ID	Common Name	Plant Part	Quantity	Radiocarbon 95.4%
2010	Tr.2 fort rampart		SF 138	N/a	10ml / 0	Quercus	oak	charcoal	2 (0.45g)	
2010	Tr.2 fort rampart		SF 157	N/a	5ml / 0	Betula	birch	charcoal	1 (1.62g)	
2011	Tr.2 fort rampart core		SF 163	N/a	30ml / 0	Quercus	oak	charcoal	6 (3.96g)	
2012	Tr.2 wall collapse		18	7	<2.5ml / 500ml	No Id				
2014	Tr.2 rubble within wall		14	6	2.5ml / 150ml	No Id				
2015	Tr.2 occupation layer		29	11	5ml / 100ml	Betula	birch	charcoal	1 (0.17g)	AD 542-638
2015	Tr.2 occupation layer		SF 187	N/a	5ml / 0	Betula	birch	charcoal	1 (0.12g)	
3003	Tr.3 occupation layer		7	2.5	15ml / 20ml	Corylus	hazel	charcoal	3 (0.44g)	
3003	Tr.3 occupation layer		8	3	10ml / 20ml	Quercus	oak	charcoal	6 (0.13g)	
3003	Tr.3 occupation layer		SF 65	N/a	10ml / 0	Corylus	hazel	charcoal	1 (0.37g)	
3006	Tr.3 occupation layer (same as 3003)		17	2	30ml / 5ml	Hordeum vulgare sl.	barley	cereal grain	10	
						Corylus	hazel	charcoal	2 (0.53g)	AD 895-1020
						Betula	birch	charcoal	1 (0.10g)	
3007	Tr.3 occupation layer below 3008		20	24	10ml / 40ml	Corylus avellana	hazel	nutshell	2 (0.01g)	
						Quercus	oak	charcoal	4 (0.10g)	
						Betula	birch	charcoal	1 (0.17g)	AD 890-993
3008	Tr.3 scree collapse		16	8	20ml / 10ml	Quercus	oak	charcoal	7 (0.23g)	
						Alnus	alder	charcoal	1 (0.04g)	
5181px	Thirlestane Square Barrow									
4003	Tr.4 tree bole		34	11	0 / 10ml	Sterile				
4005	Tr.4 square barrow slot 4004		33	18	<2.5ml / 50ml	Corylus avellana	hazel	nutshell	4 (0.05g)	
4008	Tr.4 square barrow slot 4007		37	16	<2.5ml / 50ml	No Id				
4011	Tr.4 square barrow grave	[4010]	38	10	<2.5ml / 40ml	No Id				
5181px	Thirlestane Round Barrow									
5004	Tr.5 cremation burial	[5003]	48	37	0 / 340ml	Sterile				

5181px	Tinnis Castle and Fort	Plant Remains								
Context (Fill)	Feature	Cut	Sample	Volume (litres)	Flot CV/ Mod	Species ID	Common Name	Plant Part	Quantity	Radiocarbon 95.4%
5004	Tr.5 cremation burial	[5003]	49	20	0 / 150ml	Sterile				
5004	Tr.5 cremation burial	[5003]	54	14	<2.5ml / 100ml	Betula	birch	charcoal	1 (0.09g)	
5004	Tr.5 cremation burial	[5003]	55	13	<2.5ml / 120ml	No Id				
5004	Tr.5 cremation burial	[5003]	56	17	<2.5ml / 100ml	No Id				
5004	Tr.5 cremation burial	[5003]	57	13	<2.5ml / 60ml	No Id				
5004	Tr.5 cremation burial	[5003]	58	16	<2.5ml / 80ml	No Id				
5004	Tr.5 cremation burial	[5003]	59	18	0 / 100ml	Sterile				
5004	Tr.5 cremation burial	[5003]	60	17	0 / 50ml	Sterile				
5004	Tr.5 cremation burial	[5003]	63	7.5	<2.5ml / 10ml	No Id				
5004	Tr.5 cremation burial	[5003]	64	6.75	<2.5ml / 5ml	No Id				
5004	Tr.5 cremation burial	[5003]	65	6	0 / 20ml	Sterile				
5004	Tr.5 cremation burial	[5003]	66	9	0 / 10ml	Sterile				
5004	Tr.5 cremation burial	[5003]	67	6.5	0 / 20ml	Sterile				
5004	Tr.5 cremation burial	[5003]	68	6.75	<2.5ml / 10ml	No Id				
5004	Tr.5 cremation burial	[5003]	69	8	0 / 10ml	Sterile				
5004	Tr.5 cremation burial	[5003]	70	7.5	0 / 20ml	Sterile				
5004	Tr.5 cremation burial	[5003]	71	5.5	<2.5ml / 5ml	No Id				
5004	Tr.5 cremation burial	[5003]	72	7	0 / <2.5ml	Sterile				
5004	Tr.5 cremation burial	[5003]	73	6.5	0 / 5ml	Sterile				
5004	Tr.5 cremation burial	[5003]	74	10	0 / 10ml	Sterile				

5181px	Tinnis Castle and Fort	Plant Remains								
Context (Fill)	Feature	Cut	Sample	Volume (litres)	Flot CV/ Mod	Species ID	Common Name	Plant Part	Quantity	Radiocarbon 95.4%
5004	Tr.5 cremation burial	[5003]	75	5.5	0 / <2.5ml	Sterile				
5004	Tr.5 cremation burial	[5003]	95	22.5	5ml / 150ml	Betula	birch	charcoal	1 (0.26g)	
5006	Tr.5 poss external pit/ PH?	[5005]	50	14	<2.5ml / 50ml	No Id				
5010	Tr.5 stone cap / barrow mound	[5009]	52	15	0 / 60ml	Sterile				
5010	Tr.5 stone cap / barrow mound	[5009]	61	12	<2.5ml / 5ml	No Id				
5012	Tr.5 stone cap / barrow mound	[5011]	53	12.5	<2.5ml / 100ml	No Id				
5012	Tr.5 stone cap / barrow mound	[5011]	62	1.5	5ml / 30ml	Prunoideae	cherries	charcoal	1 (0.24g)	
5012	Tr.5 stone cap / barrow mound	[5011]	82	2	<2.5ml / 5ml	Alnus	alder	charcoal	2 (0.13g)	
5014	Tr.5 cremation burial pit	[5013]	77	4	<2.5ml / 5ml	No Id				
5014	Tr.5 cremation burial pit	[5013]	78	8	0 / 30ml	Sterile				
5014	Tr.5 cremation burial pit	[5013]	79	2	<2.5ml / 10ml	No Id				
5014	Tr.5 cremation burial pit	[5013]	89	5	<2.5ml / 120ml	Corylus avellana	hazel	nutshell	5 (0.05g)	
5016	Tr.5 cremation burial pit	[5015]	80	11.5	10ml / 100ml	Alnus	alder	charcoal	2 (0.39g)	
5016	Tr.5 cremation burial pit	[5015]	81	10	<2.5ml / 50ml	No Id				
5016	Tr.5 cremation burial pit	[5015]	88	9	0 / 10ml	Sterile				
5017	Tr.5 barrow mound 3rd fill	[5009]	86	3.5	<2.5ml / <2.5ml	No Id				
5018	Tr.5 barrow mound 2nd fill	[5009]	87	3.5	<2.5ml / <2.5ml	No Id				
5021	Tr.5 barrow mound + bank 1st fill	[5009]	91	2	0 / <2.5ml	Sterile				
5022	same as 5017	[5009]	92	2.25	0 / <2.5ml	Sterile				
5023	same as 5018	[5009]	93	4	0 / <2.5ml	Sterile				
5024	same as 5017	[5009]	94	2	<2.5ml / 10ml	No Id				

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